

Lancashire County Council

Development Control Committee

Wednesday, 28th January, 2015 at 10.00 am in Cabinet Room 'B' - The Diamond Jubilee Room, County Hall, Preston

Agenda

Part I (Open to Press and Public)

No. Item

1. Apologies for absence

2. Disclosure of Pecuniary and Non-Pecuniary Interests

Members are asked to consider any Pecuniary and Non-Pecuniary Interests they may have to disclose to the meeting in relation to matters under consideration on the Agenda.

**3. Fylde Borough Council: application number. (Pages 1 - 286)
LCC/2014/0096**

Construction and operation of a site for drilling up to four exploration wells, hydraulic fracturing of the wells, testing for hydrocarbons, abandonment of the wells and restoration, including provision of an access road and access onto the highway, security fencing, lighting and other uses ancillary to the exploration activities, including the construction of a pipeline and a connection to the gas grid network and associated infrastructure to land to the north of Preston New Road, Little Plumpton.

The Chief Executive has, under the council's urgent business procedure and in consultation with the chair and deputy chair of the committee, agreed that any representations in respect of this planning application must be submitted by noon on Monday 26 January 2015. Any representations received after this time will not be considered by the Development Control Committee.

4. Fylde Borough Council: application number. (Pages 287 - 326)
LCC/2014/0097

Application for monitoring works in a 4 km radius of the proposed Preston New Road exploration site comprising: the construction, operation and restoration of two seismic monitoring arrays comprising of 80 buried seismic monitoring stations and 10 surface seismic monitoring stations. The seismic monitoring stations will comprise underground installation of seismicity sensors; enclosed equipment and fenced enclosures. The surface array will also comprise monitoring cabinets. The application is also for the drilling of three boreholes, each installed with 2 monitoring wells, to monitor groundwater and ground gas, including fencing at the perimeter of the Preston New Road exploration site near Little Plumpton

The Chief Executive has, under the council's urgent business procedure and in consultation with the chair and deputy chair of the committee, agreed that any representations in respect of this planning application must be submitted by noon on Monday 26 January 2015. Any representations received after this time will not be considered by the Development Control Committee.

5. Fylde Borough Council: application number. (Pages 327 - 640)
LCC/2014/0101
- Construction and operation of a site for drilling up to four exploration wells, hydraulic fracturing of the wells, testing for hydrocarbons, abandonment of the wells and restoration, including provision of an access road and access onto the highway, security fencing, lighting and other uses ancillary to the exploration activities, including the construction of a pipeline and a connection to the gas grid network and associated infrastructure land at Roseacre Wood, Roseacre.**

The Chief Executive has, under the council's urgent business procedure and in consultation with the chair and deputy chair of the committee, agreed that any representations in respect of this planning application must be submitted by noon on Monday 26 January 2015. Any representations received after this time will not be considered by the Development Control Committee.

6. **Fylde Borough Council: application number.** (Pages 641 - 680)
LCC/2014/0102

Application for monitoring works in a 4 km radius of the proposed Roseacre Wood exploration site comprising: the construction, operation and restoration of two seismic monitoring arrays comprising of 80 buried seismic monitoring stations and 8 surface seismic monitoring stations. The seismic monitoring stations will comprise underground installation of seismicity sensors; enclosed equipment and fenced enclosures. The surface array will also comprise monitoring cabinets. The application is also for the drilling of three boreholes, each installed with 2 monitoring wells, to monitor groundwater and ground gas, including fencing at the perimeter of the Roseacre wood exploration site. Monitoring works in a 4km radius of the proposed Roseacre Wood site, off Roseacre Road and Inskip Road, Roseacre and Wharles, Preston.

The Chief Executive has, under the council's urgent business procedure and in consultation with the chair and deputy chair of the committee, agreed that any representations in respect of this planning application must be submitted by noon on Monday 26 January 2015. Any representations received after this time will not be considered by the Development Control Committee.

7. Urgent Business

An item of urgent business may only be considered under this heading where, by reason of special circumstances to be recorded in the Minutes, the Chairman of the meeting is of the opinion that the item should be considered at the meeting as a matter of urgency. Wherever possible, the Chief Executive should be given advance warning of any Member's intention to raise a matter under this heading.

I Young
County Secretary and Solicitor

County Hall
Preston

Agenda Item 3

Development Control Committee
Meeting to be held 28th January 2015

Electoral Division affected:
FYLDE WEST

Fylde Borough Council: application number. LCC/2014/0096

Construction and operation of a site for drilling up to four exploration wells, hydraulic fracturing of the wells, testing for hydrocarbons, abandonment of the wells and restoration, including provision of an access road and access onto the highway, security fencing, lighting and other uses ancillary to the exploration activities, including the construction of a pipeline and a connection to the gas grid network and associated infrastructure to land to the north of Preston New Road, Little Plumpton.

Appendix 1 – 18

Contact for further information:

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Executive Summary

Application - Construction and operation of a site for drilling up to four exploration wells, hydraulic fracturing of the wells, testing for hydrocarbons, abandonment of the wells and restoration, including provision of an access road and access onto the highway, security fencing, lighting and other uses ancillary to the exploration activities, including the construction of a pipeline and a connection to the gas grid network and associated infrastructure to land to the north of Preston New Road, Little Plumpton.

Recommendation – Summary

That after first taking into consideration the environmental information and further information, as defined in the Town and Country Planning (Environmental Impact Assessment) Regulations 2011 submitted in connection with the application, planning permission be **refused** for the following reason:

The proposed development would be contrary to Policy DM2 of the JLMWLP and Policy EP27 of the Fylde Borough Local Plan as it has not been satisfactorily demonstrated that noise impacts would be reduced to acceptable levels and would therefore unnecessarily and unacceptably result in harm to the amenity of neighbouring properties by way of noise pollution.

Introduction

This application is one of two for the construction and operation of sites for drilling up to four exploration wells, hydraulic fracturing of the wells, testing for hydrocarbons, abandonment of the wells and restoration, including provision of access roads and access onto the highway, security fencing, lighting and other

uses ancillary to the exploration activities, including the construction of pipelines and connection to the gas grid network and associated infrastructure. The application the subject of this report is to develop land to the north of Preston New Road, Little Plumpton. The other application for similar development is at Roseacre Wood, Roseacre (ref LCC/2014/0101). The two applications are supported by applications for monitoring arrays. Application LCC/2014/0097 for a monitoring array associated with the Preston New site is also reported on this agenda and should be read in conjunction with this application. Application LCC/2014/0102 is for a monitoring array associated with the Roseacre Wood site and is reported on the agenda with planning application LCC/2014/0101.

Applicant's Proposal

Planning permission is sought for the construction and operation of a site for drilling up to four exploration wells, hydraulic fracturing of the wells, testing for hydrocarbons, abandonment of the wells and restoration, including provision of an access road and access onto the highway, security fencing, lighting and other uses ancillary to the exploration activities, including the construction of a pipeline and a connection to the gas grid network and associated infrastructure to land to the north of Preston New Road, Little Plumpton. A supporting application for the installation of a monitoring array of 80 boreholes for seismic and water quality within the surrounding area has also been submitted (ref LCC/2014/0097).

The applications are supported by a Planning Statement (PS), Supporting Documents, an Environmental Statement (ES) and a Non Technical Summary (NTS). The PS includes a Sustainability Appraisal and the Supporting Documents include a Flood Risk Assessment, Utilities Statement and a Statement of Community Involvement.

The ES provides a full description and assessment of the following:

- The application site and surroundings
- A description of the proposed development
- Scheme alternatives
- Air Quality
- Archaeology and cultural heritage
- Greenhouse gas emissions
- Community and socio economics
- Ecology
- Hydrogeology and ground gas
- Induced seismicity
- Land Use
- Landscape and visual amenity
- Lighting
- Noise
- Resources and waste
- Transport
- Water resources
- Public health

The ES was also supported by further information submitted by the applicant in response to matters raised by consultees and in response to comments made by third parties and interest groups.

The main elements of the proposal are described below with a more detailed description provided in Appendix 1:

Proposed Development.

The proposed development is for the exploration and analysis of shale gas reservoirs within the Bowland Shale formation in the Fylde district of Lancashire. The shale gas (also called methane gas or natural gas) is known to be distributed within the shale rock. The total area of the surface works is 7.34ha. In addition lateral drilling and hydraulic fracturing would be undertaken in an underground quadrant which could extend up to a maximum distance of 3km from the centre of the well pad.

A well pad would be constructed and wells would be drilled into the shale rock. A process called hydraulic fracturing would then be used to help the gas flow out of the rock by pumping water and other materials into the shale to dislodge the gas. The gas then flows back to the surface within the flow back fluid.

The proposed development would explore the potential flow rate of the gas in order to establish whether the gas can be extracted and if it would be economically viable to do so. Following exploratory activities the site would be abandoned and restored unless the site is found to be economically viable, in which case a planning application would be submitted for production works before the site is decommissioned.

Site Location and Description

The proposed development involves surface works and underground works.

Surface Development Site

The development site for the surface works is a greenfield site located within Fylde district, to the north of Preston New Road (A583) and east of Moss House Lane, between Wesham and Kirkham towns and Blackpool.

The closest residential properties to the site are located at Staining Wood Cottages/ Foxwood Chase to the south of the site. The village of Little Plumpton is located approximately 500m to the east of the site with the neighbouring village of Great Plumpton located 900m to the north east. Approximately 800m to the north and east of the site are Moss House Lane properties. Approximately 1200m along Preston New Road, two residential mobile home sites, Carr Bridge and Lyndale are located and further west is Penny Farm, a World Horse Welfare centre.

The development site is currently in agricultural use and is classified as Grade 3a (good) and 3b (moderate) quality agricultural land. The size of the development site would be approximately 7.34ha, of which an area of approximately 2.65ha would be for the exploration site (well pad and access track) and an area of

approximately 4.69ha for the extended flow test pipeline and the gas grid connection.

The majority of the development site would be bounded by fields on all sites. Preston New Road would form the southern boundary for the proposed access track and gas pipeline. The site is currently accessed by crossing fields from Preston New Road, Moss House Lane or Plumpton Lane. Land surrounding the development site is in agricultural use for grazing and arable farming.

The site has an undulating topography with slopes towards Carr Bridge Brook valley which is located to the north of the development site. The site is located within the Lancashire County Council landscape character classification Coastal Plain. The development site has a height of 12-14m AOD, in comparison to the land at Little Plumpton at 25AOD and at Great Plumpton at 35m AOD.

The Carr Bridge Brook, located approximately 200m north of the site at the northern field boundary, discharges into a main drain to the rear of Moss House Lane. The main drain discharges into the Ribble Estuary which is approximately 6km away from the development site. A number of ponds are also located around the development site within the agricultural fields and these may be used by grazing animals. The development site has been categorised by the Environment Agency as being in Flood Zone 1(low probability), this means that the probability of fluvial flooding each year is less than 0.1% (1 in 1000) from the nearby watercourses.

To the south of the site the A583 Preston New Road is a single carriageway illuminated road with a footway on the southern side. There are dedicated cycle lanes on each side. Preston New Road connects Preston to the east with Blackpool to the west. Preston New Road is connected to the M55 motorway at Junction 4. The M55 motorway is located approximately 1km to the north of the development site.

Underground Exploratory Works

The maximum extent of the below ground works (for vertical and horizontal drilling and hydraulic fracturing) as projected to the surface would extend to a total area of 562ha in a quadrant shape. The northern extent of the quadrant would be around Wildings Wood located to the north of Junction 4 of the M55 with the eastern extent of the quadrant around the village of Little Plumpton. The southwest extent would run from Humber Wood towards Lower Balham village with the western extent in the vicinity of Whitehill Road, Blackpool.

The majority of the surface area of the underground works is currently in agricultural use. The surface also includes sections of roads including the M55 motorway, Preston New Road (A583), Moss House Lane, Peel Road and Whitehill Road. The above ground area includes the village of Little Plumpton and residential/commercial properties located along local roads including Preston New Road, Moss House Lane, Peel Road and Whitehill Road properties. At Whitehill Road a major mixed use development is also located.

Background

There is no relevant planning history to the proposed site,

A number of planning permissions were previously granted for unconventional shale gas exploration operations involving the drilling of a vertical borehole and hydraulic fracturing in 2010. The ones at Grange Road, Preese Hall and Anna's Road in Fylde and Banks Marsh (Becconsall) in West Lancashire were implemented with boreholes being drilled.

The Preese Hall site was the only well that was drilled and then hydraulically fractured. The fracturing caused two seismic events. A moratorium on hydraulic fracturing was subsequently imposed by the Government in May 2011. The Government's Chief Scientific Officer appointed the Royal Society and the Royal Academy of Engineering to undertake an assessment whether hydraulic fracturing could be carried out safely. The conclusion was that it could subject to a number of recommendations. Consequently the Department of Energy and Climate Change (DECC) lifted the moratorium in December 2012, no further hydraulic fracturing has taken place. The boreholes at Annas Road and Preese Hall site have been abandoned and the wells plugged. The sites have or are being restored. The sites at Beconsall and Grange Road are the subject of planning applications for extended periods of pressure testing.

The applicant undertook a 3-dimensional (3D) geophysical seismic survey in June 2012, which covered an area of approximately 100km² to identify locations of geological faults and to identify a workable area of the Bowland shale for exploration activity including hydraulic fracturing. The applicant owns and operates an existing gas production facility at Elswick that was first granted planning permission for exploration in the 1980's and went into production in the 1990s. However, this site targeted a different geological horizon to that currently proposed and did not involve high pressure hydraulic fracturing as currently proposed.

Policy

European Policy

EU Habitats Directive

National Policy and guidance

White Paper: Energy – Meeting the Challenge

Climate Change Act Of 2008

The UK Low Carbon Transition Plan

National Policy Statement for Energy

Gas Generation Strategy

DECC About shale gas and hydraulic fracturing (fracking) 30 July 2013

House of Commons Standard Note Shale Gas and Fracking 22 January 2014

HSE

Shale gas and hydraulic fracturing (fracking) Q&A

EA Regulatory Position Statement Onshore oil and gas well decommissioning and abandonment for well prior to 1 October 2013
UKOOG UK Onshore Shale Gas Well Guidelines – Exploration & Appraisal phase 1 February 2013
CIWEM Shale Gas and Water January 2014

Planning Policy

National Planning Policy Framework (NPPF)

Paragraphs 11-14	Requirement for Sustainable Development
Paragraph 17	Core Planning Principles
Paragraphs 56-66	Requirement for Good Design
Paragraphs 100	Flood Risk
Paragraph 103	Requirement for Flood Risk Sequential Test
Paragraphs 109-112	Conserving and Enhancing the Natural Environment
Paragraphs 118-125	Conserve and Enhance Biodiversity
Paragraphs 142-148	Facilitating the Sustainable use of Minerals
Paragraphs 186-216	Decision-making

National Planning Policy Guidance (NPPG)

Air Quality	Air quality impacts
Climate Change	Mitigation and adaption measures
Design	Key design points
Flood Risk and Coastal Change	Flood Risk Assessment
Health and Well Being	Healthy communities / environmental risks
Land Stability	Risk of Unstable Land/ subsidence
Light Pollution	Obtrusive light impacts
Minerals	Mineral Extraction
Natural Environment	Protect biodiversity
Noise	Manage noise impacts
Water supply, wastewater, water quality	Quality and infrastructure

Planning Practice Guidance (PPG) Planning for Hydrocarbon extraction

Joint Lancashire Minerals and Waste Development Framework Core Strategy Development Plan documents (LMWDF)

Policy CS1	Safeguarding Lancashire's Mineral Resources
Policy CS5	Achieving Sustainable Minerals Production

Joint Lancashire Minerals and Waste Local Plan – Site Allocation and Development Management Policies – Part One (LMWLP)

Policy NPPF 1	Presumption in favour of sustainable development
Policy DM2	Development Management

Joint Lancashire Minerals and Waste Supplementary Planning Guidance

SPD	Oil and gas exploration, production and distribution (draft)
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Fylde Borough Local Plan

Policy SP2	Development in Countryside Areas
Policy EP11	Building Design and Landscape Character
Policy EP12	Conservation of Trees and Woodland
Policy EP15	European Nature Conservation Sites
Policy EP16	National Nature Reserves
Policy EP17	Biological Heritage Sites
Policy EP23	Pollution of Surface Water
Policy EP24	Pollution of Ground Water
Policy EP26	Air Pollution
Policy EP27	Noise Pollution
Policy EP28	Light Pollution

Consultations

The following bodies have been consulted on the application and supporting documents as initially submitted and on subsequent information / clarification /comment provided by the applicant in response to requests for further information or comments made. Their views in respect of the application as initially submitted and where appropriate on the clarification information provided by the applicant are summarised as follows:

Department of Energy and Climate Change (DECC): Have confirmed the details of the petroleum licence for the surface site and the maximum extent for underground drilling. The licences give exclusive rights within their area for exploration, boring for and getting petroleum, but do not waive any other legal requirement applicable to these activities, including requirements for planning permission.

DECC requires the operator to produce Environmental Risk Assessments, taking account of guidance published to the industry by them in April 2014, which flows from the recommendations of the Royal Academy of Engineering and the Royal Society, in their report on the hazards of hydraulic fracturing for shale gas published in June 2012.

Drilling of wells requires Secretary of State consent under the terms of the licence and DECC will undertake a number of checks regarding well targeting and operator funds and insurance before giving consent. With regard to drilling practice, DECC has clarified that drilling through a fault does not entail any seismic hazard.

DECC also requires for hydraulic fracturing, the implementation of measures to mitigate seismic risk including the submission to DECC of a detailed Hydraulic Fracturing Programme (HFP) for each well to be hydraulically fractured. DECC will monitor the conduct of fracturing operations in accordance with the HFP. DECC is of the view that in principle hydraulic fracturing through a fault should be avoided. The applicant has stated that they plan to avoid all detectable faults (whether local or regional), which is the correct approach. DECC say the applicant's 3D data will be scrutinised through the review of the HFPs to ensure that the full extent of the stimulated rock volume preserves a safe distance from any detectable fault. The fracturing fluids will therefore never enter a fault and will not be transmitted along it.

DECC consider the traffic light system for shutting down operations to be adequate as the association between hydraulic fracturing and seismic activity remains a developing area of knowledge. Careful monitoring of seismic activity in real time is likely to detect precursor events, providing scope to halt operations, reduce stresses and avoid more substantial tremors. DECC would explore the implications of any red light event promptly with a view to deciding whether operations can be resumed without undue risk of disturbance to local residents and if so what operations are acceptable and whether any further precautions are appropriate.

Proposals to flare gas during the initial testing phase will require the consent from the Secretary of State under the Energy Act 1976 and any venting is subject to DECC consent. Any venting should be reduced to a minimum. DECC's standard online drilling consent allows 96 hours of testing. To test for a longer period, the applicant will need to apply to DECC for a paper-based Extended Well Consent. DECC will expect the operator to minimise flaring during the period of any Extended Well Consent.

Abandonment of any well requires the Secretary of State's consent under the terms of the licence. DECC will check for completeness of well data before giving consent.

Ministry of Defence (Safeguarding) (MOD): No objection

Blackpool Borough Council: No objection - no specific comments to make on the proposal.

Fylde Borough Council: Objects for the following summarised reasons:

- The proposed drilling operations would be in relatively close proximity to residential properties and the noise and general disturbance from 24 hour drilling operations and associated activity would be significant.
- Contrary to Policy DM2 of the Minerals and Waste local Plan.
- Contrary to Policies EP26, EP27 and EP28 of the Fylde Borough Local Plan, which is considered to be in conformity with the provisions of the NPPF.

The Borough Councils Environmental Protection Team has advised and made recommendations as follows:

- The exclusion of a sensitive noise receptor in the applicants noise report may mean current calculations are artificially elevated resulting in the prediction that noise levels will not exceed current background levels.
- Recommend that the applicant ensures that there are continuous sound level monitoring at the nearest residential property to ensure sound levels accord with WHO guidelines.
- Recommend that no HGVs arrive at or leave the site between 23:00 and 07:00.
- The sound levels are currently less than WHO guidelines so residents may experience an increase in noise. Ideally criteria should be set such that "as a result of the activity at the site no dwelling shall experience sound levels that are more than 5dB above current background levels between 07.00 – 23.00 and no increase in background level between 23.00 and 07.00"
- Recommend that no HGVs arrive at or leave the site between 23:00 and 07:00.

- Recommend continuous monitoring of air quality as a result of increase in road traffic to demonstrate that AQ guidelines are being met, alongside EA monitoring of air pollutants from chemicals and flare burn off.
- Recommend dust significance should be reclassified from medium to large, due to a large site size and increased HGV movements on the roadways, with further mitigation measures to be implemented
- Recommend a plan to be provided detailing the predicted lux levels originating from the site to the vicinity. As a rural area, which is very dark at night, any increase in illumination will be more prevalent. Lighting should only be permitted as the minimum needed for security and/or working purposes and that it minimises the potential for obtrusive light from glare or light trespass to an acceptable level and in accordance with guidance for mineral sites.

Westby-with- Plumtons Parish Council: Objects. Recommend the application should be refused for the following summarised reasons:

- The proposed development would introduce an industrial form of development into a rural setting which will be of detriment to resident's quality of life.
- The value and saleability of properties will drastically diminish.
- The proposed development is located too close to some resident's properties.
- Noise pollution day and night from the 24hour operation.
- Air pollution to any degree is unacceptable.
- Evidence of earth tremors from Cuadrilla's activities elsewhere.
- Residents concerns over structural damage to properties, including Carr Bridge Residential Park, from vibrations from heavy plant and machinery.
- Concern regarding the visual aesthetic of the site, which requires screening.
- Major concerns over the highway access to the site, which is a renowned black spot. Traffic lights should be installed.
- Concern regarding the suitability of A and B roads for additional traffic and the Kingfisher pub roundabout for larger vehicles.
- No evidence is given regarding compensation availability for damage occurring due to the fracking process, including structural damage, long-term land side effects and flooding.
- Impacts on the natural drainage system and potential damage to any asbestos in the underground system.
- Concerns regarding water contamination and the disposal of contaminated water.
- Inconvenience of anti-fracking protestors, affecting resident's quality of life and in turn the need for and cost liability of extra policing.
- Parishioners feel they are 'guinea pigs' in a fracking trial that is being rushed through without guarantees regarding environmental effects, safety precautions and compensation for affected people, properties and the environment.
- Concern regarding control and enforcement of the rules and regulations.

The Parish Council has requested that if planning permission is granted that the site and process is policed at all times; that residents are kept informed of all processes; emergency contingency plans are made public; compensation guarantees are put in place; access to land is pre-approved by landowners and a liaison committee is established with representatives from the applicant, neighbouring properties, police, planning and environment officers from Lancashire and Fylde councils.

Medlar-with-Wesham Parish Council and Kirkham Town Council: Objects for the following summarised reasons:

- The potential major problems outweigh the benefits.
- The Chartered Institute of Environmental Health has highlighted shortcomings of the regulatory system regarding local environment and public health risks.
- Potential for earth tremors despite the traffic light system. Tremors can damage property and associated services including septic tanks. Any damage to underground services could result in watercourse pollution.
- Air pollution from gas emissions. Flaring can lead to over 250 pollutants including methane.
- Potential well failure and the huge potential for land contamination, particularly to aquifers and agricultural land.
- Light pollution from the 24hour operation.
- Potential flow back water site leakages and spillage during disposal and transportation.
- No information on water treatment plans. Where will flow back water be treated and will any new treatment plan accept waste from other UK sites.
- Increasing vehicle movements, particularly HGV's will exacerbate existing problems along the A585 and at the M55 Junction 3 at peak times.
- Increase in ambient noise levels from the continuous operation of this site and any future sites in the parish.
- Potential impact on resident's water supplies.
- The visual impact of the development cannot be minimised.
- Detrimental impact on property values and insurance premiums.
- Concern regarding future site expansion for production following exploratory phase. An increase in well heads will lead to further noise, traffic and pollution.
- Impact on local Wildlife including wintering and migrating birds, birds of prey, game birds, garden birds and bats from increased noise, traffic and lighting.

Health & Safety Executive (HSE): No objection; the proposed operations will be conducted in accordance with recognised regulations standards and good industry practice. From a well's operations perspective there are no issues or concerns with the proposals

HSE has provided clarification of relevant regulations applicable to onshore well; how it regulates shale gas activity; what information it requires and working with the Environment Agency. HSEs regulatory framework ensures that information is provided at key stages in the lifecycle of a well and allows HSE inspectors to assess whether risks are being adequately controlled and if not to take the appropriate regulatory action.

The Health and Safety at Work Act 1974 (HSWA) requires those who create health and safety risks to workers or the public as part of their undertaking have a duty to manage and control the risks so far as is reasonably practicable. This is supplemented with more specific regulations particular to the extraction of gas and oil through wells, which includes shale gas operations.

The Borehole Sites and Operations Regulations 1995 (BSOR) applies to all onshore oil and gas wells. These Regulations require notifications to be sent to HSE about the design, construction and operation of wells, and the development of a health and safety plan which sets out how risks are managed on site.

To comply with BSOR the well operator must submit a notification to HSE at least 21 days before work commences. The notification includes information on the design of the well, the equipment to be used to construct it, the programme of work, the location, depth and direction of the borehole, the relationship to other wells and mines, the geology of the drilling site and identified risks and their proposed management. The HSE will assess the well design before construction starts and will identify any issues which will have an impact on well integrity. Any issues will be addressed by the operator and safety features will be incorporated into the design. Further notifications are required if there are any material changes to the information previously supplied.

The Offshore Installations and Wells (Design and Construction) Regulations 1996 (DCR) includes specific requirements for all wells, whether onshore or offshore, and include well integrity provisions which apply throughout the life of shale gas or oil wells. They also require the well operator to send a weekly report to HSE during the construction of the well so that inspectors can check that work is progressing as described in the notification.

To comply with DCR the operator must report to HSE every week during construction and during work to abandon the well, to provide HSE with assurance that the operator is constructing and operating the well as described in the notification. The weekly report details well integrity tests, the depth and diameter of the borehole, the depth and diameter of the well casing and details of the drill fluid density. The drill fluid density allows the inspector to gauge the pressure in the well and identify any stability issues.

If the operator is not complying with the notification, the HSE can take appropriate regulatory action. HSE uses a risk based interventions on particular sites and operators and to ensure well integrity. The HSE has a team of expert well engineers who cover hydrocarbon wells onshore and offshore. In considering well integrity a lifecycle approach is used including notifications, weekly well reports, operator meetings and on-site inspections being used to manage the risks appropriately.

The operator must also appoint an independent well examiner in a quality control role who will ensure that the well is designed, constructed, operated and abandoned in accordance with industry and company standards and that regulatory requirements are met. Specialist well engineers help develop best practice standards for the onshore industry with the United Kingdom Onshore Operators Group (UKOOG). All members of UKOOG have to comply with the latest standards published in February 2013.

A well operator must also report to HSE any occurrences covered by RIDDOR – Reporting of Injuries, Diseases and Dangerous Occurrences Regulations. These could include a blowout (i.e. an uncontrolled flow of well fluids); the unplanned use of blowout prevention equipment; the unexpected detection of hydrogen sulphide (H₂S) which is an explosive gas; failure to maintain minimum separation distance between wells and mechanical failure of any safety-critical element of a well. HSE can

investigate any well incidents that would have an effect on well integrity and ensure the operator improves their operations.

Since 2012, the HSE and the Environment Agency have an agreement covering joint regulation of shale gas operations. HSE and EA inspectors will meet all new and first-time operators of shale gas wells to advise them of their duties under the regulations and to jointly visit all shale gas sites during the exploratory gas phase of shale gas development.

In response to comments raised by Friends of the Earth in their representation to the proposed development, HSE have clarified the following

- HSE have continued to monitor Preese Hall site during abandonment activity and that there has been no unplanned release of fluids from the well.
- HSE will continue to monitor abandonment activity on all onshore and offshore wells to ensure all work is completed to industry standards and the risk of release of fluids from wells post abandonment is as low as reasonably practicable.
- With regard to risk of leaks from gas wells and the risk of exposure to benzene, the DCR sets out the requirement that there should be no unplanned release of fluids from the well so far as is reasonably practicable. The HSE will review well notification information to ensure that the operator is managing the risks in such a way that the well is designed, constructed and abandoned safely.
- BSOR Regulation 10 requires the well operator to provide all persons engaged in borehole operations with appropriate health surveillance.
- The HSE is aware of the warning issued by NIOSH regarding exposure to silica. The HSE will look at how the well operator manages exposure to silica. It is expected that sealed units will deliver sand to site and mix it into fracturing fluid so that the exposure risk is minimised.
- HSE do not consider that the regulations are inadequate, flawed or ineffectively applied and enforced. The UK health and safety regulations are robust and the regulatory regime governing oil and gas operations is world leading.
- HSE receives well notification information 21 days before work starts. Until the notification is received HSE cannot make a full appraisal of the design of the well and the programme of work and give assurance that the well operator is managing the health and safety risks appropriately including the risk of an unplanned release of fluids.

Public Health England (PHE): Initially recommended that the Local Planning Authority (LPA) request and consider further information regarding sensitive receptors, atmospheric pollution, risks to surface waters and groundwater, environmental monitoring, radon, NORM, resources and waste, dust, noise, light and odour, accidents and incidents.

The applicant provided further information to address the issues raised by PHE. PHE has subsequently advised that the planning authority should confirm:

- That they are satisfied with the applicants assessment of site emissions and whether generator and engine emissions can be scoped out of the assessment due to their size and short operational periods.

- That emissions from activities and infrastructure at the site (e.g. generators, pumps and blenders) have been considered within the baseline methodology and the subsequent dispersion modelling assessment.
- The applicant has considered emissions from start-up, shut-down, abnormal operation and accidents when assessing potential impacts.
- They are satisfied with the fugitive emissions assessment and are satisfied there will be mitigation measures in place to identify and minimise fugitive emissions if resulting air quality impacts are identified to be a concern once operational.
- The operator is happy to provide details on the baseline monitoring protocol in response to a planning condition.
- They are satisfied with details of monitoring locations, what is being monitored for, and the schedule for monitoring frequencies.
- They are satisfied with the proposed definition of significant variation for other determinants, regarding air emissions and surface water and ground water potential contaminants.
- They are satisfied with the applicant's proposal for drill cuttings coated with low toxicity oil based muds to not be covered.

PHE has also commented that whilst human health is not considered the primary receptor by the applicant that the public health section of the ES would have identified and considered routes by which emissions may lead to population exposure and consider them in the conceptual model. Potential public health impact should be considered during the assessment of probabilities.

Environment Agency (EA): No objection in principle and recommends the following:

- A scheme to dispose of surface water between the drill pad and Carr Bridge Brook to be submitted to ensure the proposed development does not increase the risk of pollution to Carr Bridge Brook.
- Routine monitoring of on-site surface water quality and maintenance, and inspection of surface water drains, valves and interceptors to ensure correct and efficient operation.
- Surface water run-off retained on site during operations to be tankered away for off-site disposal and to not be discharged to the watercourse.
- To consider whether the Control of Pollution (Oil Storage) (England) Regulations 2001 apply. If not any facilities, above ground, for the storage of oils, fuels or chemicals to be sited on impervious bases and surrounded by impervious bund walls.

With regard to flood risk the EA confirmed that the proposed development is located in Flood Zone 1 which is defined as having a low probability of flooding in the National Planning Practice Guidance. The Agency has reviewed the Flood Risk Assessment submitted with the application and is satisfied that the development would not be at risk of flooding or increased flood risk off-site.

With regard to radon release during the flaring of gas, the Environment Agency confirmed that radon is exempt from their permitting by the Natural Gas Exemption Order 2002 and from regulation under the Environmental Permitting Regulations 2010. This is on the basis of its low risk, widespread use and that it was not

amenable to regulation. Discharges of radon in natural gas, being flared or vented at gas sites is not subject to regulation under radioactive substances regulation (RSR).

Highways Agency (HA): No objection in principle and advises as follows:

- If the traffic levels associated with the development exceed the levels in the Transport Assessment for the Strategic Road Network (SRN) the Highways Agency should be informed.
- The cost of any mitigation to the highway asset needs to be covered by the instigator should damage occur due to project activities.

National Air Traffic Services (NATS): No objection. Initially objected on the basis that the proposed development would infringe on safeguarding criteria. Following further discussions with the applicant and a more in-depth analysis, it is now considered that the potential for impact on electronic infrastructure can be managed and there is no safeguarding objection.

Civil Aviation Authority (CAA): No objection. The proposed structures would not formally constitute aviation en-route obstructions, but recommend that the planning authorities check for any safeguarding issues with local aerodromes e.g. Blackpool Airport and Warton Aerodrome and it would be sensible to establish the related viewpoints of local emergency services air support units. The CAA initially thought the application had no flaring which could cause a danger to overflying aircraft.

Following clarification that there would be routine flaring, the CAA confirmed that it is for the developer to be satisfied that the operations involving the flaring and/or venting of gas would not potentially endanger overflying aircraft or where there is a potential risk, to mitigate that level of risk. As the flare is to be contained in a flare stack it would seem reasonable for the developer to consider that flaring of gases would not be an issue to aircraft operation.

The assessment of whether gases released will be under pressure such as to cause turbulence affecting overflying aircraft also needs consideration. Any resultant turbulence, if generated, may dissipate within a few feet of the top of the stacks and the developer might consider that this represents no risk to the safety of aircraft.

Blackpool Airport Ltd: Initially objected on the basis that the proposal conflicted with safeguarding requirements as it presented a hazard to the safe operation of aircraft in the vicinity of Blackpool Airport. The hazard related to the potential for bird strike and it was recommended that a bird strike assessment and mitigation plan was undertaken. Clarification regarding the exclusion of mitigation measures by the applicant from the wintering bird survey was also requested.

Following the submission of a bird strike assessment by the applicant and written confirmation from Natural England and the county council that the mitigation has been agreed by them, Blackpool Airport would withdraw their objection.

Blackpool Airport have requested that bird management requirements should be re-evaluated if compensatory habitats are provided at the site; if bird numbers and behaviour change and start to pose a risk to aircraft or if land management / ownership or working practices by the site owner/operator changes.

National Grid Gas: No objection. National Grid has a Major Accident Hazard Pipeline in the vicinity, Peel Hill (Thornton) and associated service pipes. The Building Proximity Distance (BPD) to the pipeline is 14.5m minimum distance and when working in the vicinity of the pipeline National Grid Specification SSW22 applies. The developer should contact National Grid as soon as the planning stage has been completed to discuss the proposal and to liaise with National Grid regarding any monitoring, protection or diversion works that would be required for the works to be completed safely.

United Utilities PLC (UU): No objection subject to the inclusion of a specific worded condition to protect assets in Preston New Road from HGV movements.

With regards to water supply to the site, UU has advised that the principal water demand would be during the hydraulic fracturing operations. During other times, water would be required to support the drilling operation, site cleaning and welfare operations. The water demand during hydraulic fracturing operations is anticipated to be approximately 765m³ of water per day (a maximum of one hydraulic fracturing stage will be carried out in a single day). This water would be supplied from the United Utilities (UU) potable water network.

UU have confirmed that the 15" trunk main to the western corner of the site has the capacity to supply the site without restrictions (see Appendix 5 of the application ES for confirmation). UU have reported that the main has a history of bursts so installation of a pressure management valve (PMV) and flow meter would be required in order to reduce the burst risk. UU have also stated it may be possible to re-zone their network so the site would be the only user of the main.

To meet the current and future water quality needs of their customers across the Fylde, as well as fulfilling their obligations to their quality regulator (the DWI), a circa £13 million scheme to clean and upgrade the Lytham pipeline, which runs from Singleton into Blackpool is currently being planned. To allow for this work to take place a new 630mm water supply main section is being installed; the main will be completed in 2015. Consequently a new water supply point of connection has been identified on the new stretch of water main.

To facilitate the water supply needs of the temporary shale gas exploration scheme, and maintain the integrity of the new main an additional connection point is to be installed (at the Applicant's expense) while the main is being laid. A separate metered supply to each unit will be required at the Applicant's expense and all internal pipe work must comply with current Water Supply (Water Fittings) Regulations 1999.

Police Emergency Planning: No objection. Lancashire Constabulary has advised that the development will not impact upon the Constabulary apart from potential protests.

Natural England: No objection. An initial objection was made due to the need for further information to be supplied to the planning authority to check the likelihood for significant effects in accordance with the Habitats Regulations. Further information was required to address impacts on air quality, Special Protection Area (SPA) birds, land use and cumulative effects.

Following the receipt of additional information from the applicant, Natural England concluded that the specific issues they had raised had been addressed and therefore withdrew their objection.

Natural England also confirmed that points raised by Friends of the Earth relating to matters within their remit have been resolved with the applicant such that Natural England withdrew its objection.

The Wildlife Trust: Objects and request planning permission be refused. The reasons for objection relate primarily to the limitations of the ES and the application with regard to compliance with the NPPF, LMWP and the British Standard, Biodiversity - Code of Practice for Planning and Development as follows:

- Contrary to NPPF regarding no net loss of biodiversity, no mitigation strategy and the proposal will contribute to a high carbon economy.
- Contrary to Policy DM2, the application only makes a small contribution to biodiversity and has no habitat creation and long term management of the site
- No signed disclosure regarding competence of individuals preparing the ES.
- Survey limitations are not provided for all surveys.
- No assessment of non-vascular plants and fungi.
- Bird surveys for one season, which may not reflect the true impact over time.
- Site search excludes special/wildflower roadside verges which could be adversely affected by changes to the road or increased traffic flow.
- No consideration of wildlife corridors, stepping stone habitats and/or any area identified by local partnerships/record centres for habitat restoration/creation.
- No reference to ecological networks for grassland, wetland and woodland.
- No identification of areas for biosecurity measures regarding control of Rhododendron and non-native species e.g. Himalayan Balsam
- The application does not include Ecological Constraints and Opportunities Plan (ECOP) cross referenced to other constraints.
- No contribution to wider biodiversity enhancement to help rebuild habitat networks, improve ecological resilience and adapt to climate change and deliver Lancashire Climate Change Strategy 2009-2020, England's Biodiversity Strategy, local BAP and Nature Improvement Area targets.
- Compensatory proposals need to occur before biodiversity losses occur
- No landscape or ecological management plan submitted.
- All environmental consents have not been approved/ licenced.
- The CEMP does not set out all necessary practical measures to ensure biodiversity features are protected during construction and operational activity.
- A legal agreement is required to safeguard management arrangements to protect biodiversity during construction and to conserve and enhance biodiversity through long term management, surveillance and monitoring.
- No commitment for a final statement of losses and gains arising.
- The applicant should consider enhancing hedges, grassland, ponds, ditches, field drains and woodland and creating species rich grassland, broadleaved woodland and species rich hedgerows and ponds.

The Wildlife Trust also recommends that the application should accord with the Are We Fit to Frack Guidelines, 2014 by the National Trust, The Wildlife Trust and Wetlands and Wildfowl Trust regarding regulation of the shale gas industry.

The Campaign to Protect Rural England (CPRE): No objection subject to conditions requiring mitigation measures for visual amenity, light pollution, noise pollution, transport impacts, hours of operation, water pollution, site abandonment, fracking, site survey methods utilising fibre optic technology, flowback fluid, flaring, liability, economic impact and greenhouse gases and the use of shale gas as a transitional energy source whilst energy demand is reduced and cleaner technologies are developed.

Wildfowl & Wetlands Trust (WWT): Objection on the basis that:

- Fracking poses a risk to wildlife.
- Significant weaknesses in the regulatory framework identified by Fit to Frack assessment of the regulatory framework.
- Regulatory framework does not safeguard against long term damage to nature and water quality at the local level leading to potentially significant financial costs for local communities.
- Fossil fuel contributing to climate change, a serious long term threat to the natural environment and to economic and social wellbeing.
- Is there evidence of no adverse impact on protected areas or protected species and that sites are not hydraulically linked to such areas.

LCC Developer Support (Highways): No objection subject to the imposition of conditions requiring details for the construction of the access points to the site, the internal access road, traffic management plan, off site highway works, construction method statement, monitoring of highway conditions, provision of drainage and measures to prevent air and ground and surface water pollution it is considered that the development would be acceptable in terms of highway safety and capacity issues.

LCC Director of Public Health: Has undertaken a Health Impact Assessment (HIA) on the two drill sites and identified that the key risks to health and wellbeing of the population from the two proposed sites are a lack of public trust and confidence in the regulatory process and the industry, stress and anxiety from uncertainty about the industry that could lead to poor mental wellbeing; potential noise related health effects due to continuous drilling for at least five months for the initial borehole on each site and for three months for each of the subsequent three boreholes per site (14 months of continuous drilling), and potential health risks due to the presence of mining wastes generated as part of the drilling and hydraulic fracturing process being retained on site if adequate off site treatment facilities are not found.

A number of key recommendations to inform the planning process include:

1. Consider the need for further noise assessment, particularly on the proposed Roseacre Wood site and if necessary, require additional mitigation measures to reduce noise associated with the development of the sites and more particularly the drilling and hydraulic fracturing phases of the development and which could be controlled by conditions attached to any planning permission.

2. Establish with the applicant that liability and compensation arrangements are in place to cover any structural damages to properties that can be attributed to an unlikely event of induced seismicity.
3. Undertake an independent verification of the assessment of air quality, transport, waste management and induced seismicity prior to determining the planning applications.
4. Seek agreement with the Applicant to establish an independent comprehensive baseline and on-going long term monitoring of environmental and health conditions prior to any activity on the sites.
5. The Director of Public Health should be informed of the results of the measurements and any breaches to the planning condition or environmental permit.
6. Consider the need to seek further clarification from the Applicant that the cumulative impacts of the operations from the flare, generators, vehicles and drilling will not exceed the national air quality objective thresholds, particularly for PM₁₀, 24 hour mean levels.
7. As part of either the planning or permitting process, the Applicant should be required to submit regular data on the ambient air quality on site measuring all the common air pollutants relevant to the activity and report them regularly. PM 10 and PM2.5 should be reported separately.
8. The Roseacre Wood site is within 55m of a National Grid gas transmission pipeline. Interconnections into national transmission pipelines are proposed at both sites. Advice should be sought and an assessment undertaken as to whether the nearby gas transmission pipelines are considered to be a major hazard.
9. Any extended flow testing provided for by any planning permissions should be aligned with the permits to be issued by the Environment Agency.
10. An assessment of light pollution as part of the site operations should be carried out, and if there are likely to be significant impacts associated with light pollution from the sites that cannot be mitigated or controlled, the Applicant should be requested to consider the opportunity to offer to fit blackout blinds to those homes most likely to be affected.
11. Further clarification or new information on the occurrence and magnitude of equipment likely to be contaminated with radioactive waste and how such waste would be managed on the site and disposed of should be sought.
12. Should planning permission be granted, it should be a pre requisite that no activity can start until the onsite and offsite waste treatment capacity is defined.
13. Further clarification should be sought that any specific risks due to using the MoD site for accessing the Roseacre Wood site have been addressed before any planning permission is granted.
14. A full assessment of the impacts of additional traffic associated with the proposals on road safety should be carried out and appropriate traffic management options considered to address the public concerns, particularly in respect of the Roseacre Wood site.
15. Should planning permission be granted, provision should be made with the Applicant to maintain road safety, particularly on the access routes to Roseacre Wood site and road safety and any related incidents on the access to both the sites should be monitored.
16. In the event planning permissions are granted, any breach of planning conditions should be reported to the Director of Public Health so that necessary steps can be taken in protecting and improving the health of local communities from issues arising due to the alleged or identified breaches of planning control.

Indicative framework for long term monitoring of environmental and health conditions.

Context

It is understood that a range of data will be collected by the operator and reported to the regulatory authorities, particularly the EA. What this will constitute is not available to LCC's public health department until the environment permit, planning condition and environmental operating standards are agreed. This document is written with that gap in knowledge.

Following the Applicant's surrender of the permit to the EA (who must be satisfied that environmental conditions are acceptable and will remain so before accepting the surrender), current practice suggests there will not be a requirement for long term monitoring of the environment in and around the restored sites of former wells.

Establishing a shale gas monitoring unit in Lancashire as an independent source of reliable information will help with the understanding of any environment and health impacts and the communication of risks to the local communities. It will also support the development of future policy and practice of shale gas extraction.

Aim.

To establish an independent, reliable, single source of local information on shale gas exploration in Lancashire.

Objectives.

- To develop a framework to establish a baseline and ongoing monitoring of environmental and health conditions
- To support risk communication and reassurance to local communities on the safety and impacts of shale gas activities in Lancashire.
- The governance and management of the shale gas observatory should be determined in consultation with various stakeholders including the local communities, the industry, and the regulatory agencies.

The framework for data collection.

- It is expected that most of the data will be collected under the existing regulatory regime. Hence, the focus should be collating the data in one place with independent verification, analysis and communication of risks to the public in a transparent, reliable and proportionate manner.
- Both qualitative and quantitative methods of data collections should be used. It is
- anticipated that the data collection will start prior to any activities beginning if the applications are approved. It will mainly focus on the geographical area affected by the two planning applications. This is currently understood to be approximately a 2 kilometres radius from the proposed location of the well pads.

- The time period for long term monitoring should be at least 30 years post abandonment or until such time there is national guidance on long term monitoring.
- The suggested 30 year time period is based on the long term monitoring of landfill gas migration.

Data collection and analysis (an indicative list)

- Profiling of drill cuttings, fracturing fluids to identify substances hazardous to human health including NORM.
- Information on decontamination of equipment.
- Characterisation of the extent of fracture propagation and the permeability of layers above and beyond the faults
- Characterisation of combustion gases at the flare, particularly the levels of hydrocarbons, radon, methane, volatile organic compounds and any other substances deemed hazardous to human health
- Levels of fugitive emissions at well pads, on potential pathways and at receptor households.
- Ground water monitoring of methane.
- Measuring long term well integrity.
- Particulate Matter at source and confirmation of the modelling findings for receptors in the ES
- Levels of noise at source and receptors
- Information on any existing private water supplies that aren't covered by abstraction license within 2 km zone.
- Sampling of ground/food chain.
- Information on local climate within the 2 km zone to identify potential hotspots.
- Safety profile of transport routes and modelling to minimise road traffic accidents
- Safety profile of waste management sites.
- Household survey of human health and wellbeing, and sampling of
- environmental conditions within the 2km zone. The sampling to be based on modelling from source data.
- Survey of any other sensitive receptors in the vicinity of the two sites.
- Analysis of routinely collected data on health and health care utilisation.
- Analysis of occupational health surveillance data collected by the operator.

LCC Emergency Planning: No objection. The application does not impinge on any COMAH or REPIIR sites but does pass through an area through which a major hazard pipeline passes. This would be a matter for National Grid.

LCC Highway Services (Lighting): No objection. The design generally complies with required standards with the exception of the predicted sky glow which marginally exceeds the permitted standard, but it is not considered that this would cause any issues to the surrounding area or to the highway and its users

LCC Specialist Advisory Services:

Landscape: Focusing on a 2.0km radius from the centre of the application site, the elements of the development which have the most potential for creating significant landscape and visual impacts are drilling, hydraulic fracturing and flow testing

operations which involve the use of a drilling rig (up to 53m high), fracturing rig, well services rig and flare stacks.

It is recommended that additional photomontages for viewpoints 3, 6 and 10 to a prescribed methodology are submitted as the submitted images to do reflect the true scale of the proposed development, with the rig appearing approximately 3x smaller than it will in reality.

The site falls within the County Council's Coastal Plain landscape character type and The Fylde landscape character area, which are characterised by rural farmland, hedgerows, shelter belts and field ponds, slightly undulating topography, long views across the landscape and a strong sense of openness. The application site has these landscape characteristics along with some significant landscape detractors including electricity pylons, the M55 and the A583.

A detailed assessment of the potential impacts and significance on the landscape and receptors, taking account of the development site and area landscape characteristics has been undertaken with the following summarised observations:

- Major significance on views from The Gables and Plumpton Hall.
- Moderate to major significance on the local landscape character and views from Preston New Road, Staining Wood Farm, Plumpton Lane and Moss House Lane.
- Minor significance on landscape fabric and the views from Westby Road and Great Plumpton.
- Negligible to minor significance on the character type and area, landscape amenity and the views from Little Plumpton, Peel Road, Ballam Road and Westby.
- Negligible significance on the landscape value of the site and wider landscape.
- No significant cumulative effects with the proposals at Roseacre.

The assessment of the proposal has also taken account of the effects of time, with regard to the duration of the landscape effects, and has also taken account of mitigation proposals which will reduce the impact of low level site structures.

The proposed development would have some temporary but reversible localised landscape and visual effects of moderate-major significance. However, these are not considered to significantly affect the overall character of the Coastal Plain Landscape Character Type or The Fylde Landscape Character Area. In addition, the likely effects of the development proposals on the landscape's value and fabric would not be significant and, there would be no significant cumulative effects. For these reasons, the overall temporary effects of the proposals are deemed to be acceptable in landscape terms.

The applicant's options for mitigating the most significant localised effects are limited due to the height of the drill well (potentially 53m), characteristics of the receiving landscape and the 3 year operations period which does not leave enough 'growing time' for planting to have any significant impact. So, whilst there is much about the proposals which could be deemed acceptable in landscape terms, especially in the context of the wider landscape, the applicant needs to address the likely significant localised effects to ensure that overall, this form of temporary industrial development

is successfully assimilated into the rural landscape. The most appropriate way of achieving this would be through implementation of the additional mitigation measures outlined above.

It is concluded that significant localised landscape and visual effects are unavoidable although there is scope to further mitigate the likely effects by reducing the height of the drilling rig to a maximum of 35m; finish the drilling and fracturing rigs in a more suitable colour than red/white as proposed and to finish the various cabins and other temporary buildings in a more appropriate colour than blue as proposed.

Ecology: No objection. The application area appears to be of relatively limited biodiversity value, comprising improved agricultural land with few features of any significant biodiversity value.

The development will impact on features (habitats) of biodiversity value including hedgerows and on the habitat of protected and priority species (including bats, birds, amphibians and mammals).

Mitigation and compensation need to be secured as part of any planning approval for the site, including mitigation measures for wintering birds and great crested newts, a Biodiversity Mitigation Strategy (amphibians, bats, nesting and wintering birds, badgers, reptiles, water voles, brown hare) and a revised ecological Mitigation Strategy (landscaping, habitat creation and enhancement)

A requirement for the submission for further information to establish the presence or absence of great crested newts in water body pond 10 was also requested prior to determination of the proposal. The applicant subsequently submitted survey information that provided no evidence of great crested newts being detected within the zone of influence of the proposed development and no impacts on the species or its habitat. Therefore no mitigation or compensation for impacts on great crested newts is required by planning condition.

Archaeology: No objection. The Archaeology and Cultural Heritage chapter of the ES has been undertaken in line with the requirements of the County Archaeology Service (LCAS). LCAS agrees with the assessment that the site has a low potential to contain previously unknown archaeological finds or features.

The proposed mitigation measures are considered to be appropriate. LCAS recommend therefore that should the application be approved a condition is attached that development should not take place until the implementation of a programme of archaeological work is secured.

Representations: (Appendix 2)

The application, Environmental Statement and supporting documentation to the application have been advertised in the local press, site notices posted at various points on and around the site and neighbouring properties considered to be most affected individually notified by letter. Further information submitted by the applicant was advertised in the press. Copies of all the documents were made available for inspection on the County Council's web site and hard copies were made available at the County Council's offices, the offices of Fylde Borough Council, Kirkham Library; St Anne's Library; Lytham Library; and Ansdell Library.

Representations have been received from a number of groups and individuals. The following is a list of the main issues raised; a summary of the representations are set out in Appendix 2.

Friends of the Earth (FOE): Object to the proposed development for the following summarised reasons:

FOE, on behalf of Preston New Road Action Group, initially expressed concerns regarding the consultation period of 21 days for consideration of the Environmental Statement accompanying the planning application. LCC took account of these concerns and extended the formal consultation period to 12 weeks.

FOE submitted a further objection to the proposal with regard to the precautionary principle and the Water Framework Directive; inconsistency within national and local planning policy, inconsistency with government policy; evidence of adverse environmental impacts and inadequate consideration of adverse socio-economic and public health impacts. Further representations were made to the further information submitted by the applicant and which was accompanied by a consultant's report on waste.

Preston New Road Action Group: Representations received on behalf of Preston New Road Action Group object to the proposal for reasons under the following headings the summarised reasons and which are set out more fully in the appendix:

- Proximity to residents
- Impact on ecology
- Pollution risk
- Waste Disposal
- Traffic
- Watercourses
- Landscape
- Induced Seismic Activity
- Development and Regulation

Objections: Up to the end of December 2014 a total of 11127 representations objecting to the proposal had been received. Of these 827 were individual letters; 4727 were template objections submitted by Friends of the Earth; 5573 template objections, many of which were collected and submitted by 'Frack Free Lancashire'. Representations have continued to be received mostly in a variety of template forms, the final number of which will be reported when the application is presented for determination.

The reasons for objecting to the proposal are summarised in Appendix 2 under the following headings:

- Need for Development
- Climate Change
- Alternatives for energy production
- Environmental Impact
- Exploration or Production Stage
- Regulatory Framework

- Safety Risks
- Geology / Seismicity
- Air Pollution
- Noise Pollution
- Light Pollution
- Soil and Groundwater Contamination
- Waste Disposal
- Water Resource Sustainability
- Development in the Countryside / Landscape Impacts
- Ecology / Wildlife
- Economy
- Traffic
- Health and Well being
- Community
- Property
- Damage and Compensation
- Abandonment
- Applicant / Application
- Government
- Lancashire County Council / Decision making / Policy

Support

The North and Western Chamber of Commerce and the Chamber of Commerce East Lancashire support the proposals.

Up to the end of December 2014 a total of 200 representations supporting the proposal both in principle and in respect of the specific benefits that the proposal would generate in the locale. Representations in support have continued to be received the final number of which will be reported when the application is presented for determination.

The reasons for supporting the proposal are summarised in Appendix 2 under the following headings:

- Energy Security – need, supply and pricing
- Economic Benefits
- Minimal Environmental Risks
- Robust Regulatory Framework

Advice

Planning permission is sought for the construction and operation of a site for drilling up to four exploration wells, hydraulic fracturing of the wells, testing for hydrocarbons, abandonment of the wells and restoration, including provision of an access road and access onto the highway, security fencing, lighting and other uses ancillary to the exploration activities, including the construction of a pipeline and a connection to the gas grid network and associated infrastructure to land to the north of Preston New Road, Little Plumpton. A supporting application for the installation of a monitoring array of 80 boreholes for seismic and water quality within the surrounding area has also been submitted (ref LCC/2014/0097).

The applications are supported by a Planning Statement (PS), Supporting Documents, an Environmental Statement (ES) and a Non Technical Summary (NTS). The PS includes a Sustainability Appraisal and the Supporting Documents include a Flood Risk Assessment, Utilities Statement and a Statement of Community Involvement. Further information was submitted in response to consultee responses and comments made by other bodies, groups and individuals.

Section 38 (6) of the Planning and Compulsory Purchase Act 2004 requires planning applications to be determined in accordance with the Development Plan, unless material considerations indicate otherwise. In considering the issues that arise from the proposed development, it is necessary to take into consideration the relevant policies of the Development Plan and the planning history of the site and all other material planning considerations. Government policy is a material consideration that should be given appropriate weight in the decision making process.

Government policy supports the exploration, testing (appraisal) and production of economic onshore hydrocarbon reserves. This application relates to the first two phases; exploration and testing (appraisal). The site would then be restored unless the appraisal stage indicated that exploitation would be viable. If that were to be the case, further planning permission for an exploitation phase would be required.

Policy

General Government Policy on Energy resources

One of the primary roles of National Government is to manage and regulate the supply of energy resources to ensure that the UK has access to secure, clean affordable energy supplies whilst also aiming to meet international obligations on climate change including reduction in green house gas emissions. A number of pieces of legislation and policy statements have been made by recent Governments in relation to energy including the following:

In 2007 the Government published a White Paper on energy (Energy – Meeting the Challenge) which set out the Government's domestic and international strategy for responding to the two main challenges of meeting targets for cutting green house gases to meet climate change objectives and to ensure the availability of secure, clean and affordable energy as imports replace declining North Sea production. The White Paper sought to respond to these challenges in a way that was consistent with energy policy goals including cutting CO₂ emissions, maintaining reliability of energy supplies, promoting competitive markets and ensuring that every home is adequately and affordably heated,

The Climate Change Act Of 2008 also makes it a duty of the Secretary of State to ensure that levels of the main green house gases in 2050 emitted by UK households, industry, transport and the energy generation sector are at least 80% lower than 1990 levels.

In 2009, the Government published 'The UK Low Carbon Transition Plan' which is a national strategy for climate and energy including how energy generation will be gradually transformed to a system based on renewables in order to meet climate change objectives including those obligations in the Climate Change Act. The

document identifies that there will be a continuing need for energy generation from fossil fuel sources including gas as part of this transformation provided that such generation is associated with carbon capture technologies in order to meet climate change objectives.

More recently (2011), the Government has also published a National Policy Statement for Energy against which proposals for energy infrastructure brought forward under the 2008 Planning Act will be assessed. Although, this application is for exploration for hydrocarbons and not for nationally significant energy infrastructure, there are a number of themes within the policy document that are relevant with regards to the present Government's views on the likely future need for gas as a fuel for energy generation. These general themes are as follows:-

- The need to meet legally binding targets to cut green house emissions by at least 80% by 2050 compared to 1990 levels which will require major changes in the way that energy is generated and used by individuals, industry and the public sector.
- The Government considers that it is critical that the UK continues to have secure and reliable supplies of energy resources to be achieved by ensuring the existence of reliable supply chains (for example fuel for power stations) to meet demand as it arises
- A diverse mix of technologies and fuels including the need to source fuels from a wide range of locations.
- The need to address issues raised by increased imports of oil and gas as North Sea reserves decline in an environment where energy demand is rising and supply is increasingly politicised.
- The requirement to make substantial and timely investment in new infrastructure over the next two decades including in new fossil fuel generating capacity during the transition to a low carbon economy.

In December 2012, the Government also published a Gas Generation Strategy. The report noted that a third of UK energy demand is met by gas and that as coal use declines for use in power generation, gas will have an important role to play in filling the gap alongside renewable and nuclear generation thereby helping to reduce carbon emissions. The Government's forecast is that gas use in 2030 will be at similar levels to 2012 and that gas will still be needed for many years into the future.

The Strategy noted that the strong role of gas in energy generation has been supported by a secure supply of fuel and that the global outlook for gas supply is good which has been recently enhanced by developments in unconventional gas extraction. The Strategy notes that an important component of Government energy security policy is to ensure that the UK is not over dependant on any individual fuel source and that over reliance on gas, or any single energy resource, could put the UK at more risk if there were any disruption to supply. Such risks are likely to become greater for gas as the UK become dependent upon imports as domestic production declines. The strategy notes the developments in unconventional (shale) gas in the US, highlights the favourable geology in some parts of the UK and provides a commitment to provide various policy and fiscal incentives to encourage exploration for shale gas in the UK as a possible means to provide additional security of supply for gas.

To summarise, Government energy policy is therefore that there will be a continuing need for gas particularly for energy generation and that gas will have an important role to play in terms of providing security of supply and enabling a transition to low carbon means of generation. The Government has identified the security issues that may arise from increasing amounts of gas having to be imported from outside the UK and therefore has sought to encourage the exploration of domestic shale gas resources in order to establish the degree to which they could enhance diversity and security of supply.

National Planning Policy

National Planning Policy Framework (NPPF): The NPPF provides a broad framework for dealing with planning applications for mineral development including for energy resources.

The NPPF states that '*minerals are essential to support sustainable economic growth and our quality of life. It is therefore important that there is a sufficient supply of material to provide the infrastructure, buildings, energy and goods that the country needs.*' The NPPF therefore requires that in determining planning applications, that great weight is given to the benefits of mineral extraction, including to the economy but that proposals should also be considered against a range of criteria including impacts on human health, impacts of noise at nearby properties and effects on the natural and historic environment.

When determining planning applications for on shore oil and gas development, including unconventional hydrocarbons, the NPPF also requires mineral planning authorities to clearly distinguish between the three phases of development (exploration, appraisal and production). The current application is for an exploration site and therefore the application should be considered on that basis.

There are a number of other sections of the NPPF that are relevant to this application in terms of general planning issues including:-

Paragraphs 11-14	Requirement for Sustainable Development
Paragraph 17	Core Planning Principles
Paragraphs 56-66	Requirement for Good Design
Paragraph 100	Flood Risk
Paragraph 103	Requirement for Flood Risk Sequential Test
Paragraph 109	Conserving and Enhancing the Natural Environment
Paragraph 118-125	Conserve and Enhance Biodiversity

National Planning Policy Guidance (NPPG)

The National Planning Practice Guidance includes policy on hydrocarbon extraction including onshore oil and gas. The guidance is intended to be read alongside the NPPF and other planning guidance. The guidance is intended to cover unconventional hydrocarbons (such as shale gas). The guidance states that unconventional hydrocarbons are emerging as a form of energy supply and that there is a pressing need undertake exploratory drilling to assess whether or not there are sufficient recoverable reserves to allow full scale production on an economically viable scale. The guidance also includes information on the phases of hydrocarbon

exploration, the planning application process and the issues raised by such developments including those that are specific to unconventional gas reserves.

In summary, National Planning Policy and Guidance in relation to this application is that proposals which meet the definition of sustainable development and which comply with the policies of the development plan should be approved without delay. In determining individual applications, the economic benefits of mineral extraction are important considerations but must be balanced against local environmental impacts. In terms of unconventional gas proposals, the Government wishes to understand the likely contribution that such resources might make to gas supply. As with any hydrocarbon resources, the information gathered by techniques such as seismic surveys has limitations and exploration wells must be drilled to allow an accurate assessment of the size and recoverability of the resource. The Government wishes to encourage the drilling of such exploration wells where they are environmentally acceptable as a means to more accurately establish the size of UK shale gas resources including the contribution they may make towards energy self sufficiency.

Local Development Plan Policy

The Development Plan for the site is made up of the Joint Lancashire Minerals and Waste Development Framework Core Strategy (LMWDF), the Joint Lancashire Minerals and Waste Local Plan – Site Allocation and Development Management Policies – Part One (LMWLP) and the Fylde Borough Local Plan.

Joint Lancashire Minerals and Waste Development Framework Core Strategy Development Plan documents (LMWDF)

Policy CS1 - Safeguarding Lancashire's Mineral Resources – this policy requires that minerals will only be extracted where they meet a proven need for materials with those particular specifications

Policy CS5 - Achieving Sustainable Minerals Production – the policy outlines a number of criteria against which proposals will be considered to ensure that natural resources (water, air, soil and biodiversity), the historic and visual importance of landscapes, flooding and the amenity, health and well being of the population are protected from harm and appropriately enhanced.

Joint Lancashire Minerals and Waste Local Plan – Site Allocation and Development Management Policies – Part One (LMWLP)

Policy NPPF 1 - Presumption in favour of sustainable development = the policy reiterates the position in the NPPF that planning applications which accord with the policies in the local plan will be approved without delay and that where there are no relevant policies, the County Council will grant planning permission unless material considerations, including policy in the NPPF, indicate otherwise .

Policy DM2 - Development Management – the policy states that proposals for minerals operations will be supported where it can be demonstrated that all material social, economic or environmental impacts that would cause demonstrable harm can be eliminated or reduced to acceptable levels.

The policy also states that proposals will be supported where it can be demonstrated to the satisfaction of the mineral planning authority that the proposals, where appropriate, will make a positive contribution towards the local and wider economy, historic environment, biodiversity and landscape character, residential amenity, reduction in carbon emissions and reduction in length and number of journeys made.

The County Council is also preparing a 'Supplementary Planning Document' (SPD) on oil and gas exploration, production and distribution. The purpose of the SPD is to provide interpretation of how the existing policies in the Minerals and Waste Core Strategy and Local Plan are intended to operate, to give guidance on the application process and to provide information on some of the characteristics of the hydrocarbon industry. The draft was published for consultation on 5th January 2015.

Fylde Borough Local Plan

The Fylde Borough Local Plan contains a number of policies for the general control of development in the Fylde area and was adopted in 2005. The Borough Council are producing a replacement Local Plan. However this is at an early stage of preparation and therefore carries limited weight at present. Due to the age of the existing local plan, it may be that some policies of the existing local plan carry limited weight, particularly where they are not consistent with the NPPF. However the policies referred to in the report are considered to still retain weight and are consistent with the NPPF.

At a strategic level, the site is defined as a countryside area in the Local Plan and is therefore subject to Policy SP2. Policy SP2 states that development in such areas will not be permitted except where proposals are essentially required for the purposes of agriculture, horticulture or forestry or other use appropriate to a rural area. An exploration site for hydrocarbons is an industrial development which does not fall within the above categories.

However, minerals can only be worked where they are found. Although the Bowland Shale occurs beneath most of the Fylde area and therefore there may be some flexibility as to where an exploration site can be located, much of the area outside the existing settlements within Fylde Borough is designated as countryside. Due to the need to retain a separation between exploration sites and settlements, exploration in countryside locations is therefore almost inevitable. For these reasons, the development is considered acceptable in terms of Policy SP2.

There are also a number of other local plan policies dealing with environmental impacts which will be discussed in other sections of this report. These policies are:-

Policy EP11	Building Design and Landscape Character
Policy EP12	Conservation of Trees and Woodland
Policy EP23	Pollution of Surface Water
Policy EP24	Pollution of Ground Water
Policy EP26	Air Pollution
Policy EP27	Noise Pollution
Policy EP28	Light Pollution

Assessment

The application and supporting information has been assessed against the national guidance, the national policies and those relevant policies of the local development plan under the following sections relative to those set out in the ES. In view of the nature and complexity of some of the issues raised where appropriate these have been set out in supporting appendices including the nature of the proposal relative to the subject matter, the proposed mitigation if required, a summary of representations received and an assessment of such. A summary of the issues with reference to the respective appendices are reported as follows.

Scheme alternatives

Schedule 4, Part 1 (2) of the EIA Regulations requires the ES to provide “*an outline of the main alternatives studied by the applicant or appellant and an indication of the main reasons for the choice made, taking into account the environmental effects*”.

Unlike other types of mineral development where there are very narrowly defined locations for development, exploration sites could potentially be located at a variety of sites within the applicant's exploration licence area. The applicant has undertaken a systematic process to select the preferred sites for this stage of exploration.

The purpose of the exploration proposals is to establish the potential commercial shale gas reserves in Lancashire and provide a clearer understanding of the total amount of gas in place and the volume of commercially recoverable gas. The exploration of gas is supported by the Government and particularly DECCs UK Gas Generation Strategy in respect of shale gas.

The applicant is proposing 4 wells at each of the proposed sites (Preston New Road and Roseacre Wood) which would enable different strata to be targeted from one site. The sites have been selected based on geological, environmental, community, land ownership and other technical factors in a staged manner.

The first stage involved a detailed understanding of the geological conditions following the 3D geophysical survey that was carried out. This identified areas of relatively shallow flat laying shale which directed the choice of site to avoid hydraulically fracturing near regional faults and which together with the employment of a 'traffic lights system' of monitoring would reduce the risk of inducing a felt seismic event.

The second stage involved the identification of Tier 1 environmental constraints, namely:

- Existing and proposed European and national designations (for example Special Protection)
- Areas, Sites of Special Scientific Interest).
- Nationally designated heritage assets including: listed buildings, Scheduled Monuments,
- Registered Parks and Gardens, Registered Battlefields and World Heritage Sites.
- Groundwater Source Protection Zone 1.
- Flood Risk – avoiding flood risk zone 3b.

The second stage involved the identification of Tier 2 environmental constraints, namely:

Connections:

- Highway routes and access - A review of the existing road network and access arrangements was undertaken to identify locations where it would be suitable to use an existing access or create a new access to an exploration site.
- Utilities - Areas were identified where there is potential to connect to existing utilities networks (principally potable water supply and gas).

Environmental Constraints:

- Cultural heritage - All heritage assets identified via the historic environmental record were mapped and reviewed.
- Landscape character - Landscape character areas were mapped and considered in regard to the location of exploration well sites and the County's Landscape Strategy.
- Visual impact - A broad zone was used to establish the area in which the exploration well sites may be visible.
- Protected species - Data was collected from site walkovers, surveys and existing ecological records were reviewed.
- Non-designated sites/valuable habitat - Non-designated sites and valuable habitats were defined and reviewed for each site
- Agricultural land quality - Information on agricultural land classifications (i.e. 1, 2, 3a and 3b) was reviewed.
- Proximity to housing and other sensitive uses - Residential properties and other sensitive uses were considered and the distance from these uses was taken into account.
- Light pollution - The potential for light pollution was considered for each zone taking into account the topography of the site, existing barriers and sensitive receptors.
- Noise - A more detailed consideration of noise was undertaken for each zone, taking into account existing noise levels, potential noise barriers and distance from residential properties and sensitive receptors.
- Air quality - The potential for air quality impacts was considered taking into account air quality management designations and sensitive receptors.
- Water resources, flood risk and drainage - Proximity to watercourses, wetlands and ponds, and the potential for future development of groundwater resources was considered. Flood risk issues and drainage requirements were also considered.

Planning Constraints

- Local planning policy - The Development Plan allocations and planning designations were identified.
- Land Ownership Issues
- Potential to secure a lease from the landowner - The likelihood of using the land for the purpose of an exploratory well was determined based on discussions between Cuadrilla and the land owners.

- The existing sites that are within the control of the applicant and for which planning permission has previously been granted at Grange Hill, Preese Hall, Annas Road and Becconsall were also considered. These were dismissed due to them not having the most suitable geological characteristics (Grange Road), abandonment (Preese Hall, Annas Road) or not falling within the 3D geophysical survey (Becconsall).

The assessment of all the above constraints has lead to the proposed site being chosen.

Inevitably, notwithstanding the site may be considered to be the preferred site by the applicant it would still generate potential impacts, most particularly on the nearest residential properties. It has been suggested that a site could have been located in a more industrial location particularly with the opportunity to directionally drill at depth and which would not have generated the same type of impacts. However, such locations may not be as attractive in terms of targeting the geological horizons and if the impacts of the proposed development can be found or made acceptable then it could be argued that the preferred site could be found acceptable.

The application must of course be considered on its merits and the following is an assessment of the need for the development and the potential impacts and proposed mitigation.

Need for the development

The Government has made it clear that there is a need to reduce carbon emissions and to ensure energy security and that while renewable energy must form an increasing part of the national energy picture, oil and gas remain key elements of the energy system for years to come. The Government is committed to maximising indigenous resources, subject to safety and environmental considerations. It is considered that in principle the proposal accords with the approach set in national guidance by investing in energy infrastructure to establish whether indigenous oil and gas reserves are available and worth exploiting.

The NPPF, for the purposes of oil and gas exploration notes that '*Minerals are essential to support sustainable economic growth and our quality of life*' and that '*...minerals are a finite natural resource, and can only be worked where they are found...*' (NPPF paragraph 142). Paragraph 144 requires that in determining planning applications local planning authorities '*give great weight to the benefits of mineral extraction, including to the economy*', though this must be balanced against the weight given to environmental impacts of a development.

Paragraph 124 PPG: Minerals advises that nationally, energy should come from a variety of sources, including oil and gas, and mineral planning authorities should take account of government policy including that relating to oil and gas.

Paragraph 147 of the NPPF states that minerals planning authorities should "*when planning for on-shore oil and gas development ... address constraints on production and processing within areas that are licensed for oil and gas exploration or production.*" This makes it clear that any consideration of constraints should be limited to sites which are covered by a Petroleum Exploration and Development Licence (PEDL). As operators can only explore within the area they hold a PEDL for,

it is considered reasonable to limit consideration of alternative sites to a single PEDL area, particularly as a key constraint for oil/gas exploration would be holding the PEDL licence.

At the local level, there are no specific policies relating to oil and gas. Policy CS1 of the Joint Lancashire Minerals and Waste Development Framework Core Strategy Development Plan documents (LMWDF) seeks to safeguard Lancashire's mineral resources and requires that minerals are only extracted where they meet a proven need for materials with those particular specifications. Policy CS5 - Achieving Sustainable Minerals Production outlines a number of criteria against which proposals will be considered to ensure that natural resources (water, air, soil and biodiversity), the historic and visual importance of landscapes, flooding and the amenity, health and well being of the population are protected from harm and appropriately enhanced.

Policy NPPF 1 of the Joint Lancashire Minerals and Waste Local Plan – Site Allocation and Development Management Policies – Part One (LMWLP) reiterates the position in the NPPF that planning applications which accord with the policies in the local plan will be approved without delay and that where there are no relevant policies, the County Council will grant planning permission unless material considerations, including policy in the NPPF, indicate otherwise. Policy DM2 states that proposals for minerals operations will be supported where it can be demonstrated that all material social, economic or environmental impacts that would cause demonstrable harm can be eliminated or reduced to acceptable levels.

The application site is within PEDL 165 and EXL 269 licence boundaries. The area covered by the PEDL encompasses the major settlements of Preston, Fleetwood, Blackpool, Lytham, Leyland, Chorley and Southport between which the area is generally rural with scattered, small settlements and, therefore, any oil/gas site tapping into this reserve is likely to be within the countryside.

It is considered that in principle the proposal accords with the approach set in local policy that mineral operations will be supported where it can be demonstrated that all material social, economic or environmental impacts that would cause demonstrable harm can be eliminated or reduced to acceptable levels. The following is an assessment of whether the applicant has demonstrated such.

Air Quality (Appendix 3)

The project will generate some emissions to air. But providing the operational practices are adhered to and regulated by the Environment Agency, the emissions would not cause unacceptable impacts.

Having undertaken a detailed assessment, the Environment Agency is satisfied that the emissions from the flare would be insignificant at locations closest to the site. In terms of public health impact of the flare emissions, the Agency's audit checks, modelling and sensitivity analysis confirms there will be no exceedance of standards established for human protection.

Based on the information contained within the application, Public Health England has no significant concerns in relation to the potential emissions from the site adversely impacting the health of the local population, providing the applicant takes all

appropriate measures to prevent or control pollution, in accordance with the relevant sector technical guidance or industry best practice

Comprehensive monitoring of the practices and the site, overseen and regulated by the Environment Agency, will ensure that risks are managed effectively.

Archaeology and Cultural Heritage (Appendix 4)

As part of the EIA an assessment has been undertaken of the effects of the project on the archaeology of the area, the above or below ground remains left by previous generations including pre history, Roman, early medieval, medieval, post medieval and later. The assessment concludes there would be significant effects on archaeology and cultural heritage assets resulting from the construction, operation and decommissioning of the proposed exploration compound, the construction of the associated access route and the installation of the seismic monitoring array.

To mitigate the impact of the development works the most appropriate way to implement a scheme of investigation would be to carry a strip, map and record exercise during the excavation of the topsoil if the monitoring archaeologist identifies any features requiring further investigation

Subject to the imposition of a condition requiring the implementation of a programme of archaeological work is secured prior to commencement of development it is considered the development would not have an unacceptable impact on archaeology, would not have an unacceptable cumulative impact in conjunction with the Roseacre Wood proposed development and would comply with policy EP21 of the Fylde Local Plan.

Greenhouse Gas Emissions (Appendix 5)

The project will generate some greenhouse gas emissions. But providing the operational practices are adhered to and regulated by the Environment Agency, the emissions would not cause unacceptable impacts.

The Environment Agency permit requires that during drilling of the exploratory boreholes, fugitive emissions of natural gas are to be prevented by increasing the hydrostatic pressure of fluids so as to prevent gas release. The well will also be equipped with physical control equipment which enables the borehole to be shut at the surface to prevent escape of gas emissions. Gas monitoring equipment will be in constant use at the surface. The permit does not allow the venting of natural gas unless it is necessary for emergency reasons. Comprehensive monitoring of the practices and the site, overseen and regulated by the Environment Agency, will ensure that any risks are managed effectively.

The Environment Agency permit regulates fugitive emissions of methane. Venting is not permitted except in safety emergencies. The permit applies controls. Flowback fluid will be transferred through the separator and to the storage tanks via enclosed pipework. And as described in section 9.9 of the Waste Management Plan (which is part of the permit) pipework and connections will be tested for integrity prior to use and will be monitored during operations. Importantly, methane monitoring will take place before, during and after operations.

The major source of greenhouse gas emissions from the proposal is however CO₂ from the combustion of natural gas in the flare. The operator has justified the use of a flare rather than using the gas on site by demonstrating to the Environment Agency that the costs of using the gas would be disproportionate for the 90 day periods. It is also not reasonably practicable to connect the flow of extracted natural gas to the gas grid during the initial flow tests. This is because the flow rates are unknown and the quality of the gas produced may not be compatible with gas grid requirements without further processing. In addition, in order to establish whether there is sufficient flow of gas to move to extended flow testing, there needs to be an uninterrupted flow. Using the gas to meet energy requirements on site would necessitate interrupting the gas flow, preventing the collection of the required data for analysis.

The project's carbon footprint is 118,418 to 124,367 tonnes of carbon dioxide equivalent (tCO₂e). This is made up of approximately 94% direct emissions and 6% indirect emissions. 73% of the project carbon footprint can be attributed to flaring.

Average annual greenhouse gas emissions are 22,618 tCO₂e per year, which is 0.18% of the county's annual emissions as set out in the Lancashire Climate Change Strategy (2009). The project's emissions are just over 3% of the Borough's annual emissions as set out in the Strategy. The emissions are short term.

Community and Socio-economics (Appendix 6)

The applicant has undertaken an assessment of the community and socio-economic effects of the proposal. The applicant's assessment identifies that the proposal would have a number of community and socio-economic effects consisting of:

- Temporary loss of local amenity value through site activities, traffic and influx of population area.
- Employment generation, with direct employment for initial exploration wells predominantly drawn from beyond the local area, but with indirect and induced effects from local spending and the influx of population on Site (local supporting industry, hotels and subsistence for example);
- Increased spending in the agriculture sector from increased landowner income;
- Opportunity costs from the loss of agricultural land;
- Community disturbance from any protest activities, or site works.
- Effects of increased local spending from the community benefit payment from the applicant via the Community Foundation for Lancashire to local communities (although the applicant acknowledges that such payments are not a material consideration in deciding whether to grant planning permission and are not presented as such, but arte of the view that they would be a positive effect flowing from the development).

An assessment of the potential community and socio economic impacts has also been carried out by the County Council. The proposal is for a temporary project but it has the potential to have impacts that may impact on community, social and economic factors particularly relating to the temporary loss of local amenity value through site activities, traffic and influx of population area; community disturbance from any protest activities; impacts on tourism and agricultural production; many of these potential impacts (and more) are referred to in representations opposing the

proposal. However, there would also be opportunities for employment generation, with direct employment for initial exploration wells predominantly drawn from beyond the local area, but with indirect and induced effects from local spending and the influx of population on site such as local supporting industry, hotels and subsistence; increased spending in the agriculture sector from increased landowner income although these are difficult to quantify; and whilst it is not a material consideration for planning purposes, the opportunity for community benefit payments.

Subject to the adherence to regulatory requirements it is considered that the community and socio economic impacts could be kept to a minimum. In the event there were to be disturbance leading to damage, the applicant has committed to investigating complaints and has demonstrated insurance would be in place if damage is proven to be attributable to their operations. It is not possible to quantify what impacts a proposal of this nature would have on either property values or the market, but these are not material planning considerations.

Stay Lancashire has publically countered the view that the site would adversely affect tourism and is of the view that the hospitality industry would benefit. There are no statistics that support either view.

In terms of community cohesion, recent experience has shown that drill sites can attract public attention and a degree of protest and environmental extremist activities may also occur. The Lancashire Constabulary have been consulted on the proposals and have not objected. It is right to assume that public order would be maintained by the police although there would inevitably be costs associated with such as has been evidenced by other sites elsewhere in the country.

It is concluded that whilst there would be some localised impact on residents in the community at the nearest properties, the project would not have a significant effect on wider communities or socio-economic factors, particularly in groups with protected characteristics. There would not be a material impact on agricultural land or practices and there would be some-economic benefits during the exploration stage to the local economy. It is therefore considered that the proposal would not have an unacceptable impact on communities or socio-economic impacts and that to the contrary there would be some community and socio-economic benefits. On balance therefore, it is concluded that the proposal would not be in conflict with the NPPF or the development plan policies.

Ecology (Appendix 7)

The ecological receptors, of nature conservation value, identified within the zone of influence of the main site included; hedgerows, bats, breeding birds, wintering birds and brown hare.

The ecological receptors, of nature conservation value, identified within the zone of influence of the array sites included; wintering birds connected to Lytham Moss BHS and Morecambe Bay SPA and the Ribble and Alt Estuary SPA and ground nesting breeding birds.

The routes of potential impact are;

- Loss of habitat.

- Disturbance due to increased noise levels, vehicle and personnel movements (visual) and increased light levels.
- Alteration of bat behaviour due to heat emitted by the flare stack.
- Accidental injury or killing of brown hare.

A range of mitigation measures and compensation measures are to be adopted to either reduce the level of impact so that it is no longer significant or provide alternative habitat to ensure that the local population is not significantly impacted by the project. These measures will be presented within a Biodiversity Mitigation Strategy (BMS).

Following implementation of the mitigation measures, there will be no unacceptable impact on biodiversity as a result of the proposal.

Hydrogeology and Ground Gas (Appendix 8)

The applicant has undertaken an assessment of the potential impacts relevant to hydrogeology and ground gas. The assessment looks at the potential effects of the project as part of the well pad activities and materials in transit, the well construction and integrity, and features created by the hydraulic fracturing on the quality of the water environment, both ground water and surface water and the possible creation of subsurface pathways to sensitive features that could result in pollution.

The geology beneath the site is described and the interpretation by the applicant has been assessed by the EA. The geology is such that the Manchester Marls forms a seal between the ground surface and shale rock within which is trapped the natural gas. The Manchester Marls act as an impermeable barrier and prevent the movement of water and gas up towards the surface of the ground from deeper layers of rock. The Sherwood Sandstone aquifer, a porous rock containing water lies above the Manchester Marls. The EA has confirmed the poor quality of the aquifer because of its salinity and it is therefore not used for drinking water.

The assessment sets out how the well pads and the wells have been designed to prevent leaks or spills from entering the wider environment (the soil, groundwater, surface water or the atmosphere) and cause pollution. The well design is assessed by the HSE and the EA in accordance with their respective regulatory requirements and industry guidance. The EA also assesses the proposed drilling fluid and the fracture fluid and requires it to be non-hazardous.

Prior to and during works, groundwater water and surface water would be monitored. The monitoring would be agreed with the EA. The EA would require baseline monitoring of groundwater, air quality and surface water for approval before the start of operations.

When the works are finished, the wells would be plugged and abandoned in accordance with the regulatory requirements of the HSE and the EA and industry guidance. The plugging and abandonment of the well including the monitoring of the ground water quality and gas concentrations are matters for the HSE, the EA and the DECC.

The assessment concludes that the probability of source pathway receptor linkage associated with contaminant release during well pad construction and access is low;

that the contaminant release due to defects in the pad membrane is low; that the contaminant release due to overflow discharge from the well pad drainage systems is low; that liquid spray off due to high pressure equipment failure is low; that the spill of contents of vehicles in transit on the public highway is low; that the loss of well integrity due to poor well construction is very low; that the loss of well integrity caused by hydraulic fracturing is very low; that the loss of well integrity is very low.

As mentioned, the Manchester Marls forms a seal between the ground surface and shale that traps the natural gas within the rock. It therefore acts as a barrier and prevents the movement of water and gas up towards the surface from deeper layers of rock. The Sherwood Sandstone is a porous rock and contains water. It is considered by the Environment Agency to be a poor quality aquifer because of its salinity and is therefore not used for drinking water.

The well pads and the wells have been designed in accordance with the HSE and EA regulatory requirements and industry guidance. The Environment Agency also assesses the proposed drilling fluid and the fracture fluid requires it to be non-hazardous. Prior to and during works, groundwater water and surface water will be monitored. The monitoring will be agreed with the EA. The EA will require baseline monitoring of groundwater, air quality and surface water for approval before the start of operations. When the works are finished, they will be decommissioned in accordance with the regulatory requirements of the EA and the HSE and industry guidance. The plugging and abandonment of the well including the monitoring of the ground water quality and gas concentrations are matters for the HSE and the DECC.

An assessment of subsurface geology by the EA has considered the potential for retained pollutants in the shale rock to migrate upwards into contact with any groundwater bearing formations. This outcome has been assessed as very low and with no plausible pathway. A groundwater activity permit is required from the EA because of the theoretical possibility that fluid and gas could migrate from the target formation into the Millstone Grit. The EA has assessed the possibility of fluid migration as very low. This is because of the absence of a pressure gradient driving the fluid once the fracturing pressure is turned off. Moreover, close monitoring of fractures (using the micro seismic array and in accordance with the Fracture Plan that must be approved by DECC and the Agency) will prevent any fractures moving into the Millstone Grit from the target formation, thus preventing the movement of fluid.

There are possible impacts associated with the well pad construction and activities. The site construction involves laying an impermeable membrane over the whole compound area to prevent accidental slippage and rainwater from entering the underlying soils, groundwater and nearby water courses. The platform is bounded by a ditch, for the purpose of pollution control. Only clean surface water will drain into a water course (outside drilling, hydraulic fracturing and initial flow test stages) and the Environment Agency has advised that the arrangements are acceptable subject to conditions.

There are potential impacts associated with the well design and construction and proposal to manage these impacts. It is proposed that the well would be drilled, constructed and tested in accordance with regulatory requirements and industry standards. The well design would comprise a two barrier cement sealed design. Details of the well design would be reviewed by the Independent Well Examiner.

Additionally, the Environment Agency considers the proposed well construction would form a barrier to prevent the escape of fluids. The EA is satisfied that well integrity is assured through compliance with the well examination regime and regulation by the Health and Safety Executive, and further through conformance to Oil & Gas UK and UK Onshore Operators' Group good practice guidelines for well design and construction. Hydraulic fracturing plans and a seismic monitoring programme would be submitted to DECC and the EA for approval prior to hydraulic fracturing operation commencing; operation of a traffic light system for monitoring of induced seismicity is also designed to mitigate the risk from induced seismicity, including any potential for damage to well integrity. The potential for fractures that are propagated by hydraulic fracturing to extend beyond the target formation has been assessed to be very low and the growth of fractures resulting from each fracturing stage would be assessed with the aid of the seismic monitoring array.

The EA has assessed the proposed fracture fluid as non-hazardous. It is also satisfied that the chemical similarity between the fluid and the water in the Millstone Grit is sufficiently high that any indirect discharge would be insignificant. Finally, the EA believes that if any fluid reaches the Millstone Grit it would not move far from the point of entry because of the confined nature of the rock. If needed low toxicity oil based muds would only be used below the Manchester Marl formations and with the approval of the EA.

Prior to and during works, groundwater water and surface water would be monitored (see application LCC/2014/0097). The monitoring would be agreed with the EA. The permit includes pre-operational requirements to provide baseline monitoring of groundwater, air quality and surface water for approval before the start of operations. The permit also includes a requirement to provide for a monitoring plan for at least 4 weeks prior to gas flaring. The EA has specified monitoring of groundwater and surface water in the permit and this would be carried out until the permit is surrendered.

When the works are finished, they would be decommissioned in accordance with the regulatory requirements of the EA and the HSE and industry guidance. The plugging and abandonment of the well including the monitoring of the ground water quality and gas concentrations are matters for the HSE, the DECC and the EA and their respective regulatory regimes. In particular, the plugging and abandonment of the borehole is regulated by the HSE under the Offshore Installations and Wells (Design and Construction etc.) Regulations 1996. These Regulations contain provisions relating to well integrity and abandonment as well as the selection of materials. The Regulations apply to all wells drilled under landward licences, the key objectives of which are to prevent the escape of fluids from the well which might result in pollution of freshwater or ground contamination. Under the Regulations, well abandonment techniques must prevent the transfer of fluids created by pressure gradients between different zones. Such transfer is achieved by means of the original borehole casing and the cementing and plugging operations that are undertaken as part of well abandonment.

Paragraph 122 of the NPPF requires that planning authorities should not seek to control processes or emissions where these are subject to approval under separate pollution control regimes and that LPA's should assume that these regimes will operate effectively. Nonetheless, paragraph 112 of PPG Minerals, notes that before granting permission the local planning authority should be satisfied that the issues

dealt with under other regimes can be adequately addressed by taking advice from the relevant regulatory body. The County Council has consulted with the EA and HSE, neither of which has objected.

The EA has granted the applicant the necessary environmental permits needed to carry out their proposed operations. The permits set out the conditions needed to protect groundwater, surface water and air quality. Now permits are issued, the applicant would have to comply with the proposed conditions that are designed to ensure that operations do not cause harm to people or the environment. The EA has assessed the proposed activities that could involve the discharge of pollutants into groundwater (a 'groundwater activity') and the nature of these pollutants. The EA is satisfied, subject to conditions, that there is minimal risk of direct discharge of pollutants into groundwater. The EA is also satisfied that the indirect entry of non-hazardous pollutants will be limited so as not to cause pollution.

Hydrogeological issues and the protection of surface and ground water have been assessed by the applicant and the risks associated with such were considered to be low or very low.

Advice provided to the County Council from the University of Glasgow states the scenarios of pollution of shallow groundwater and surface waters due to fracking operations, as suggested in some representations, are not credible. They also say the suggestion the proposal is unsafe because there are faults in the vicinity are unfounded.

The EA and HSE have been consulted and have advised on the regulatory regimes that would be employed to manage the risks and that they are satisfied that such risks could be managed in a way that would not cause any unacceptable impact. It is considered that the site can be contained and surface waters managed in a way as to prevent pollution to adjoin land or nearby watercourses.

The County Council should assume that these regimes will operate effectively and can be satisfied that the issues dealt with under other regimes can be adequately addressed. Boreholes for ground water monitoring are the subject of planning application LCC/2014/0097. Subject to conditions controlling the management of surface water it is considered that the proposal could be acceptably controlled by other regulatory regimes and would not have any unacceptable impacts on hydrology or ground or surface water and would comply with national guidance and policies and the policies of the development plan.

Induced Seismicity (Appendix 9)

A full assessment of the likely effects of induced seismicity associated with the proposed hydraulic fracturing operations including the likely effects on surface deflections (subsidence) from gas extraction has been carried out. It recognises seismic events could occur as a result of stress changes on a plane of weakness (a fault) caused by the growth of engineered fractures and the transmission of fluid pressure into a critically stressed fault. The assessment has been carefully considered against the findings of the Royal Society, in light of national guidance and with regard to specialist advice that has been sought from DECC and the County Council's own appointed seismologists and in light of the views and recommendations of the Director of Public Health. The views expressed by groups

and individuals have also been carefully considered. The full assessment of such is set out in a separate appendix 9.

The Royal Society concludes that health, safety and environmental risks associated with hydraulic fracturing as a means to extract shale gas can be managed effectively in the UK as long as operational best practices are implemented and enforced through regulation. DECC will control fracking in a way, through a traffic light system that prevents fracturing generating more than 0.5M_L which means induced seismicity will not be felt at all, or only by a few under especially favourable conditions. Whilst perceived fears are understandable, they cannot be supported by independent review and guidance. It is safe to assume that BGS or other appropriate bodies will carry out national surveys to characterise stresses and identify faults in UK shales and operators will carry out site-specific surveys to characterise and identify local stresses and faults. It is proposed that seismicity will be monitored before, during and after hydraulic fracturing (see application LCC/2014/0097). Monitoring has already been carried out in the Becconsall area. A traffic light monitoring systems would be implemented and data fed back to well injection operations so that action can be taken to mitigate any induced seismicity and which would be overseen by DECC and whom the county council can be satisfied will operate within its own regulatory framework.

With regard to possible subsidence DECC has reported [Review and Recommendations for Induced Seismic Mitigation (April 2012)] that there are no documented cases of fracturing operations causing subsidence or tremors large enough to cause damage at the surface and that unlike coal mining, shale gas production does not remove large quantities of rock from underground, which can cause subsidence. The report notes that subsidence could occur when rock is compressed and collapses in on itself, but that shale rock is not easily compressed, so subsidence is unlikely and that rock samples would be tested before any commercial production is approved. The conclusions of the applicant and the previous conclusions of DECC are accepted. It is considered that the proposed exploration and appraisal of shale gas would not lead to any subsidence at surface and should there be an opportunity for any further stage of exploration that could lead to commercial exploitation, that would require the benefit of planning permission and would be the subject of greater scrutiny by DECC.

With regard to the representations received it is not likely that seismic activity would lead to injury to humans or wildlife or destabilise the geology in a way that would generate earthquakes that would place the Heysham power station or the proposed underground gas storage project at Preesall at risk. The County Council is not aware of any verified evidence of damage to property as a consequence of the seismic events at Preese Hall or that the surface strata was undermined in any way or present a risk of subsidence to moss land or nearby properties. There is no evidence to support that fact induced seismicity would led to pollution of surface or ground water or that the process could be safely carried out. A 3D survey has been carried out to give a clear understanding of the geological conditions and faulting in the area and the sites, depth and direction of drilling and horizons proposed to be fracked have been chosen and designed in a way to minimise seismic movement and which, if undertaken in accordance with a traffic light system would prevent the migration of fluids. There are no mine workings in the Fylde.

Whilst the concerns are understandable it is concluded that they cannot be supported and that the County Council can assume and be satisfied that the development would be carried out to meet the requirements of DECC.

Land Use (Appendix 10)

As part of the EIA an assessment has been undertaken of the impacts of the proposal on the land use. The agricultural land affected (7.5ha) has been assessed as good or moderate in terms of its agricultural land quality. A soil survey has been carried out and data on farming practices collated. The site forms part of a 162ha farm holding of which 7.5 is proposed to be used for the development – approximately 1.5%. The land is grassland grazed by milking cattle, produces hay crops for sale, dairy replacements and beef are reared and used for winter grazing by sheep. The land lost to the site would be replaced by an additional 8ha of rented land. Approximately 1.5ha is classed as good quality (Class 3a) with approximately 1.1 ha moderate quality (Class 3b).

The assessment concludes the impact on the loss of agricultural land is not significant.

An assessment of the ES has been carried out and it is concluded that the impact of the proposal in terms of land use planning would not be significant. The loss of agricultural land would be for a temporary period and provided that appropriate mitigation measures are imposed with regard to soil compaction and conditions controlling the storage of soils and the reinstatement of the land, the proposal would be acceptable. The proposal would not be contrary to the policies of the NPPF or the policies of the development plan.

Landscape and Visual Amenity (Appendix 11)

As part of the EIA an assessment has been undertaken of the impacts of the proposal on the landscape and visual effects. It concludes there would be no significant landscape effects although there would be very localised direct change due to the development temporarily altering a very small proportion of the local character area during construction of the well pad but no effect during other phases. The visual findings conclude there would be significant adverse visual effects arising during the drilling, hydraulic fracturing and flow testing phases. Seven of the principal viewpoints would experience significant adverse visual effects. Six of these are residential receptors within and one with a recreational viewpoint. No significant adverse visual effects were judged to occur on any receptor more than 930m from the site during any phase of the project.

Mitigation measures are proposed in the form of 4m bunds around the well pad, landscaping around the well pad to help filter views, allowing hedgerows to grow taller, minimisation of light spill, gap filling in existing hedgerows.

The ES concludes there would be no cumulative effects from other developments proposed or committed that would have and significant impact on visual amenity. The land is of moderate agricultural quality and it is concluded that there would be no significant effects on farming practices.

An assessment of the ES has been carried out and advice provided by the County Council specialist advisor on landscape. The assessment finds that given the undulating and open nature of the landscape, the development would have some significant landscape impacts but only for a limited period and in the main restricted to locations near to the site, in particular properties at Staining Wood and Foxwood Chase and from Preston New Road. The development would not affect any conservation areas, listed buildings or protected trees. It would not require the removal of any significant existing landscape features and therefore any landscape change would not be of a permanent nature. In the long term, it is considered the development is acceptable in terms of landscape impacts. However, it is considered that any planning permission should be subject to conditions relating to the colour of the drilling rigs and other equipment, the design and location of the perimeter landscaping mounds, the colour and design of fencing, lighting design and control and details of the restoration and aftercare of the site to include the replanting of any hedgerows that are removed and restoration.

It is therefore concluded that the proposal would generate significant localised landscape and visual impacts in the short term and which would be unavoidable due to the nature and duration of the proposal. However, whilst the duration is over an extended period of time, it would still be temporary. Mitigation measures are proposed and there is scope to further mitigate the likely effects by reducing the height of the drilling rig to a maximum of 35m; finish the drilling and fracturing rigs in a more suitable colour than red/white as proposed and to finish the various cabins and other temporary buildings in a more appropriate colour than blue as proposed. Subject to such conditions it is considered that the proposal would not be contrary to Policy D2 of the Lancashire Minerals and Waste Local Plan and whilst it could be seen as contrary to Policy EP11 of the Fylde Local Plan, the proposed development, due to its nature for a temporary period could not be designed in a way to meet the requirements of this policy.

Lighting (Appendix 12)

As part of the EIA an assessment has been undertaken of the effects of the potential night time light obtrusion from the project in view of the site being in a rural location away from built up areas and where there is little existing night time lighting. The assessment has used national policy and light obtrusion guidance including the Institute of Lighting Professionals (ILP) Guidance Note for the Reduction of Obtrusive Light. An assessment of the impacts has been carried out against the policies of the NPPF, the policies of the development plan and with regard to the views of the county councils specialist lighting advisor, the Director of Public Health and in view of representations received (Appendix 14).

The County Council's lighting advisor has raised no objection to the proposals and has advised that the lighting design generally complies with the required standards, with the exception of predicted sky glow, which marginally exceeds permitted standards. He does not anticipate any issues to the surrounding area, highway and its users on the grounds of safety.

The Director of Public Health has recommended that an assessment of light pollution as part of the site operations should be carried out, and if there are likely to be significant impacts associated with light pollution from the sites that cannot be

mitigated or controlled, the Applicant should be requested to consider the opportunity to offer to fit blackout blinds to those homes most likely to be affected.

In terms of landscape impact, lighting has properly been assessed. The assessment concludes there would be some light pollution at night. This would be for a temporary period but would be significant particularly when seen from the A583, nearest residential properties at Staining Farm and the villages of Little and Great Plumpton. Notwithstanding it would be for an extended period of time, with the mitigation measures proposed, and which could be controlled by condition, on balance, it is considered that lighting could be made acceptable and that the impacts associated with such would not be so great to affect amenity on a permanent basis or lead to unacceptable effects on nature conservation to constitute a sustainable reason for refusal. It would not be appropriate to require blackout blinds to be fit to those properties most likely to be affected. Subject to the mitigation measures proposed, and which could be controlled by condition, it is considered on balance that the proposed lighting for a temporary period would be acceptable for the purposes of the NPPF Policy DM2 of the LMWLP and Policy EP28 of the Fylde Local Plan.

Noise (Appendix 13)

Paragraph 109 of the NPPF states that the planning system should contribute to and enhance the natural and local environment by *inter alia* preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability.

Paragraph 123 of the NPPF states that *planning policies and decisions should aim to:*

- *avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;*
- *mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;*
- *recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and*
- *Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.*

Assessment of 'significant adverse impacts' is directed to the DEFRA publication *Explanatory Note to the Noise Policy Statement for England*.

In the accompanying practice guidance for the NPPF the management of the noise associated with particular development types is considered in a number of separate documents. For minerals development there is National Planning Practice Guidance: Minerals (PPG).

In relation to noise the PPG states that applicants *should carry out a noise impact assessment, which should identify all sources of noise and, for each source, take account of the noise emission, its characteristics, the proposed operating locations,*

procedures, schedules and duration of work for the life of the operation, and its likely impact on the surrounding neighbourhood.

Proposals for the control or mitigation of noise emissions should:

- *consider the main characteristics of the production process and its environs, including the location of noise-sensitive properties and sensitive environmental sites;*
- *assess the existing acoustic environment around the site of the proposed operations, including background noise levels at nearby noise-sensitive properties;*
- *estimate the likely future noise from the development and its impact on the neighbourhood of the proposed operations;*
- *identify proposals to minimise, mitigate or remove noise emissions at source;*
- *monitor the resulting noise to check compliance with any proposed or imposed conditions.*

The PPG continues by adding that *Mineral planning authorities should take account of the prevailing acoustic environment and in doing so consider whether or not noise from the proposed operations would:*

- *give rise to a significant adverse effect;*
- *give rise to an adverse effect; and*
- *enable a good standard of amenity to be achieved.*

In line with the Explanatory Note of the Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure would be above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation.

The PPG recommends appropriate noise standards and advises that *Mineral planning authorities should aim to establish a noise limit, through a planning condition, at noise-sensitive property that does not exceed the background noise level ($L_{A90,1h}$) by more than 10dB(A) during normal working hours (0700-1900). Where it will be difficult not to exceed the background level by more than 10dB(A) without imposing unreasonable burdens on the mineral operator, the limit set should be as near that level as practicable. In any event, the total noise from the operations should not exceed 55dB(A) LAeq, 1h (free field). For operations during the evening (1900-2200) the noise limits should not exceed the background noise level ($L_{A90,1h}$) by more than 10dB(A) and should not exceed 55dB(A) LAeq, 1h (free field). For any operations during the period 22.00 – 07.00 noise limits should be set to reduce to a minimum any adverse impacts, without imposing unreasonable burdens on the mineral operator. In any event the noise limit should not exceed 42dB(A) LAeq, 1h (free field) at a noise sensitive property.*

Where the site noise has a significant tonal element, it may be appropriate to set specific limits to control this aspect. Peak or impulsive noise, which may include some reversing bleepers, may also require separate limits that are independent of background noise (e.g. Lmax in specific octave or third-octave frequency bands – and that should not be allowed to occur regularly at night.)

For particularly noisy short term events such as soil stripping and road construction the PPG advises:

Increased temporary daytime noise limits of up to 70dB(A) LAeq 1h (free field) for periods of up to eight weeks in a year at specified noise-sensitive properties should be considered to facilitate essential site preparation and restoration work and construction of baffle mounds where it is clear that this will bring longer-term environmental benefits to the site or its environs.

Where work is likely to take longer than eight weeks, a lower limit over a longer period should be considered. In some wholly exceptional cases, where there is no viable alternative, a higher limit for a very limited period may be appropriate in order to attain the environmental benefits. Within this framework, the 70 dB(A) LAeq 1h (free field) limit referred to above should be regarded as the normal maximum.

Policy DM2 of the Joint Lancashire Minerals and Waste Local Plan (JLMWLP) states that development for minerals operations will be supported where it can be demonstrated that all material social, economic or environmental impacts that would cause demonstrable harm can be eliminated or reduced to acceptable levels. In assessing proposals account will be taken of the proposal's setting, baseline environmental conditions and neighbouring land uses, together with the extent to which its impacts can be controlled in accordance with current best practice and recognised standards.

Policy EP27 of the Fylde Borough Local Plan states that development which would unnecessarily and unacceptably result in harm by way of noise pollution will not be permitted. Where appropriate, planning permission will be granted subject to conditions to minimise or prevent noise pollution. This policy is considered not to be in conflict with the NPPF.

The Environmental Statement contains a noise assessment including details of existing background noise levels at noise sensitive receptors and details of predicted noise levels from proposed operations including traffic, drilling and hydraulic fracturing. The assessment outlines the available British Standards and guidance in relation to noise measurement and recommended acceptable noise levels. From this the applicant employed noise levels based on recommendations and guidance set out in BS5228-1:2009 – *Code of practice for noise and vibration control on construction and open sites*, which the applicant considers is the most appropriate by virtue of being representative of the nature of the proposed development.

Drilling would take place for 24 hours per day. The first drilling phase would last for five months. Three other separate drilling phases would then follow. Each of the three phases would last for three months. Between each drilling phase would be a hydraulic fracturing stage that would last for two months. Hydraulic fracturing would not take place at night time, and would last for three hours per day. Cumulatively there would be 14 months of 24 hour drilling.

The applicant has advised that different stages of the proposed development would generate different noise levels and noise levels for all stages of the project have been assessed. The applicant has concluded that the only stage with the potential to result in a significant noise effect would be where hydraulic fracturing occurs during night time (2300-0700) where noise limits are at their most stringent. The applicant proposes to mitigate this by only operating the pumps used (only for up to 3 hours at a time during hydraulic fracturing) during weekday daytime and Saturday mornings.

Vibration impacts have been ruled out by the applicant because of the nature of the project, method of construction for the well pad, arrays and pipeline connection for the extended flow testing.

The assessment concludes that there would be no significant adverse impacts on sensitive receptors and consequently no further mitigation is required. Nevertheless, a number of possible noise reduction measures are suggested and the applicant has more recently stated that recommended noise limits in the PPG could be achieved.

Proposed mitigation measures for drilling include:

- Installing enclosures to mud pumps.
- Fitting noise absorbent materials to the housing containing shale shakers and generators.
- Identify items of pipework or equipment that can be fitted with rubber bushings to reduce vibration and impact noise.

Proposed mitigation measures for hydraulic fracturing include:

- Confine fracturing pumping operations to Monday to Friday 0700 to 1900 and Saturdays 0700 to 1300 only with no fracturing on Sundays or Bank Holidays.
- Installation of an acoustically designed, up to 5m high hoarding around the fracturing pumps. Additionally, real time noise monitoring could be installed throughout the development.

The applicant's background noise readings and predicted noise levels are considered to be sufficiently robust and have been verified by independent noise measurements undertaken by consultants on behalf of LCC with the exception that background noise readings were found to be lower than those set out in the ES. Furthermore, it is concluded that it is unlikely there are any tonal or impulsive aspects to the noise from the drilling rig or from the hydraulic fracturing phase of the project.

The closest residential properties to the site are at Staining Wood Cottages (270m south of the site) and the adjacent properties at Staining Wood Farm and Foxwood Chase. Plumpton Hall Farm which includes two residential properties is approximately 380m to the east of the well pad boundary. .

Background noise levels at Staining Wood Cottages have been recorded as low as 29.5 dB L_{A90} at night (LCC's own measurements) and 56 dB L_{A90} during the day (applicant's measurement). Noise from drilling operations is predicted to raise background noise levels by approximately 12.5 dB at night when judged against LCC's background measurement.

Background noise levels at Plumpton Hall Farm have been recorded as low as 26 dB L_{A90} at night (LCC's own measurements) and 50 dB L_{A90} during the day (applicant).

The difference between existing low background noise levels and predicted noise levels is of concern. Fundamentally, the PPG states that *Mineral planning authorities should take account of the prevailing acoustic environment and in doing so consider whether or not noise from the proposed operations would give rise to a significant adverse effect and whether it would enable a good standard of amenity to be achieved.*

PPG-Minerals seeks to ensure that noise is minimised as far as practicable and it should be demonstrated that noise would be no more than 10dB above background during daytime and evening working at noise sensitive receptors (subject to a maximum of 55dB) and that for any operations during the period 22.00 – 07.00 noise would be reduced to a minimum, without imposing unreasonable burdens on their operations subject to a ceiling noise limit not exceeding 42dB(A) LAeq,1h (free field) at a noise sensitive property.

Fylde Borough Council's Environmental Health Team has commented that residents may experience an increase in noise with the proposed development and ideally criteria should be set such that "as a result of the activity at the site no dwelling shall experience sound levels that are more than 5dB above current background levels between 07.00 – 23.00 and no increase in background level between 23.00 and 07.00".

Clearly there is a balance to be struck between not imposing unreasonable burden on developers and ensuring that there would be no impact or an acceptable impact on local residents and the environment. The applicant has indicated that a range of noise attenuation measures could be employed to reduce noise levels but that further attenuation would result in unreasonable burden. What constitutes unreasonable burden has not been explained by the applicant.

Notwithstanding assurances by the applicant that *PPG –Minerals* maximum noise levels could be achieved for both day and night periods, it is considered that there has not been clear demonstration that noise impacts would be reduced to an acceptable level given the low background levels in the area. Therefore it is concluded that noise from the proposed operations would be above the significant observed adverse effect level (SOAEL) as defined in the *Noise Policy Statement for England*. This is the level above which significant adverse effects on health and quality of life occur.

The proposed development would be contrary to Policy DM2 of the JLMWLP and Policy EP27 of the Fylde Borough Local Plan as it has not been satisfactorily demonstrated that noise impacts would be reduced to acceptable levels and would therefore unnecessarily and unacceptably result in harm to the amenity of neighbouring properties by way of noise pollution.

Resources and Waste (Appendix 14)

The applicant has undertaken an assessment of the management of waste, including inert, non-hazardous and hazardous waste, and including waste water. The wastes described would be solid, liquid and gas and both oil and gas are defined as minerals. The waste produced would be:

- Non-hazardous and inert waste.
- The accumulation of injected hydraulic fracturing fluid which would remain in the underground target formation and has become waste;
- Above ground hazardous including the temporary deposit and accumulation of hazardous waste in storage containers as the wells are successively drilled. The hazardous waste would include flow back water and drill cuttings coated with residual Low Toxicity Oil Based Muds ("LTOBM").

- The incineration by flaring of hazardous waste, namely natural gas above 10 tonnes per day, as an activity listed in schedule 1 of the Environmental Permitting (England and Wales) Regulations 2010.

The management of waste is set out in the waste management plan and subject to environmental permits that are regulated by the EA and needed by the applicant to carry out their proposed operations. The permits set out the conditions needed to manage waste and naturally occurring radioactive material (NORM). Now permits are issued, Cuadrilla will have to comply with the proposed conditions that are designed to ensure that operations do not cause harm to people or the environment.

The assessment concludes that all types of waste would not result in a significant effect; that there is sufficient capacity to treat flow back fluid even though at peak times it could use up to 68% of identified treatment capacity but which would have a significant effect. Consequently re use of flow back fluid is proposed to reduce this effect. Fracturing at the site would be staggered with Roseacre Wood to avoid increasing weekly waste water production rates to minimise cumulative effects. In the event on site storage and treatment capacity is exceeded, operations would be suspended.

General measures would be employed to reduce the quantity of waste generated, increase the re-use, recycling and recovery of materials and improve waste management.

An assessment of the proposals has been carried out. With regard to inert, non-hazardous and hazardous waste associated with the construction, drilling, hydraulic fracturing, initial and extended flow testing and decommissioning it is considered that subject to compliance with the permits issued by the EA the quantities generated would not result in a significant effect.

The treatment of the quantity of waste water generated by the project would result in a significant effect and so mitigation to reduce this effect is proposed to include recycling of flow back water and staggering of operations. In particular there would be a requirement, wherever possible, to re-use the flow back fluid once the gas has been separated. This would reduce the amount of waste which needs to be disposed at an offsite facility. About 10-40% of the injected fluid is predicted to return to the surface.

The applicant proposes to leave some fracture fluid deep underground. The EA is of the view that leaving some of the retained fluid in situ is the 'Best Available Technique'. The EA has assessed the components of the fluid to be used in fracking process and is satisfied that it is non-hazardous. They are also satisfied that the fluid that would be retained underground would be non-hazardous and that over time the retained fluid would become indistinguishable from the water already present in the target formation.

Naturally occurring radioactive material (NORM) is present in many geological formations including oil and gas bearing strata such as shale formations. The flow-back fluid that returns to the surface following hydraulic fracturing as well as the sediments and scales in gas or water process vessels, is likely to contain sufficient NORM that it will be classed as radioactive waste. The level of radioactivity is considered to be extremely low. The EA has assessed the impact and proposals for

NORM disposal and is satisfied that the applicant has demonstrated that it can have suitable arrangements in place with licenced waste disposal companies for its treatment.

Drill cuttings can be contaminated with hazardous waste. All hazardous waste must be stored in solid steel containers which are subject to inspections. The EA has advised that it is satisfied with the proposed arrangements.

With regard to representations received, it is considered that waste can be acceptably contained and that there are available facilities with capacity to accommodate the waste to which safe purpose designed transport would deliver it. The permit restricts the available storage on site and the continued production of such in the event off site facilities were unavailable. The site can be contained in a way to prevent discharge or over spill off site and provide secure storage facilities. The permit applies the necessary controls on waste quality standards. There will be no risk of migration of fracking fluids that could result in cross contamination of water resources and leaving fluids in the ground would not result in contamination in their own right. The waste is not toxic and would not be stored close to residential properties or schools and the site would be secure preventing unauthorised access.

Paragraph 122 of the NPPF requires that planning authorities should not seek to control processes or emissions where these are subject to approval under separate pollution control regimes and that LPAs should assume that these regimes will operate effectively. Nonetheless, paragraph 112 of PPG Minerals, notes that before granting permission the local planning authority should be satisfied that the issues dealt with under other regimes can be adequately addressed by taking advice from the relevant regulatory body'. The County Council has consulted with the EA which has not objected.

The EA has granted the environmental permits needed to carry out the proposed operations. The permits set out the conditions needed to manage waste and NORM. Now permits are issued, the applicant will have to follow the proposed conditions that are designed to ensure that operations do not cause harm to people or the environment.

The EA is satisfied that the permit and associated conditions will require that extractive wastes are managed in a way that minimises harm to human health and the impact on the environment. The operator has demonstrated this through a waste management plan that accompanies the permit. The EA is satisfied that the proposals are in line with the waste hierarchy.

It is considered that the proposal could be acceptably controlled by other regulatory regimes and would not have any unacceptable impacts and would comply with national guidance and policies and the policies of the development plan.

Transport (Appendix 15)

A full assessment of traffic impacts associated with the proposed development has been carried out by the applicant as part of the EIA. An assessment of the impacts has been carried out against the policies of the NPPF, the development plan policies and in light of advice received from the Highways Agency, LCC Developer Support (Highways) and with regard to those views received in representations.

The applicant proposes to access the site via a new access from the north side of the A583 (Preston New Road). Traffic to the site could travel either east or west along the A583 in order to gain access to the M55 at junctions 3 or 4. Both routes to the motorway are comprised of major roads and would not require HGV traffic to pass through major built up areas.

The access would be created by breaking through the existing hedgerow on the north side of the A583 to create an access point of sufficient width to allow the two way passage of HGV's. The access road to the site compound would be surfaced to withstand HGV traffic. The works to create the access would require the removal of approximately 190m of hedgerow including two trees in order to create the required visibility splays.

The ES includes an assessment of traffic impacts which includes details of the anticipated traffic flows and an assessment of likely impacts in terms of highway capacity and safety.

The peak traffic flows would occur as a result of combined traffic associated with activities at more than one well. The total traffic numbers in the ES are based on such conditions. The peak traffic generated would be around 50 two way HGV movements per day which would occur for around one week on eight occasions over the life of the project.

The forecast traffic flows are below the thresholds in Department for Transport Guidance for Transport Assessments which define when a full transport assessment is required. The main traffic impacts arising from the development therefore relate to the size of vehicles rather than vehicle numbers. The assessment has therefore concentrated on selection of the appropriate access routes to the site.

The site is located on the A583 which is a major highway carrying around 13,000 vehicles per day including over 250 HGV's. The proposed development would therefore only increase total traffic on this road by around 1%.

The proposed route via the motorway network would be acceptable and would not pass through any major residential areas. There would be an increase in HGV movements on the strategic highway network but it is considered there is sufficient capacity to accommodate such. There have been representations objecting to the proposal and the impacts associated with an increase in HGV movements but most of these cannot be supported. There would be some localised loss of amenity as a result of an increase in movements, most particularly to those residential properties close to the access, but this would be for a temporary period; it is considered that such impacts would not be so great as to constitute a sustainable reason for refusal. The proposed route and access would be acceptable to the Highways Agency and to LCC Developer Support (Highways). Subject to conditions requiring details for the construction of the access points to the site, the internal access road, traffic management plan, off site highway works, construction method statement, monitoring of highway conditions, provision of drainage and measures to prevent air and ground and surface water pollution it is considered that the development would be acceptable in terms of highway safety and capacity issues and would not be in conflict with the policies of the development plan.

Water Resources (Appendix 16)

The applicant has undertaken an assessment of the impact of the proposal on water supplies and surface water runoff or drainage and the consequent impact on flood risk. The construction of the well pad would include the installation of an impermeable plastic membrane to be laid to prevent infiltration from the well pad through the underlying soils and water bodies. Ditches would be constructed around the perimeter of the well pad to collect storm water. The void space in the granular fill, ditches and the 50mm "air freeboard" would provide a storage volume to attenuate drainage flows from the site. During drilling and hydraulic fracturing operations a valve would prevent storm water from leaving the site. During these periods storm water would be removed by tanker to a licenced wastewater treatment works. At other times when the water quality in the ditch system meets the requirements of EA the site would drain freely to Carr Bridge Brook via an interceptor.

The water requirements for the Project would be provided by a pipe connection to an adjacent United Utilities (UU) water main. UU have confirmed that this supply would not affect their current customers (including residential properties). The use of mains water negates the need to transport water to the site by tanker to reduce transport impacts. Estimated daily water use during hydraulic fracturing activities has been reduced from 765³m per day to 600³m per day by reducing the proposed number of hydraulic fracturing stages and reusing flow back water to make up part of the fracturing fluid for the subsequent fracturing stages. Flowback fluid would be subject to physical treatment using ultra violet disinfection to control bacterial growth. If possible collected storm water would also be used to make up part of the fracturing fluid volume.

The assessment concludes that subject to such measures the proposed development would not have a significant effect on surface water runoff, drainage or water supplies.

An assessment of the potential impacts of the proposal on water supplies and surface water runoff or drainage and the consequent impact on flood risk has been carried out with reference to the views of the EA and UU and with regard to representations received. It is concluded that the proposal would have no adverse effect on potable water supply and would not be an unacceptable use of potable water. Flow back water would be reused resulting in lower quantities of potable water being required. Water will be supplied direct to the site thereby reducing the number of HGVs travelling to and from the site. The site would be contained and managed to ensure the protection of surface and ground water and nearby water courses. The site is in a Flood Zone 1 which is defined as having a low probability of flooding. The EA has reviewed the Flood Risk Assessment submitted with the application and is satisfied that the development would not be at risk of flooding or increased flood risk off-site. The development is therefore considered to comply with the national guidance and policies and the policies of the development plan.

Public Health (Appendix 17)

The County Council's Director of Public Health has provided specific advice to inform the planning process and provide public health advice to protect and improve the health of local residents living near the proposed shale gas exploration sites of Preston New Road (planning application numbers LCC/2014/0096 and 0097) and

Roseacre Wood (planning application numbers LCC/2014/0101 and 0102). The advice was published as a Health Impact Assessment (HIA) in November 2014.

The Health Impact Assessment makes 45 recommendations to a broad range of agencies, suggesting actions before, during and after any permissions or permits are granted. Appendix J contains 16 recommendations to specifically inform the determination of this application (together with the Roseacre applications).

Given the advice is specific to this application, an assessment has been undertaken in relation to each of the 16 recommendations in Appendix J to the HIA.

All of the recommendations in Appendix J to the HIA have been addressed as part of this determination.

Recommendation 1 states: 'Consider the need for further noise assessment, particularly on the proposed Roseacre Wood site and if necessary, require additional mitigation measures to reduce noise associated with the development of the sites and more particularly the drilling and hydraulic fracturing phases of the development and which could be controlled by conditions attached to any planning permission'.

The predicted night time noise levels at the nearest properties (Staining Wood Cottages) are at the national night time standard of 42dB. The elevation of 12.5 dB above background levels at night time at the nearest property, for such a sustained period, would be perceived as noticeable and disruptive. It is likely this would have significant adverse effects on the health and quality of life of the nearby residents

Recommendation 4 states: 'Seek agreement with the Applicant to establish an independent comprehensive baseline and on-going long term monitoring of environmental and health conditions prior to any activity on the sites'.

The applicant has questioned the appropriateness of providing for such long term monitoring through the planning system, and has cited national guidance and case law as justification for this position. Nevertheless, while there is a question around the appropriateness of using a planning condition or section 106 agreement to provide for such monitoring, the County Council would have pursued a Unilateral Undertaking with the applicant to provide for such in the event of a recommendation to grant permission.

Many representations received by the County Council refer to research conducted in North America and overseas that indicate shale gas extraction is linked to adverse health impacts.

While much research exists, and is growing in volume each year, it is difficult to gain an objective view of the veracity of the research. Anti-fracking campaigners frequently point to studies that indicate increased health risks (e.g. elevated risks of cancer or birth defects) as a result of shale gas activity in North America. Conversely, pro-fracking campaigners point to numerous methodological flaws in the research. It is also difficult to translate the findings of research from North America into the UK environment. Operating and regulatory practices are very different.

In June 2014, Public Health England (PHE) published a review into the potential health impacts of shale gas extraction. The review drew on significant scientific

evidence in peer reviewed or published reports up to January 2014. Much of the research cited in representations to the County Council was reviewed by PHE.

PHE say there have been very few epidemiological studies or health risk assessments published in the peer reviewed literature. Epidemiology is the branch of medical science that investigates all the factors that determine the presence or absence of diseases and disorders. It aims to assess the cause of a disease, and seeks to look beyond associations which might be a result of chance, bias or confounding effects.

PHE highlight significant methodological flaws in the research that has been cited to the County Council.

Moreover, one study frequently cited by objectors (McKenzie, 2014) has been publicly criticised by the Chief Medical Officer and Executive Director of the Colorado Department of Public Health and Environment in the USA as follows "*we disagree with many of the specific associations with the occurrence of birth defects noted within the study. Therefore, a reader of the study could easily be misled to become overly concerned.*"

PHE state that direct application of the North American research to the UK situation is impossible because of the wide differences between the two countries. It is clear from experience in the US that emissions vary widely depending on the phase of development, operational practices, the geology, local topography and meteorology, and the types of activities and equipment on-site. PHE state that such variability makes direct application to the UK situation impossible. There are also different regulatory practices in the UK.

At present there is limited environmental and health surveillance data within the published literature in relation to existing shale gas extraction operations. There have been very few epidemiological studies (as opposed to statistical associations) and those that have been carried out generally lack robust exposure assessments according to PHE.

Representations

The development has generated a significant number of representations the majority of which object to the proposal although there are a smaller number offering support for the proposal. The reasons for objecting are summarised in Appendix 2.

Up to the end of December 2014 a total of 11,125 representations objecting to the proposal had been received. Most of these were in the form of a generic template. 1490 of the objections were from within Fylde and this is 2.4% of the adult population (1.9% of total population) and 118 were from within a 2km radius of the site. 6038 of the representations were received from outside Lancashire. Many of the representations object to the principle of exploring for and placing future reliance on the use of hydrocarbons as a means of providing an energy resource and that investment and consequent employment opportunities would be better directed into renewable and more sustainable energy resources. There is further objection to the proposed methodology for the exploration of shale gas and the unacceptable impacts associated with such along with the localised impacts of the proposed development itself on the area, environment and communities. About 200

representations in support have been received, many from economic bodies (e.g. Chambers of Commerce) that refer to the economic benefits that shale gas could bring.

More representations both opposing and in support of the proposal have been received since this report has been finalised and an updated figure will be reported to the Committee at the meeting.

Some of the objections maintain that planning permission should not be granted in view of the alleged poor track record of the applicant when carrying out operations at other sites within its control.

The issues raised in representations have been addressed relative to the 'topic' areas that they have been summarised into and which are many. There is an assumption that the number of representations received assist in demonstrating the level of opposition and consequently the proposal should be refused. However, it is the issues raised rather than the number of representations received and it is considered that these have properly been addressed a part of the assessment of the application.

With regard to the applicants previous operations and compliance with planning permissions a planning permission goes with the land rather than with the applicant and it is right to assume that the applicant would comply with conditions attached to any planning permission.

Overview of cumulative and in combination effects

The applicant has undertaken an assessment of the cumulative effects associated with the individual elements of the technical topic areas covered in the ES along with an assessment of the cumulative effects of the proposed development at Roseacre Wood. They have also undertaken a review of current adopted land use plans and emerging local plans to identify and significant planned new development proposals in the vicinity of the site or along the key access routes to the site. The review has confirmed that there are no large development proposals for development in the vicinity of the site or nearby settlements so consequently there is limited scope for cumulative effects with other developments. There are other development proposals within 10km of the site although it is concluded that they are not likely to alter the scale of the effects of the proposal or create any new or additional effects. The applicant's current proposals at Grange Hill to pressure test an existing well are minor and should planning permission be granted, they would not contribute to any effect.

The conclusion drawn is that there would be no cumulative effects associated with the two sites operating in tandem (assuming planning permission is granted for the Roseacre Wood application) that the separation distance is sufficient such that

- Air quality, heritage, hydrogeological, seismic, water resources noise, visual and general disturbance impacts will not result in a cumulative effect. Likewise, the sites themselves are also separated enough from other development sites that these potential cumulative effects can be avoided;
- There is sufficient separation between the two sites so that their operations will not have a combined effect on the same settlements. Vehicles would use a

- different junction from the M55 and different local roads to access the Roseacre Wood site compared to those accessing the Preston New Road site; and
- The different activities that would be carried out at the two sites would be synchronised so that, for example, when hydraulic fracturing is occurring at one site a different activity, such as drilling, is occurring at the other site. This would further reduce the risk of any cumulative effects from occurring.
 - The rate and quantity of flowback fluid generated from both this Site and Roseacre Wood could be managed using the mitigation measures proposed.
 - Some of the impacts from the Project result in effects on more than one of the EIA topics including:
 - Air quality impacts on human beings and ecological receptors (nationally and internationally designated sites);
 - Visual impacts on the setting of heritage sites and assets (e.g. Listed Buildings and Registered Parks and Gardens);
 - Noise impacts on residential and ecological receptors; and
 - Lighting impacts on residential and ecological receptors.

Due to the distance between the Sites, the dispersed nature of residential properties, topography and landscape features no in-combination effects are predicted.

The applicant concludes that the EIA process has identified the foreseeable impacts arising from the Project, and assessed whether or not they are likely to result in significant effects. Where significant effects have been predicted measures to avoid or mitigate these effects, so that where possible they are no longer significant, have been identified. Additional mitigation measures to further reduce the magnitude of potential impacts have also been identified within the assessment. As a consequence of taking these measures the applicant considers that the only residual significant effects (following the identification of mitigation measures) are the:

- Temporary visual effects from the use of the taller pieces of equipment (e.g. the drilling rig and workover rig used during hydraulic fracturing).
- Temporary sky glow and building luminance effects from night time exploration activities.
- The short term use of the available waste treatment capacity, for flowback fluid, within 100 miles the proposed sites.
- It is considered that there would be no unacceptable cumulative effects associated with the development of the Preston New Road site or with the proposed Roseacre Wood site should planning permission be granted for that proposed development.

Conclusion

In principle the proposed development for exploration and appraisal for shale gas accords with national guidance and policy to investigate the possibility to provide an alternative energy source.

Whilst it is recognised that a number of groups and individuals oppose the continued reliance on hydrocarbons as a primary energy resource and more particularly the principle and nature of shale gas exploration and appraisal in view of the potential harm and irreversible damage and ground contamination it could potentially cause, it is considered that these concerns are very low risk if regulated properly. They

cannot be supported and would not constitute a sustainable reason for refusing the proposal.

An assessment of the proposal has been carried out and it is considered that whilst the development could have some impacts on air quality; archaeology and cultural heritage; greenhouse gas emissions; community and socio economics; ecology; hydrogeology and ground gas; induced seismicity (including subsidence); land use; landscape and visual amenity; lighting; resources and waste; water resources or public health; such impacts would be low or could be mitigated and controlled by condition.

However, in the location proposed, over a two year development phase the proposal would generate some localised disturbance most particularly to the nearest residential properties at Staining Wood Cottages, Staining Wood Farm and Foxwood Chase and which would be mostly associated with noise as part of the drilling operations.

The increase in traffic would be only during the day and the existing highway network could accommodate the proposed increase in movements. It is considered that the noise associated with such would not be significantly greater than that associated with existing traffic flows. Noise associated with site development works would similarly only be in the day and would not lead to an unacceptable increase in noise over the existing background noise levels. Noise from hydraulic fracturing would also be during day time only, and would not raise noise levels to an unacceptable level compared to the existing background levels.

However, there would be significant noise associated with the drilling operation on a 24 hour basis for an initial period of 5 months and then over three further three month periods that would create most noise disturbance. The applicant has advised that the predicted levels of night time noise would be reduced to the national guideline maximum limit (average over one hour) and which they have confirmed would be the best reduction that can be achieved without onerous burdens. However, notwithstanding that the national guideline maximum limit (averaged over one hour) may be able to be achieved this would still lead to a significant increase in noise levels (12.5dB at Staining Wood Cottages) over and above existing background noise levels during the night.

The County Council commissioned its own noise survey which identified lower background levels at night than the applicant, indicating that there would be a greater increase in noise levels than predicted by the applicant. This level of disturbance would initially be for a period of 5 months associated with night time drilling operations after which it should cease but followed by three further three month periods interspersed with two month periods of hydraulic fracturing to facilitate the drilling of four boreholes.

Considerable concern has been expressed to such increases by residents, parish councils, interest groups, the Borough Council and the County Council's Director of Public Health. It is considered that such increase over background levels at night for such periods over an extended period of 24 months would have a significant adverse effect on the health and quality of life and lead to an unacceptable loss of residential amenity to those residents at the nearest residential properties at Staining Wood

Cottages, Staining Wood Farm and Foxwood Chase contrary to the national guidance and development plan policies.

Notwithstanding this conclusion, it is important to recognise that the planning application must be considered on its merits and in accordance with planning law. It is also important to accept that notwithstanding the criticism directed at the regulatory processes within which developments of this nature would be carried out there are other regulatory regimes (DECC, the HSE and the EA) that the County Council as planning authority must assume would operate in ways to control the developments within their remit and that the County Council must be satisfied that they would do such. In this case DECC, the HSE and the EA have advised that the development could only be carried out within their regulatory regimes and subject to their controls would be acceptable. In this respect the County Council can assume and be satisfied that this would be the case.

A planning authority's reliance on other (non planning) regulatory bodies to provide the appropriate controls and conditions in relation to their statutory responsibilities was recently addressed in case law (December 2014) relating to a drilling site in West Sussex {R [on the application of Frack Free Balcombe Residents Association] v West Sussex County Council [2014] EWHC 4108 (Admin)}. Paragraph 102 of the judgment is particularly relevant to this issue:

"the existence of the statutory regimes applied by the HSE, the EA and the DECC shows that there are other mechanisms for dealing with the very proper concerns which the Claimant's members have about the effects on the environment. The Claimant and its members' concerns are in truth not with the planning committee's approach of relying on the other statutory regimes, but rather with the statutory bodies whose assessments and application of standards they disagree with. That does not provide a ground of legal challenge to the decision of the planning committee."

In light of this judgment as well as NPPF guidance (Para 122) it is not necessary or appropriate to impose planning conditions or require an applicant to enter into a S.106 legal agreement with respect to matters, such as longer term monitoring, that are clearly within, and properly, the remit of other regulatory regimes and bodies.

It is therefore concluded that the principle of exploration and appraisal for shale gas would be acceptable and that in the proposed location impacts on air quality; archaeology and cultural heritage; greenhouse gas emissions; community and socio economics; ecology; hydrogeology and ground gas; induced seismicity and subsidence; land use; landscape and visual amenity; lighting; traffic; resources and waste; water resources or public health (except for noise) would be low or could be mitigated and controlled by condition to make them acceptable.

However, it is considered that the proposed development in this location would lead to a significant increase in night time background noise levels and consequently it is likely that this would have significant adverse effects on the health and quality of life and lead to an unacceptable loss of residential amenity to those residents at the nearest residential properties of Staining Wood Cottages, Staining Farm and Foxwood Chase. Such effects and loss would be contrary to the National Planning Policy Guidance on noise, Policy DM2 of the Joint Lancashire Minerals and Waste Local Plan – Site Allocation and Development Management Policies – Part One

(LMWLP) and Policy EP27 of the Fylde Borough Local Plan. Consequently and for this reason alone it is considered that on balance the proposal would be unacceptable and should be refused.

Equality Impact Assessment

As part of the decision-making process, under the Equality Act, public bodies must have due regard to the need to eliminate unlawful discrimination, harassment, victimisation and any other conduct prohibited by the Act; advance equality of opportunity between people who share a protected characteristic and people who do not share it; and foster good relations between people who share a protected characteristic and people who do not share it.

An Equality Impact Report is required in relation to this development to show how consideration of equality issues has influenced the decision-making process. This concluded that the development would not adversely affect those with 'protected characteristics'.

An assessment has been undertaken for the purposes of judging that the County Council has met its own requirements under the duty. The assessment has concluded that impact of the proposal can be mitigated so that they will not have a significant impact on groups with protected characteristics.

Human Rights

The proposal raises issues relating to the protection of amenity and property under Article 1 of the 1st Protocol of the Human Rights Act 1998.

The Human Rights Act requires the County Council to take into account the rights of the public under the European Convention on Human Rights and prevents the Council from acting in a manner which is incompatible with those rights. Article 8 of the Convention provides that there shall be respect for an individual's private life and home save for that interference which is in accordance with the law and necessary in a democratic society in the interests of (inter alia) public safety and the economic wellbeing of the country. Article 1 of protocol 1 provides that an individual's peaceful enjoyment of their property shall not be interfered with save as is necessary in the public interest.

For an interference with these rights to be justifiable the interference (and the means employed) needs to be proportionate to the aims sought to be realised. The main body of this report identifies the extent to which there is any identifiable interference with these rights. The planning considerations identified are also relevant in deciding whether any interference is proportionate. Case law indicates that certain development does interfere with an individual's rights under Human Rights legislation. This application has been considered in the light of statute and case law and the interference would be considered to be disproportionate if the proposal was to proceed because of certain impacts.

The County Council has a duty to secure the proposed location and design of exploration and appraisal activities to protect the amenities of residents in the area as set out in the policies of the development plan. The proposal would conflict with certain policies of the development plan designed to achieve these aims and the

interference in the rights of the applicant is therefore considered to be justified in order to protect the amenities of the residents to the nearest residential properties. It is considered that the public interest can only be safeguarded by the refusal of permission and that the refusal of the application would not be disproportionate in that the proposed increase in night time background noise levels would have significant adverse effects on the health and quality of life and lead to an unacceptable loss of residential amenity to those residents at the nearest residential properties at Staining Wood Cottages, Staining Farm and Foxwood Chase.

Article 6 is the determination of an individual's civil rights and obligations. Article 6 provides that in the determination of these rights, an individual is entitled to a fair and public hearing within a reasonable time by an independent and impartial tribunal. Article 6 has been subject to a great deal of case law. It has been decided that for planning matters the decision making process as a whole, which includes the right of review by the High Court, complied with Article 6.

Recommendation

That after taking into consideration the environmental information and further information, as defined in the Town and Country Planning (Environmental Impact Assessment) Regulations 2011 submitted in connection with the application, planning permission be **refused** for the following reason:

The proposed development would be contrary to Policy DM2 of the JLMWLP and Policy EP27 of the Fylde Borough Local Plan as it has not been satisfactorily demonstrated that noise impacts would be reduced to acceptable levels and would therefore unnecessarily and unacceptably result in harm to the amenity of neighbouring properties by way of noise pollution.

Local Government (Access to Information) Act 1985 List of Background Papers

Paper	Date	Contact/Directorate/Ext
LCC/2014/0096	02/06/2014	Stuart Perigo/Environment/531948
LCC/2014/0097	02/06/2014	
LCC/2014/0101	16/06/2014	
LCC/2014/0102	16/06/2014	

Reason for Inclusion in Part II, if appropriate

N/A

Appendix 1

Proposed Works

Proposal

The proposed development is for the exploration and analysis of shale gas reservoirs within the Bowland Shale formation in the Fylde district of Lancashire. The shale gas (also called methane gas or natural gas) is known to be distributed within the shale rock. The total area of the surface works is 7.34ha. In addition lateral drilling and hydraulic fracturing would be undertaken underground with horizontal wells extending up to a distance of 2km from the centre of the well pad.

A well pad would be constructed and wells would be drilled into the shale rock. A process called hydraulic fracturing would then be used to help the gas flow out of the rock by pumping water and other materials into the shale to dislodge the gas. The gas then flows back to the surface within the flow back fluid. During Initial Flow Testing (IFT) the gas would be burnt off at flare stacks and during Extended Flow Testing (EFT) the gas would flow into the gas network through new pipelines and connections to the gas grid.

The proposed development would explore the potential flow rate of the gas in order to establish whether the gas can be extracted and if it would be economically viable to do so. Following exploratory activities the site would be abandoned and restored unless the site is found to be economically viable, in which case a planning application would be submitted for production works before the site is decommissioned.

The description of the proposed works below has been divided into Surface Construction Works and Underground Exploratory Activities.

Surface Construction Works

The surface works construction phase would involve the creation a temporary well pad, drilling cellars, monitoring boreholes, drainage system, access road, pipelines and gas grid connections, ancillary facilities and boundary works. During this construction phase the seismic arrays and groundwater quality monitoring wells proposed in planning application LCC/2014/097 would also be installed.

The surface site area would be divided into 6 zones. The well pad zone would contain 4 other zones – drilling/well zone, sand silo zone, flare zone and EFT equipment zone, and would be surrounded by, and adjoined to, the sixth zone the boundary pipeline zone. Each zone would have maximum heights of equipment, with the tallest structures, up to a maximum height of 53m, located in the centre of the site, reducing down to the smallest structures, with a maximum height of 5m, on the periphery.

A description of each zone is given below:

Well Pad Zone A 1.55ha stone well pad area would be constructed with the well/drilling cellar, sand silo, well pad, flare and EPT equipment zones all located within it. The well pad would also contain well pad drainage and an earth bund.

Well Pad - Construction of the well pad area would involve digging out soil to create a flat working surface area. An impermeable plastic membrane and geotextile layer with protective felt inter-layers would be laid on the flat surface to create a waterproof barrier between the well pad and the soil below. On top of the plastic membrane a 300mm (minimum) layer of clean compacted aggregate would be placed to create a firm working surface for machinery used in the exploration process. The stone well pad would have a level of 12.5m AOD. Any structures/ activities located on it, outside of the other zones, would have a maximum height of 10m and are described in the Well Pad Zone ancillary structures description below. The construction works for the well pad zone would involve general earth working equipment.

Well Pad Drainage - Around the edge of the well pad, an open drainage ditch would be constructed to collect surface water run-off and attenuation. The drainage ditch would be lined with an impermeable plastic membrane to create a waterproof barrier. A pollution interceptor would be used to separate oil and fuel from drainage water. Subject to meeting Environment Agency water quality standards the collected water would either be discharged into the adjacent farm drain or would be removed off site by tanker via the pipe perimeter drain. An isolation value would be closed during exploratory operations to ensure no potentially polluting materials enter the farm drain or other adjacent surface water ditches.

Groundwater Monitoring Wells – Three pairs of groundwater monitoring wells would be installed around the perimeter of the well pad to a maximum depth of approximately 30m, using a small drilling rig.

Well Pad Bunds - Soil excavated to construct the well pad and the drainage ditch would be used to construct earth banks (bunds) to help provide visual and noise screening. The earth banks would be seeded with grass and wildflowers. These landscape bunds would have a height of 12.55 AOD and prior to planting would be laid with an impermeable plastic membrane and a 1mm thick fully welded smooth HDPE membrane.

Drilling/Well Zone A well/drilling cellar zone would be located within the central area of the well pad area. The zone would extend 97m x 30m with a maximum equipment height, above the well pad, of 53m (65.5m AOD). At the centre of the well pad within the well/drilling zone, 4 holes called drilling cellars would be constructed using a piling rig or shallow drilling rig, with each measuring 2.7m by 3m deep. A distance of between 5 and 25m would be left between each drilling cellar. The cellar would have a concrete floor and walls. One exploration well would be drilled from each cellar, creating 4 exploration wells in total.

During drilling and initial and extended flow testing (IFT/EFT) phases a drilling rig with a mast height of between 30 and 53m (65.5m AOD) would be located in this zone along with well cementing equipment, drilling materials and fluids including drilling muds, wireline logging equipment, casings and tubular.

During hydraulic fracturing activities and testing, a service rig (up to 36m high), a coiled tubing unit (up to 36m high), a coiled tubing support tower, up to 6 hydraulic fracturing pumps, a manifold unit, a blender unit and a high volume separator would be located in this zone. Other equipment would include a monitoring cabin, generators and fuel storage. Cranes would be used to assemble the drilling rig and other equipment as required.

Sand Silo Zone A sand silo zone would be located in the south eastern section of the well pad zone, adjacent to the drilling/well zone. The sand silo zone would extend 109m x 15m with a maximum equipment height, above the well pad, of 15m (27.5m AOD). During drilling and IFT and EFT testing, the zone would house drilling rig equipment, mud processing, mud pumps and mud mixing facilities, cementing equipment, generators and fuel storage. Substances including diesel, chemicals and propane gas would be stored in storage units and steel containers. During hydraulic fracturing activities and testing the zone would contain sand silos, hydraulic fracturing pumps and fuel storage.

Flare Zone A flare zone would be located towards the north eastern corner of the well pad zone. The flare zone would extend 20m x 10m with a maximum equipment height, above the well pad, of 10m (22.5m AOD). Two enclosed flare stacks up to 10m high and 3m in diameter would be located in the flare zone and would be used during Initial Flow Testing.

EFT Equipment Zone An Extended Flow Testing (EFT) zone would be located in the north eastern corner of the well pad zone next to the Flare Zone. The EFT zone would extend 25m x 25m with a maximum equipment height, above the well pad, of 5m (17.5m AOD). The EFT zone would be bounded by a security fence.

Well Pad Zone ancillary development: The remaining area of the well pad excluding the drilling/well, sand silo, flare and EPT zones would have ancillary development located within it, including storage facilities, site offices, welfare facilities, utilities, lighting and a drainage ditch. The maximum height of the ancillary structures would be 10m (22.5 AOD).

Storage Facilities – During drilling and testing a separator unit and flowback tanks would be located on the well pad between the well/drilling cellar zone and the flare zone towards the northern boundary of the well pad. Mud system storage would be located primarily within the sand silo and drilling zones. During hydraulic fracturing and testing, water tanks and iron storage would be located on the southern boundary with the flowback tanks also remaining on site.

The following containment options for material/substance storage is proposed on the well pad containment system– single skinned steel tanks for fresh water; purpose designed tanks, skips and containers for the mud system (drilling fluids, additives, cuttings, displacement/spacer fluid and suspension additives); on pad containment for cement powder, fire fighting foam/water, well servicing and suspension fluid/additives and hydraulic oil and maintenance lubricants; single skinned tank for foul effluent; fuel tanks with integral secondary containment for diesel; integral containment and drip tray for hydraulic oil and maintenance lubricants; separate double skinned tank for waste oil. Hydraulic fracturing fluid would not be stored in

mixed form. Hydraulic fracturing fluid additives would be stored in the chemical storage area with secondary containment and drip trays. Flowback fluid would be stored in steel single skinned tanks.

Offices and Welfare Facilities - Modules (ie single storey height shipping containers) for office, welfare and onsite accommodation would be located on the eastern boundary of the well pad zone throughout the drilling, hydraulic fracturing, testing and decommissioning phases of the project.

Stores and Workshops – During drilling and testing phases, single storey 40 foot shipping containers would be used for storage of equipment and workshops, and would be located on the southern area of the well pad zone.

HGV Turning Area, Car Parking and Security – An area for HGV turning and car parking would be located on the well pad at the western corner and western boundary of the site. Small cabins for security staff and site visitors and toilets would be provided at the well pad site entrance at the north western corner. CCTV would be located at strategic points of the site.

Utilities – A connection to the mains water supply would be installed to provide water for site staff welfare, drilling and hydraulic fracturing activities. A 150mm diameter pipe would be connected to a United Utilities mains located adjacent to the development site. An on-site diesel powered generator would provide electricity and small power for mains electricity and telecommunications within the site offices and welfare facilities. Domestic foul sewerage from site welfare facilities would be stored on site and tankered periodically to nearby wastewater facilities

Lighting – Lighting proposed within the whole well pad including the named zones would include low intensity security lighting and task lighting which would enable works to be carried out in hours of darkness. During construction of the well pad, access track and gas pipeline, security lighting would be located around the contractors site cabins, comprising low power over door bulkhead luminaries using. If required a temporary works lighting unit utilising 4No. 400W lamp floodlights would be used during working hours. During drilling and hydraulic fracturing, the site lighting would be dependent upon the type of drilling rig, the position, orientation and type of lights and luminaries mounted on the rig and other equipment. The likely lighting would be site lighting comprising 4 mobile lighting towers with 4No. 400W floodlights; drilling rig lighting comprising of 9No. 500W floodlights and 14No. 2 x 35W fluorescent luminaries and tank lighting comprising of 2No. 2 x 18W luminaries. The installation and construction of extended flow testing would be during normal working hours. Operating lighting around the well pad would use medium power, less or equal to 400W floodlights.

Boundary zone / Pipeline Zone - Boundary and pipeline works would be located around the well pad zone and would also extend to the south west towards Preston New Road. The boundary zone would include fencing, landscaping, bunds, the EFT pipeline and a National Grid compound.

Fencing – Around the well pad would be three types of perimeter security fencing, outer, perimeter and inner to maintain a secure site during construction and

exploration activities. Around the perimeter of the earth bunds, an inner 2.5m high fence would be located. A 4m high welded mesh perimeter fence would then be located followed by screen planting and a 1.2m high outer fence.

Well Pad Access track –The entrance to the site would be located to the east of an existing lay-by, located approximately 2.2km along the A583 Preston New Road from Junction 4 of the M55 motorway. A new access point would be created off the highway, between Humber Wood and Staining Wood Farm buildings. The entrance would be wide enough to allow two heavy goods vehicles (HGVs) to pass each other in order to enter and exit the site. This would avoid HGVs waiting at the site entrance and potentially blocking the A583. A crushed stone track of approximately 170m would be laid with cattle crossing grids incorporated at intervals along it. The last 20m of the track at the junction with Preston New Road would be tarmac to improve durability and control rutting for turning vehicles entering the site. A fence would be installed on either side of the access track for site security.

National Grid Compound Access – An access to the gas grid connection would be located along the A583 Preston New road, approximately 800m west of the development site.

EFT Pipeline/ National Grid compound – Two buried gas mains would be constructed for use during Extended Flow Testing as part of the exploratory activities. The first gas pipeline would run from the development site south to Preston New Road to connect with a National Grid compound to be located adjacent to the access track/highway junction. The compound would be within a secured stoned area. A separate pipeline would run from the first pipeline west towards Blackpool adjacent to Preston New Road and would connect to another National Grid compound which would be located off the highway. The compound area would be stoned and would be accessed via a separate new access point from the highway. Both compounds would be fenced for site security.

Underground Exploratory Activities

The underground exploratory activities would include the drilling of vertical and horizontal exploration wells, hydraulic fracturing of the shale rock and initial flow testing and extended flow testing of the natural gas released.

Drilling of Exploration Wells

An exploration well would be drilled from the base of each of the 4 drilling cellars. Drilling equipment would include plant and equipment specific to the drilling unit used, which would include a mast with an erected height of between 30 to 53m high. Cranes would be used to assemble the drilling rig and other equipment. Additional equipment would include drilling mud log equipment, well cementing equipment, wireline logging equipment, drilling materials and fluids and casings and tubular.

The first vertical well (Well 1) would be drilled to a maximum depth of approximately 3.5km below ground level and would provide geological information regarding the depth, thickness and characteristics of each layer of rock (strata) including the shale. The data provided would then be used to select the depth and orientation for the

next stage of horizontal drilling. The lower section of the vertical well (Well 1) may be plugged with cement to a selected depth for initiating the horizontal well (Well1).

A horizontal well for Well 1 would then be drilled laterally at a depth of between 1.5-3.5km and could extend up to 2km horizontally from the drilling cellar. This drilling process would be repeated for Wells 2 -4. Vertical wells would be drilled for each of the remaining wells and the horizontal drilling depth for each well would be determined by the data obtained from drilling Well 1.

Three types of well has been designed – a vertical section of Well 1; the horizontal section of Well 1; and the subsequent combined vertical and horizontal wells for Wells 2, 3 and 4. During drilling operations, low intensity security lighting and focused task lighting at the base of the drilling rig would allow works to be undertaken during hours of darkness. Drilling operations would be undertaken 24hours a day, 7 days a week.

The drilling process involves drilling mud engineering, casing running and cementing, data acquisition (via coring and wireline logging) and directional drilling.

Mud Engineering - For each well a drilling fluid (also known as drilling mud) would be used to help facilitate the removal of rock fragments (drill cuttings); to prevent the release of fluids or gas during drilling by managing the hydrostatic pressure within the well; to stabilise the borehole and the drilled cuttings; to cool the drill bit; to lubricate the drill string and to minimise the loss of drill cuttings to permeable formations. A water based mud is proposed to be used when drilling through shallow formations and the permeable Sherwood Sandstone formation. A low toxicity oil based emulsion mud (LTOBM) is proposed to be used when borehole stability is problematic or where maximum lubrication is required. LTOBM would only be used after casing and cementing of all potentially sensitive groundwater receptors.

Casing running and cementing - Each exploration well would be lined with steel tubing (called casing) and would be cemented in place. The well casings would form physical multiple barriers between the well and the surrounding rock with the aim of preventing well contents (gases and liquids) from entering the surrounding rock. The casing would also help prevent the well being blocked which could restrict the flow of natural gas. The concrete layer would separate the well casing from the adjacent rock and the next well casing. Additional layers would be provided where sections of the wells are near the surface in order to provide greater protection between the wellbore and adjacent rock.

The steel casings have different diameters and applicable depths from ground level and would include shallow conductors (1067-762mm diameter, extend to 60m), deep conductors (473-508mm diameter, extend to 300m), surface casing (340mm diameter, extend to 1,200m), intermediate casing (245mm diameter, extend to 2,000m), drilling liner and tie back (178-245mm diameter, extend to 2,300-3,200m) and production liner (144mm diameter, depth to be determined).

Casings and liners would generally be cemented in place to seal off various subsurface formations through which they extend, with exceptions made to allow for

pressure monitoring. Un-cemented sections would only be present in sections where they would always be at least one further layer of casting between a well and adjacent rock. For each well, a high-pressure wellhead would be installed onto the surface casing. To provide secondary well control when drilling the remainder of each well, a blow out preventer (BOP) would be installed onto the wellhead.

Data acquisition (via coring and wireline logging) and directional drilling would follow the completion of the casing running and cementing.

Hydraulic Fracturing

Hydraulic fracturing would require the provision of: - a coiled tubing rig (up to a maximum height of 36m); a service rig (up to a maximum height of 36m) to install and remove the tubing up to 36m in height; 2 enclosed gas flares each 10m high, a flowback separator with line heater and associated equipment; enclosed steel flow-back tanks and steel water storage tanks. The equipment would remain on site during Initial Flow Testing. The coiled tubing and service rig would be used to occasionally service the wells. Well servicing which would take approximately a week per well.

The hydraulic fracturing process would involve the following stages – testing of the wellhead, well casing perforation, mini fracturing, hydraulic fracturing and flowback fluid and testing.

Wellhead testing - A 'Frac Tree' would be installed on each wellhead, to provide a seal and prevent the release of gas and liquids to the surface. The Frac Trees would include primary and secondary valves capable of withstanding maximum hydraulic fracture pressure.

Well casing perforation - To control where fractures are created, the well casing would be perforated at target locations. The perforations would be pre-set in the well casing by installing frac sleeves during well construction. The sleeves would be mechanically opened prior to fracking. If the sleeves fail to open, an abrasive jetting technique or a small shaped explosive charge would be used. If jetting is used, coiled tubing would be placed into the well and jetting fluid (water, sand, and friction reducer) would be injected through the tube under pressure. After jetting perforation, the jetting fluid could be recovered. The sand would settle in the surface collection tanks and the recovered jetting fluid could be reused. Sand would be damaged and not reusable.

Mini fracturing - Pilot hydraulic fracturing would take place involving the pumping of small volumes of fracturing fluid, without a proppant, into a well. A mini-fracture to evaluate the injection pressure required to generate fractures in the rock would be undertaken. The process would also be used to calibrate the micro-seismic monitoring network. Additional mini fracture tests would take place during hydraulic fracturing.

Hydraulic fracturing - Hydraulic Fracturing would take place on Well 1 first and then for each of the subsequent wells. The process involves pumping fracturing fluid under high pressure down the well and into the shale rock. The fluid would open up

millimetre sized cracks or gaps with the aim of releasing the natural gas trapped within the shale. The fracturing fluid would be composed of mains water and silica sand (approximately 99.95%) and polyacrylamide (approximately 0.05%).

Silica sand would be used as a proppant to hold open the cracks in the shale after the hydraulic pressure is released. Polyacrylamide would be used as a friction reducer to minimise the pressure losses incurred due to friction between the water and well casings. Polyacrylamide is non-toxic and classified as non-hazardous to groundwater by the Environment Agency. Dilute hydrochloric acid (compromising 10% acid and 90% water) may be pumped into the wells before the fracking fluid to dissolve any well drilling mud or cuttings.

Hydraulic fracturing would be carried out in stages along the well with between 30 to 45 stages expected per well, which would be undertaken at intervals of 30 to 50m per stage. The initial stage would be at the end of the horizontal well at the furthest distance from the well pad. Successive fracturing stages would take place, with operations working backwards along the well length towards the vertical section. Pressure would be applied at target intervals and the amount of sand proppant would be adjusted to optimise the fracturing process. Each fracturing stage would last for 3 hours.

Flowback fluid and testing - Once a hydraulic fracturing stage has been completed, pressure at the surface would be reduced and a portion of the injected fracturing fluid would be allowed to return to the surface as flowback fluid. The flowback fluid would pass into a choke manifold unit which would maintain full pressure during the flowback fluid process and prevent excessively high flowback velocities.

The flowback fluid would be a mixture of injected hydraulic fracturing fluids, sand, water from the shale rock, dissolved minerals and any released hydrocarbons. Naturally occurring radioactive materials (NORM), soluble NORM in shale, may also return in the flowback fluid. If LTOBM has been used as part of the drilling process, the flowback fluid may also contain small amounts of LTOBM. Testing of the flowback fluid would ensure the appropriate waste classification for the flowback fluid and subsequent waste management. Gas flow rates would also be measured and recorded with samples taken for analysis of the hydrocarbons.

The flowback fluid would be deposited in an enclosed 4 phase separation system at the surface which would separate solids, water, condensate and gases to be separated for optimal waste recovery and management. Any solids such as sand and NORM (in its solid form) would be removed and the remaining fluid's quality would be tested. Flowback fluid materials would be stored temporarily on site in enclosed tanks prior to removal off site.

The flowback fluid may be used with new mains water, sand and polyacrylamide to fracture the next section of well. The recycling of the flowback fluid would reduce the quantity of mains water being used and the quantity of flowback fluid to be removed for treatment and disposal offsite. If the flowback fluid contains any bacteria, the bacteria would be killed using UV treatment. Unused flowback fluid would be transported off site by tanker and taken to an Environment Agency permitted

treatment centre for treatment and disposal. Rainwater collected in the drainage ditches may also be used as part of the fracturing fluid.

Once hydraulic fracturing has been completed on a Well 1, the process would be continued on Wells 2, 3 and 4. On completion of hydraulic fracturing for individual wells, Initial Flow Testing would commence.

Initial Flow Testing

After hydraulic fracturing has been completed for a well and the flowback of hydraulic fluid has commenced, natural gas would flow into the well. Eventually more gas would flow from the well than flowback fluid and at that point Initial Flow Testing would begin.

Each well would have Initial Flow Testing for up to 90 days, depending on the amount of gas flowing. The gas would be burned off at two flare stacks, which would be approximately 10m tall and 3m in diameter. The flare stacks would be fully enclosed within a flare shield. The shield would help to retain the flare in a confined area and would minimise the level of noise generated, light spillage and visual impact.

Extended Flow Testing

If sufficient gas is measured during Initial Flow Testing, the exploratory activities would move into Extended Flow Testing. For each well this could last between 18 and 24 months. Gas produced would not be burned in the flare stacks but instead would flow through a new connection into the gas grid. This process would require the installation of equipment within the boundary of the well pad to filter and prepare the gas.

The gas would be filtered to separate sand, liquid and gas. The gas would then be dried to remove any remaining water and would pass through a carbon filter to remove any impurities. Following testing of the hydrocarbon levels, propane may be added to increase the calorific value of the gas. Data would be gathered regarding the flow rates and well pressure. A regulator would be installed to limit pressure to 75bar prior to injection into the gas grid. Declining rates of gas flow would be measured along with an assessment of the amount of flowback fluid produced.

Two gas grid pipeline connections would be made to carry the gas from the well pad to the nearest gas main. The 6inch diameter pipelines would be buried at a depth of 1.2m. One pipeline would run parallel to the access track and connect to the gas grid pipeline which runs parallel to Preston New Road. The other pipeline would run west towards Blackpool, running parallel with Preston New Road and would connect to a gas main located to the west of the development site. Where the pipelines connect to the gas grid, a fenced off area of approximately 8m x 9m would be installed as required by National Grid. The fenced off areas would include a small kiosk building, which would contain telemetry and gas quality monitoring equipment.

Abandonment Activities

Decommissioning - On completion of the exploratory activities the site would be decommissioned by plugging and abandonment. The drilling cellars would be removed and the wells would be cut off at least 2m below ground level and sealed with concrete. A service rig would be used to plug and abandon the wells.

Plant, equipment and temporary buildings would be removed off site. The stone and plastic membranes used to construct the well pad would be removed along with the access track, fencing and lighting. The ditches would be emptied and all utilities disconnected. Extended flow testing equipment would be removed and any connections to the gas grid would be removed to the connection point and capped in line with National Grid requirements. It is estimated that the decommissioning activities would take 3 months to complete.

Restoration – The site would be restored to its former use as agricultural land in accordance with an agreed Restoration Plan. Subsoil and topsoil from the two earth banks would be treated with herbicides and would be redistributed across the site including the infilling of the drainage ditch. The site would then be grassed over and returned to agricultural land use. Fences, gates and field drains would be reinstated. The restoration activities are estimated to take 3 months, with an additional 3 month contingency provided to take account of any seasonal constraints which could affect the timing of the works. Ongoing monitoring of the caverns would be carried out for a further as yet unspecified period.

Long term gas production – if the exploratory activities demonstrate that the flow of natural gas from this area of the Bowland Shale would support long term shale gas production from the application site, then a new planning application and Environmental Statement may be produced and submitted for planning approval. A planning application could be submitted prior to abandonment and restoration of the proposed development.

Waste Treatment

Welfare Facilities - Domestic foul drainage from site welfare facilities would be routed into temporary storage facilities on site and then periodically tankered to nearby wastewater treatment works.

Waste Streams – Waste streams would be present from all phases of the development, well pad construction, drilling, hydraulic fracturing, initial flow testing, extended flow testing, decommissioning and restoration. Some of the waste streams would be stored on site pending removal for treatment and/or disposal offsite by a licensed waste management contractor. The following waste recovery and disposal options are proposed.

Excavation materials would be reused on site, with vegetation waste composted or residual waste to landfill. Concrete would be subject to waste recovery off site and/or disposal at landfill. Packaging/food etc waste would be subject to recycling or landfill disposal. Oils and lubricants would go for treatment at a hazardous waste facility.

Drilling waste materials would be a variety of non hazardous and hazardous waste. Non hazardous waste including polymer based water drilling muds and drill cutting,

cement waste from well casings and spacer fluid would be recycled or treated at a specialist waste facility for recovery or disposal. LTOBM waste would be classified as non waste and the muds reconditions for reuse. Drill cutting LTOBM and any contaminated materials (e.g. oil, diesel, waste oil, lubricants) would be hazardous and treated at a hazardous waste facility. General waste (paper, timber, scrap metal, food) would be recycled or disposed of at landfill. Foul and industrial wastewater (rain captured on well pad during drilling) would go to wastewater treatment works.

Hydraulic fracturing, IFT and EFT waste materials would be a variety of non hazardous and hazardous waste. Flowback fluid, solid scale and materials/equipment contaminated by NORM, would be analysed to ensure appropriate waste classification and adequate handling and disposal. Radioactive waste with non hazardous composition would be stored on site in enclosed tanks and removed to a treatment centre permitted by the Environment Agency with a licence to receive NORM. Jetting fluids sand used in the perforation process would not be reused and would be for disposal. Flowback fluid may also be reused on site in the hydraulic fracturing process. Hazardous waste including oils would be recycled or treated at a specialist waste facility for recovery or disposal. Any non hazardous sand would be recycled as secondary aggregate. General waste would be recycled or disposed of at landfill. Foul and industrial wastewater would go to wastewater treatment works. Surplus natural gas would be flared on site.

Decommissioning waste materials would include hazardous and non hazardous waste. Clean aggregate and the well pad membrane liner and felt liner and inert concrete would be non hazardous and could be reused offsite. Contaminated aggregate and the contaminated well pad impermeable membrane would go to a hazardous waste treatment centre for waste recovery or disposal.

Traffic

The applicant proposes to access the site via a new access from the north side of the A583 (Preston New Road). Traffic to the site could travel either east or west along the A583 in order to gain access to the M55 at junctions 3 or 4. Both routes to the motorway are comprised of major roads and would not require HGV traffic to pass through major built up areas.

The access would be created by breaking through the existing hedgerow on the north side of the A583 to create an access point of sufficient width to allow two way passages of HGV's. The access road to be surfaced to withstand HGV traffic would then lead to the site compound. The works to create the access would require the removal of approximately 190m of hedgerow including two trees in order to create the required visibility splays.

In the vicinity of the site access, the A583 has a large central hatched area arising from when the road used to have three lanes with a central overtaking lane. The applicant proposes to use part of the central hatched area in order to create a right turning lane for vehicles entering the site from the east.

The traffic movements associated with the development would vary over the duration of the project depending upon the activities being undertaken. During stage 1 (construction of the site), which would last approximately 2 months, there would be an average of 22 two way HGV movements per day (maximum of 48). During stage 2 (mobilisation of rig, drilling of first borehole and demobilisation of rig) lasting five months, there would be an average of 14 two way HGV movements (maximum of 50). For drilling of the subsequent three wells, the duration of the movements would be over a shorter period of three months but would equate to around 17 two way HGV movements per day. For hydraulic fracturing, (taking one to two months for each well) the average two way HGV movements would be around 10 per day. For the initial flow testing, (around three months), it is anticipated that the average two way movements would be around 5 per day. The extended flow testing would generate minimal HGV movements whilst the decommissioning and restoration of the site over approximately 2 months would generate an average of 22 two way HGV movements.

The peak traffic flows would occur as a result of combined traffic associated with activities at more than one well. The total traffic numbers in the ES are based on such conditions. The peak traffic generated would be around 50 two way HGV movements per day which would occur for around one week on eight occasions over the life of the project.

Job creation

19 new full-time jobs would be created.

Timeframe

The development works (exploration and restoration) would have a proposed duration of 6 years from the start of construction works on site to the completion of the restoration activities. If the site moves into full production the decommissioning period would not take place.

Exploratory activities would take place concurrently for each of the 4 wells. The indicative sequence for the development is as follows:

1. Install surface seismometer and buried seismometer arrays (LCC/2014/097)
2. Install groundwater quality monitoring wells (LCC/2014/097)
3. Construct well pad and access track and commence gas pipeline
4. Drill Well 1
5. Hydraulic fracture Well 1 and Drill Well 2
6. Initial Flow Testing (IFT) Well 1, Hydraulic Fracture Well 2, Drill Well 3
7. Extended Flow Testing (EFT) Well 1, IFT Well 2, Hydraulic fracture Well 3, Drill Well 4
8. EFT Wells 1&2, IFT Well 3, Hydraulic Fracture Well 4
9. EFT Wells 1,2 &3, IFT Well 4
10. EFT Wells 1-4
11. Plug and abandon all wells – unless application for full production submitted
12. Restoration of site

Site mobilisation and construction of the well pad would take 2 months. Equipment mobilisation period for the drilling of each well would typically last for two weeks. Once commenced, drilling operations must take place 24hours a day, 7 days per week. The first well would take around 5 months to complete to enable geological data to be analysed as the well is drilled. The other 3 wells are expected to take 3 months each to complete.

Each fracturing stage of hydraulic fracturing is expected to last 3 hours with approximately 30 to 45 stages per well. For each well the approximate time period for hydraulic fracturing would be 2 months. The duration of hydraulic fracturing would be dependent on the total number of hydraulic fracturing stages undertaken for each well. Hydraulic fracturing pumping equipment would operate between 07:00 and 19:00hrs Monday to Friday and between 07:00 and 13:00hrs on Saturdays. Operatives would be on site 24hours a day, 7 days a week for operational and monitoring purposes.

Initial Flow Testing would take place for a period of 90days per well with the gas flow flared. Extended Flow Testing would take between 18 and 24 months per well to complete. Decommissioning and restoration of the site is expected to take between 7 and 9 months depending on weather conditions. A two month contingency would cover any delays.

An indicative timeline for the works activities is summarised below

Year 1	Site mobilisation, installation of seismic arrays, groundwater monitoring Commence pipeline construction Well 1 – Drilling, Hydraulic Fracturing, Initial Flow Testing Well 2 – Drilling
Year 2	Well 1 – Initial Flow Testing, Extended Flow Testing Well 2 – Drilling, Hydraulic Fracturing, Initial Flow Testing Well 3 – Drilling, Hydraulic Fracturing
Year 3	Well 1 – Extended Flow Testing Well 2 – Extended Flow Testing Well 3 – Extended Flow Testing Well 4 –Initial Flow Testing, Extended Flow Testing
Year 4	Well 1 – Extended Flow Testing Well 2 – Extended Flow Testing Well 3 – Extended Flow Testing Well 4 –Extended Flow Testing
Year 5	Well 3 – Extended Flow Testing Well 4 –Extended Flow Testing Plug and abandon wells
Year 6	Site restoration completed

Appendix 2

Representations

Objections

Friends of the Earth (FOE):

FOE, on behalf of Preston New Road Action Group, initially expressed concerns regarding the consultation period of 21 days for consideration of the Environmental Statement accompanying the planning application. LCC took account of these concerns and extended the formal consultation period to 12 weeks.

FOE submitted a further objection to the proposal with regard to the precautionary principle and the Water Framework Directive; inconsistency within national and local planning policy, inconsistency with government policy; evidence of adverse environmental impacts and inadequate consideration of adverse socio-economic and public health impacts.

Friends of the Earth have made further representations on the further information. The grounds for objection are summarised as follows.

Precautionary Principle

- The development should not go ahead unless it can be proven that there will be no groundwater contamination over the short and long term.
- The development is an unconventional activity where the full impacts are unknown and where the risks can be clearly identified.
- Fracking poses a higher risk of well failure (and leaks) due to injection of wells and drilling wells horizontally as well as vertically.
- Fracking at Preese Hall resulted in harmful consequences
- The current regulatory framework for the shale gas industry is inadequate, flawed or ineffectively applied and enforced.
- Regulators appear to have failed to assess the risks and determine the standards necessary to enable the development to go ahead, e.g. water recycling standards.

Groundwater, Flooding and Water Resource

- Potential groundwater contamination as a result of mechanical failure of equipment, well integrity issues, membrane defects, well degradation, geological faults, and increased run off leaving the site.
- Watercourses could be conduits transferring contamination to other areas.
- Where there is a risk of significant adverse impact on surface water quality then the development is only acceptable in terms of the Water Development Framework in the circumstances set out in the River Basin Management Plan for the North West.
- Risk of flooding to Carr Bridge Residential Park and Moss House Lane properties

- The EIA does not consider impacts on water circulation from polluted water and the unsustainable use of water, given the large amounts of water required
- Risks to the availability of water supplies and water pressure problems for nearby residents

Climate Change

- The assessment of the potential for greenhouse gas (GHG) emissions is incorrect, with regard to impact of leakage, global warming potential (GWP) of methane and scales of emissions.
- The EIA findings that the impact on climate change is n/a does not enable the local planning authority to make an informed decision.
- The mitigation measures proposed for possible sources of fugitive methane emissions are basic and may be ineffective based on US research.
- The figure used in the application for GWP is inaccurate and asks for clarity regarding the carbon footprint calculations.
- The comparison of the sites GHG emissions to the UK carbon budget is wholly inappropriate. Cuadrilla do not appear to know how much GHG will be emitted and therefore the precautionary principle should apply.
- Utilising shale gas resources is contrary to Policy DM2, to reduce carbon emissions and is contrary to the Lancashire Climate Change
- Planning decisions must take account of the need to reduce GHG emissions and this application will increase the emissions.

Energy

- Need for the mineral resource has not been demonstrated
- Local planning authorities should consider all energy sources and as per the European Renewable Directive 2009, including renewable energy sources.
- Impact of shale gas on UK security of energy supply is highly contested
- Shale gas recovery is incompatible with the UK meeting the climate change target and could lock the UK into fossil fuel use for decades.
- Exploitation of unconventional gas and oil are a dangerous distraction to investing in energy efficiency and renewable energy

Waste

- Insufficient information on how overflow water and wastewater discharges, and pollutants, will affect the local environment and protected sites.
- Management of contaminated wastewater is wholly inadequate. There is a lack of treatment centres, resulting in potential capacity issues, especially if flow back rates are higher than estimated. This is not an adequate solution.
- Contrary to Planning Policy (Statement 10) as the application produces huge quantities of waste.
- It is unclear what waste quality standards would be applied by the applicant to ensure that concentration of pollutants in the wastewater did not accumulate beyond safe levels as a result of re-use for fracking and how risks to the environment and health and safety would be mitigated.

- Further investigation is required before the Council can lawfully grant an application to drill.
- Legacy of underground waste which will be present is denied, not a temporary development as it will create permanent contaminated wastewater
- Risks from flow back fluid and waste water
- Risks of storage of waste to protected ecological areas

Chemical Composition

- No detail has been given on the drilling and hydraulic fracturing chemicals, including the additives in the friction reducer
- Polymers may leach or decompose into toxic monomers
- The classification of polyarylamide as non hazardous is disputed.
- The classification of oil based muds as non toxic is disputed
- The classification of flow back fluid as radioactive waste with non-hazardous composition is disputed.
- The chemical content of jetting fluid is unclear.
- Will surfactant, gelling agent, defoamers, corrosion inhibitors, weighing agents and additional biocides not be needed?
- A list of actual products to be used and in what quantities, with a Material Safety Data Sheet for each chemical should be available for public viewing.
- Total quantities of friction reducer are significant and the use of hydrochloric acid as a contingency is a concern.
- Environmental permit information should be part of the planning application. The list of potential additives includes 14 that are presumed hazardous.
- The use of toxic chemicals is contrary to the aim of the North West River Basin Management Plan which aims to reduce the release of toxic pollutants.

Air quality

- People including children will be exposed to pollutants from traffic.
- The planning authority should check the baseline air quality and assess whether the development will significantly add to air quality issues and whether significant people will be affected.
- The air quality assessment does not identify vulnerable groups e.g. the elderly residents at Carr Bridge Residential Park nor Weeton St Michael primary school nor the large urban areas of Blackpool and Kirkham Wesham.
- Emissions from generators, engines and site equipment for drilling have been scoped out of the air quality assessment despite the potential for emissions.
- All possible sources of emissions should be included with cumulative impacts assessed, including increased NO₂ levels.
- There will be air quality impacts and mitigation is required, with reference to the Air Quality Directive.

Traffic

- HGV movements on single lane roads has the potential for severe impacts and conflict with vulnerable road users including cyclists and pedestrians

- The local authority is responsible for proper management of roads and the safety of road users
- Access to the westbound bus stop on Preston New Road by residents of Carr Bridge Caravan Park could be affected by site traffic.
- The generation of 49,722 vehicle movements will impact on the environment and will be in breach of statutory thresholds for noise and air quality.
- Peak vehicle movements are to be spread throughout the day, but at Balcombe and Barton Moss there was a convoy of vehicles
- The removal of waste will result in additional transport movements with increased carbon emissions and air quality impacts.

Ecology

- Potential adverse impacts on the migratory path for wintering birds utilising the Morecambe Bay and Ribble Estuary Ramsar/ SPA sites
- Impacts of surface overflow draining into Carr Bridge Brook and watercourses connected to the Ribble Estuary
- Impacts on internationally designated sites, Morecambe Bay SPA, Ribble and Alt Estuaries SPA and Liverpool Bay SPA and Marton Mere SSSI
- Impacts on protected and notable species
- Impacts on SPA qualifying bird species and wintering birds
- Impacts on the functional link with the Ribble and Alt Estuaries SPA/Ramsar, require that a full Habitat Regulation Assessment must be carried out.
- Significant loss of 2.6ha of habitat and disturbance to breeding and wintering birds, bats and brown hare.
- Adverse impacts of loss of habitat and disturbance to protected species are not sufficiently mitigated
- Impacts of the flare (noise, heat, emissions) and 24hour lighting on wildlife
- The applicant has assessed cumulative impact of development as significant at the international level but the mitigation measures proposed are inadequate
- There is no Biodiversity Mitigation Strategy
- The use of conditions would be inadequate as the applicant has disregarded conditions at other sites
- A mitigation measure to not construct during bird breeding or wintering birds season does not reflect the construction timetable
- Mitigation measures for wintering birds are minimal and incomplete as they do not address the impacts from the flare or lighting and available habitat.
- The applicant conclusion that significant impacts will become not significant after mitigation is contested

Seismicity

- The ES contains too little information for the Council to understand and evaluate the risks around induced seismicity from drilling and fracking
- The Fylde is highly faulted geologically and there are a number of faults in the vicinity of the site including one which will be encountered by drilling
- Potential effects on induced seismicity during the hydraulic fracturing stage of the project, associated with ground motion hazard, well integrity, liquefaction,

slope instability, and cumulative effects of settlement and fluid migration. The scale of impact is disputed; it is not insignificant / negligible.

- The relevant authorities lack a full understanding of the geology of the local area and the causes of the tremors from fracking last undertaken in the area.

Socio economic

- The analysis of socio-economic impacts is probably unlawful because it takes account of economic impacts which are not related to environmental consequences of drilling and fracking
- Strongly disagree that shale gas will make a positive contribution to economic growth at a local and national scale
- There is no explanation of local expenditure and its calculation
- Job creation effects are highly limited. There will be low job creation with no guarantee of jobs for local people given the specialist nature of the jobs
- Strongly disagree that there will be no significant effects for wider economic effects as potential adverse effects have been disregarded. Economic costs of the development will be detrimental to the local economy
- There is no assessment of impacts to residents in the immediate vicinity and impacts on tourism and agriculture
- Several years of disruption to the local community with 14 months of drilling 24hours a day, 8 months of hydraulic fracturing and 12 months of flaring with dust, light and noise emissions.
- Unprecedented levels of public opposition / concern about the impacts
- Previous sites yet to be restored, a concerning precedent to communities
- Inaccuracies in the site description and proximity to residences with failure to mention Foxwood Chase and Carr Bridge Residential Caravan Park
- No consideration of impacts on schools, caravan parks, kennels, catteries, farm nurseries and national cycle infrastructure located 1-2km from the site.
- Fracking could adversely affect house prices
- Tourism may be affected by loss of rural tranquillity, visual and noise impact, additional traffic and risks of local environmental pollution.
- No consideration of impacts on Blackpool and tourism.
- US evidence linking fracking to harmful effects on livestock and farming.
- No mitigation measures for impacts on agriculture, tourism, loss of amenity for local residents

Public Health

- The ES does not review the evidence of known and unknown adverse public health impacts of unconventional gas. The industry is evolving quicker than the research into health impacts.
- Occupational health not addressed despite US evidence of harmful effects to workers from air quality, waste, wastewater, fracking fluid.
- Fracking fluid information is vague and there are no details of chemicals in the drilling fluids
- The community profile does not include communities in the immediate vicinity of the site, e.g. Carr Bridge.
- Relevant data on demographics and deprivation in Blackpool is excluded.

- Impacts on physical activity have not been considered.
- HGVs carrying drilling and fracking chemicals and hazardous wastewater may deter cyclists and pedestrians using local roads
- Air quality assessment should include fixed point sources of air emissions (e.g. generators)
- Cuadrilla has overstated safety claims, through misleading advertising, exaggeration and subjective claims.
- US evidence of negative health impacts of shale gas development
- US evidence of heart and neural defects in newborns within 10mile radius of maternal residence to shale gas developments
- Dangerous levels of human exposure to benzene.
- Exposure to silica as a health hazard to workers.
- Breast Cancer UK expressed strong concerns about the potential adverse health effects from exposure to harmful chemicals as a result of fracking.
- Germany environment agency has stated that there is a lack of information to assess risks and how they can be controlled.
- Operator has a poor track record in running operations properly.

Consultation

- Very low participation in consultation tools and techniques, compared to high numbers of people submitting representations. Public exhibition events managed to separate stakeholders, elected members from residents.
- The LPA need to take account of the legitimacy of high local and national interest and opposition, due to the international importance of the area for wildlife, national importance for food production and tourism and the precedent of the decision regarding shale gas development in the UK.
- Levels of risk to area have been mi-advertised and characterised.

Planning Policy

- Not conform with LWMLP Policies CS5 and DM2
- Not conform with FBLP Policies SP2, EP10, EP15, EP16, EP17, EP22, EP23, EP24, EP26 regarding countryside development, habitats, protected sites, SSSIs, BHS, agricultural land, water resources, groundwater and air pollution.
- Application must be judged on all relevant national and local planning policy, especially climate change, waste, transport and unacceptable adverse environmental impacts
- Not sustainable development – as leave legacy for future generations for mining waste, climate change emissions, risk of groundwater contamination
- Significant problems with the assessment of impacts in the ES including waste, waste mitigation, seismicity, chemicals, health and air quality
- Adverse impacts of application cannot be mitigated through conditions in terms of climate change emissions, wastewater production, lighting or noise because of the scale of the activity proposed.
- Production scale shale gas disguised as exploration and appraisal, given 4 wells, continuous nature of the drilling and hydraulic fracturing proposed, total period of the development, extended flow test over 2 years, installation of pipes connecting to the national transmission network, the installation of

equipment to treat and regulate gas on-site, and the proposal to pump gas during EFT into the grid.

- No margin for rigorous testing, monitoring or evaluation between stages.

Preston New Road Action Group:

Representations received on behalf of Preston New Road Action Group object to the proposal for the following summarised reasons:

Proximity to residents

- Other countries do not allow such sites within 2km of residences
- The application does not fully address the impacts on the closest residences, particularly Foxwood Chase and Staining Wood cottages
- Residents will suffer increased noise levels, visual intrusion and subsidence.
- Testing of dangerous materials near to resident's homes should be prohibited.
- The development will result in poor water supply/pressure to local residents
- Will the site be subject to water restrictions during droughts like residents?

Impact on ecology

- The methodology, results and analysis of ecological surveys are considered to be incomplete and in parts inaccurate, particularly with regard to habitats, bats, badgers, water vole, great crested newt, wintering birds and brown hare.
- The environmental assessment results are disputed particularly with regard to bird species, pink footed geese, the functional link between Lytham Moss and the SPA sites, and the impacts on and the mitigation for wintering birds.
- Seismic arrays are being located in fields away from those used by wintering birds, but the proposed field is grazed by pink footed geese

Pollution risk

- Development is contrary to Policy EP26 as it will emit chemicals into the air from the flaring process, with a negative impact on local residents, especially those with breathing disorders. Alternatives to flaring should be used.
- Chemicals in the air could enter Westby reservoir
- Polyacrylamide when heated breaks down into component chemicals which are hazardous and could affect people's health
- Failure rates for wells are high, all wells eventually leak with a risk of polluting the surrounding land. Preese Hall well was subject to failure
- The development will contribute to climate change, and is therefore contrary to the NPPF and the Climate Change Act (2008)
- There is a risk of groundwater capacity from well head failure and potential for the containment capacity of the well pad to be exceeded
- Monitoring wells for groundwater quality and gas concentrations should be mandatory. Who will monitor and what will happen if levels are exceeded?
- Risk that trucks will drip waste onto the free draining access track, and into ground the Carr Bridge Brook. Impacts on Carr Bridge Brook are not provided.

Waste Disposal

- Other countries would not allow contaminated waste to be stored on site
- No defined plan for waste management so no defined end to the process.
- There is not enough waste treatment capacity available for flowback fluid (and inert waste), especially when considered with the Roseacre development.
- No defined plan for the disposal of spacer fluid or suspension brine
- Need detail on the recycling of flowback fluid and any additional chemicals to enable its reuse. Reuse could generate a concentration of toxic chemicals
- Radium and lead cannot be treated, what will happen to them?
- One employee on site for extended flow testing is a health and safety concern
- No detail on an emergency response plan for any serious accident on site

Traffic

- Development traffic will increase accident risks on the busy/ dangerous A583
- The impact of traffic on nearby residences and Fylde residents is understated
- It would be better for traffic to turn left out of the site and join the M55 at junction 3, turning right onto the A583 will be dangerous
- Lorries accessing the site could be a hazard to buses stopping

Landscape

- Contrary to Policy SP2, significant impact, agricultural to industrial land use
- Food chain contamination risk from flared chemicals falling on grazing land
- Disagree with the finding of the ES with regard to landscape impact and mitigation measures with regard to site trees and hedgerows and TPO trees.
- The development will result in the loss of agricultural and tourism jobs

Induced Seismic Activity

- Seismic monitoring will not stop an earthquake happening it will only warn, an earthquake like at Preese Hall could happen again.
- The Preese Hall earthquake took place after drilling had stopped, further information on why this happened is required.
- Drilling through a fault is proposed, this is contrary to DECC guidance and could induce seismic activity.

Development and Regulation

- The development is not temporary. If exploration is successful it will move into full production so long term impacts need consideration.
- Need onshore drilling regulations with an accountable body to enforce them.
- Should focus on developing renewable energy solutions instead of shale gas
- No detail on approval processes for the design, construction and operation of the wells, site rig, hydraulic fracturing, gas mains and propane storage
- No detail on the monitoring of the site infrastructure following abandonment.

Objections: Up to the end of December 2014 a total of 11127 representations objecting to the proposal had been received. Of these 827 were individual letters; 4727 were template objections submitted by Friends of the Earth; 5573 template objections, many of which were collected and submitted by 'Frack Free Lancashire'. Representations have continued to be received mostly in a variety of template forms, the final number of which will be reported when the application is presented for determination.

A petition of 52 signatories objecting to the proposed development was received from Roseacre Awareness Group.

The reasons for objecting to the proposal have been summarised under the following headings:

Need for Development

- Fracking not needed in Lancashire or anywhere in the country.
- Extraction is for profit for a minority and we will not own or use the gas produced.
- Amount of gas that could be produced is overestimated.
- Shale gas production will not result in cheaper gas prices.
- Shale gas is not a long term viable solution to energy needs/security.

Climate Change

- Shale production will have a negative effect on meeting UK targets relating to global heat, carbon emissions and greenhouse gas emissions, from Kyoto agreement and Climate Change Act 2008.
- Contrary to NPPF Para 93- reductions in greenhouse gas emissions.
- LCC has a responsibility to help reduce emissions.
- LCC has a moral duty to ensure fossil fuels not exploited.
- Need to leave fossil fuels in the ground.
- International Energy Agency warns that most of gas should stay in ground to avoid catastrophic climate change.
- The use and burning of fossil fuels impacts on climate change.
- Burning shale gas is as bad as burning coal.
- Can't continue to use up natural resources.

Alternatives for energy production

- We have a responsibility to future generations to find better sources of energy
- Should focus on gas off-shore not on-shore.
- Should produce cleaner nuclear energy.
- We should not rely on fossil fuels.
- Need to invest in renewable energy sources to reduce carbon output.
- LCC should promote renewable energy in line with Renewables Directive
- Will not help to produce 27% of renewable sources as agreed by EU.
- Make Blackpool a renewable investment centre / Fylde Green Coast.
- Need to encourage/invest in wind farms on hills and coastline.

- Need to commit to more solar power / solar roadways / solar farms and allow more solar panels on roofs.
- Use and develop green technology/clean renewables like other countries, e.g. Germany runs on 90% renewable energy
- Need to stop energy waste and promote green efficiency.
- Harness wave power at the coast.
- Need more research into sustainable energy before committing to shale gas.
- More jobs (approx 40,600) could be sustained in off shore wind capacity.
- Renewables guarantee to provide energy.
- Wind power turbines dismantle easily when out of use, earth remains same.
- Should invest in biomass.
- Fossil fuel reliance stifles innovation for alternative clean sources of energy.

Environmental Impact

- Fracking will endanger the planet, the environment and people.
- Fracking is not sustainable as a well can only be fracked 18 times.
- Gas is a luxury. Clean water, air and soil are not.
- Need to preserve not destroy planet for future generations.
- Will result in environmental catastrophe in Lancashire.
- Full environmental effects are unknown and need further research and risk assessments before allowing fracking in Lancashire/ UK.
- Other countries/states/areas have banned or restricted the process.
- Other countries advocate buffer zones between the development and sensitive receptors e.g. residences.
- American reports of pollution and contamination from shale gas production.
- The cons/risks of fracking outweigh the pros/rewards.
- The evidence of danger is overwhelming.
- Too many unanswered questions.
- Too many potential and irreversible problems linked to fracking.
- Fracking needs wide open spaces so cannot work in the UK.
- Should wait 10 years for research results from America.
- Shale gas is a new industry and need research into the risks.

Exploratory or Production Stage

- The application is for production and not exploration as demonstrated by the need to process the gas and the length of time - 6 years.
- It is contrary to DECC guidance to put gas into the gas grid during exploration
- If it's exploratory, why are they connecting to the gas grid?
- By creating a well pad, the development will scale up to enable full production.

Regulatory Framework

- No regulation / lack of regulation for shale gas industry.
- No amount of regulation can prevent human error or equipment failure.
- Unrepentant industry already flouts and exploits previous planning regulations due to lack of enforcement / policing.

- USA contamination incidents despite strict regulations.
- Accidents and disasters happen offshore despite all the regulations and inspections.
- Regulation unlikely – Government only interested in money.
- Government inspectors cannot inspect what they don't know about.
- Environment Agency and Health & Safety Executive are not in a position to protect us, due to staff cutbacks, lack of expertise, limited scope and not sufficiently independent.
- HSE can approve well design but do check if built correctly.
- HSE need to confirm their role before LCC can legally decide the application.
- Agencies are in a state of confusion as to who does what.
- Well heads will not be properly managed.
- Who will monitor roads for spillages to ensure safety of local communities?
- The council is powerless and uninterested in enforcing regulations causing great distress to residents.
- If approved, measures / restrictions cannot be enforced.
- Regulation must be fit for purpose.
- No independent inspection regime
- What happens if regulatory / mitigation plans don't work?
- Who pays for any damage?
- There is nothing in place to monitor wells after they are drilled or abandoned
- If anything goes wrong, the operator accepts no responsibility and leave clean up and reparation costs to local authorities.
- Robust monitoring is vital.
- Cuadrilla has breached planning permissions in Lancashire (and Balcombe) on numerous occasions. Safety regulations have not been enforced, demonstrating a dangerous gap in regulatory enforcement.
- Companies involved in shale gas have been proved to bend the rules to the detriment of the environment and have not alerted the necessary authorities.
- Cuadrilla has previously not reported faults at other sites.
- Cuadrilla accidentally released radioactive contamination into groundwater at Preese Hall and concealed it from LCC, the EA and the public for over a year until the information was released under duress.
- Cuadrilla continued drilling after its licence expired at its site near the Ribble Estuary SSSI.

Safety Risks

- To start fracking would be terrible as it's destructive, dangerous and risky.
- The process and (unreliable) technology have not been proven to be safe.
- How can fracking be safe in the UK and not in other countries?
- Fracking is not 100% safe and should be banned or delayed until risk assessed and fully researched and the public receive independent assurance that fracking processes are safe in short and long term.
- The process is flawed and inherent risks outweigh any benefits.
- Risks from the use, collection, storage and transportation of gas and propane
- Risk of accidents to workers and residents.
- Risk of explosion and unavoidable blowouts, in densely populated areas.

- Potential for major accidents (and comparison made to Abbeystead).
- The site will be a potential target for terrorist attacks.
- Concern regarding flammable gas in boreholes and USA accidents.
- Methane is highly flammable.
- Risks from faulty well heads, well integrity failure, human error.
- All wells fail within 100 years as they are only made of steel and concrete
- Cuadrilla's Annas Road site, both wells failed.
- Well integrity compromised / failure and major problems at Preese Hall.
- How did the faults at Preese Hall cause damage to the well? Not explained
- Why is there no appraisal of the technical failures at Preese Hall?
- The development site will have multiple wells with the potential for bigger problems.
- Risks to National Grid / power cables.
- Risk of accidents from pipes under houses, including potential loss of life.
- Multiple wells will pose a greater risk than one exploratory well, increased likelihood of accidents and potentially more dangerous.
- Shale gas extraction is a significant engineering challenge with the potential for serious technical problems.
- The development is a hazardous installation and should be refused permission as per policy EMP5.
- How are explosives classified? What quantity will be used and how will they be stored and transported?
- Could the emergency services deal with any incident?
- How will the council respond to a major chemical leak?
- Cuadrilla has a poor safety record.
- Concern regarding Cuadrilla's ability to deal with any incidents, to contain them and resolve them.

Geology / Seismicity

- Triggering of earth tremors are massive risks to undermining of sub surface strata and creating instability and sink holes.
- Risk of earth tremors not adequately addressed given past experience of test drilling in Fylde and particularly at Preese Hall.
- Earthquake risk / causes earthquakes and sink holes - injury to humans, property, roads and wildlife.
- Strong risk of earthquake near to nuclear power station at Heysham and other nuclear establishments and risk of damage to proposed underground gas storage facility at Preesal.
- Last time drilling in Lancashire – earthquakes caused house to shake leading to cracks in plaster. Patio sank.
- UK geology – too many local faults will allow leakage. Faults still moving. In previous drilling using unproven technology an undetected fault moved and failed the borehole. Too risky.
- Earth movement happened in Lancashire as a result of initial testing – safety assurances are of no value and events cause fear to adults and children.
- David Smythe, Professor of Geophysics at Glasgow University – research raised questions about dangers of fracking in UK. Induced seismic activity.

- Link between fracking and previously geologically stable areas – Ohio/US.
- Fracking could destabilise the entire bedrock beneath the Fylde, upon which sits several mine workings and unstable ground conditions – running sand etc.
- PNR area moss land – significant risk to local properties of subsidence especially Carr Bridge Residential Caravan Park.
- Intention is to drill into a fault line (fault 1) with Harves Ho and Moor Hey faults adjacent, will this induce seismic activity. Contrary to DECC guidance to avoid drilling wells into or close to existing pre stressed regional faults. Consequences are unknown.
- Traffic light system of seismic monitors provides warning only, will not stop an earthquake.
- Earthquake risk –contrary to DM2.
- Annular pressure checks at Preese Hall are not independent.

Air Pollution

- Proposal will result in greenhouse gas emissions / air pollution.
- Proposal is contrary to Policy EP26 due to flaring and air quality impacts.
- Flared methane emissions from fracked gas are worse than from coal.
- It is estimated that up to 7.9% of methane from shale gas escapes to atmosphere from venting and leaks over the lifetime of a well.
- In the USA, the methane emissions from shale developments were up to 1000 times higher than initially reported.
- Flaring of methane 24hrs a day is not clean energy.
- The proposal is contrary to Article 4 of the mining waste directive which requires that the best available technique for the management of waste should be used e.g. green completion.
- In the US, the Environmental Protection Agency (EPA) requires use of green completion technology from 2015 for hydraulically fractured wells instead of flaring to reduce air pollution.
- The description of the proposed flare is unclear.
- Flare plume dispersal modelling should be a priority.
- Flaring within 230m of a residential property is not acceptable.
- Fracking will unleash radon, methane, toxic gases, particulate matter and carcinogenic toxins into the atmosphere with associated health risks.
- Radioactive products will be released into environment, and will affect drinking water and food production.
- Radon should be treated as a hazardous waste.
- Potential impact from air pollution to Westby reservoir and watercourses.
- Fumes from the flare will concentrate toxic air pollution, which will be detrimental to local residents, including those at the caravan park.
- Air pollution will impact people and particularly those with existing illnesses, breathing disorders and low immune systems.
- Gas flaring is hazardous and will cause fires in homes.
- Impact of 100 lorries per day will release carbon monoxide and carbon dioxide.
- Waste fluid left in open air pits to evaporate will release harmful VOC's (volatile organic compounds) into the atmosphere.

- The development will increase nitrogen dioxide levels and increase health risks to local residents.
- If boreholes are not sealed properly there will be fugitive gas emissions.
- Is Cuadrilla being made to fit special filters to machines, diggings, chimneys, diesel generators etc?
- Need air quality monitoring for Great Plumpton given the prevailing wind and likely negative impacts.
- Residents sought rural environment for clean air and now at risk of adverse effects.
- Negative impact from air pollution on enjoyment of property, garden and living in Great Plumpton.
- Emissions should be monitored with limits and fines for exceeding
- There will be an unacceptable level of dust generated.

Noise Pollution

- There will be an unacceptable level of noise / noise pollution.
- The proposed times and duration for hydraulic fracturing are excessive in an area people have chosen to live in for the peace and quiet.
- A 50db noise level during fracturing is too loud to be acceptable.
- 24 hours a day of drilling, compressor and generator noise alongside associated traffic noise will disturb residents and have negative impacts on shift workers.
- Carr Bridge residential park, residents aged 55-90 years old of which many are not in good health. They chose to live on the site for the pleasant, quiet, rural location but are greatly concerned about drilling and traffic noise.
- The impact of 24/7 noise for a local autistic child will be unbearable.
- How far away will compressor stations be heard? The thump of compressors could be sensed up to 2 miles away.
- Traffic noise will affect the peace and quiet, with HGVs thundering past properties.
- The applicants EIA site noise assessment is incorrect for Foxwood Chase as the majority of residents are retired so if the noise exceeds acceptable limits it will have a significant effect on their daily enjoyment of homes and gardens.
- The applicants EIA traffic noise assessment is incorrect for Foxwood Chase as the properties are in close proximity to the site entrance and will hear HGV's and other vehicles decelerating and accelerating on entry and exit to the site, resulting in varying noise levels not constant as reported in the EIA.
- The applicants EIA traffic assessment is incorrect as the increase in traffic noise will be significant as the noise from one HGV is equivalent to noise from 10-15 cars and there will be 100 lorries per day.
- There will be a detrimental effect from noise in Great Plumpton, due to the prevailing wind blowing from the west carrying noise to the village. The ES has not provided information on noise levels for the village.
- There will be negative impacts from noise to the nearby dog kennels and the horse welfare centre.
- There is no information regarding noise from explosives detonation and impact on residents.
- The proposed site is a quiet field so the noise will be new and concentrated

- The noise of the site will impact on local residents and visitors enjoyment of the site for leisure including walking.
- There needs to be baseline and continuous acoustic monitoring at neighbouring houses.
- Cuadrilla exceeded set noise levels at Balcombe.
- The proposal will be contrary to Noise Policy Statement for England, Defra 2010 and NPPF 2012 Paragraph 144 due to observed adverse effects from large scale, long term noise duration.
- The proposal will be contrary to FBLP Policy EP27 by emitting unacceptable constant noise in a relatively quiet rural area.

Light Pollution

- Disturbance to residents from light pollution.
- Floodlights ruining night sky.
- Staining Farm 1 & 2 (10 properties) – expect illuminated 53m rig will have unavoidable impact on local residents.
- Light pollution increases sleep problems and causes health problems
- The flares will cause light pollution.
- Negative impacts at night are large. Detrimental impact on humans and wildlife
- Site lit brightly at night including access road - become an island of light - like an oil refinery/industrial site.
- Proposed lighting not in keeping with rural area. Significant direct impact on local residents.
- Contrary to EP28 – avoid or minimise harm.
- Contrary to SP5.
- Flare should not be visible.
- Flare should be fitted with suitable silencing.
- Flare plume dispersal modelling should be a priority.

Soil and Groundwater Contamination

- The Earth will become a barren toxic wasteland after fracking, breaking up and filling the ground with chemicals must have environmental consequences.
- Risk of short term well failure and loss of well integrity in the long term are widely reported, resulting in a toxic legacy for current and future generations
- Issues from corrosion of well casings, cement deterioration, faulty drilling.
- Fracking fluid contains carcinogens, toxins, radioactive and hazardous materials which will contaminate land and water sources affecting food production and drinking water.
- Risk of contamination from carcinogenic chemicals.
- Risk of contamination from *Caesium-137, Americium-241, Beryllium, Hydrochloric acid, lead, arsenic, cadmium, glutaraldehyde, biocide quaternary ammonium chloride, ammonium persulfate, choline Chloride, isopropanol, petroleum distillate, polyacrylamide, guar gum, citric acid, lauryl sulphate, sodium hydroxide, copolymer of acrylamide, sodium acrylate, chloride, bromine, methane.*
- 50% of chemicals will remain in the ground.

- Don't want a chemical legacy for our children to have to deal with.
- Need full disclosure of chemicals in fracking fluids and risks from them.
- Contamination/pollution from fracking process, gases and fracking fluid to aquifers, ground water sources, local rivers, streams, springs and reservoirs in the short and long term which could endanger drinking water supply to people and grazing animals with associated health risks.
- Over a thousand documented cases in the US of groundwater pollution.
- Drinking water is more important resource than gas. Risk of contaminating water supply is too big a risk.
- Need more work to establish the safety of the process in relation to ground water contamination.
- Need baseline and continuous groundwater monitoring with work suspended if contamination / adverse effects are found.
- Monitoring wells for groundwater quality and gas concentrations should be mandatory.
- Even if tightly regulated an unforeseen accidental discharge could contaminate groundwater and the damage cannot be rectified.
- Millions of litres of polluted / toxic water will be left to drift underground, approximately 30miles around each well with long term damage.
- Faults can act as conduits and enable fracking fluids to migrate to water sources.
- Excessive rain could impact on the containment capacity of the well pad. Land adjacent to Carr Brook and Moss House Lane already prone to flooding.
- Proposed site is on a hill and any polluted waste water will leach into dykes and waterways including Carr Brook, and into farm land and out into the River Ribble.
- Preese Hall well was damaged and toxic waste water could be leaking into dykes and streams feeding into the River Wyre.
- The Water Framework Directive requires that a development should not go ahead unless it is proven that there is no risk to groundwater.
- Contrary to FBLP Policy EP24 as water quality will be affected by leaking wells.
- Who pays for decontamination of our water supplies? Are councils not cash strapped?
- Need a law for every contamination, company directors get 10 year jail sentence.
- Water from taps could ignite.

Waste Disposal

- Huge amounts of toxic/hazardous waste and waste water will be produced with inadequate measures in places to treat and dispose of it.
- Significant risks associated with its waste transportation and disposal.
- Risk of a devastating impact on local environment from waste management.
- There are no adequate treatment facilities / insufficient capacity for huge volumes of hazardous and contaminated waste with radium.
- Burying radioactive waste in landfill sites is ridiculous.
- How can massive amounts of waste water be disposed of without significantly affecting the landscape.

- How will large volumes of waste water be managed in times of heavy rain and localised flooding.
- Flowback fluid recycling risk assessment does not recognise resultant flow back waste will have increased toxicity /chemical composition.
- DECC has said that there is no clear and safe way to treat flowback water.
- Flow back water from Preese Hall, when tested at Davyhulme was too toxic to treat, so returned to Preese Hall.
- Safety concerns over separating process for flow back fluid.
- Cuadrilla has dumped thousands of gallons of contaminated waste water into Manchester Ship Canal (from Barton Moss) and was allowed to get away with it. The EA cannot guarantee that this will not happen again.
- Flowback fluid will be 'lost' to avoid expense of disposal. How can this be regulated?
- Waste products will be stored in sealed containers which demonstrates Cuadrilla have no idea how to treat waste
- Toxic waste will be stored near schools and residential areas
- Risk of children jumping into a cavern of chemically poisoned water
- Potential unknown hazards will be transported on roads as the waste will not have been analysed instantly on site.
- US have documented accidents and spills from transportation of shale gas waste materials.
- Is there sufficient security to keep hazardous waste from being misused

Water Resource Sustainability

- Excessive amounts of a scarce resource, fresh water, will be used.
- Existing water suppliers and handlers may struggle to cope.
- Public drinking water must be preserved at all costs and not depleted particularly in times of drought.
- Vast amounts of water should not be utilized for gas drilling, especially given water shortages in recent years
- Water usage is unsustainable, it should be safeguarded
- Why not use saline water?
- The mains water supply in the area has a history of bursts and poor water pressure and fracking will deteriorate if further.
- The negotiations and works by United Utilities are not clear or complete.

Environmental / Landscape Impact

- Local and global level implications to natural environment.
- Should not allow companies to exploit the environment at our expense.
- Fracking wells are only viable for a short number of years, this development will open the way for hundreds across the Fylde with untold environmental damage.
- Potential for 1000's of well pads across the Fylde if these are approved, reports suggest a need for 80 to 33,000 wells to exploit the Bowland Shale.
- Fylde will become industrialised with thousands of wells feeding the south.

- Once interest rates rise, the development will fail and leave damage to environment and landscape for future generations to clear up.
- The proposal will destroy/degrade/permanently damage the beautiful Lancashire/Fylde countryside by industrialisation and traffic.
- Inappropriate development in the greenbelt.
- Application is contrary to Policies SP2, SP5 and EP11 as it is not in keeping with the landscape character due to its character and appearance.
- The development will be a blight/blot/scar on the rural landscape and will get worse when in full production, turning area into an industrial zone.
- The visual impact from the M55 motorway and the A583 will promote an industrial image and deter tourists
- A 53m high rig will have a significant landscape impact and is inappropriate and unnecessary in this area
- The tall structures will be on site for approximately 29 months and will be a third of the size of Blackpool Tower
- The title page image is misleading as it shows a 30m rig and not a 53m rig
- Staining Wood properties will suffer the highest impact on visual amenity but they are not shown in the ES photo montage.
- The new access road and hedgerow changes are not minor landscape changes.

Ecology / Wildlife

- Contamination of nearby Carr Bridge Brook could result in pollution of the Ribble Estuary SSSI site an internationally important site for wildlife including wintering wildfowl and animals that use the watercourses.
- Poses a threat to wildlife sites including Ribble Estuary SSSI, Wyre Estuary SSSI, Lytham Moss BHS, RSPB sites including Marton Mere.
- Potential ecological disaster.
- The RSPB report says that shale gas will damage biodiversity, by salinization of soils and surface water and fragmentation of forests, creating shale gas landscapes.
- Adverse effect on local ecology and biodiversity, including death of and disturbance to wildlife and damage to habitats.
- Impacts from well operation 24hours a day, 7 days a week.
- Impacts from flare burn off.
- Impacts from noise and lighting pollution to animals e.g. lighting and bats.
- Impact on protected species including brown hare, foxes, rabbits, frogs, toads, dragonflies, shrews, voles, weasels, stoats, hedgehogs and great crested newts.
- Impact on wildlife corridors/feeding grounds for wintering wildfowl, migratory birds, local birds, skylarks, kestrels, Canada goose, buzzards, barn owls, tawny owls, woodpeckers, Martin Mere birds, pink footed geese, starlings
- Pollinating insects could be driven away.
- Impact of stress to the horses at the World Horse Welfare and Rehabilitation Centre (Penny Farm). The centre is visited by children and elderly people.
- Impact on trees and woodlands from vehicle pollution.
- Proposals are contrary to EU, UN, NPPF and Policy EP15 policy guidance, as the proposal will cause environmental harm.

- Ecological surveys are incomplete as per a report by an independent ecologist
- Humber Wood and the Plumpton Lane/A583 TPO tree are not included in the assessment.
- Survey data limitations relating to the bat information.

Economy

- No economic benefit. The number of jobs to be created are exaggerated
- Only jobs for outside specialists, so no local benefit.
- More job opportunities in renewable green energy, which are also sustainable.
- DECC report that job creation in fracking will be approximately 24,300 yet 400,000 could be created in clean energy. Fracking is not sustainable, whereas sun, wind and tidal resources will not run out.
- Shale gas creates bad press which has a negative impact on the Northwest economy particularly if the industry were to escalate in scale.
- Impact on coastal settlements from potential loss of jobs in tourism/farming
- Tourism in Blackpool, Lytham St Annes and the Fylde could be seriously affected /harmed, with reduced visitors and trade due to industrialisation, toxic rivers, dead wildlife, gasfield landscape and HGV traffic.
- New York University (Professor Oswald) reported that shale gas impacts on cattle and crops from water, soil and air pollution.
- Rich arable land / grazing land will be polluted from leaching of chemicals onto the land and water supply with subsequent entry into the food chain, rendering produce unsalable.
- Cannot sacrifice food growing, need to keep prime farming land safe for food production, for local economy and to avoid world food shortages.
- Impact on local dog boarding kennel from dog owner's perception of risks.
- Impact on Maple Farm Nurseries from impacts to trees and shrubs.

Traffic

- Unacceptable increase in the number of heavy lorries and tankers delivering large loads of water, silica sand, prop pant and acid and taking away toxic waste flowback water on an inadequate minor road system and damaging road surface – over 100 per day (200 movements) for each well, 20,000 for the total project. Contrary to Policy T3.
- Site entrance on a dangerous section of Preston New Road which is narrow and with fast traffic will lead to traffic congestion from HGVs turning into the site and which would lead to confrontation due to insufficient room to manoeuvre within the highway.
- Impact on villages and country lanes. No go zones for cyclists, pedestrians, horse riders, dog walkers, vulnerable road users stopping tourism and leisure and ruining peace and quiet.
- Highway safety major concern. Roads not wide enough for heavy traffic 24.7 supplies. Traffic jams and disruption to bus services and bus stops near the site. Hazard of spillage by impatient motorists and water pollution.
- Drilling under motorway – any tremors could cause chaos and destruction.
- Articulated lorries for the development but ES compares increase in traffic against all HGVs and not just the same articulated lorries. Number of

articulated lorries will double and at times treble. Significant change in profile of traffic passing homes.

- Cyclists count taken in October 13 does not reflect summer cycling levels. Increased HGV increase risk to cyclists at junction of A583 and Westby Road where A583 comes over brow of the hill and bends right. Drill rig directly in driver's eye line with potential to distract and heighten risk of accident.
- Cyclists would be affected by spillages from vehicles leaving the site. Inadequate washing down vehicles.
- Impact on communities of Weeton, Great Plumpton if site traffic uses the B5260, Plumpton Lane and Moss House Lane.
- Kirkham notorious blackspot, several fatal accidents, impact of extra traffic heading to M55.
- Impact on trees and woodlands from pollution
- HGV traffic out of site will turn right onto the A583 to access J4, would it not be better to turn left and access J3.
- Impact on Moss House Lane, used as a short cut, so likely increase if congestion on A583 with inherent risks to road users and pedestrians.
- Impact on A583 as emergency route to Blackpool Victoria Hospital from congestion./ traffic volume increase
- Congestion, stop people being able to access A583. Existing problems with turning right out of sites on Preston New Road.
- Carr Bridge residents access to PNR problematic – elderly and poor health. A safe crossing point is required for Carr Bridge residents.
- Contrary to SP7 - impact on amenity of residents from heavy trucks and toxic waste, fumes, noise and vibration contrary to SP9.
- Impact to main routes to M55 and M55 itself.
- Impact on A583 to M55 J3 – even more traffic from Wesham, Kirkham, Wrea Green and Warton.
- Impact on entry and exit to Foxwood Chase. Already difficult - proposal will make it significantly worse.
- Existing problems with turning right out of sites on Preston New Road.
- Cumulative impact with Roseacre site
- Arup traffic modelling based on computer models only and not real-time system.
- Carr Bridge Residential Caravan Park, some residents are elderly and in poor health, and will find it difficult to access the A583 and there will be no safe crossing point.
- Proposal is contrary to Policy T3 due to the impact of 20,000 vehicle movements over the lifetime of the policy and the impacts on tourism from toxic waste and emissions.
- Proposal is contrary to Policies SP7 and SP9 due to impact on the amenity of residents from heavy trucks, toxic waste, fumes, noise and vibration and the endangerment to road users including schoolchildren and horse riders

Health and Well being

- Full short term and long term public health effects are unknown.
- Growing evidence of serious risk to human health.
- Other countries have banned shale gas development on health grounds.

- American reports have linked air pollution/gas flaring, contamination and groundwater contamination from shale gas developments with health impacts.
- US shale gas air reported to have 50 hazardous chemicals of which 35 affect the brain and nervous system.
- In New York State a 3 year moratorium on shale gas followed a report from hundreds of health professionals regarding health impacts.
- Lancet, British Medical Journal and the Medical Journal of America have linked the proximity of shale gas sites with increased health risks.
- Lancet article reported insufficient regulations to safeguard public health.
- NHS website states that the gases emitted are highly toxic and cancer inducing.
- Breast Cancer UK has reported that fracking chemicals are linked to an increased risk of breast cancer.
- The council should protect people's lives and not destroy them; it's too dangerous to risk the health of local people. People will get sick and die; it will be a living hell.
- Need before and after baseline check on residents health.
- Reported health risks include neurological conditions (brain damage, memory problems, sensory conditions), cancer, breast cancer, leukaemia, heart defects, respiratory disease, infertility, neural tube defects, congenital heart defects, reduced Apgar scores for newborn babies, dermalogical conditions (skin rashes), chemical burns, poisoning, sickness, stress, emotional distress and sleep problems.
- Risk of exposure to sulphur dioxide, polycyclic aromatic hydrocarbons, radon and particulate matter, carcinogenic gases (benzene) neurotoxins (toluene) and central nervous system impacts (xylene) which have health implications.
- Elderly residents (including Carr Bridge residents) with respiratory conditions including (Chronic Obstructive Pulmonary Disease) COPD, asthma and heart problems have moved to the countryside to improve their health and life expectancy, but now concerned that the development will affect their health, particularly from methane which is an asphyxiate.
- Potential for toxins to enter the food chain risking starvation and death.
- Silica sand can cause pulmonary, lung cancer and cardio vascular diseases.
- Blind people will not be able to see that water is discoloured.
- Health impacts will cause a strain on the NHS as people become ill.
- Need to think about present and future generations including elderly and younger generation's safety.
- The EIA does not consider impacts on humans.
- There are no guarantees that the health of local people will not be adversely affected. No decision should be made until a Health Impact Assessment (HIA) / investigation into health risks (supported by empirical data) has been completed.
- Regulations can't mitigate against health impacts from accidental waste spillage and well failure.
- No amount of money is worth the risks of the health of the community.
- Will Cuadrilla pay compensation for health impacts.
- The proposal is contrary to NPPF Paragraphs 120 and 144 as it poses a considerable risk to human health.

- The proposal is contrary to Policy EMP5 as the chemicals in the air make it contrary to health.

Community

- The damage to communities will be irreparable and not good for wellbeing.
- Massive impact on rural community from the 24hr operation, will be like living on a heavy industrial site.
- Rapid industrialisation of small isolated rural communities leading to industrial and population growth will put stress on services and infrastructure.
- An influx of gas workers and families could lead to over building and an increase in rental values. Baseline data is needed to compare the effect.
- The application is incorrect with regard to number of residences/people in close proximity to the site that will be unavoidably impacted by the development. There are 10 not 1 residences at Staining Wood Farm.
- Need a 2km buffer zone from residential areas for unconventional gas well pads (like in Australia). It's irresponsible to locate an unsafe development near to (densely) populated areas including Staining Wood/Foxwood Chase which is within 300m of the site.
- Contrary to Policy EMP5 as residences at risk from hazardous installation.
- An unsafe development should not be located near to villages and schools.
- Impact on communities at Foxwood Chase, Little Plumpton, Great Plumpton, Carr Bridge, Westby, Wrea Green.
- People will leave the area, take children out of schools and it will be ruined
- The development site is too close to large urban communities.
- Need to consider the impact on residents of drilling and fracking for 24/7 for 2-3years, and if viable for 10-15yrs with 20-30wells on the site.
- Concern about hydraulic fracturing for 12hrs a day 7-7pm is far too long and will disturb too many people. No restriction on how many 2-3hr durations during a 12hr day.
- Any disaster will affect the local community for generations. People in local area do not want this forced on them.
- Earthquakes or the threat of earthquakes will impact on the quality of life of residents.
- Impact from protests and cost of policing them.
- Proposal is contrary to NPPF Paragraph 144 on grounds of unacceptable adverse impact on the environment and local communities.
- There has not been transparent consultation. As a major issue, need better public consultation and opportunity for people to speak and be listened too. Need a local vote.

Property

- Purchased house for a peaceful retirement and/or peace and quiet, these plans will have a very negative impact.
- To allow this application is an infringement of Human Rights to allow people to peacefully enjoy their property.
- Development in close proximity to residential properties within 230m is totally unacceptable. It is not necessary to be so close to homes.

- Applicant does not have our consent to access the land under our property, outraged that property owners do not have a say on what happens underneath properties.
- An unproven process, should not be allowed under residential land.
- The change to trespass laws put the public at greater risk. Legislation for on-shore exploitation is not protecting the public.
- Nothing to protect us if damage occurs from fracking beneath our homes.
- Significantly higher risk of potential damage to property / foundations.
- Mobile residential park will be on a direct line of the proposed work, any undue pressure caused by drilling will undermine the mobile homes.
- Home insurance premiums may increase, or insurance refused due to risks of subsidence.
- If house is undermined who will be responsible? Will the applicant pay/ be made to pay for repairs to damaged property?
- Will be the same as coal mining experience, where told there will be no impact on property and there is and then fight for years for compensation
- Properties have been damaged from Preese Hall earth tremors and costs of repair have not been reimbursed by Cuadrilla. Insurance company is not paying out as there is no proof that the damage was caused by the tremor
- Horrendous experience from days' explosions from Cuadrilla Annas Road site, houses shaking, property damage and residents panic.
- Ground water leaks at property resulting from Anna's Road site works.
- Concern regarding impact from HGVs on the stability of properties at Carr Bridge Residential Park.
- LCC will be held liable for any damage to property if permission is granted.
- The cost of future legal challenges to Fylde BC and LCC for compensate for damages will outweigh any government subsidies.
- Residents have paid a premium to live in a rural area and planning applications have already had a detrimental impact on housing and land value
- House valuations in area will depreciate further if proposal is approved and this will lock people into possible negative equity.
- Will applicant pay for compensation for loss in house value?
- Who wants to buy a house with 24hr drilling on the doorstep?

Damage and Compensation

- Need a fund to compensate residents for damage caused by any earthquakes during works and for several years after abandonment.
- Local residents and people of Lancashire should receive significant financial benefits over and above taxation/employment.
- No assurance that Cuadrilla will accept liability for any damage to properties and the environment. The local authority and the community will have to pay for any damage caused by Cuadrilla
- Will applicant be accountable for damage to the environment, housing, roads, health? Who will foot the bill?
- How much will the mess cost to clean up and who will clean it up?
- Who picks up the bill when something goes wrong? If council it's a waste of money that could be put to serious use.

Abandonment

- Abandonment and restoration proposals will not ensure that accidental pollution is cleaned up or contained by the applicant.
- No guarantee countryside will be returned to former state when fracking ceases.
- Do not trust the gas companies to properly and safely close off wells.
- Need to review Grange Road, Beckonsall and Preese Hall sites to establish why they are still restoring the sites so long after the seismic activity.
- Annular pressure checks at Preese Hall are not independent.
- Cuadrilla fill the well with cement which will fail as the cement fails.
- Who will be responsible for the abandoned wells?
- Need financial and monitoring processes in place, particularly after well abandonment, so legacy issues are minimised.
- Unclear clear how consequential damage to property / wider environment will be dealt with after abandonment.
- Additional costs to tax payer will result from the development.
- Who is examining existing sites for pollution and safety following abandonment?
- Who is paying to monitor the abandoned sites in the future and for how long?
- No bond submitted for monitoring during and after the works.

Applicant / Application

- Company are not acting in best interest for future generations, they only care about making money and not the harm to the local area.
- Cuadrilla will sell to a bigger company, resulting in dozens of drill holes all over the place which will turn Fylde into a nightmare.
- Is Cuadrilla a fit company to carry out these operations In light of earthquakes, tremors and well damage at Preese Hall and a government reprimand?
- Cuadrilla has not complied with previous permissions or permits. They have a poor reputation and do not keep promises
- One problem after another at previous sites.
- £100k bribery per district.
- Cuadrilla has handed out monetary incentives to parish councillors and local landowners.
- The legality / validity of Cuadrilla's shale gas licences is questioned
- DECC licences have expired.
- The application form is incorrect
- The planning application documents are unreliable as they are full of inaccuracies, contain highly contentious statements and there is no credible risk assessment.
- The ES data is incorrect in relation to distances to properties and villages to the site and nearest receptors and therefore assessments, including fugitive gas release, are incorrect.
- There are doubts regarding the ES data and in turn Cuadrilla's ability to execute the proposal safely, within set parameters, and to accurately record and monitor data.

- The EIA prepared by Arup for Cuadrilla is not independent as Arup were restricted by Cuadrilla in terms of research. There is not enough information supplied regarding geology and hydrogeology.
- Company not agree to an Institute of Mechanical Engineering assessment.
- Public meetings arranged whilst at work, need a better forum.

Government

- Government dash for gas is wrong.
- Live in a democracy, but feel we have no say in this matter as the Government is intent on pushing forward regardless of people's views and incentivising the industry.
- Government is bribing councils to accept fracking by offering extra money – unacceptable.
- Significant profits should not be permitted
- Have any MPs been to Lancashire to see the areas that will be destroyed?
- Lancashire is beautiful and valued - it is not a northern industrial wasteland.
- Government is being short sighted. Shale gas is a short term fix.
- By allowing an overseas company to frack here the government is taking away our rights as citizens, e.g. the right to prevent drilling under own home
- Violation of rights of citizens
- What right does the government have to make Lancashire the core site for fracking.
- Disappointed that Lancashire are being told what to do by central government
- After contamination the Government will refer to £100k payment and let Cuadrilla keep profits and LCC will have to pay for the clean up.
- Should be a public consultation before fracking our country.
- Being rushed through out of political fear that companies will go to other countries.

Lancashire County Council / Decision making / Policy

- LCC making money out of fracking.
- LCC have a moral duty to future generations to ensure that fossil fuels are not exploited. Permitting fracking will accelerate and expand the fossil fuel industry, LCC should not support a short sighted and destructive move.
- LCC should pursue safer and more long term solutions to secure our energy needs in the future rather than a short term view to acquire energy resources
- Why authorise, promote and support a destructive activity when there are alternatives.
- Ridiculous and dangerous to allow fracking.
- If LCC allow the application, they will be held accountable for problems.
- How will the Council respond to future lawsuits if anything goes wrong?
- If LCC refuse the application, it can lead the UK on clean, renewable energy.
- LCC should not rush a decision but should enforce a moratorium on all further fracking activity until a proper regulatory framework is in place and a full study of evidence from the USA into health and environmental effects has been considered by the full Council.

- Council should look after and protect residents, communities and the environment, need to protect safety, security and well-being of society. Not in public interest to allow.
- To approve when there is objection is anti-democratic.
- No glory to the Council when there is sickness and water pollution.
- Outraged that the Council is planning on or even considering applications for fracking when it knows the dangers to the environment and the earthquake it caused.
- Stand firm and listen to constituents and not bow to the government or industry.
- There is a lack of clear information about the process. Is the Council making a decision with the same lack of verifiable evidence?
- Lancashire needs to be progressive, forward thinking and responsible, don't let Lancashire be exploited
- Do councillors want to have large scale damage to inhabitants on their hands?
- Science and technologies are not advanced enough to reassure ratepayers of Lancashire that any disastrous outcomes can be mitigated against.
- Once grant this application, lead to more and cumulative impact of intensive gas drilling in Lancashire for many years
- If one council approves, trigger for others to follow.
- The proposal is contrary to NPPF Paragraphs 30,32,36,61,93,97,109,120,144
- The proposal is contrary to Policies EC5, E5, and GD1.
- The proposal is contrary to Policies EP11, EP12, EP15, EP18, EP23, EP24, EP26, EP27, and EP28.
- The proposal is contrary to Policy DM2, SP7, SP9, and EMP5.

Support

North and Western Chamber of Commerce

- Support shale gas development subject to conclusive evidence that the proposals are unsafe and will cause irreparable damage to the local environment
- Welcome investment in Lancashire which could create thousands of jobs in the local economy directly through the supply chain and spread beyond that, through inward investment and spin off technologies.
- Help create well paid jobs in Lancashire and help rebalance the local economy and generate wealth.
- The National Transmission System for gas has spare capacity and runs through the county which has excellent road, rail, air and port infrastructure.
- UCLAN and Lancaster University have considerable energy expertise across a range of disciplines which could benefit from the shale gas development.
- Lancashire is already a leading centre for the nuclear industry and advanced technology and manufacturing and with shale gas opportunities could regain its role as a national economic powerhouse, with Lancashire a centre of expertise for shale gas operations.
- Huge opportunity for Lancashire to use to generate economic growth.

- Following a review of Government, Royal Society, Royal Academy of Engineering, International Energy Agency, Energy and Climate Change Select Committee and Public Health England findings, concluded that if properly and effectively regulated, fracking is no more dangerous than any other form of energy extraction.
- Shale gas extraction would be at low risk to the environment and public health
- Confident that shale gas extraction will be properly regulated and take place safely and responsibly
- Shale gas in Lancashire would strengthen the UK's energy supply as well as providing a bridge fuel towards a low-carbon future
- Shale gas in Lancashire would establish Lancashire at the heart of a successful UK and European industry
- Lancashire's Strategic Economic Plan, prepared by Lancashire Enterprise Partnership (LEP) and endorsed by Lancashire County Council, acknowledged that shale gas sector may play an important economic role in Lancashire within the timeframe of the Growth Deal and the locating of an elite institution in Lancashire for shale gas would be important in establishing the sector both locally and nationally.

Chamber of Commerce East Lancashire

- Important to the local and national economies and for international competitiveness to have energy supply, security, price and supply chain opportunities
- Assurance of energy supply will be a strategic consideration to would-be inward investors.
- Shale gas fills the gap between decommissioning coal and nuclear plants and the ideal of a no-carbon solution
- Shale gas will be a significant buffer against volatile imports
- Lancashire's manufacturing sector could gain from careful use of shale gas resources
- Lancashire's wellbeing and prosperity can benefit

Up to the end of December 2014 a total of 200 representations supporting the proposal both in principle and in respect of the specific benefits that the proposal would generate in the locale. Representations in support have continued to be received the final number of which will be reported when the application is presented for determination.

The reasons for supporting the proposal have been summarised under the following headings:

Energy Security – need, supply and pricing

- UK needs to secure energy reserves as global energy demands increase and reserves decrease, need to avoid energy shortages
- Growing population needs energy. 80% of homes have gas central heating
- Need to reduce reliance on expensive imported gas and associated impacts of supply disruption (due to political unrest) and fluctuating gas prices

- Need to reduce reliance on imported gas which helps support foreign regimes
- Need to have a predictable, sustainable source of energy to ensure our energy supply, to stabilise prices and replace declining North Sea reserves
- Shale gas is critical for future energy strategy. Failure to explore this possible source of energy would be grossly irresponsible
- Without shale gas, National Grid scenarios suggest 80% of our gas will be imported in 20 years time. Global market prices could cripple us.
- National Grid suggests that up to 40% of the UK's gas requirements could be met by shale in 2035. Bowland could supply the UK with gas for 23-169 years
- US has moved from being the world's largest energy importer to being a net exporter due to shale gas and has reduced energy prices
- If priced correctly shale gas would force competition in the energy market
- Everybody wants cheaper energy, gas is the cheapest source of energy
- Shale gas will be potentially vast resource of clean sustainable energy for the UK which could help deliver climate change commitments by substituting for coal in electricity production and thereby reducing emissions of CO₂.
- Need to explore all future gas sources, including shale, renewable and nuclear. It would be madness not to tap into huge store of natural energy
- Shale could bridge the gap until we build up renewable and/or nuclear capacity to deliver the quantities we need
- Cannot expect one source of energy wind power to provide our energy needs
- A wind farm requires 200 times as much land as a fracking well site for the same energy output and residents are anti wind farms
- Prefer to have shale gas than nuclear energy

Economic Benefits

- Need to determined whether or not the gas is in commercial quantities
- Shale gas development will bring economic growth, wealth and prosperity to the UK, Northwest and Lancashire economies and to local communities
- It's vital to the country's prosperity to exploit our natural reserves and to benefit future generations
- Energy from a local source will be good for the local economy and could attract high gas consuming businesses to relocate in the region.
- SME business failure may be avoided by stabilising energy costs and by providing new business opportunities as part of the supply chain - energy services, components, education/training, hospitality, property
- Shale gas exploration will provide increased potential for local business growth and revenues and provide employment for local people
- Shale gas could be a catalyst bringing in inward investment and regenerating Lancashire and Blackpool
- This opportunity should be welcomed and not lost to other counties and countries. Shale gas could transform Lancashire like North Sea oil/gas has done for Aberdeen and how shale gas has done for small towns in the US.
- Fylde Borough Council and Lancashire County Council will benefit from tax revenues, which could help pay for public services and infrastructure
- Investigation works have already provided significant business to the accommodation sector in and around Blackpool with knock on impacts

- This is an opportunity to change the region from high unemployment and no industry, to an innovative area that supports new industry and is a leader of new technology within the energy sector.
- Without shale gas, what is the economic future for Lancashire and Blackpool, Blackpool has high levels of deprivation, child poverty, poor health, benefits dependency and youth unemployment
- Fylde coast has an over dependence on declining agriculture and tourism sectors with a transient, seasonal, low paid, unskilled, migrant workforce.
- Shale gas provides economic diversity through new industrial activity, generating skilled permanent jobs and youth employment opportunities, directly or indirectly through the supply chain including engineers, apprentices
- Reports suggest that a shale gas industry could be responsible for a supply chain spend of over £300 billion and support 60,000-74,000 jobs.
- If shale gas development is not allowed in Lancashire, but develops elsewhere, Lancashire will miss out on revenue and employment generated by supply chain businesses
- New jobs essential for the prosperity of the UK and the Northwest area
- Job prospects for future generations will help stop them having to move away and will improve the local skills base
- UCLAN and Blackpool & the Fylde College can train local people in skills to ensure jobs can go to local people
- Every aspect of the community will benefit, including people struggling to pay gas bills through cheaper gas prices

Minimal Environmental Risks

- Environmental impact of shale gas is less than any other energy source, mineral and coal extraction have a far larger impact on our environment
- Shale operations are sustainable, non-polluting and can be undertaken with minimal risk to the environment, wildlife or the local population
- Shale gas development has been safely undertaken in America for 10 years
- The process of rock fracturing and its waste products have been intensely investigated and proven to be totally safe
- Reports by the Royal Society, the Royal Academy of Engineers and other academics have concluded that shale gas is safe
- Security of energy, economic benefits and job creation far outweigh any supposed risks, disruption or inconvenience
- The energy industry creates jobs and prosperity on a grand scale in a secure and environmentally friendly way as evidence in the Shetland Islands
- The EIA addressed environmental risks and has satisfactory mitigation
- Lancashire experiences natural geological processes/earth tremors, shale gas will not significantly increase the incidence
- The possibility of any localised pollution is the same as any other industrial or agricultural business
- The development footprint of a producing gas well is minimal
- Drilling rigs will be no more visually intrusive than large electric pylons and site lighting will be no more visually intrusive than airport approach lights
- The noise of drilling will be low compared with noise of jet aircraft at Warton

- Vehicle movements are less than to quarries/waste disposal sites and vehicle sizes are no greater than large farm equipment used by local farmers
- Routing of traffic will be controlled by planning conditions and the use of byways for cycling will not be impaired
- Environmental and property concerns raised by professional protesters have been overstated/inaccurate, to scaremonger local communities to oppose
- Opposition viewpoint is short sighted, over-emotional, ill informed and nimbyism. Adverse factors identified by objectors have no scientific credibility
- Silent majority support the proposal, cannot let activists jeopardise new jobs

Robust Regulatory framework

- Exploitation of shale gas in Lancashire is safe and will avoid environmental impacts if environmental protection measures are implemented to best practice standard and monitored and controlled by regulatory bodies
- Regulations, enforced by Lancashire County Council, the Environment Agency, the Health & Safety Executive and DECC will ensure that the process is safe and safeguards are in place to protect the environment.
- DECC seismic control system should overcome ground tremor fears
- The Environment Agency is convinced that shale gas activities can be carried out safely and will monitor the development in the short and long term
- The UK has 60 years of regulating onshore and offshore oil and gas industries
- The UK has some of the toughest and most stringent health and safety, environmental and drilling regulations and the gas industry prioritises safety, environmental protection and competence
- Engineers located in Lancashire are confident with the process, regulations and limited risks to the environment
- Public scrutiny and implementation of regulations will ensure the safe and responsible extraction of shale gas
- Preference to risk the potential failure of gold standard regulatory bodies rather than competing for higher priced gas
- The establishment of a local liaison group should ensure a good working relationship between Cuadrilla and local communities
- Cuadrilla is open and informative about their development and is aware of its responsibilities with regard to safety, environmental management and working with local communities. The management team have been involved in over 3,000 natural gas and oil wells across the world
- Visited a Cuadrilla site and impressed by the company's efficiency and safe modern technology. Need to allow Cuadrilla to prove it can be done safely with no damage to the environment.
- At Annas Road site, Cuadrilla kept residents well informed, noise was minimal (similar to light aircraft /farm vehicles), increased traffic was negligible and there was no noticeable smells or gases

Appendix 3

Air Quality

Proposal

The applicant has assessed air quality impacts in Chapter 6 and Appendix E of the Environment Statement. It does this by predicting the likely changes in pollutant concentrations as a consequence of the project. These are then compared to air quality objectives and limit values for these pollutants to determine whether the predicted changes are significant.

The area in which the site is situated is rural and not densely populated. There are no existing significant sources of emissions to the atmosphere. Likewise, there are no areas within the vicinity of the site where there is an existing problem with air quality or pollution.

The project has five main activities that will result in emissions to the atmosphere, these are:

- Emissions from construction activities;
- Emissions from the vehicles associated with the use of the site;
- Emissions from the flaring of gas during flow testing;
- Emissions from equipment associated with the operation of the Site (e.g. generators); and
- Possible fugitive emissions (i.e. unexpected or uncontrolled emissions)

The main source of atmospheric pollutants from the project is the gases that are emitted when gas is burnt in the flare during flow testing. The assessment in the ES quantifies the amount of nitrogen dioxide, benzene and radon that could be emitted from the flare and how it would be dispersed using weather data for the prevailing wind directions.

The predicted air quality emissions from the project have been compared to Air Quality Objectives and Limit Values for the different pollutants likely to be emitted by the project activities (Section 6.7 of the ES). These objectives and limit values are based on minimizing health effects as a result of acute or chronic exposure to potentially sensitive individuals.

Dust

The applicant concludes that given that the site is located within an area of agricultural land and has not been subject to historical development there is a negligible risk of contaminated dust being generated during the construction of the well pad, access track, extended flow testing infrastructure, gas pipeline and the seismometer arrays.

The risk to nearby receptors has been assessed by the applicant. This assessment has concluded that there is a negligible to low risk of dust being created by the project and it will not result in a significant effect. This is because there is sufficient distance between the site and potentially sensitive receptors. Furthermore, the scale and duration of the project activities (construction of the access track and well pad

and decommissioning) will not be carried out over a long period of time (less than 2 months for each activity).

Emissions from generators

The applicant has provided details of equipment that will be used at the site, i.e. pumps, fracturing water transfer pumps, generators, blender units and service rigs. The equipment will be used during the drill phases for the duration of the drilling. During the hydraulic fracturing the engines will be run for only a few hours at a time. Given the size of the generators and engines and the relatively short period of operation, these sources have been scoped out of the assessment by the applicant. A table summarising the generators used on site is provided in Appendix F of the ES.

Further information was requested from the applicant to justify the decision to remove the generators from the scope of the assessment. This has been provided and provides sufficient information to justify the applicant's conclusion.

Emissions from road traffic.

To assess the impacts from road traffic an initial screening exercise was undertaken by the applicant that examined the likely changes in vehicle numbers on the road and compares these with criteria from the national guidance 'Design Manual for Roads and Bridges' (DMRB) to determine whether a more detailed assessment was required. The criteria are not exceeded so no significant air quality impacts are likely, according to the applicant's assessment.

Again, further information was requested to justify this decision and this has been provided and provides sufficient information to justify the applicant's conclusion.

Emissions from the Flare

The Air Quality chapter of the ES (Chapter 6) includes a forecast and assessment of the potential quantity and effects of NORM in the form of gas (specifically radon) that may be present in the gas that is burnt in the flare stacks. These predictions have been compared to an annual dose limit of 300 microSv/yr for a single source. The predicted emissions from the combustion of gas in the flares is 0.3 microSv/yr. This is one thousand times lower than the International Commission on Radiological Protection (ICRP) limit. Therefore, the applicant concludes, the levels of NORM emitted to the atmosphere by the project do not present a significant risk to health.

The flares that will be used to burn gas generated during initial flow testing are the main source of emissions to air associated with the project. The concentrations and distribution of pollutants (specifically NO₂ and benzene) have been modelled by the applicant so that the effect on air quality, and indirectly health, can be predicted at potentially sensitive receptor locations around the site (residential properties). The ES air quality assessment concludes that the levels of NO₂ and benzene are well within the regulatory limits and therefore do not present significant risk to health.

The air quality effects from the project have been assessed for dust, NO₂, PM10, PM2.5, benzene and NORM. The assessment by the applicant for all of these parameters has concluded that the emissions from the project will not be significant.

Because of the low risks, the applicant says the only mitigation measures required are standard dust control measures that are used during construction of the access

track, well pad and the installation of the connection to the national transmission system. According to the ES, these will be sufficient to manage the risk of the project generating dust that could adversely affect vegetation or nearby properties.

Summary of consultee comments and representations

LCC Director of Public Health: Has provided specific advice to inform the planning process and provide public health advice to protect and improve the health of local residents living near the proposed shale gas exploration sites of Preston New Road (planning application numbers LCC/2014/0096 and 0097) and Roseacre Wood (planning application numbers LCC/2014/0101 and 0102). The advice was published as a Health Impact Assessment (HIA) in November 2014. This is covered in more detail in Appendix 19.

The Health Impact Assessment makes 45 recommendations to a broad range of agencies, suggesting actions before, during and after any permissions or permits are granted. Appendix J contains 16 specific recommendations to inform this planning process.

Three of the 16 recommendations in Appendix J relate specifically to air quality as follows:

3. *Undertake an independent verification of the assessment of air quality, transport, waste management and induced seismicity prior to determining the planning applications.*
6. *Consider the need to seek further clarification from the Applicant that the cumulative impacts of the operations from the flare, generators, vehicles and drilling will not exceed the national air quality objective thresholds, particularly for PM 24 hour mean levels*
7. *As part of either the planning or permitting process, the Applicant should be required to submit regular data on the ambient air quality on site measuring all the common air pollutants relevant to the activity and report them regularly. PM10 and PM2.5 should be reported separately.*

Public Health England: has sought a number of clarifications regarding the planning application in two separate consultation responses. In turn, the clarifications and questions contained in both PHE responses have been satisfactorily addressed as a result of further information or clarification provided by the applicant.

In many cases, the applicant has clarified how and where the PHE comments are addressed in the Environment Statement submitted with the planning application, or has submitted additional information. This further information has been the subject of further consultation. Several of the clarifications requested by PHE are also controlled by the Environment Agency through the permit process.

PHE conclude that although onshore oil and gas extraction and related activities have the potential to cause pollution to air, land and water, the currently available

evidence indicates that the potential risks to public health from exposure to the emissions associated with such extraction are low if the operations are properly run and regulated.

Overall, based solely on the information contained within the application provided, PHE has no significant concerns in relation to the potential emissions from the site adversely impacting the health of the local population from this proposed activity, providing that the applicant takes all appropriate measures to prevent or control pollution, in accordance with the relevant sector technical guidance or industry best practice.

PHE agrees with the proposals to undertake baseline monitoring of ground waters, surface waters and local air quality to better assess the impact on the environment from any development.

However, it says the details of the baseline monitoring prior to operations need to be provided to ensure it will allow assessment of the impact of operations on the local environment. Baseline monitoring, and on-going monitoring, is a requirement of the Environment Agency permit as set out in the Waste Management Plan (which is part of the permit). In addition, a pre-operational condition of the permit requires the applicant to obtain written approval from the Agency for an Environmental Management and Monitoring Plan (EMMP) at least 4 weeks before commencement of the gas flaring activity. This will include details of the baseline air quality study undertaken before activities commence, together with details of the ambient air monitoring programme proposed during and after the period of gas flaring.

PHE say the levels of radon are very small and there are no grounds for concern about the potential radiological impact of radon arising from the proposed activities. Similarly, on naturally occurring radioactive material (NORM) PHE confirm the dose is significantly below PHE's recommended level and is not a concern.

Fylde Borough Council: objects to the proposal. The Borough Council believes operations would be in relatively close proximity to residential properties and the noise and general disturbance from 24 hour drilling operations and associated activity would be significant. The Borough Council says the proposal is contrary to the provisions of Policy DM2 of the Minerals and Waste Local Plan and Policies EP26, EP27 and EP28 of the Fylde Borough Local Plan which are considered to be in conformity with the provisions of the National Planning Policy Framework.

In terms of air quality, the Borough Council states the increase in road traffic is unlikely to approach the "action" level of 40 $\mu\text{g}/\text{m}^3$ but the area will see a rise in air pollution albeit not very significant but due to low current levels there will be a significant percentage increase. It is the Borough Council's intention to relocate one of the NOx tubes that is used to monitor road traffic pollution in another area to this location.

In addition, the Borough Council requests that the applicant shall ensure that there is continuous monitoring of air quality as a result of increase road traffic to demonstrate that air quality guidelines are being met.

Dust – the site has been categorised as “medium” with reference to likelihood of dust creation and dispersal. Due to the sensitivity of the environment and the residents the Borough Council advise that the site is categorised as “large”.

Westby-with- Plump tons Parish Council: Recommends the application be refused. Among a range of objections, the parish councils believes air pollution to any degree is unacceptable

Kirkham Town Council: Object to the proposed exploration activities as a whole and are of the view that the benefits are outweighed by the potential major problems relating to air quality among a range of issues.

Medlar-with-Wesham Parish Council and Kirkham Town Council: Object to the proposal as submitted and requests that it be refused planning permission for the following air quality related reason: Air pollution from gas emissions. Flaring can lead to over 250 pollutants including methane.

Friends of the Earth: have made two representations. On air quality, the following issues are raised:

- The project has adverse air quality impacts which have consequences for people and children.
- Local planning authorities should check the impacts against background (baseline) air quality
- The applicant's air quality assessment does not identify vulnerable groups that might be affected at a caravan park (1.2km away) and school (1.5km away). These groups experience impacts differently.
- the applicant has scoped out of the assessment the Blackpool air quality management area approximately 5km away
- The applicant has scoped out of the assessment the generators and site equipment which emit gases.
- The project will increase emissions to air in absolute terms, yet no mitigation is provided.

Other Representations: The following is a summary of the issues raised in representations that relate to air quality:

- Proposal will result in greenhouse gas emissions / air pollution
- Proposal is contrary to Policy EP26 due to flaring and air quality impacts
- Flared methane emissions from fracked gas are worse than from coal
- It is estimated that up to 7.9% of methane from shale gas escapes to atmosphere from venting and leaks over the lifetime of a well.
- In the USA, the methane emissions from shale developments were up to 1000 times higher than initially reported.
- Flaring of methane 24hrs a day is not clean energy
- The proposal is contrary to Article 4 of the mining waste directive which requires that the best available technique for the management of waste should be used e.g. green completion.

- In the US, the Environmental Protection Agency (EPA) requires use of green completion technology from 2015 for hydraulically fractured wells instead of flaring to reduce air pollution.
- The description of the proposed flare is unclear
- Flare plume dispersal modelling should be a priority
- Flaring within 230m of a residential property is not acceptable
- Fracking will unleash radon, methane, toxic gases, particulate matter and carcinogenic toxins into the atmosphere with associated health risks
- Radioactive products will be released into environment, and will affect drinking water and food production.
- Radon should be treated as a hazardous waste
- Potential impact from air pollution to Westby reservoir and watercourses
- Fumes from the flare will concentrate toxic air pollution, which will be detrimental to local residents, including those at the caravan park.
- Air pollution will impact people and particularly those with existing illnesses, breathing disorders and low immune systems.
- Gas flaring is hazardous and will cause fires in homes
- Impact of 100 lorries per day will release carbon monoxide and carbon dioxide
- Waste fluid left in open air pits to evaporate will release harmful VOC's (volatile organic compounds) into the atmosphere
- The development will increase nitrogen dioxide levels and increase health risks to local residents
- If boreholes are not sealed properly there will be fugitive gas emissions.
- Is Cuadrilla being made to fit special filters to machines, diggings, chimneys, diesel generators etc?
- Need air quality monitoring for Great Plumpton given the prevailing wind and likely negative impacts
- Residents sought rural environment for clean air and now at risk of adverse effects
- Negative impact from air pollution on enjoyment of property, garden and living in Great Plumpton
- Emissions should be monitored with limits and fines for exceeding
- There will be an unacceptable level of dust generated

Policy

As part of the National Planning Policy Framework, planning practice guidance on various topics has been published. In relation to air quality, the guidance refers to the significance of air quality assessments to determine the impacts of proposed developments in the area and describes the role of local plans with regard to air quality. Paragraph 5 sets our considerations on whether or not air quality is relevant to a planning decision, stating this will depend on the proposed development and its location. Paragraph 9 sets out a flow chart to be followed in the development management process.

Policy DM2 of the JLMWLP states that development for minerals operations will be supported where it can be demonstrated that all material social, economic or environmental impacts that would cause demonstrable harm can be eliminated or reduced to acceptable levels. In assessing proposals account will be taken of the

proposal's setting, baseline environmental conditions and neighbouring land uses, together with the extent to which its impacts can be controlled in accordance with current best practice and recognised standards.

Assessment

Overview of air quality impact.

Lancashire County Council Scientific Services (LCCSS) carried out a review of the air quality chapter (including radon) of the Environmental Statement.

The review concluded that the documents provide sufficient detail to show that the applicant has carried out the assessment in a satisfactory manner and that the conclusions drawn from the assessment are valid.

The review found that the documents for both sites identified the following emissions from the activities before, during and after operations: fugitive dust, nitrogen oxides and particulate matter, volatile organic compounds (VOCs) and odours.

The review suggested there are other potential pollutants not mentioned in the assessment which may adversely affect air quality. These include sulphur dioxide, hydrogen chloride and other potentially carcinogenic VOCs. It was suggested that the assessment should explicitly consider these chemicals, but if the consideration concludes these chemicals are of little or no concern this should be confirmed. Further information has been provided by the applicant in relation to these points:

Sulphur Dioxide & Hydrogen Chloride

Results of testing of gas from Cuadrilla's Preese Hall well did not detect any sulphurous compounds or chlorine compounds in the gas. It is therefore assessed as very unlikely that there will be any significant concentrations of sulphur dioxide or hydrogen chloride in the gas produced at the proposed site. The applicant concludes that the contribution of sulphur dioxide is insignificant. The Environment Agency permit documentation supports this view.

Monitoring of the gas quality will be undertaken once the site is operational. This will mitigate the risk of any unexpected pollutant emissions going undetected. In addition, the EA permit (which incorporates the Waste Management Plan) provides for ambient sulphur dioxide monitoring.

Potentially Carcinogenic VOCs

The air quality assessment has identified the most significant VOCs (volatile organic compounds) as benzene and benzo-a-pyrene (BaP) (selected to represent carcinogenic VOCs). The main pollutants of concern which are included in the air quality objectives are benzene and BaP (Benzo-a-pyrene). The benzene results are included within the ES, section 6.7.5.

BaP: Due to limited amounts of information on polycyclic aromatic hydrocarbons (PAHs) being available in the UK, for the assessment at Preston New Road a precautionary approach has been taken by the applicant by making assumptions based on data from Alberta, Canada. The information has been used to determine

the emissions of BaP that could potentially result in a breach of the UK objective for BaP (0.25ng/m³ annual mean).

Analysis undertaken by M.Strosher et al looking at the composition of flare gas from natural gas extraction sites in Canada is the report which has been used for the assumptions made for the Preston New Road site, which in discussion with the Environment Agency is considered the best source of information regarding BaP content of shale gas.

The applicant has made a worst case assumption for the Preston New Road site in the ES (chapter 6) that assumes that C6 hydrocarbons constitute 0.1% of the total emissions. The Alberta report indicates that BaP is around 1/1000th of the amount of Benzene. Using this as the worst case assumption, the potential contribution from the Preston New Road site can be calculated. Based on this approach the highest predicted annual mean concentration is 0.0224 ng/m³ which is well below the UK objective (0.25ng/m³). In summary, the findings in the ES and the further information submitted by the applicant conclude that the risk of any impacts of VOCs emissions from the flare on local receptors would be not significant. In addition, the EA permit (which incorporates the Waste Management Plan) requires ambient monitoring of VOCs and BTEX (benzene, toluene, ethylbenzene, and xylenes) and indirect monitoring of the flare of VOCs among other chemicals.

Emissions from construction activities

Because the site is located within an area of agricultural land and has not been subject to historical development there is a negligible risk of contaminated dust being generated during the construction of the well pad, access track, extended flow testing infrastructure, gas pipeline and the seismometer arrays.

The risk to nearby receptors has been assessed by the applicant. This assessment has concluded that there is a negligible to low risk of dust being created by the project and it will not result in a significant effect. This is because there is sufficient distance between the site and potentially sensitive receptors. Furthermore, the scale and duration of the project activities (construction of the access track and well pad and decommissioning) will not be carried out over a long period of time (less than 2 months for each activity).

Emissions from the vehicles associated with the use of the site;

Environmental Protection UK (EPUK) provides guidance (Development Control: Planning for Air Quality, 2010) to help establish when an air quality assessment is likely to be considered necessary because a proposal might cause a significant change in air quality. Environmental Protection UK is a national charity that provides advice on air quality and their effects on people and communities.

For emissions from vehicles, the following guidance is provided.

- *Proposals that will give rise to a significant change in either traffic volumes, typically a change in annual average daily traffic (AADT) or peak traffic flows of greater than ±5% or ±10%, depending on local circumstances (a change of ±5% will be appropriate for traffic flows within*

- an AQMA), or in vehicle speed (typically of more than ±10 kph), or both, usually on a road with more than 10,000 AADT (5,000 if 'narrow and congested');*
- Proposals that would significantly alter the traffic composition on local roads, for instance, increase the number of HGVs by say 200 movements or more per day, due to the development of a bus station or an HGV park (professional judgement will be required, taking account of the total vehicle flow as well as the change);*

The applicant has used this guidance to assess the significance of vehicle emissions on air quality. A significant effect would occur if the number of HGVs was to increase by 200 or more per day, or the overall traffic flow was to increase by more than 1,000 vehicles per day.

Construction: Vehicle traffic movements during the construction phase reach a worst case maximum of 34 average annual daily traffic (AADT) movements (12 cars or vans and 22 HGVs). Following the EPUK guidance (which states the number of vehicles required in order to trigger the need for a detailed assessment - an increase in HGVs by 200 or an increase in total AADT by 1000) it is clear the number of vehicles is well below the thresholds which would require a detailed assessment. It is therefore concluded that the air quality impacts of exhaust emission from vehicles in the construction phase is not significant.

Drilling: Vehicle traffic movements during the drilling phases reach a worst case maximum of 45 AADT (32 cars or vans and 13 HGVs). Following the EPUK guidance which states the number of vehicles required in order to trigger the need for a detailed assessment (an increase in HGVs by 200 or an increase in total AADT by 1000) it is clear the number of vehicles is below the thresholds which would require a detailed assessment. It is therefore concluded that the air quality impacts of exhaust emission from vehicles in this phase is not significant.

Initial flow testing: The maximum impacts on air quality will take place during the initial flow testing stage (from the flare). Traffic flows in this phase are well below the level which would require a detailed assessment. The impact from vehicle movements during this phase is therefore considered not significant. This would also apply if greater than anticipated flowback rates were encountered because the maximum number of daily vehicle movements is significantly less than the 200 HGVs or 1000 vehicle movements per day threshold.

Extended flow testing: No significant air quality impacts are expected as a result of the construction phase for extended flow testing. Limited vehicle movements will occur during this phase of activity, these movements will have a negligible effect on air quality and therefore are not significant.

Decommissioning and restoration: Extended Flow Testing Infrastructure; limited vehicle movements will occur during this phase of activity so there are no significant effects on air quality. Exploration well, pad and access track; decommissioning the well pad and access track will require the same number of vehicle movements as during construction so the air quality impacts of exhaust emission from vehicles is again not significant.

Emissions from the flaring of gas during flow testing:*Environment Agency assessment*

The Environment Agency has undertaken its own detailed assessments of the emissions to air that will arise from the flow testing operations (i.e. from the flare) and the potential impact of these emissions on human health and ecological receptors.

Detailed air dispersion modelling has been carried out by the Agency. This considered the potential impacts of the main pollutants that could be emitted from the combustion of natural gas based on its expected composition:

- Oxides of nitrogen / nitrogen dioxide
- Benzene (a volatile organic compound)
- PAH emissions (a reference to benzo-a-pyrene)

Particulate emissions have been covered by a qualitative assessment as the Agency would not expect particulate (PM10) to result from gaseous emissions.

Sulphur dioxide (SO₂) was not included in the Agency's assessment because the applicant provided information based on other gas extraction locally that no hydrogen sulphide (H₂S) has been identified during monitoring of the drilling muds or gas.

Having undertaken a detailed assessment, the Agency is satisfied that the emissions from the flare would be insignificant at locations closest to the site.

In terms of public health impact of the flare emissions, the Agency's audit checks, modelling and sensitivity analysis confirms there will be no exceedance of standards established for human protection. Indeed, the modelling assumed the flares would be operating for 24 hours, 365 days per year per well. The actual proposal is for the flares to operate for no more than 90 days per well.

Public Health England assessment

PHE conclude that although onshore oil and gas extraction and related activities have the potential to cause pollution to air, land and water, the currently available evidence indicates that the potential risks to public health from exposure to the emissions associated with such extraction are low if the operations are properly run and regulated.

Based solely on the information contained within the application provided, PHE has no significant concerns in relation to the potential emissions from the site adversely impacting the health of the local population from this proposed activity, providing that the applicant takes all appropriate measures to prevent or control pollution, in accordance with the relevant sector technical guidance or industry best practice.

PHE agrees with the proposals to undertake baseline monitoring of ground waters, surface waters and local air quality to better assess the impact on the environment from any development.

Emissions from equipment associated with the operation of the site (e.g. generators)

In the Environment Statement (ES), the applicant provided details of equipment that will be used at the site, i.e. pumps fracturing water transfer pumps, generators, blender units and service rigs. The equipment will be used during the drill phases for the duration of the drilling. During the hydraulic fracturing the engines will be run for only a few hours at a time. Given the size of the generators and engines and the relatively short period of operation, these sources were scoped out of the assessment by the applicant. A table summarising the generators used on site is provided in Appendix F of the Environment Statement.

However, the County Council requested the applicant to undertake a further assessment to demonstrate (and justify) the exclusion of the generators from the air quality assessment in the ES. This assessment was undertaken and the information provided by the applicant was subject to a further round of public consultation.

The further assessment included detailed dispersion modelling to assess the impacts from the generators and the vehicle movements to/from the site. A number of worst case assumptions have been made in the modelling to ensure a conservative approach has been taken. The modelling shows that no significant effects are likely to result.

Further corroboration of the conclusion that no significant effect is likely from PM10s is demonstrated by the generators being below the threshold of local authority regulation. Fylde Borough Council has confirmed this is the case. This is a result of the Environmental Permitting (England and Wales) (Amendment) Regulations 2014/255. The amendment removes the need for the aggregation of diesel generators with a rated thermal input of less than 3 megawatts:

Schedule 1 (activities, installations and mobile plant)

11.—(1) Schedule 1(a) is amended as follows.

(2) In Part 1 (interpretation and application: general)—

(a) In paragraph 3(c) (application of activities falling within Part 2), for “and” substitute “or”;

(b) In the heading to paragraph 4 (application of thresholds in Part 2), for “in Part 2” substitute “for Part A activities”;

(c) In paragraph 4, for “given in Part 2 of this Schedule” substitute “for any Part A activity”.

(3) In Part 2 (activities)—

(a) In Section 1.1 (combustion activities)—

(i) in Part B, omit paragraphs (b) (ii) and (iii), (c) and (d);

The modelling shows the PM10 24 hour mean level (50 ug/m³) is not breached on any day of the year. The national standard (24 hour mean, 50 ug/m³) allows for 35 breaches per year (90.4 percentile).

Possible fugitive emissions (i.e. unexpected or uncontrolled emissions)

The Environment Agency permit requires that during drilling of the exploratory boreholes, fugitive emissions of natural gas are to be prevented by increasing the

hydrostatic pressure of fluids so as to prevent gas release. The well will also be equipped with physical control equipment which enables the borehole to be shut at the surface to prevent escape of gas emissions. Gas monitoring equipment will be in constant use at the surface. The permit does not allow the venting of natural gas unless it is necessary for reasons of safety in an emergency.

Fugitive emissions of methane could potentially arise from the wellbore and mud circulation system. The applicant has provided a specific risk assessment for this scenario, which includes monitoring and proposes emergency control measures. The operator will carry out testing of all surface pipework to check for leaks prior to starting the operations and will be carrying out monitoring using Flame Ionization Detection monitoring equipment during the operations as part of the Environmental Management and Monitoring Plan required by the permit.

The operations will be benchmarked against baseline levels and should elevated levels of methane be detected, the well will be shut and the cause of the damages investigated and remedied. Operation will only resume once the Agency is satisfied that the issue has been resolved.

The Agency is satisfied that these measures minimise the risk of fugitive emissions and, together with condition 3.1 of the permit, provide acceptable controls.

Particulate matter (PM10) emissions

The County Council's Director of Public Health has made two recommendations that relate specifically to emissions of particulate matter (PM10). These are recommendations 6 and 7 from appendix J of the Health Impact Assessment. An assessment has therefore been carried out in relation to PM10s.

PM10 from generators and vehicles:

An assessment of PM10 (particulate matter of 10 microns diameter or less) from generators and vehicles has been undertaken and presented for both the Preston New Road and the Roseacre Wood proposed exploration sites as part of a further information request to the applicant. Detailed dispersion modelling has been used to assess the impacts from the generators and the vehicle movements to/from the site. A number of worst case assumptions have been made in the modelling to ensure a conservative approach has been taken. The modelling shows that no significant effects are likely to result.

Further corroboration of the conclusion that no significant effect is likely from PM10s is demonstrated by the generators being below the threshold of local authority regulation. Fylde Borough Council has confirmed this is the case. This is a result of the Environmental Permitting (England and Wales) (Amendment) Regulations 2014/255. The amendment removes the need for the aggregation of diesel generators with a rated thermal input of less than 3 megawatts:
Schedule 1 (activities, installations and mobile plant)

In order to calculate the total cumulative impacts from generators and traffic the scheme related concentrations are added together. The findings from this cumulative assessment of PM10 for the Roseacre Wood and Preston New Road site during

operations are that the results indicate no receptor is likely to experience a change of greater than, or equal to 1% of the annual mean objective (40 $\mu\text{g}/\text{m}^3$). As such no significant effects are likely to result from cumulative impacts. The total concentrations are also well below the air quality objectives for PM10. In other words, the assessment shows the PM10 24 hour mean level (50 $\mu\text{g}/\text{m}^3$) is not breached on any day of the year. The national standard (24 hour mean) allows for 35 breaches per year (90.4 percentile).

PM10 from Flaring

The generation of PM10 emissions from the flare has been scoped-out of the assessment due to the gas composition and high efficiency of combustion. This has been agreed with the Environment Agency and is described in the permit:

"Particulates have been covered by a qualitative assessment as we would not expect PM10 to result from gaseous emissions. It formed part of the air quality assessment submitted by the applicant and is included in the habitats section for completeness".

Indeed the Agency has further clarified its position in relation to particulates from flaring of natural gas in that when there is full and efficient combustion (based on temperature and retention time) the emissions are not likely to contain particulate matter.

An enclosed flare, which is a requirement for these activities, allows more control of the process, and the temperature can be continuously monitored along with the retention time to ensure the combustion process is complete. The gas flow to the flare and the gas composition are also measured.

In this case the applicant will produce an Environmental Management and Monitoring Plan before they are operational which will need to be approved by the EA; this plan will contain details of appropriate control measures they will put in place should efficient combustion not be achieved.

PM10 from Drilling

No PM10 emissions from drilling would be expected as the material drilled would be wet. Also any dust-creating processes on site would be mitigated by following the site Environmental Operating Standard (see ES: 4.13.1 & Appendix E).

Air Quality Monitoring

The Environment Agency permit requires, through the Waste Management Plan (section 9.6, version 7 of the WMP), monitoring of 13 ambient air quality parameters including PM2.5 and PM10. This will be done prior to operations commencing to establish a baseline, during operations and after operations have ceased. Four sampling positions will remain constant at the perimeter of the site. The parameters are: methane, carbon monoxide, hydrogen sulphide, nitrogen dioxide, nitrogen monoxide, sulphur dioxide, ozone, total petroleum hydrocarbons, VOCs, BTEX, PM2.5 and PM10, dust. Results will be published monthly and submitted to the Agency for check and verification.

Monitoring of particulates will be undertaken throughout the operational period of the site using Frisbee-type dust gauges with directional adhesive strips (for nuisance

dust) plus pumped gravimetric sampling for PM10 and PM2.5 will be located at four locations in close proximity to key receptors.. The sampling period for gravimetric monitoring for PM10 and PM2.5 will be 24 hours.

In addition, the Environment Agency requires point source emission monitoring from the flare for oxides of nitrogen, carbon monoxide, total volatile organic compounds, and methane (using emission modelling calculations) as part of the permit.

In summary, no significant effects are expected daily or annually from PM10s for any phase of the project, or in combination of phases. Moreover, the Environment Agency permit (section 9.6, version 7 of the WMP) provides for ambient PM10 and PM2.5 monitoring over 24 hour periods.

Conclusion

The project will generate some emissions to air. But providing the operational practices are adhered to and regulated by the Environment Agency, the emissions would not cause unacceptable impacts.

Having undertaken a detailed assessment, the Agency is satisfied that the emissions from the flare would be insignificant at locations closest to the site. In terms of public health impact of the flare emissions, the Agency's audit checks, modelling and sensitivity analysis confirms there will be no exceedance of standards established for human protection.

Based on the information contained within the application, Public Health England has no significant concerns in relation to the potential emissions from the site adversely impacting the health of the local population, providing the applicant takes all appropriate measures to prevent or control pollution, in accordance with the relevant sector technical guidance or industry best practice

Comprehensive monitoring of the practices and the site, overseen and regulated by the Environment Agency, will ensure that risks are managed effectively.

The proposal would not have unacceptable impacts and would comply with national guidance and policies, together with the policies of the development plan.

Appendix 4

Proposal

Archaeology and Cultural Heritage

As part of the EIA an assessment has been undertaken of the effects of the project on the archaeology of the area, the above or below ground remains left by previous generations including pre history, Roman, early medieval, medieval, post medieval and later. The assessment considers the likely significant effects on archaeology and cultural heritage assets resulting from the construction, operation and decommissioning of the proposed exploration compound, the construction of the associated access route and the installation of the seismic monitoring array.

The assessment has been carried out in accordance with national guidance documents in the absence of any statutory requirements to use any particular methodology for the assessment of impacts on heritage assets. A number of different historical records have been used to inform the assessment including data held by the County Council and English Heritage. A walk over survey has also been carried out. There are no World Heritage Sites, Scheduled Monuments, Registered Parks and Gardens, Registered Battlefields, listed buildings or Conservation Areas within 1km of the site. The assessment has confirmed there are no records of archaeological finds within the planning application boundary for any of the proposed surface works.

The EIA has identified that the only activities associated with the project that have the potential to result in a significant effect on archaeology are the construction of the well pad, access track and connection to the national transmission system as a result of top and sub soil removal as part of the construction of the site which might encounter archaeology which without specific mitigation could be lost with the opportunity of recording it. To mitigate this it is proposed to record any evidence of the track and field systems during excavation works. It is concluded that this would not result in significant effect on heritage or archaeological features.

The site is not in close proximity to above ground heritage assets such as listed buildings to avoid any indirect visual impacts on their setting.

An interconnection from the site to the national grid is proposed in the event extended flow testing of gas is carried out and which would be laid in an excavated trench to then be covered and the surface restored. There are no known heritage assets on the proposed alignment. Nevertheless the excavation of trench to accommodate the interconnection could have a significant effect in disturbing unknown archaeology.

In terms of cumulative impacts, the assessment concludes that the Preston New Road site is considered sufficiently distant from the Roseacre Wood site such that their combined impacts on heritage features will not result in a greater combined effect than individually.

To mitigate the impact of the development works it is concluded that the most appropriate way to implement a scheme of investigation would be to carry a strip, map and record exercise during the excavation of the topsoil if the monitoring archaeologist identifies any features requiring further investigation

Summary of consultee comments and representations

The County Councils Archaeology Service (LCAS) has confirmed the Archaeology and Cultural Heritage chapter of the ES has been undertaken in line with the requirements of the Service which agrees with the assessment that the site has a low potential to contain previously unknown archaeological finds or features. The proposed mitigation measures are considered to be appropriate. LCAS recommend that should planning permission be granted it should be subject to a condition preventing the commencement of development until the implementation of a programme of archaeological work is secured.

No issues relating to archaeology have been raised in representations.

Policy

Policy EP21 of the Fylde Local Plan requires developers to provide an archaeological assessment or if necessary a field evaluation where there is an identified archaeological interest and to make adequate provision for recording remains if their preservation in situ cannot be justified.

Assessment

The proposed development of the site, access roads and trench would not have any impact on World Heritage Sites, Scheduled Monuments, Registered Parks and Gardens, Registered Battlefields, listed buildings or Conservation Areas. The construction of the site, access road and trench for the interconnecting pipeline would have significant effects on unknown archaeology; however these effects could be mitigated by carrying out a strip, map and record exercise during the excavation of the topsoil if the monitoring archaeologist identifies any features requiring further investigation and which would be addressed by condition.

Conclusions

Subject to the imposition of a condition requiring the implementation of a programme of archaeological work is secured prior to commencement of development it is considered the development would not have an unacceptable impact on archaeology and would comply with policy EP21 of the Fylde Local Plan.

Appendix 5

Greenhouse Gas Emissions

Proposal Outline

Chapter 8 of the applicant's Environment Statement assesses, calculates and describes the potential greenhouse gas emissions (GHG) from the proposal. It does this by taking data about the project (e.g. quantity of gas burnt in the flares and vehicle movements) and applies factors that allow the GHG emissions from the project to be calculated.

The applicant states there is no methodology to determine the significance of the emissions associated with the project. However, although the significance cannot be assessed the applicant's assessment compares the greenhouse gas emissions from the project to UK national GHG emissions for 2012.

The assessment has used data provided by Cuadrilla from previous projects on the amount of fuel or energy used. Where this data was not available other sources of information have been used. Where this is the case, ranges have been applied where possible. In addition, more than one source of emission factors has been applied to provide a range of results. This makes allowance for uncertainties associated with the project.

The greatest source (73%) of the project GHG emissions come from burning the gas in the flare. The total project GHG emissions could be between 118,418 (lower range) to 124,397 (higher range) tCO₂e (tonnes carbon dioxide equivalent).

Summary of consultee comments and representations

Fylde Borough Council: objects to the proposal. The Borough Council believes operations would be in relatively close proximity to residential properties and the noise and general disturbance from 24 hour drilling operations and associated activity would be significant. The Borough Council says the proposal is contrary to the provisions of Policy DM2 of the Minerals and Waste Local Plan and Policies EP26, EP27 and EP28 of the Fylde Borough Local Plan which are considered to be in conformity with the provisions of the National Planning Policy Framework.

Friends of the Earth: have made two representations and make the following objections in relation to greenhouse gas emissions:

- the applicant has failed to properly consider climate change
- the applicant has not considered methane emissions from drilling
- fugitive methane emissions is a key issue because of its high global warming potential
- An incorrect conversion factor has been used for methane in respect of its potential to contribute to global warming, meaning the contribution of the proposal to greenhouse gas emissions would be nearly 3.5 times that stated by the applicant.

- The County Council, as mineral planning authority, has a duty to reduce and mitigate the impact of climate change.
- The report by the previous government Chief Scientist into the 'Potential Greenhouse Gas Emissions Associated with Shale Gas Extraction and Use' is contested.
- The assessment of the potential for greenhouse gas (GHG) emissions is incorrect, with regard to impact of leakage, global warming potential (GWP) of methane and scales of emissions.
- The EIA findings that the impact on climate change is n/a does not enable the local planning authority to make an informed decision.
- The mitigation measures proposed for possible sources of fugitive methane emissions are basic and may be ineffective based on US research.
- The comparison of the sites GHG emissions to the UK carbon budget is wholly inappropriate. Cuadrilla does not appear to know how much GHG will be emitted and therefore the precautionary principle should apply.
- Utilising shale gas resources is contrary to Policy DM2, to reduce carbon emissions and is contrary to the Lancashire Climate Change
- Planning decisions must take account of the need to reduce GHG emissions and this application will increase the emissions.

Other representations

The following is a summary of the points raised in other representations:

Climate Change Impact

- Shale production will have a negative effect on meeting UK targets relating to global heat, carbon emissions and greenhouse gas emissions, from Kyoto agreement and Climate Change Act 2008
- Contrary to NPPF Para 93- reductions in greenhouse gas emissions
- LCC has a responsibility to help reduce emissions
- LCC Moral duty to ensure fossil fuels not exploited
- Need to leave fossil fuels in the ground
- International Energy Agency warn that most of gas should stay in ground to avoid catastrophic climate change
- The use and burning of fossil fuels impacts on climate change
- Burning shale gas is as bad as burning coal.
- Can't continue to use up natural resources

Alternatives for energy production

- Responsibility to future generations to find better sources of energy
- Focus on gas off-shore not on-shore
- Produce cleaner nuclear energy
- We should not rely on fossil fuels.
- Need to invest in renewable energy sources to reduce carbon output.
- LCC should promote renewable energy in line with Renewables Directive
- Will not help to produce 27% of renewable sources as agreed by EU.
- Make Blackpool a renewable investment centre / Fylde Green Coast
- Need to encourage/invest in wind farms on hills and coastline
- Need to commit to more solar power / solar roadways / solar farms

- Allow more solar panels on roofs
- Use and develop green technology/clean renewables like other countries, e.g. Germany runs on 90% renewable energy
- Need to stop energy waste and promote green efficiency
- Harness wave power at the coast
- Need more research into sustainable energy before committing to shale gas
- More jobs (approx 40,600) could be sustained in off shore wind capacity
- Renewables guarantee to provide energy.
- Wind power turbines dismantle easily when out of use, earth remains same.
- Should invest in biomass.
- Fossil fuel reliance stifles innovation for alternative clean sources of energy.

Policy

The Climate Change Act, 2008

The Climate Change Act (2008) establishes a framework for the UK to achieve its long term goals of reducing greenhouse gas emissions (GHG) emissions by at least 80% from 1990 levels by 2050 and to ensure that steps are taken towards adapting to the impact of climate change.

An interim target of 34% reduction from 1990 by 2020 has also been agreed. Some of the key measures provided by the CCA include:

- Decarbonising the grid supply, such as renewable source of energy;
- Cleaner transport modes such as electric and hybrid vehicles;
- Energy efficiency measures in the built environment; and
- Behavioural changes.

The Carbon Plan, 2011

The Carbon sets out the Government's plans for achieving the GHG emissions reductions committed to in the Climate Change Act and the first four carbon budgets. The strategy for energy as set out in the Carbon Plan includes:

- Reduce emissions from electricity generation through increasing the use of gas instead of coal, and more generation from renewable sources;
- Support the deployment of major low carbon technologies through providing financial incentives; and
- Support the development of less mature renewable technologies such as marine and offshore technologies.

National planning policy

National Planning Practice Guidance (PPG) states that planning plays a key role in helping shape places to secure radical reductions in greenhouse gas emissions, minimising vulnerability and providing resilience to the impacts of climate change, and supporting the delivery of renewable and low carbon energy and associated infrastructure

Paragraph 98 of the PPG states:

When determining planning applications, local planning authorities should:

- *Not require applicants for energy development to demonstrate the overall need for renewable or low carbon energy and also recognise that even small-scale projects provide a valuable contribution to cutting greenhouse gas emissions; and*
- *Approve the application if its impacts are (or can be made) acceptable. Once suitable areas for renewable and low carbon energy have been identified in plans, local planning authorities should also expect subsequent applications for commercial scale projects outside these areas to demonstrate that the proposed location meets the criteria used in identifying suitable areas.*

Lancashire Climate Change Strategy, 2009

The Lancashire Climate Change Strategy sets out the county's long-term objective to achieve a 'low carbon and well adapted Lancashire by 2020'.

The strategy contains an objective to actively promote decentralised energy production and medium and large scale renewable energy generation. The strategy recognises the challenge is to ensure that the replacement energy supply for fossil fuels will be low carbon.

Joint Lancashire Minerals and Waste Local Plan

Policy DM2 of the JLMWLP states that development for minerals operations will be supported where it can be demonstrated that all material social, economic or environmental impacts that would cause demonstrable harm can be eliminated or reduced to acceptable levels. In assessing proposals account will be taken of the proposal's setting, baseline environmental conditions and neighbouring land uses, together with the extent to which its impacts can be controlled in accordance with current best practice and recognised standards.

Assessment

Many of the representations made against this application refer to the wider national impact on greenhouse gas emissions as a result of the use of gas. Many representations make an assumption that the shale gas industry will scale-up substantially and will damage the UK's efforts to tackle climate change.

However, this application is for four experimental boreholes. Any proposal to move into gas production will be the subject of a new planning application. The impacts of this application must therefore be assessed against the greenhouse gas emissions from the project for four exploratory wells only.

Nevertheless, given the level of representations on this issue (greenhouse gas emissions associated with the wider shale gas sector) it is appropriate that the issues are explored briefly.

Emissions from the shale gas sector

The House of Commons Energy and Climate Change Committee reported on the 'The Impact of Shale Gas on Energy Markets' in 2013. The Committee concluded that the US shale gas revolution has seen significant reduction in the country's greenhouse gas emissions because of a large switch from coal to gas. And a report by DECC's Chief Scientific Advisor in 2013 concludes that shale gas's overall carbon footprint was comparable to gas extracted from conventional sources, lower than that of liquid natural gas and, when used for generating electricity, significantly lower than that of coal if the correct controls are used.

However, this study is contested by Friends of the Earth who cite several other pieces of research to show that methane leakage is significant and adds considerably to the carbon footprint of shale gas. (Friends of the Earth further argue there is a risk that shale gas will be used as well as coal rather than in its place. And it may divert investment from alternatives such as renewables, weakening the case for reducing the UK's reliance on fossil fuels).

In turn, the research into methane emissions cited by Friends of the Earth has been challenged. The House of Commons Energy and Climate Change Committee (2013) refer to research by the Massachusetts Institute of Technology which suggests the claims of substantial methane emissions have been exaggerated. Other more recent research has also been criticised because of methodological flaws (e.g. very small aerial sample size and the confounding effects of a coal mining area on methane emissions in the study). Methane emissions undoubtedly occur. But there are differing views on the degree and impact of emissions.

Given the lack of conclusive evidence either way, the carbon footprint of shale gas remains a source of disagreement, which was recognised by the House of Commons Energy and Climate Change Committee.

The Committee therefore recommended that "*DECC should also monitor the methane emissions of those companies that are currently exploring for shale gas. It should be possible, by way of regulation, to ensure that fugitive emissions are prevented by outlawing venting*".

The Environment Agency permit regulates fugitive emissions of methane. Venting is not permitted except in safety emergencies. Condition 3.2 of the permit applies controls. Flowback fluid will be transferred through the separator and to the storage tanks via enclosed pipework. And as described in section 9.9 of the Waste Management Plan (which is part of the permit) pipework and connections will be tested for integrity prior to use and will be monitored during operations. Importantly, methane monitoring will take place before, during and after operations.

Global warming potential of methane

Global-warming potential (GWP) is a relative measure of how much heat a greenhouse gas traps in the atmosphere. It compares the amount of heat trapped by a certain mass of the gas in question to the amount of heat trapped by a similar mass of carbon dioxide.

Friends of the Earth (FOE) say that the figure used by the applicant in the ES for the global warming potential of methane is inaccurate. It is this figure which plays an

important part in estimating the carbon footprint of the project, including its greenhouse gas emissions.

The applicant has used a figure of 25 over a 100 year timeframe, citing the UN Intergovernmental Panel on Climate Change (IPCC) fourth assessment report that uses this figure. FOE argues that the figure of 34 should be used from the recent IPCC fifth assessment report. They also argue that the GWP of methane over a 20 year period (as well as a 100 year period) should have been used.

The applicant says GWP figures were selected to provide consistency with DEFRA conversion factors which are currently based on the IPCC's 2nd assessment report. DEFRA's aim is to provide a consistent comparison with the UK Greenhouse Gas Inventory and Kyoto Protocol. The GWP of 25, over a 100-year period, maintains this consistency of comparison and incorporates a safety margin in the estimation of effects.

DECC's Chief Scientist says methane has a global warming potential 25 times greater than CO₂, based on a 100-yeartime horizon in his September 2013 report (citing the IPCC fourth report).

The UK Greenhouse Gas Inventory, 1990 to 2012: Annual Report for Submission under the Framework Convention on Climate Change (published April 2014 by DECC) uses a greenhouse gas potential figure of 21 over 100 years for methane (Table 1.1).

In light of the conversion factors commonly used by others agencies in the UK, the applicant's use of a figure of 25 is not unreasonable.

Emissions from this project

The applicant's ES estimates the greatest source of the project GHG emissions come from burning the gas in the flare (73%). The total project GHG emissions could be between 118,418 (lower range) to 124,397 (higher range) tCOe (tonnes carbon dioxide equivalent).

Both direct and indirect GHG emissions have been assessed. Direct emissions are GHGs emitted directly by activities associated with the project, such as the combustion of fossil fuels by on-site generators or through the flares. Indirect emissions consist of GHGs emitted outside of the direct influence of the project (either further up or down the supply chain). For example, GHG emissions associated with the production, extraction, refining and transport of diesel used to power generators and trucks (referred to in this assessment as well-to-tank), or the treatment of flowback fluid are defined as indirect emissions. A more detailed summary of emission sources associated with the project, and whether or not they are direct or indirect, is included in Table 8.2 of the ES.

The average volume of direct emissions is 114,009 tCO₂e. The average volume of indirect emissions is 7,401 tCO₂e.

The project's carbon footprint is 118,418 to 124,367 tCOe. This is made up of approximately 94% direct emissions and 6% indirect emissions. 73% of the project carbon footprint can be attributed to flaring.

Emissions from drilling

The issue of potential methane emissions from the drilling phase has been raised by Friends of the Earth. The Environment Agency permit requires that during drilling of the exploratory boreholes, fugitive emissions of natural gas are to be prevented by increasing the hydrostatic pressure of fluids so as to prevent gas release. The well will also be equipped with physical control equipment which enables the borehole to be shut at the surface to prevent escape of gas emissions. Gas monitoring equipment will be in constant use at the surface. The permit does not allow the venting of natural gas unless it-is-necessary for reasons.

Fugitive emissions of methane could potentially arise from the wellbore and mud circulation system. The applicant has provided a specific risk assessment for this scenario, which includes monitoring and proposes emergency control measures. The operator will carry out testing of all surface pipework to check for leaks prior to starting the operations and will be carrying out monitoring using Flame Ionization Detection monitoring equipment during the operations as part of the Environmental Management and Monitoring Plan required by the permit.

The operations will be benchmarked against baseline levels and should elevated levels of methane be detected, the well will be shut and the cause of the damages investigated and remedied. Operation will only resume once the Agency is satisfied that the issue has been resolved.

The Agency is satisfied that these measures minimise the risk of fugitive emissions and, together with condition 3.1 of the permit, provide acceptable controls.

Emissions from the flare

The principal greenhouse gas emitted is carbon dioxide (CO₂), but the flare could also emit small amounts of methane (CH₄) arising from the combustion process. The Environment Agency expect combustion efficiency of at least 98%, therefore there is potential for a small amount of un-burnt methane to be emitted from the flare (fully efficient combustion converts CH₄ to CO₂ and water vapour). CH₄ has a global warming potential many times that of CO₂.

The major source of greenhouse gas emissions from the installation is however CO₂ from the combustion of natural gas. The best available technique for greenhouse gas emissions is to maximise energy recovery and efficiency but on this occasion the Agency is satisfied that flaring the gas is the best available option.

The operator has justified the use of a flare rather than using the gas on site by demonstrating to the Agency that the costs of using the gas would be disproportionate for the 90 day periods. It is also not reasonably practicable to connect the flow of extracted natural gas to the gas grid during the initial flow tests. This is because the flow rates are unknown and the quality of the gas produced may not be compatible with gas grid requirements without further processing.

In addition, in order to establish whether there is sufficient flow of gas to move to extended flow testing, there needs to be an uninterrupted flow. Using the gas to meet energy requirements on site would necessitate interrupting the gas flow, preventing the collection of the required data for analysis.

The incineration of hazardous waste is not subject to the Greenhouse Gas Emissions Trading Scheme Regulations 2012; therefore it is a requirement of the Industrial Emissions Directive to investigate how emissions of greenhouse gases emitted from this activity might be prevented or minimised.

The only factor influencing the GWP of the installation is the efficient operation of the combustion unit. The operator will ensure the combustion of natural gas is carried out to the maximum efficiency; by monitoring the combustion temperature and air flow. Requirements to this effect are in the permit.

Comparative analysis

In attempt to determine whether the projects greenhouse gas emissions are significant, the applicant has compared the emissions expected from this project to the UK's greenhouse gas emissions in 2012. This concludes that the project is equivalent to 0.002% of the current UK Carbon Budget set by the government and as such the project's contribution to national GHG emissions is negligible.

There is no standard methodology to determine the significance of the emissions associated with the project. The applicant has therefore chosen to compare the project's emissions with the UK's emissions for 2012. Comparing the emissions of 4 exploratory boreholes with those of the UK as a whole is not the most appropriate comparison, and Friends of the Earth also make this point.

A more appropriate comparison would be against local emission data, for example those contained in the Lancashire Climate Change Strategy published in 2009. Total CO₂ emissions in Lancashire (as set out in the strategy) were estimated at 12.7 million tonnes. Maximum emissions from the project over its 5.5 years are estimated at 124,397 tonnes carbon dioxide equivalent (tCO₂e). This averages to 22,618 tCO₂e per year, which is 0.18% of the county's annual emissions as set out in the Strategy. The project's emissions are just over 3% of the Borough's annual emissions. The emissions are short term.

By way of further comparison, livestock is a significant source of methane emissions. Agriculture is the highest contributing sector to total methane emissions for the UK, representing 46% of total methane emissions. The Fylde contains about 14% of the cattle and pigs in Lancashire, which is higher than average. If 46% of all methane emissions in the Fylde are from livestock (as in the UK) then it would not be inappropriate to suggest that agriculture in the Fylde is a significant source of greenhouse gas emissions in the Borough. Landfill gas sites can also be a significant source of methane emissions.

In light of these comparisons, together with the proposed regulation and operational practices to limit methane emissions, it is concluded that the greenhouse gas emissions would not cause an unacceptable impact.

Conclusion

The project will generate some greenhouse gas emissions. But providing the operational practices are adhered to and regulated by the Environment Agency, the emissions would not cause unacceptable impacts.

Comprehensive monitoring of the practices and the site, overseen and regulated by the Environment Agency, will ensure that any risks are managed effectively.

The development is therefore considered to comply with national guidance and the policies of the development plan.

Appendix 6

Community and socio economics

Proposal

The applicant has undertaken an assessment of the community and socio-economic effects of the proposal and in particular on:

- Population;
- Wealth and deprivation;
- Industrial structure;
- Community infrastructure;
- Housing;
- Education and skills;
- Crime and public safety;
- Public rights of ways;
- Employment (socio-economic factor);
- The wider economy (socio-economic factor);
- Public access (community factor); and
- Crime and public safety (community factor).

The assessment identifies that the proposal would have a number of community and socio-economic effects consisting of:

- Temporary loss of local amenity value through site activities, traffic and influx of population area.
- Employment generation, with direct employment for initial exploration wells predominantly drawn from beyond the local area, but with indirect and induced effects from local spending and the influx of population on Site (local supporting industry, hotels and subsistence for example93);
- Increased spending in the agriculture sector from increased landowner income;
- Opportunity costs from loss of in use agricultural land;
- Community disturbance from any protest activities, or Site works.
- Effects of increased local spending from the community benefit payment from the applicant via the Community Foundation for Lancashire to local communities (although the applicant acknowledges that such payments are not a material consideration in deciding whether to grant planning permission and are not presented as such, but arte of the view that they would be a positive effect flowing from the development).

The area of the proposed works is situated in the east of the Fylde borough, mainly rural in character with various different types of farming activity, including intensive market gardening and extensive arable and dairy farming. The site is surrounded by open farm land and a number of small businesses within 1km of the site including a garden centre, catteries and a caravan park. The area is relatively affluent and is in a low population density area. It is considered that the growing population will necessitate employment opportunities into the future, particularly in the context of increasing levels of employment benefit claimants. The major existing and potential

employment land areas in the borough are located away from the site. The ward has limited provision of community infrastructure due to the small size of the population and the agricultural nature of the area. The local area does not contain any of the existing or potential housing supply identified in the Five Year Housing Supply Statement. Although the proposal is a temporary exploration project lasting six years the applicant considers it has the potential to have the following beneficial effects:

- Direct, indirect and induced job creation in the local Lancashire area;
- Opportunities for local businesses to provide services to the project (e.g. construction of the well pad and access track; transportation of materials and equipment and site welfare facilities);
- Expenditure in local hotels and restaurants by people working on the project but do not live locally; and
- Community benefit payments for each well that is hydraulically fractured. (It is acknowledged that such payments are not a material consideration in deciding whether to grant planning permission and are not presented as such, but they would be a positive effect flowing from the development which is properly to be assessed when considering the socio-economic effects).

The applicant's recent experience has shown that drill sites can attract public attention and a degree of protest. The risk of criminal activity is thought to be minimal, although should this occur, it is assumed that public order and people management will be maintained by the local police. The assessment concludes that the proposal would not have any significant adverse effects on community and socio-economic effects.

Policy

National Planning Policy Framework (NPPF)

Paragraphs 11-14	Requirement for Sustainable Development
Paragraph 17	Core Planning Principles
Paragraph 144	Environment and local communities

Joint Lancashire Minerals and Waste Local Plan – Site Allocation and Development Management Policies – Part One (LMWLP)

Policy NPPF 1	Presumption in favour of sustainable development
Policy DM2	Development Management

Fylde Borough Local Plan

Policy SP2	Development in Countryside Areas
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Summary of consultees and representations

There are no specific consultees on community and socio economic issues.

Westby-with- Plumptons Parish Council recommends the application should be refused for a number of reasons including the following in respect of community and socio economic issues:

- The proposed development would introduce an industrial form of development into a rural setting which will be of detriment to resident's quality of life.
- The value and saleability of properties will drastically diminish.
- The proposed development is located too close to some resident's properties.
- Noise pollution day and night from the 24hour operation.
- No evidence is given regarding compensation availability for damage occurring due to the fracking process, including structural damage, long-term land side effects and flooding.
- Inconvenience of anti-fracking protestors, affecting resident's quality of life and in turn the need for and cost liability of extra policing.
- Parishioners feel they are 'guinea pigs' in a fracking trial that is being rushed through without guarantees regarding environmental effects, safety precautions and compensation for affected people, properties and the environment.

The Parish Council has requested that if planning permission is granted that the site and process is policed at all times; that residents are kept informed of all processes; emergency contingency plans are made public; compensation guarantees are put in place; access to land is pre-approved by landowners and a liaison committee is established to with representatives from the applicant, neighbouring properties, police, planning and environment officers from Lancashire and Fylde councils.

Medlar-with-Wesham Parish Council and Kirkham Town Council objects to the proposal for a number of reasons including the following in respect of community and socio economic issues:

- Detrimental impact on property values and insurance premiums.
- Concern regarding future site expansion for production following exploratory phase. An increase in well heads will lead to further noise, traffic and pollution.

Friends of the Earth: have made representations objecting to the proposal and which include objections relating to community and socio economics and which have been summarised as follows:

- The analysis of socio-economic impacts is probably unlawful because it takes account of economic impacts which are not related to environmental consequences of drilling and fracking.
- Strongly disagree that shale gas will make a positive contribution to economic growth at a local and national scale.
- There is no explanation of local expenditure and its calculation.
- Job creation effects are highly limited. There will be low job creation with no guarantee of jobs for local people given the specialist nature of the jobs
- Strongly disagree that there will be no significant effects for wider economic effects as potential adverse effects have been disregarded. Economic costs of the development will be detrimental to the local economy.
- There is no assessment of impacts to residents in the immediate vicinity and impacts on tourism and agriculture.

- Several years of disruption to the local community with 14 months of drilling 24 hours a day, 8 months of hydraulic fracturing and 12 months of flaring with dust, light and noise emissions.
- Unprecedented levels of public opposition / concern about the impacts.
- Inaccuracies in the site description and proximity to residences with failure to mention Foxwood Chase and Carr Bridge Residential Caravan Park.
- No consideration of impacts on schools, caravan parks, kennels, catteries, farm nurseries and national cycle infrastructure located 1-2km from the site.
- Fracking could adversely affect house prices.
- No consideration of impacts on Blackpool and tourism.
- US evidence linking fracking to harmful effects on livestock and farming.
- No mitigation measures for impacts on agriculture, tourism, loss of amenity for local residents.

Representations objecting to the proposal include reasons which could be considered to relate to community and socio economic issues and which have been summarised as follows:

- No economic benefit. The number of jobs to be created are exaggerated
- Only jobs for outside specialists, so no local benefit.
- More job opportunities in renewable green energy, which are also sustainable.
- DECC report that job creation in fracking will be approximately 24,300 yet 400,000 could be created in clean energy. Fracking is not sustainable, whereas sun, wind and tidal resources will not run out.
- Shale gas creates bad press which has a negative impact on the Northwest economy particularly if the industry were to escalate in scale.
- Impact on coastal settlements from potential loss of jobs in tourism/farming
- Tourism in Blackpool, Lytham St Annes and the Fylde could be seriously affected /harmed, with reduced visitors and trade due to industrialisation, toxic rivers, dead wildlife, gasfield landscape and HGV traffic.
- Cannot sacrifice food growing, need to keep prime farming land safe for food production, for local economy and to avoid world food shortages.
- Impact on local dog boarding kennel from dog owner's perception of risks.
- Impact on Maple Farm Nurseries from impacts to trees and shrubs.
- The damage to communities will be irreparable and not good for wellbeing.
- Massive impact on rural community from the 24hr operation will be like living on a heavy industrial site.
- Rapid industrialisation of small isolated rural communities leading to industrial and population growth will put stress on services and infrastructure.
- An influx of gas workers and families could lead to over building and an increase in rental values. Baseline data is needed to compare the effect.
- The application is incorrect with regard to number of residences/people in close proximity to the site that will be unavoidably impacted by the development. There are 10 not 1 residences at Staining Wood Farm.
- Need a 2km buffer zone from residential areas for unconventional gas well pads (like in Australia). It's irresponsible to locate an unsafe development near to (densely) populated areas including Staining Wood/Foxwood Chase which is within 300m of the site.
- Contrary to Policy EMP5 as residences at risk from hazardous installation.

- An unsafe development should not be located near to villages and schools.
- Impact on communities at Foxwood Chase, Little Plumpton, Great Plumpton, Carr Bridge, Westby, Wrea Green.
- People will leave the area, take children out of schools and it will be ruined
- The development site is too close to large urban communities.
- Need to consider the impact on residents of drilling and fracking for 24/7 for 2-3 years, and if viable for 10-15yrs with 20-30wells on the site.
- Concern about hydraulic fracturing for 12hrs a day 7-7pm is far too long and will disturb too many people. No restriction on how many 2-3hr durations during a 12hr day.
- Any disaster will affect the local community for generations. People in local area do not want this forced on them.
- Impact from protests and cost of policing them.
- Proposal is contrary to NPPF Paragraph 144 on grounds of unacceptable adverse impact on the environment and local communities.
- Home insurance premiums may increase, or insurance refused due to risks of subsidence.
- If house is undermined who will be responsible? Will the applicant pay/ be made to pay for repairs to damaged property?
- Residents have paid a premium to live in a rural area and planning applications have already had a detrimental impact on housing and land value
- House valuations in area will depreciate further if proposal is approved and this will lock people into possible negative equity.
- Will applicant pay for compensation for loss in house value?
- Who wants to buy a house with 24hr drilling on the doorstep?
- Need a fund to compensate residents for damage caused by any earthquakes during works and for several years after abandonment.
- Local residents and people of Lancashire should receive significant financial benefits over and above taxation/employment.
- No assurance that Cuadrilla will accept liability for any damage to properties and the environment. The local authority and the community will have to pay for any damage caused by Cuadrilla
- Will applicant be accountable for damage to the environment, housing, roads, health? Who will foot the bill?

Representations have been received in support of the proposal in respect of socio economic benefits from the North and Western Chamber of Commerce on the basis investment in Lancashire could create thousands of well paid jobs in the local economy directly through the supply chain and spread beyond that, through inward investment and spin off technologies rebalancing the local economy and generate wealth; shale gas in Lancashire would establish Lancashire at the heart of a successful UK and European industry; Lancashire's Strategic Economic Plan, prepared by Lancashire Enterprise Partnership (LEP) and endorsed by Lancashire County Council, acknowledged that shale gas sector may play an important economic role in Lancashire within the timeframe of the Growth Deal and the locating of an elite institution in Lancashire for shale gas would be important in establishing the sector both locally and nationally.

The Chamber of Commerce East Lancashire maintains the proposal is important to the local and national economies and for international competitiveness to have energy supply, security, price and supply chain opportunities and that Lancashire's wellbeing and prosperity can benefit.

Up to the end of December 2014 a total of 200 representations supporting the proposal both in principle and in respect of the specific benefits that the proposal would generate in the locale. Representations in support have continued to be received the final number of which will be reported when the application is presented for determination.

The reasons for supporting the proposal in respect of socio economic effects have been summarised as follows:

- Need to determine whether or not the gas is in commercial quantities
- Shale gas development will bring economic growth, wealth and prosperity to the UK, Northwest and Lancashire economies and to local communities
- It's vital to the country's prosperity to exploit our natural reserves and to benefit future generations
- Energy from a local source will be good for the local economy and could attract high gas consuming businesses to relocate in the region.
- SME business failure may be avoided by stabilising energy costs and by providing new business opportunities as part of the supply chain - energy services, components, education/training, hospitality, property
- Shale gas exploration will provide increased potential for local business growth and revenues and provide employment for local people
- Shale gas could be a catalyst bringing in inward investment and regenerating Lancashire and Blackpool
- This opportunity should be welcomed and not lost to other counties and countries. Shale gas could transform Lancashire like North Sea oil/gas has done for Aberdeen and how shale gas has done for small towns in the US.
- Fylde Borough Council and Lancashire County Council will benefit from tax revenues, which could help pay for public services and infrastructure
- Investigation works have already provided significant business to the accommodation sector in and around Blackpool with knock on impacts
- This is an opportunity to change the region from high unemployment and no industry, to an innovative area that supports new industry and is a leader of new technology within the energy sector.
- Without shale gas, what is the economic future for Lancashire and Blackpool, Blackpool has high levels of deprivation, child poverty, poor health, benefits dependency and youth unemployment
- Fylde coast has an over dependence on declining agriculture and tourism sectors with a transient, seasonal, low paid, unskilled, migrant workforce.
- Shale gas provides economic diversity through new industrial activity, generating skilled permanent jobs and youth employment opportunities, directly or indirectly through the supply chain including engineers, apprentices
- Reports suggest that a shale gas industry could be responsible for a supply chain spend of over £300 billion and support 60,000-74,000 jobs.

- If shale gas development is not allowed in Lancashire, but develops elsewhere, Lancashire will miss out on revenue and employment generated by supply chain businesses
- New jobs essential for the prosperity of the UK and the Northwest area
- Job prospects for future generations will help stop them having to move away and will improve the local skills base
- UCLAN and Blackpool & the Fylde College can train local people in skills to ensure jobs can go to local people
- Every aspect of the community will benefit, including people struggling to pay gas bills through cheaper gas prices

Assessment

An assessment of the potential community and socio economic impacts has been carried out. This is a temporary project but it has the potential to have impacts that may impact on community, social and economic factors particularly relating to the temporary loss of local amenity value through site activities, traffic and influx of population area; community disturbance from any protest activities; impacts on tourism and agricultural production. However, there would also be opportunities for employment generation, with direct employment for initial exploration wells predominantly drawn from beyond the local area, but with indirect and induced effects from local spending and the influx of population on site such as local supporting industry, hotels and subsistence; increased spending in the agriculture sector from increased landowner income although these are difficult to quantify; and whilst it is not a material consideration for planning purposes, the opportunity for community benefit payments.

Many of the representations received strongly refute the findings of the assessment on community and socio economic impacts, most particularly the employment benefits the industry would bring to the area and highlight the negative impacts it would have on agriculture, tourism, property values, community cohesion and the industrialisation of rural areas both as part of the current proposals and any future proposals. It is maintained existing businesses would be impacted including the established market garden economy and tourism and that investment in renewables would lead to more sustainable investment and long term environmental and economic benefits. The concerns are understandable but are not necessarily expressed with foundation. Equally, whilst it is acknowledged that some local economic benefits could be generated by the proposal, it is difficult to quantify the scale of such and whether they would counter the impacts.

The proposal is for exploration and appraisal, a temporary operation, albeit for a development period of two years. Throughout that period there would be both disturbance and a potential negative impact on the nearest residents at Staining Wood and Foxwood Chase although it is questionable what impact it would have on wider communities, if any at all. There would be some economic benefits in the use of local services and industry and where specialist services are drawn in from elsewhere, they would generate income in the local economy in some form. The use of such a small area of agricultural land would not have a negative effect on agriculture nor, subject to the regulatory regimes that would be in place, would there be any detriment to agricultural land or practices elsewhere in the locale. Whilst fracking would be carried out over a much wider underground area, as projected to

the surface, it has the potential to affect properties most particularly in terms of vibration and which is considered in the seismicity section. However, again, subject to the adherence to regulatory requirements such impacts could be kept to a minimum. In the event there were to be disturbance leading to damage, the applicant has committed to investigating complaints and has demonstrated insurance would be in place if damage is proven to be attributable to their operations. It is not possible to quantify what impacts a proposal of this nature would have on either property values or the market, but these are not material planning considerations.

The Tourism Board have publically countered the view that the site would adversely affect tourism and is of the view that the hospitality industry would benefit. There are no statistics that support either view.

In terms of community cohesion, recent experience has shown that drill sites can attract public attention and a degree of protest and environmental extremist activities may also occur. The Lancashire Constabulary have been consulted on the proposals and have not objected. It is right to assume that public order would be maintained by the police although there would inevitably be costs associated with such as has been evidenced by other sites elsewhere in the country.

Conclusion

It is concluded that whilst there would be some localised impact on residents in the community at the nearest properties, the project would not have a significant effect on wider communities or socio economic factors, particularly in groups with protected characteristics. There would not be an impact on agricultural land or practices and there would be some economic benefits during the exploration stage to the local economy. It is therefore considered that the proposal would not have an unacceptable impact on communities or the economy and would not be in conflict with the policies of the NPPF or the development plan policies.

Appendix 7

Ecology

Proposal

The Environment Statement assesses the potential for the project to effect sensitive habitats and species of wildlife value. It does this by firstly establishing which habitats and species of value are present within the zone of influence of the Project. An assessment is then undertaken to determine whether there are any pathways of impact upon the valued habitats and species.

The assessment has established which habitats and species of value are present in the zone of influence of the proposal and then considered whether there are any pathways of impact on the valued habits and species. The assessment identifies that the site is located in an intensively managed landscape adjacent to a main road and which affects the quality of habitats present on site and influences the species that the site may support. The site is not located within close proximity to any protected nature conservation sites although the wider agricultural landscape is of value to wintering birds. A desk based data collation exercise has been carried out along with field surveys, an extended Phase 1 Habitat Survey, badger surveys, water vole surveys, bat activity surveys, amphibian survey, an ornithological site assessment and breeding bird surveys.

The ecological receptors, of nature conservation value, identified within the zone of influence of the main site as part of a Phase 1 Habitat Survey included; hedgerows, bats, breeding birds, wintering birds and brown hare. The ecological receptors, of nature conservation value, identified within the zone of influence of the array sites included; wintering birds connected to Lytham Moss BHS and Morecambe Bay SPA and the Ribble and Alt Estuary SPA and ground nesting breeding birds. The routes of potential impact identified included:

- Loss of habitat.
- Disturbance due to increased noise levels, vehicle and personnel movements (visual) and increased light levels.
- Alteration of bat behaviour due to heat emitted by the flare stack.
- Accidental injury or killing of brown hare

A range of mitigation measures and compensation measures are proposed to be adopted to either reduce the level of impact so that it is no longer significant or provide alternative habitat to ensure that the local population is not significantly impacted by the Project. These measures would be presented within a Biodiversity Mitigation Strategy (BMS).

Policy

Strategic Policy

European Policy

EU Habitats Directive

Planning Policy

National Planning Policy Framework (NPPF)

Paragraphs 109-112	Conserving and Enhancing the Natural Environment
Paragraphs 118-125	Conserve and Enhance Biodiversity

National Planning Policy Guidance (NPPG)

Natural Environment	Protect biodiversity
Noise	Manage noise impacts

Joint Lancashire Minerals and Waste Development Framework Core Strategy Development Plan documents (LMWDF)

Policy CS1	Safeguarding Lancashire's Mineral Resources
Policy CS5	Achieving Sustainable Minerals Production

Joint Lancashire Minerals and Waste Local Plan – Site Allocation and Development Management Policies – Part One (LMWLP)

Policy NPPF 1	Presumption in favour of sustainable development
Policy DM2	Development Management

Fylde Borough Local Plan

Policy EP12	Conservation of Trees and Woodland
Policy EP15	European Nature Conservation Sites
Policy EP16	National Nature Reserves
Policy EP17	Biological Heritage Sites
Policy EP23	Pollution of Surface Water
Policy EP24	Pollution of Ground Water
Policy EP26	Air Pollution
Policy EP27	Noise Pollution
Policy EP28	Light Pollution

Consultee comments and representations

Natural England: No objection. An initial objection was made due to the need for further information to be supplied to the planning authority to check the likelihood for significant effects in accordance with the Habitats Regulations. Further information was required to address impacts on air quality, Special Protection Area (SPA) birds, land use and cumulative effects.

Following the receipt of additional information from the applicant, Natural England concluded that the specific issues they had raised had been addressed and therefore withdrew their objection.

Natural England has also confirmed that points raised by Friends of the Earth relating to matters within their remit have been resolved with the applicant such that Natural England withdrew its objection.

LCC County Ecology Service: These comments address impacts on biodiversity with the exception of European sites and their qualifying features (wintering birds). European site issues have been addressed by Natural England. In general, the application area appears to be of relatively limited biodiversity value, comprising improved agricultural land with few features of any significant biodiversity value. Whilst there appear to be few if any significant biodiversity constraints, the development (construction and operation) would impact on features (habitats) of biodiversity value including hedgerows, and on the habitat of protected and priority species (including bats, birds, amphibians and mammals). Mitigation and compensation would be needed to be secured as part of any planning approval for this site. Mitigation and compensation for impacts upon biodiversity relating to wintering birds, and conditions requiring a biodiversity mitigation strategy and a revised ecological mitigation strategy (landscaping, habitat creation and enhancement) should be imposed.

Initially, further surveys were required to establish the presence or absence of great crested newts. The further surveys have been submitted and no evidence of great crested newts has been detected within the zone of influence of the proposed development; no impacts on this species or its habitat are predicted and therefore there is no requirement for mitigation or compensation to be secured by planning condition.

RSPB - Concern about the lack of data and therefore it is difficult to conclude that there would definitely not be an impact on the three SPAs (Ribble & Alt Estuaries, Martin Mere and Morecambe Bay) through impacts on functionally-linked land. Winter bird surveys for the area would elucidate the issue. The RSPB believe that "the regulatory regime for fracking is not fit for purpose, that such a new and untested technology in the UK should be approached with far more caution and that the case has not been made for encouraging a large scale fracking industry within our legally binding climate change limits."

Wildlife Trust –The Environmental Statement (ES) does not take into account fungi or lichens, the bird surveys were carried out over one season only and may not represent a true reflection of the impact of the development over time. Concern that the ES and site survey does not include road side verges, wildlife corridors etc in accordance with British Standards Institute Code of Practice Biodiversity Code of Practice for planning and development. Concern is raised over the competence of the author of the ES. The application does not meet the aims of the NPPF in particular paragraphs 17, 19 and 165 of the NPPF. An appropriate landscape/ ecological management plan has not been submitted and there is the need for a legal agreement to safeguard such arrangements. A construction environmental

Management Plan (CEMP) is required. The site has the potential to provide net gains in a number of areas of biodiversity. There is general concern about the regulatory framework associated with Fracking.

Representations

Friends of the Earth: has objected to the proposal and further information for a number of reasons including impacts on ecology and biodiversity. The reasons for objecting are summarised as follows:

- Potential adverse impacts on the migratory path for wintering birds utilising the Morecambe Bay and Ribble Estuary Ramsar/ SPA sites
- Impacts of surface overflow draining into Carr Bridge Brook and watercourses connected to the Ribble Estuary
- Impacts on internationally designated sites, Morecambe Bay SPA, Ribble and Alt Estuaries SPA and Liverpool Bay SPA and Marton Mere SSSI
- Impacts on protected and notable species
- Impacts on SPA qualifying bird species and wintering birds
- Impacts on the functional link with the Ribble and Alt Estuaries SPA/Ramsar, require that a full Habitat Regulation Assessment must be carried out.
- Significant loss of 2.6ha of habitat and disturbance to breeding and wintering birds, bats and brown hare.
- Adverse impacts of loss of habitat and disturbance to protected species are not sufficiently mitigated
- Impacts of the flare (noise, heat, emissions) and 24hour lighting on wildlife
- The applicant has assessed cumulative impact of development as significant at the international level but the mitigation measures proposed are inadequate
- There is no Biodiversity Mitigation Strategy
- The use of conditions would be inadequate as the applicant has disregarded conditions at other sites
- A mitigation measure to not construct during bird breeding or wintering birds season does not reflect the construction timetable
- Mitigation measures for wintering birds are minimal and incomplete as they do not address the impacts from the flare or lighting and available habitat.
- The applicant conclusion that significant impacts will become not significant after mitigation is contested

Representations objecting to the proposal have made reference to the unacceptable impacts on ecology and biodiversity and which are summarised as follows:

- Contamination of nearby Carr Bridge Brook could result in pollution of the Ribble Estuary SSSI site an internationally important site for wildlife including wintering wildfowl and animals that use the watercourses.
- Poses a threat to wildlife sites including Ribble Estuary SSSI, Wyre Estuary SSSI, Lytham Moss BHS, RSPB sites including Marton Mere.
- Potential ecological disaster.
- The RSPB report says that shale gas will damage biodiversity, by salinization of soils and surface water and fragmentation of forests, creating shale gas landscapes.

- Adverse effect on local ecology and biodiversity, including death of and disturbance to wildlife and damage to habitats.
- Protected species could be threatened.
- Impacts from well operation 24 hours a day, 7 days a week.
- Impacts from flare burn off.
- Impacts from noise and lighting pollution to animals e.g. lighting and bats.
- Impact on brown hare, foxes, rabbits, frogs, toads, dragonflies, shrews, voles, weasels, stoats, hedgehogs.
- Impact on wildlife corridors/feeding grounds for wintering wildfowl, migratory birds, local birds, skylarks, kestrels, Canada goose, buzzards, barn owls, tawny owls, woodpeckers, Martin Mere birds, pink footed geese, starlings
- Pollinating insects could be driven away.
- Have ponds been checked for great crested newts?
- Impact of stress to the horses at the World Horse Welfare and Rehabilitation Centre (Penny Farm). The centre is visited by children and elderly people.
- Impact on trees and woodlands from vehicle pollution.
- Proposals are contrary to EU, UN, NPPF and Policy EP15 policy guidance, as the proposal will cause environmental harm.
- Ecological surveys are incomplete as per a report by an independent ecologist. Survey data limitations relating to the bat information, reptiles, water vole, brown hare) and their habitat during construction and operation of the development.
- Prior to the commencement of works, a revised Ecological Mitigation Strategy (landscaping, habitat creation and enhancement) shall be submitted for approval in writing and subsequent implementation in full. The Strategy shall provide details of the creation and enhancement of habitats to offset hedgerow losses and to compensate for impacts on the habitat of protected and priority species.
- Humber Wood and the Plumpton Lane/A583 TPO tree are not included in the assessment.

Assessment

The County Council's Ecologist has assessed the proposal.

It is concluded that the application area appears to be of relatively limited biodiversity value, comprising improved agricultural land with few features of any significant biodiversity value. Whilst there appear to be few if any significant biodiversity constraints, the development (construction and operation) will impact on features (habitats) of biodiversity value including hedgerows, and on the habitat of protected and priority species (including bats, birds, amphibians and mammals). Mitigation and compensation will therefore need to be secured as part of any planning approval for this site.

Natural England submitted an initial objection due to the need for further information to be supplied to the planning authority to check the likelihood for significant effects in accordance with the Habitats Regulations. Further information was required to address impacts on air quality, Special Protection Area (SPA) birds, land use and cumulative effects.

Following the receipt of additional information from the applicant, Natural England concluded that the specific issues they had raised had been addressed and therefore withdrew their objection.

Natural England has also confirmed that points raised by Friends of the Earth relating to matters within their remit have been resolved with the applicant such that Natural England withdrew its objection.

Red and Amber list birds

A concern has been expressed about certain species on the Royal Society of Protection of Birds (RSPB) Red and Amber list, with the suggestion that a number of species on this list are to be found at or around the main site. Only grey wagtail and mistle thrush are referenced in the representation. It is claimed that one of these birds has nested at Foxwood Chase in November, which is about 300m from the site. It is not clear whether the reference is to grey wagtail or mistle thrush. Grey wagtail is virtually absent from the west of County during the breeding season, favouring breeding sites near water especially streams and rivers where the surface is broken by pebbles and stones. Mistle thrush is a widespread breeding bird in Lancashire.

In any case, the predicted noise levels (with mitigation) at Foxwood Chase will be within the standards of the NPPF (PPG) (42dB at night and 53dB in the day). The proposals would therefore not be expected to result in any significant impacts on birds at Foxwood Chase.

A concern has been expressed that several Red and Amber (R&A) list species have only been referred to at a high level in the ES. The presence of species in the wider area is not necessarily relevant to the assessment of impacts. In this case, further consideration of house sparrow, starling and house martin would not be necessary since the application area (and zone of influence) does not apparently provide nesting habitat for these species (primarily associated with buildings and structures) and does not appear to provide any significant foraging resource for such species. The proposed Biodiversity Mitigation Strategy will in fact enhance foraging habitat for these species.

Concern is expressed that parts of the Environment Statement (ES) note suitable breeding habitat for other R&A List birds (e.g.: skylark, linnet, barn owl) but no further assessment is apparent. It should be noted that the presence of potentially suitable habitat does not necessarily imply occupied nest sites or indicate successful nesting. The ES does not state that there is suitable breeding habitat for barn owls.

Moreover, the ES does address potential impacts on skylark and linnet as both species were recorded during the breeding bird survey. Skylark require vegetation heights of between 20-50cm for breeding, and have been lost from a lot of lowland sites as a result of changes in cropping (e.g. from spring sown to autumn sown cereals); close grazed pasture does not provide nesting opportunities and silage fields may be suitable early in the season but are unlikely to remain suitable long enough for successful nesting.

Linnet typically uses scrub, gorse and hedgerow habitats for nesting; the proposals will result in the loss of some such habitats and will render others less suitable through disturbance, but the proposed Biodiversity Mitigation Strategy will offset these impacts in the longer-term.

It is claimed that some species are included in survey data, but were not spotted at or around the sites on the one or two occasions when surveys were carried out (e.g.: song thrush). This appears to be a criticism of the survey. The breeding bird survey appears adequate to inform the assessment of impacts (a scoping visit and two breeding bird surveys, as was carried out, is standard).

Song thrush is widely distributed through Lancashire, associated with woodlands, hedgerows, parks and gardens. It seems highly unlikely that the application area (improved agricultural land) would support good populations of snails (unlike for example residential gardens) and therefore the absence of this species as a breeding or even foraging species during breeding bird surveys is hardly remarkable.

It is claimed that further assessment is required because local residents' data indicates that other species are to be found at or around the main site.

The claims (and the records) focus in particular at Foxwood Chase, i.e. 300 - 400m from the main site, and the data is not therefore representative of the application area. Whilst there may be records of birds in this area, their presence in the wider area does not necessarily imply that the proposed development would result in any significant impact.

There is concern that Natural England may not have been presented with a rounded assessment of impacts on nature on which to base their withdrawal of objection. Natural England do not routinely comment on impacts on protected or priority species arising from development proposals. It therefore seems highly unlikely that the perceived flaws in the assessment referred to would have any bearing on Natural England's comments.

Reference is made in the objections to the Habitats Regulations and to case law pertaining to Habitats Regulations matters. The red and amber list species of bird referred are not qualifying features of European sites in this area, and the Habitats Regulations do not therefore apply. In any case adequate assessment of these species was undertaken.

There will be no significant impacts on red and amber list breeding birds because the applicant has carried out an adequate ecological assessment and has considered impacts on such species. The application area (and zone of influence) supports a limited number of bird species which will be affected to some degree by the proposals. Impacts cannot be entirely avoided, so the applicant proposes mitigation and compensation, which is entirely appropriate and is an approach endorsed by the NPPF.

Mention is made of a number of other red and amber list species:

Yellow wagtails. This is a summer visitor to the UK, breeding in arable farmland, wet pastures and upland hay meadows. According to the Lancashire Atlas of Breeding and Wintering Birds, Lancashire is close to the edge of the species range, and this is likely to account for observed declines; its range is now almost entirely confined to farmland south of the Ribble, with the exception of the Upper Lune. Therefore this species is unlikely to be present/ significantly affected.

Tree sparrow. This is a species of hedgerow and woodland edges, whose population is often artificially enhanced by nest boxes and winter feeding schemes. It can be difficult to detect, but is a colonial breeder; no signs of breeding were detected.

Corn bunting. In summer this is a species of open farmland; in winter on stubbles, root crops, weedy fields and cattle yards. According to the Atlas, in the lowlands of the west it is concentrated in the south-west mosslands north of Ribble and in north Fylde; the current population estimate is 210 individuals, but a limited number of sites account for most of these birds. There is no evidence to suggest it is present at this site.

Curlew. This is an estuary bird, breeding in greatest numbers in uplands in rough grass, moorland and bog; in Lancashire breeding in the lowlands has declined to low numbers only in some areas of West Lancashire, Chorley and the Fylde. The application area does not appear to provide suitable nesting habitat.

Swallow, house martin and swift. Breed in buildings; forage where there is a ready supply of small insects. Any loss of insects as a result of the proposals would be offset by habitat enhancements.

Meadow pipit. According to the Atlas, the current range is mostly uplands and coastal marshes and dunes, with small remnants of previous populations in agricultural lowlands hanging on in St Helens and West Lancashire, but elsewhere in the County (including the lowlands of Fylde) it is absent as a breeding bird.

Reed bunting. This is a breeding bird of farmland and wetland, common in the west of Lancashire, with main breeding sites at places such as Martin Mere and Leighton Moss. There is no reason to believe it breeds here, or in large numbers, or would be significantly adversely affected.

Such species therefore appear largely irrelevant to the assessment of impacts at this site.

Noise assessment

Concern is expressed about the validity of the noise assessment carried out by the applicant. It is claimed the assessment is flawed, and therefore the baseline noise levels and steps proposed to mitigate the impacts on wintering birds are also questionable.

The County Council appointed specialist noise consultants (Jacobs) to review the applicant's noise assessment, and to also undertake some background monitoring at night time. Jacobs confirm that the noise calculations were undertaken in accordance with established international standards, although the degree of confidence or certainty in the noise predictions is not stated.

A concern has been expressed about use the assessment methodology. The applicant has used BS5228. However, it is considered that the applicant has not employed the most appropriate noise standards against which to compare the noise predictions. BS5228 contains more relaxed noise standards than the National Planning Policy Framework – Planning Practice Guidance (NPPF-PPG). The applicant was therefore informed that the County Council will use the more stringent standards contained in the NPPF-PPG when making its assessment.

As a result of this a number of possible noise reduction measures were suggested, and the applicant has stated that recommended noise limits in the NPPF -PPG could be achieved. This commitment to meeting the standards in the NPPF-PPG, and the measures to achieve those standards was contained in further information submitted by the applicant and which was the subject of a further consultation (Regulation 22).

The applicant has confirmed that these levels are the lowest that can be achieved at the nearest properties (Staining Wood Cottages) without resulting in onerous burdens on operations, in accordance with the NPPF-PPG. The applicant has also confirmed that night time levels at all other noise sensitive properties will be below this level. The mitigation measures include:

- Installing enclosures to the shale shakers and generators.
- Fitting noise absorbent materials to the housing containing the mud pumps.
- Fitting rubber cushioning to drill pipe cassette to minimise impulsive noise from handling lengths of drill pipe.
- Installing 4m acoustic hoarding around the site.

The day time noise prediction from the hydraulic fracturing phase is 53dB at Staining Wood Cottages. Hydraulic fracturing is the loudest phase of the project. Noise from hydraulic fracturing would occur for three hours per day, for 30 to 45 days over a two month period. There will be 4 of these two month periods over the 5.5 year lifetime of the project. Each of these two month periods for fracturing will be interspersed by a three month period of drilling.

The 53dB level accounts for the applicant's mitigation which was submitted after the ES and was consulted upon as part of the further consultation. 53dB is just below the national standard.

The applicant has also submitted a Habitat Regulations Assessment (HRA) Shadow Screening Opinion. The noise mitigation in this assessment prevents a significant effect on the Ribble and Alt Estuary Special Protection Area (SPA). This information and noise mitigation led to Natural England withdrawing its objection.

Fields to the south of the site

There is concern that the applicant has failed to assess fields to the south of the main site for potential for wintering birds. However, Appendix F of the HRA Shadow Screening Opinion (SSO) refers to the location of monitoring array number 1388329 (in the field to the south of the site) as a 'track at the side of a large open winter wheat field with high potential for use by wintering birds and regularly overflowed'. Appendix G does not show the array being avoided in winter (as part of the installation of the monitoring array) as part of the assessment of fields to the south of the site.

Not every field that appears potentially suitable to support wintering birds will be used by wintering birds, and even where fields are used they may not be used on a regular basis and/ or by large numbers of birds. Available information does not suggest that the array installation here in winter would result in a significant adverse effect on wintering birds or the SPA.

There is a view that the fields to the south of the site have allegedly been omitted from the assessment because it has been assumed that noise from the road would prove too much of a disturbance. However, the response of birds to traffic has been documented. For example, Madsen (1985) reported that roads with traffic volumes greater than 20 cars per day depressed goose utilization in a range of up to 500m, and the distance from roads where geese feed without interruption is likely to be approximately 500m. The variable nature of traffic volume is irrelevant since the birds will be disturbed and displaced away from Preston New Road (PNR).

The noise attenuation maps in the HRA SSO suggest that at the distance from PNR at which wintering birds might be expected to occur, if present, noise levels will have dissipated sufficiently not to result in significant effects. Figure 5 'water bird response to construction disturbance' in the HRA SSO report helps to illustrate this point.

The Lancashire Wildlife Trust has raised a number of concerns and questions.

A concern has been raised that the applicant did not assess lower plants (e.g. fungi). The initial assessment and subsequent surveys did not assess the habitat as significant and did not trigger the need for lower plant surveys. The site is largely characterised as improved agricultural grassland.

A concern is expressed that the ES has not considered the location of the site in respect of wildlife corridors. The ES considers ecological networks and connectivity in relation to habitat loss (ES: chapter 10, section 10.7.2) and species-specific impacts of this loss. For example, it considers how the development could affect bats migrating along linear features (Para 261 to 264), amphibians migrating across pasture and hedgerows (Para 266), movements of wintering birds between the SPAs and BHS sites (page 236).

The Trust is concerned that the ES does not include an Ecological Constraints and Opportunities Plan (ECOP). The Biodiversity Mitigation Strategy (BMS) for the site will follow the format set out in chapter 10, section 10.9.1 of the ES which provides an indication of the activities to be used to mitigate impacts arising from development, and to also enhance biodiversity in local area.

There is a concern the application does not meet the biodiversity/nature conservation requirements of the National Planning Policy Framework (NPPF, 2012) outlined in paragraphs 17, 109 and 165. See points above in relation to assessment of connectivity and the development of measures which mitigate and, where possible, enhance biodiversity in the locality of the site. Mitigation under the BMS will include the development of seed-rich strips for breeding birds which are currently absent from the landscape as the local area is managed for dairy production; the development of cover strips for hare, which are not currently present. The BMS will also incorporate detailed habitat creation and management activities.

The Trust is concerned that requirements 7, 9, 17, 109 and 118 of the NPPF, require there to be an enhancement of biodiversity instead of a net loss of biodiversity. The applicant says the mitigation measures presented within the ES will be included within the BMS. The detailed commitments to habitat creation and management to be included in the BMS will be developed with reference to the views of the County Council.

There is a concern the compensatory measures do not appear to have been timed so that biodiversity losses do not occur until such compensatory measures are in place and are likely to establish successfully. The timing for implementation of the mitigation measures will be prescribed within the BMS. These measures will commence as soon as possible following the grant of planning permission. The rate of establishment of these features will vary, but the BMS will be developed to ensure that a loss of biodiversity does not occur as a result of development. For example the establishment of seed crops will have a positive impact upon biodiversity during the year of establishment, as this resource is currently absent from the landscape, and will provide a range of passerine birds with additional food resource.

The Trust is concerned that whilst Rhododendron was recorded in the adjacent woodland, the ES does not identify areas where biosecurity measures are necessary to manage the risk of spreading pathogens or non-native invasive species. The applicant says these measures will be addressed in the BMS.

There is a concern the development does not appear to contribute towards biodiversity enhancement. Section 10.9.1 of the ES provides a summary of the scope and format of the proposed BMS which highlights those areas which will be used to mitigate the impacts of the development, and to also enhance the local area. The applicant says full details of these elements will be included within the BMS.

The Trust is concerned that the proposal does not consider how it could best contribute to delivering local biodiversity priorities. The applicant says the BMS will consider ways in which the project can best contribute to local biodiversity priorities (ES: section 10.9.1).

There is a concern all the proposals for the management of any particular species of flora and/or fauna during (and beyond) the period of development /operational activity are not in place. The BMS will include detailed measures for habitat creation and management to be implemented during and after the period of development (see ES: 10.9.1).

The Trust is concerned that an appropriate landscape and/or ecological management plan has not been submitted and approved. The BMS and Environmental Operating Standard (summarised in Appendix E of the ES) will ensure that all habitat creation and management activities are implemented, monitored and maintained.

There is a concern that all environmental consents have not been approved/licensed. All permits and licenses, including planning permission and attached conditions, will be included within the Environmental Operating Standard (EOS). This will provide a clear and transparent mechanism for managing the site and associated activities. Relevant environmental conditions and approvals will also form integral elements of the BMS and Ecology Control Plan, which will form part of the EOS, as set out in section 10.9.1 and Appendix E of the ES. The EOS and its constituent Control Plans (including the BMS) will be implemented following grant of planning permission to ensure compliance with all relevant conditions.

The Trust is concerned that all necessary practical measures to ensure that biodiversity features are protected during construction or development implementation have not been set out in a Construction Environmental Management Plan. Practical control measures will be included within the BMS. Measures included in this document will be included in the site's Environmental Management and Monitoring Plan (EMMP). The EMMP is described in the ES: Appendix E.

The Trust is concerned that sufficient resources have been allocated to protect biodiversity during construction. These elements will be included within the BMS to be prepared and agreed following grant of planning permission, and will form part of the EOS for the site. The EOS, and its constituent Control Plans (including the Ecology Control Plan) will be reviewed and updated at regular intervals and will comprise an auditable document that will, among other things, be used to demonstrate that the site is being managed in accordance with the mitigation measures set out in the ES.

The Trust says it is unclear whether or not sufficient resources have been allocated to conserve and enhance biodiversity through long-term management, ongoing surveillance and monitoring performance against targets. These elements will be included within the BMS.

The Trust says there is no commitment that, at the end of the monitoring period, the results will be used to complete a "final statement of losses and gains" arising from the development, which will identify the actual changes that have occurred, as opposed to what was predicted prior to the commencement of development. The applicant says that the EOS will be a live and auditable document. A final audit of impacts and enhancements, against the baseline characteristics set out in Chapter 10 of the ES would be possible.

Conclusion

The ecological receptors, of nature conservation value, identified within the zone of influence of the main site as part of a Phase 1 Habitat Survey included; hedgerows,

bats, breeding birds, nesting birds wintering birds, brown hare and great crested newts. The following were identified as having the potential to be significant at the local scale.

- Loss of habitat.
- Disturbance due to the loss of bat foraging habitat from the activities and equipment present at the well pad.
- Loss terrestrial habitat for great crested newts and potential direct effects on them
- Disturbance and loss of habitat from brown hare.
- Potential disturbance and displacement of migratory species of birds in the vicinity of the array points.

These measures include the following:

- Replace hedgerow, trees and habitats,
- Measures to reduce the magnitude of lighting impacts on feeding bats
- Locate seismometer array points away from land unused by overwintering birds.
- Clearance of vegetation to occur outside of bird breeding season or after confirmation that there are no breeding birds using the vegetation.

This range of mitigation measures and compensation measures are to be adopted to either reduce the level of impact so that it is no longer significant or provide alternative habitat to ensure that the local population is not significantly impacted by the project. These measures will be presented within a Biodiversity Mitigation Strategy (BMS).

Following implementation of the mitigation measures, there will be no unacceptable impact on biodiversity as a result of the proposal.

It is therefore considered that the proposal would not have an unacceptable impact and would not be in conflict with the policies of the NPPF or the development plan policies.

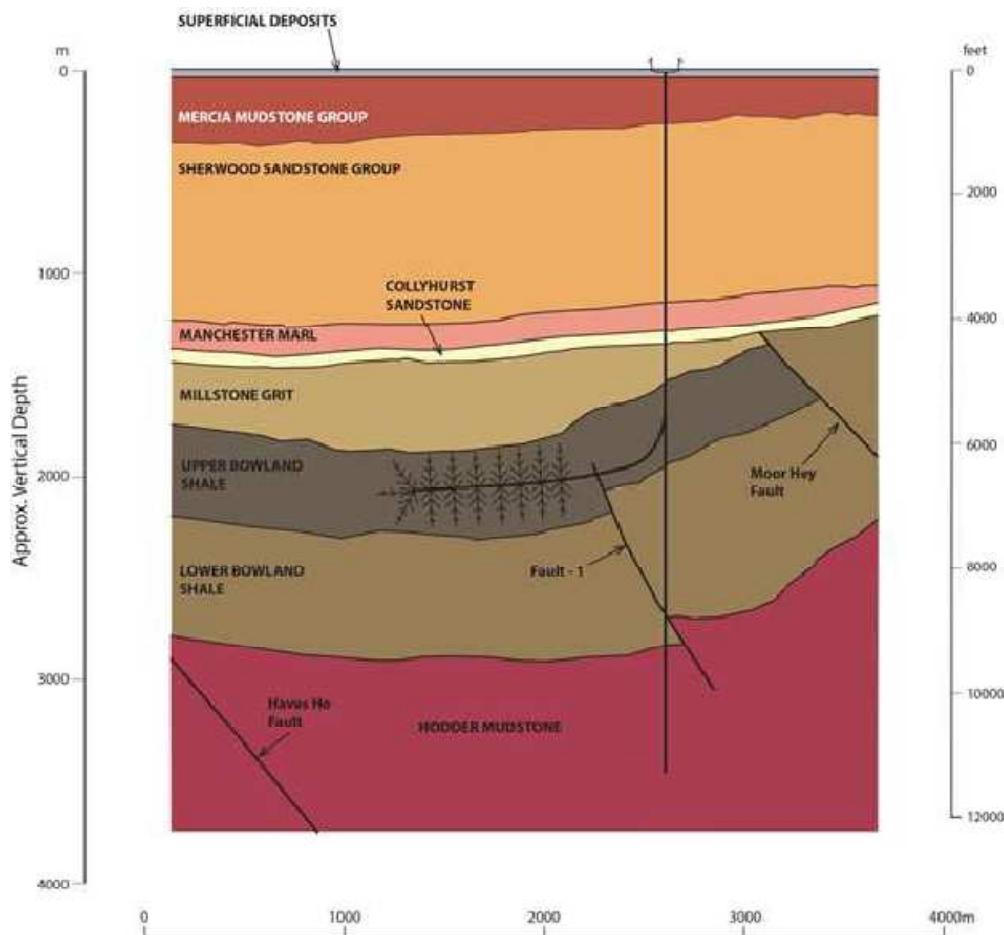
Appendix 8

Hydro Geology and Ground gas

Proposal

The applicant has undertaken an assessment of the potential impacts relevant to hydrogeology and ground gas. The assessment looks at the potential effects of the project as part of the well pad activities and materials in transit, the well construction and integrity and features created by the hydraulic fracturing on the quality of the water environment, both ground water and surface water and the possible creation of subsurface pathways to sensitive features that could result in pollution.

The geology beneath the site is described and the interpretation by the applicant has been assessed by the EA. The geology is such that the Manchester Marls forms a seal between the ground surface and shale rock within which is trapped the natural gas within the rock. The Manchester Marls act as an impermeable barrier and prevent the movement of water and gas up towards the surface of the ground from deeper layers of rock. The Sherwood Sandstone aquifer, a porous rock containing water lies above the Manchester Marls. The EA has confirmed the poor quality of the aquifer because of its salinity and it is therefore not used for drinking water. The following diagram is a typical cross section of the local geology.



The assessment sets out how the well pads and the wells have been designed to prevent leaks or spills from entering the wider environment (the soil, groundwater,

surface water or the atmosphere) and cause pollution. The well design is assessed by the HSE and the EA in accordance with their respective regulatory requirements and industry guidance.

The EA also assesses the proposed drilling fluid and the fracture fluid and requires it to be non-hazardous.

Prior to and during works, groundwater water and surface water would be monitored. The monitoring would be agreed with the EA. The EA will require baseline monitoring of groundwater, air quality and surface water for approval before the start of operations.

When the works are finished, the wells would be pugged and abandoned in accordance with the regulatory requirements of the HSE and the EA and industry guidance. The plugging and abandonment of the well including the monitoring of the ground water quality and gas concentrations are matters for the HSE, the EA and the DECC.

The assessment concludes that the probability of source pathway receptor linkage associated with the contaminant release during well pad construction and access is low; that the contaminant release due to defects in the pad membrane is low; that the contaminant release due to overflow discharge from the well pad drainage systems low; that liquid spray off due to high pressure equipment failure is low; that the spill of contents of vehicles in transit on the public highway is low; that the loss of well integrity due to poor well construction is very low; that the loss of well integrity caused by hydraulic fracturing is very low; that the loss of well integrity

Policy

National Planning Policy Framework (NPPF) Para 122

National Planning Policy Guidance (NPPG) Water supply, wastewater, water quality

Joint Lancashire Minerals and Waste Local Plan – Site Allocation and Development Management Policies – Part One (LMWLP): Policy DM2 Development Management

Joint Lancashire Minerals and Waste Supplementary Planning Guidance: SPD Oil and gas exploration, production and distribution (draft)

Fylde Borough Local Plan: Policy EP23 Pollution of Surface Water
Policy EP24 Pollution of Ground Water

Summary of consultee comments and representations

Department of Energy and Climate Change: Has confirmed the details of the petroleum licence for the surface site and the maximum extent for underground drilling. The licences give exclusive rights within their area for exploration, boring for and getting petroleum, but do not waive any other legal requirement applicable to these activities, including requirements for planning permission.

DECC requires the operator to produce Environmental Risk Assessments, taking account of guidance published to the industry by them in April 2014, which flows from the recommendations of the Royal Academy of Engineering and the Royal Society, in their report on the hazards of hydraulic fracturing for shale gas published in June 2012.

Drilling of wells requires Secretary of State consent under the terms of the licence and DECC will undertake a number of checks regarding well targeting and operator funds and insurance before giving consent. With regard to drilling practice, DECC has clarified that drilling through a fault does not entail any seismic hazard.

DECC also requires for hydraulic fracturing, the implementation of measures to mitigate seismic risk including the submission to DECC of a detailed Hydraulic Fracturing Programme (HFP) for each well to be hydraulically fractured. DECC will monitor the conduct of fracturing operations in accordance with the HFP. DECC is of the view that in principle hydraulic fracturing through a fault should be avoided. The applicant has stated that they plan to avoid all detectable faults (whether local or regional), which is the correct approach. The applicant's 3D data will be scrutinised through the review of the HFPs to ensure that the full extent of the stimulated rock volume preserves a safe distance from any detectable fault. The fracturing fluids will therefore never enter a fault and will not be transmitted along it.

DECC consider the traffic light system for shutting down operations to be adequate as the association between hydraulic fracturing and seismic activity remains a developing area of knowledge. Careful monitoring of seismic activity in real time is likely to detect precursor events, providing scope to halt operations, reduce stresses and avoid more substantial tremor. DECC would explore the implications of any red light event promptly with a view to deciding whether operations can be resumed without undue risk of disturbance to local residents and if so what operations are acceptable and whether any further precautions are appropriate.

Proposals to flare gas during the initial testing phase will require the consent from the Secretary of State under the Energy Act 1976 and any venting is subject to DECC consent. Any venting should be reduced to a minimum. DECC's standard online drilling consent allows 96 hours of testing. To test for a longer period, the applicant will need to apply to DECC for a paper-based Extended Well Consent. DECC will expect the operator to minimise flaring during the period of any Extended Well Consent.

Abandonment of any well requires the Secretary of State's consent under the terms of the licence. DECC will check for completeness of well data before giving consent.

Environment Agency (EA): No objection in principle and recommends the following:

- A scheme to dispose of surface water between the drill pad and Carr Bridge Brook to be submitted to ensure the proposed development does not increase the risk of pollution to Carr Bridge Brook.
- Routine monitoring of on-site surface water quality and maintenance, and inspection of surface water drains, valves and interceptors to ensure correct and efficient operation.
- Surface water run-off retained on site during operations to be tankered away for off-site disposal and to not be discharged to the watercourse.
- To consider whether the Control of Pollution (Oil Storage) (England) Regulations 2001 apply. If not any facilities, above ground, for the storage of oils, fuels or chemicals to be sited on impervious bases and surrounded by impervious bund walls.

With regard to flood risk the EA confirmed that the proposed development is located in Flood Zone 1 which is defined as having a low probability of flooding in the National Planning Practice Guidance. The Agency has reviewed the Flood Risk Assessment submitted with the application and is satisfied that the development would not be at risk of flooding or increased flood risk off-site.

With regard to radon release during the flaring of gas, the Environment Agency confirmed that radon is exempt from their permitting by the Natural Gas Exemption Order 2002 and from regulation under the Environmental Permitting Regulations 2010. This is on the basis of its low risk, widespread use and that it was not amenable to regulation. Discharges of radon in natural gas, being flared or vented at gas sites is not subject to regulation under radioactive substances regulation (RSR).

Health and Safety Executive (HSE): No objection; the proposed operations will be conducted in accordance with recognised regulations standards and good industry practice. From a well's operations perspective there are no issues or concerns with the proposals

HSE has provided clarification of relevant regulations applicable to onshore well; how it regulates shale gas activity; what information it requires and working with the Environment Agency. HSEs regulatory framework ensures that information is provided at key stages in the lifecycle of a well and allows HSE inspectors to assess whether risks are being adequately controlled and if not to take the appropriate regulatory action.

The Health and Safety at Work Act 1974 (HSWA) requires those who create health and safety risks to workers or the public as part of their undertaking have a duty to manage and control the risks so far as is reasonably practicable. This is supplemented with more specific regulations particular to the extraction of gas and oil through wells, which includes shale gas operations.

The Borehole Sites and Operations Regulations 1995 (BSOR) applies to all onshore oil and gas wells. These Regulations require notifications to be sent to HSE about the design, construction and operation of wells, and the development of a health and safety plan which sets out how risks are managed on site.

To comply with BSOR the well operator must submit a notification to HSE at least 21 days before work commences. The notification includes information on the design of the well, the equipment to be used to construct it, the programme of work, the location, depth and direction of the borehole, the relationship to other wells and mines, the geology of the drilling site and identified risks and their proposed management. The HSE will assess the well design before construction starts and will identify any issues which will have an impact on well integrity. Any issues will be addressed by the operator and safety features will be incorporated into the design. Further notifications are required if there are any material changes to the information previously supplied.

The Offshore Installations and Wells (Design and Construction) Regulations 1996 (DCR) includes specific requirements for all wells, whether onshore or offshore, and

include well integrity provisions which apply throughout the life of shale gas or oil wells. They also require the well operator to send a weekly report to HSE during the construction of the well so that inspectors can check that work is progressing as described in the notification. .

To comply with DCR the operator must report to HSE every week during construction and during work to abandon the well, to provide HSE with assurance that the operator is constructing and operating the well as described in the notification. The weekly report details well integrity tests, the depth and diameter of the borehole, the depth and diameter of the well casing and details of the drill fluid density. The drill fluid density allows the inspector to gauge the pressure in the well and identify any stability issues.

If the operator is not complying with the notification, the HSE can take appropriate regulatory action. HSE uses a risk based interventions on particular sites and operators and to ensure well integrity. The HSE has a team of expert well engineers who cover hydrocarbon wells onshore and offshore. In considering well integrity a lifecycle approach is used including notifications, weekly well reports, operator meetings and on-site inspections being used to manage the risks appropriately.

The operator must also appoint an independent well examiner in a quality control role who will ensure that the well is designed, constructed, operated and abandoned in accordance with industry and company standards and that regulatory requirements are met. Specialist well engineers help develop best practice standards for the onshore industry with the United Kingdom Onshore Operators Group (UKOOG). All members of UKOOG have to comply with the latest standards published in February 2013.

A well operator must also report to HSE any occurrences covered by RIDDOR – Reporting of Injuries, Diseases and Dangerous Occurrences Regulations. These could include a blowout (i.e. an uncontrolled flow of well fluids); the unplanned use of blowout prevention equipment; the unexpected detection of hydrogen sulphide (H₂S) which is an explosive gas; failure to maintain minimum separation distance between wells and mechanical failure of any safety-critical element of a well. HSE can investigate any well incidents that would have an effect on well integrity and ensure the operator improves their operations.

Since 2012, the HSE and the Environment Agency have an agreement covering joint regulation of shale gas operations. HSE and EA inspectors will meet all new and first-time operators of shale gas wells to advise them of their duties under the regulations and to jointly visit all shale gas sites during the exploratory gas phase of shale gas development.

In response to comments raised by Friends of the Earth in their representation to the proposed development, HSE have clarified the following

- HSE have continued to monitor Preese Hall site during abandonment activity and that there has been no unplanned release of fluids from the well.
- HSE will continue to monitor abandonment activity on all onshore and offshore wells to ensure all work is completed to industry standards and the

risk of release of fluids from wells post abandonment is as low as reasonably practicable.

- With regard to risk of leaks from gas wells and the risk of exposure to benzene, the DCR sets out the requirement that there should be no unplanned release of fluids from the well so far as is reasonably practicable. The HSE will review well notification information to ensure that the operator is managing the risks in such a way that the well is designed, constructed and abandoned safely.
- BSOR Regulation 10 requires the well operator to provide all persons engaged in borehole operations with appropriate health surveillance.
- The HSE is aware of the warning issued by NIOSH regarding exposure to silica. The HSE will look at how the well operator manages exposure to silica. It is expected that sealed units will deliver sand to site and mix it into fracturing fluid so that the exposure risk is minimised.
- HSE do not consider that the regulations are inadequate, flawed or ineffectively applied and enforced. The UK health and safety regulations are robust and the regulatory regime governing oil and gas operations is world leading.
- HSE receives well notification information 21 days before work starts. Until the notification is received HSE cannot make a full appraisal of the design of the well and the programme of work and give assurance that the well operator is managing the health and safety risks appropriately including the risk of an unplanned release of fluids.

Public Health England (PHE): Initially recommended that the Local Planning Authority (LPA) request and consider further information regarding sensitive receptors, atmospheric pollution, risks to surface waters and groundwater, environmental monitoring, radon, NORM, resources and waste, dust, noise, light and odour, accidents and incidents.

The applicant provided further information to address the issues raised by PHE. PHE has subsequently advised that the planning authority should confirm (in respect of hydrogeology):

- The operator is happy to provide details on the baseline monitoring protocol in response to a planning condition.
- They are satisfied with details of monitoring locations, what is being monitored for, and the schedule for monitoring frequencies.
- They are satisfied with the proposed definition of significant variation for other determinants, regarding air emissions and surface water and ground water potential contaminants.
- They are satisfied with the applicant's proposal for drill cuttings coated with low toxicity oil based muds to not be covered.

LCC Director of Public Health: Has undertaken a Health Impact Assessment (HIA) on the two drill sites and identified that the key risks to health and wellbeing of the population from the two proposed sites are a lack of public trust and confidence in the regulatory process and the industry, stress and anxiety from uncertainty about the industry that could lead to poor mental wellbeing; potential noise related health effects due to continuous drilling for at least five months for the initial borehole on

each site and for three months for each of the subsequent three boreholes per site (14 months of continuous drilling), and potential health risks due to the presence of mining wastes generated as part of the drilling and hydraulic fracturing process being retained on site if adequate off site treatment facilities are not found.

With particular regard to hydrogeology

- To develop a framework to establish a baseline and on-going monitoring of environmental and health conditions.
- Characterisation of the extent of fracture propagation and the permeability of layers above and beyond the faults
- Characterisation of combustion gases at the flare, particularly the levels of hydrocarbons, radon, methane, volatile organic compounds and any other substances deemed hazardous to human health
- Levels of fugitive emissions at well pads, on potential pathways and at receptor households.
- Ground water monitoring of methane.
- Measuring long term well integrity.
- Information on any existing private water supplies that aren't covered by abstraction license within 2 km zone.

Westby-with- Plumptons Parish Council: Objects to the proposal for a number of reasons including the following summarised reasons in respect of hydrogeology:

- Impacts on the natural drainage system and potential damage to any asbestos in the underground system.
- Concerns regarding water contamination and the disposal of contaminated water.

Medlar-with-Wesham Parish Council and Kirkham Town Council: Object to the proposal for a number of reasons including the following summarised reasons in respect of hydrogeology:

- Potential well failure and the huge potential for land contamination, particularly to aquifers and agricultural land.
- Potential flow back water site leakages and spillage during disposal and transportation.
- No information on water treatment plans. Where will flow back water be treated and will any new treatment plan accept waste from other UK sites.

Friends of the Earth have raised a number of objections to the proposal including the following summarised reasons in respect of hydrogeology as part of their response to the application as initially submitted and in response to the further information:

- It is unclear what waste quality standards would be applied by the applicant to ensure that concentration of pollutants in the wastewater did not accumulate beyond safe levels as a result of re-use for fracking and how risks to the environment and health and safety would be mitigated as a result of well failure.

- Legacy of underground waste which will be present is denied, not a temporary development as it will create permanent contaminated wastewater
- Risks from flow back fluid and waste water
- Risks of storage of waste to protected ecological areas and the developer has not clarified what happens when the storage capacity of the site is exceeded.
- Concerned that the site has insufficient capacity to contain storm water without overflowing and presenting risk to adjoining land.

Other representations

Representations objecting to the proposal have made reference to the unacceptable impacts on hydrogeology which are summarised as follows:

- The applicant has underplayed the impact because they have omitted important faults from their maps and that have also understated the hazard from the faults that they have considered by overlooking the possibility that fracking fluid may leak into these faults.
- Concerns have been expressed that the presence of major faults in the area means that the proposal will inevitably pollute the surrounding region as a result of flow along the faults.
- In addition concerns have also been expressed about well integrity, chemical that are used in fracking fluid, and the need for long term monitoring.
- The Earth will become a barren toxic wasteland after fracking, breaking up and filling the ground with chemicals must have environmental consequences.
- Risk of short term well failure and loss of well integrity in the long term are widely reported, resulting in a toxic legacy for current and future generations
- Issues from corrosion of well casings, cement deterioration, faulty drilling.
- Fracking fluid contains carcinogens, toxins, radioactive and hazardous materials which will contaminate land and water sources affecting food production and drinking water.
- Risk of contamination from carcinogenic chemicals.
- Risk of contamination form *Caesium-137, Americium-241, Beryllium, Hydrochloric acid, lead, arsenic, cadmium, glutaraldehyde, biocide quaternary ammonium chloride, ammonium persulfate, choline Chloride, isopropanol, petroleum distillate, polyacrylamide, guar gum, citric acid, lauryl sulphate, sodium hydroxide, copolymer of acrylamide, sodium acrylate, chloride, bromine, methane.*
- 50% of chemicals will remain in the ground.
- Don't want a chemical legacy for our children to have to deal with.
- Need full disclosure of chemicals in fracking fluids and risks from them.
- Contamination/pollution from fracking process, gases and fracking fluid to aquifers, ground water sources, local rivers, streams, springs and reservoirs in the short and long term which could endanger drinking water supply to people and grazing animals with associated health risks.
- Over a thousand documented cases in the US of groundwater pollution.
- Drinking water is more important resource than gas. Risk of contaminating water supply is too big a risk.
- Need more work to establish the safety of the process in relation to ground water contamination.

- Need baseline and continuous groundwater monitoring with work suspended if contamination / adverse effects are found.
- Monitoring wells for groundwater quality and gas concentrations should be mandatory.
- Even if tightly regulated an unforeseen accidental discharge could contaminate groundwater and the damage cannot be rectified.
- Millions of litres of polluted / toxic water will be left to drift underground, approximately 30 miles around each well with long term damage.
- Faults can act as conduits and enable fracking fluids to migrate to water sources.
- The Water Framework Directive requires that a development should not go ahead unless it is proven that there is no risk to groundwater.
- Contrary to FBLP Policy EP24 as water quality will be affected by leaking wells.
- Who pays for decontamination of our water supplies? Are councils not cash strapped?
- Need a law for every contamination, company directors get 10 year jail sentence.
- Water from taps could ignite.
- UK geology – too many local faults will allow leakage. Faults still moving. In previous drilling using unproven technology an undetected fault moved and failed the borehole. Too risky.
- Link between fracking and previously geologically stable areas in Ohio, USA.
- Fracking could destabilise the entire bedrock beneath the Fylde, upon which sits several mine workings and unstable ground conditions – running sand.

Assessment

An assessment of subsurface geology by the EA has considered the potential for retained pollutants in the shale rock to migrate upwards into contact with any groundwater bearing formations. This outcome has been assessed as very low risk and with no plausible pathway. The rock formation directly above the target formation, known as the Millstone Grit (at depths of ~1300m to ~1550m below ground level), has been assessed as a groundwater unit. A groundwater activity permit is therefore required because of the theoretical possibility that fluid could migrate from the target formation into the Millstone Grit.

The EA has assessed the possibility of fluid migration as very low risk. This is because of the absence of a pressure gradient driving the fluid once the fracturing pressure is turned off. Moreover, close monitoring of fractures (using the micro seismic array and in accordance with the Fracture Plan that must be approved by DECC and the Agency) will prevent any fractures moving into the Millstone Grit from the target formation, thus preventing the movement of fluid.

Concerns have been raised by third parties that there are groundwater / surface water pollution risks and that that '*The hydrogeology of the area immediately east of the site shows that regional faults are transmissive.*'

In considering these concerns the County Council has taken advice from the Environment Agency and from Professor Younger and Dr Westaway at the University of Glasgow. This concludes:

- (i) Where faults cut low-permeability strata such as shale there is a marked tendency for the fault plane to be lined with a fine-grained clay-rich material known as “fault gouge”, which typically renders these portions of the fault planes effectively impermeable (*Younger, P.L., 2007, University of Glasgow. Groundwater in the environment: an introduction. Blackwell, Oxford*). In contrast, where the same fault cuts a permeable rock such as sandstone and the displacement has not smeared clay-rich gouge from an over- or under-lying mudstone into the fault zone, then the fault plane may well be occupied by relatively permeable breccia; minor fractures either side of the fault plane in a sandstone might also be relatively clean and open. However, because of the formation of fault gouge where the same faults pass down into mudstones, there is no a priori reason to suppose that these faults are permeable throughout their depths: where they cut mudstones they are overwhelmingly likely to be of low permeability.
- (ii) Even where a fault is not so lined with gouge as to render it impermeable, it is subject to the present crustal stress regime, which tends to favour faults being more permeable where they are aligned fairly closely to the current maximum compressive stress azimuth, but tends to make them far less permeable if they are otherwise oriented (Ref: *Ellis, J., Mannino, I., Johnston, J., Felix, M.E.J., Younger, P.L. and Vaughan, A.P.M. 2014. Shiremoor. Geothermal Heat Project: reducing uncertainty around fault geometry and permeability using Move™ for structural model building and stress analysis. European Geosciences Union General Assembly 2014, Vienna, 27th April–2nd May 2014. EGU2014-15069*. Note that this does not override the basic permeability control provided by fault gouge).
- (iii) Crucially, even where a fault is continuously permeable over a large vertical interval (which is unlikely in sequences, like those in the region under consideration, that contain thick mudstones) groundwater flow can only occur if there is a sustained driving head from one area to another. There is no evidence of any such upward-oriented hydraulic gradient in this region, and the extremely short-lived pulses of increased head close to the boreholes during fracking operations are insufficient to overcome the head in overlying strata. Where conventional oil and gas reservoirs occur, natural upward hydraulic gradients may exist, but oil and gas only accumulate where permeable pathways upwards are insufficient to allow dissipation of fluid pressure over geological time. It is inherent in the very definition of unconventional gas that such over-pressure does not occur; hence the need for reservoir stimulation and depressurisation of the target horizon in order to get gas to move into boreholes. These points were addressed in the Joint Royal Academies’ report (Ref: *Shale gas extraction in the UK: a review of hydraulic fracturing. Royal Society and Royal Academy of Engineering*)

There are possible impacts associated with the well pad construction and activities. The site construction involves laying an impermeable member over the whole compound area to prevent accidental slippage and rainwater from entering the underlying soils, groundwater and nearby water courses. The platform is bounded by a ditch, for the purpose of pollution control. Surface water will drain into a water

course and the Environment Agency has advised that the arrangements are acceptable subject to several conditions

There are potential impacts associated with the well design and construction and proposal to manage these impacts. It is proposed that the well would be drilled, constructed and tested in accordance with regulatory requirements and industry standards. The well design would comprise a two barrier cement sealed design. Details of the well design would be reviewed by the Independent Well Examiner. Additionally, the Environment Agency considers the proposed well construction would form a barrier to prevent the escape of fluids. The EA is satisfied that well integrity is assured through compliance with the well examination regime and regulation by the Health and Safety Executive, and further through conformance to Oil & Gas UK and UK Onshore Operators' Group good practice guidelines for well design and construction. Hydraulic fracturing plans and a seismic monitoring programme would be submitted to DECC and the EA for approval prior to hydraulic fracturing operation commencing; operation of a traffic light system for monitoring of induced seismicity is also designed to mitigate the risk from induced seismicity, including any potential for damage to well integrity. The potential for fractures that are propagated by hydraulic fracturing to extend beyond the target formation has been assessed to be very low and the growth of fractures resulting from each fracturing stage would be assessed with the aid of the seismic monitoring array.

The EA has assessed the proposed fracture fluid as non-hazardous. It is also satisfied that the chemical similarity between the fluid and the water in the Millstone Grit is sufficiently high that any indirect discharge would be insignificant. Finally, the EA believes that if any fluid reaches the Millstone Grit it would not move far from the point of entry because of the confined nature of the rock. If needed low toxicity oil based muds would only be used below the Manchester Marl formations and with the approval of the EA.

Prior to and during works, groundwater water and surface water would be monitored (see application LCC/2014/0097). The monitoring would be agreed with the EA. The EA permit includes pre-operational requirements to provide baseline monitoring of groundwater, air quality and surface water for approval before the start of operations. The permit also includes a requirement to provide for a monitoring plan for at least 4 weeks prior to gas flaring. The EA has specified monitoring of groundwater and surface water in the permit and this would be carried out until the permit is surrendered.

When the works are finished, they would be decommissioned in accordance with the regulatory requirements of the EA and the HSE and industry guidance. The plugging and abandonment of the well including the monitoring of the ground water quality and gas concentrations are matters for the HSE, the DECC and the EA and their respective regulatory regimes. In particular, the plugging and abandonment of the borehole is regulated by the HSE under the Offshore Installations and Wells (Design and Construction etc.) Regulations 1996. These Regulations contain provisions relating to well integrity and abandonment as well as the selection of materials. The Regulations apply to all wells drilled under landward licences, the key objectives of which are to prevent the escape of fluids from the well which might result in pollution of freshwater or ground contamination. Under the Regulations, well abandonment techniques must prevent the transfer of fluids created by pressure gradients between different zones. Such transfer is achieved by means of the original borehole casing

and the cementing and plugging operations that are undertaken as part of well abandonment.

Paragraph 122 of the NPPF requires that planning authorities should not seek to control processes or emissions where these are subject to approval under separate pollution control regimes and that LPA's should assume that these regimes will operate effectively. Nonetheless, paragraph 112 of PPG Minerals, notes that before granting permission the local planning authority should be satisfied that the issues dealt with under other regimes can be adequately addressed by taking advice from the relevant regulatory body'. The County Council has consulted with the EA and HSE, neither of which has objected.

The EA has granted the applicant the necessary environmental permits needed to carry out their proposed operations. The permits set out the conditions needed to protect groundwater, surface water and air quality. Now the permits are issued, the applicant would have to comply with the proposed conditions that are designed to ensure that operations do not cause harm to people or the environment. The EA has assessed the proposed activities that could involve the discharge of pollutants into groundwater (a 'groundwater activity') and the nature of these pollutants. The EA is satisfied, subject to conditions, that there is minimal risk of direct discharge of pollutants into groundwater. The EA is also satisfied that the indirect entry of non-hazardous pollutants will be limited so as not to cause pollution.

Conclusion

Hydrogeological issues and the protection of surface and ground water have been assessed by the applicant and the risks associated with such were considered to be low or very low.

Advice provided to the County Council from Professor Younger and Dr Westaway at the University of Glasgow states the scenarios of pollution of shallow groundwater and surface waters due to fracking operations, as suggested in some representations, are not credible. They also say the suggestion the proposal is unsafe because there are faults in the vicinity are unfounded.

The Environment Agency (EA) and the Health and Safety Executive (HSE) have been consulted and have advised on the regulatory regimes that would be employed to manage the risks and that they are satisfied that such risks could be managed in a way that would not cause any unacceptable impact.

It is considered that the site can be contained and surface waters managed in a way as to prevent pollution to adjoin land or nearby watercourses.

The County Council should assume that these regimes will operate effectively and can be satisfied that the issues dealt with under other regimes can be adequately addressed.

Boreholes for ground water monitoring are the subject of planning application LCC/2014/0097. Subject to conditions controlling the management of surface water it is considered that the proposal could be acceptably controlled by other regulatory regimes and would not have any unacceptable impacts

The development is therefore considered to comply with national guidance and the policies of the development plan.

Appendix 9

Induced Seismicity

Proposal

A full assessment of the likely effects of induced seismicity associated with the proposed hydraulic fracturing operations including the likely effects on surface deflections (subsidence) from gas extraction has been carried out. Seismic events could occur as a result of stress changes on a plane of weakness (a fault) caused by the growth of engineered fractures and the transmission of fluid pressure into a critically stressed fault.

The potential extent of underground engineering activities have been identified and projected to the surface and which represents a quadrant extending some 2km from the well site. The key development issues associated with induced seismicity include:

- The potential effects of ground motion, including felt vibrations, damage to structures, infrastructure and other elements of the built environment.
- The risk of ground motion hazard causing equipment damage, in particular the integrity of the borehole and casing.
- The growth of engineered fractures and the potential for the migration of hydraulic fracturing fluids and gases out of the fracturing zone; and
- The methods to monitor and limit the magnitude of seismic activity.

Induced seismicity is seismic events usually of a very low magnitude. An extensive review of geological information of the area from a diverse range of sources has been undertaken as part of a baseline data collection process. These include geological information, stress data, background seismicity, and identification of seismic receptors to inform a predicted future baseline. An assessment of operational effects has been carried out the methodology for which includes:

- Review and select criteria for assessment of ground borne vibration.
- Assessment of the potential hazard of induced seismic events during drilling, hydraulic fracturing, flow testing and extended flow testing.
- Quantify the effects from induced seismic events specific to the mechanisms associated with shale gas.
- Develop a risk based mitigation plan.

The assessment has been based on a source, pathway, and receptor framework. In order to quantify the significant effects, the risk and subsequently the significance of the effect have been estimated. To reduce the effects of induced seismicity, mitigation measures are proposed to reduce the risk of felt magnitude seismic events occurring, rather than preventing very low magnitude seismic events occurring all together.

There is no existing ground investigation information for the site. An understanding of the geology has been derived from the desk top study and review of source information and from the 3D geophysical survey carried out in the area to provide an

interpretation of the below ground stratigraphy of the site. This sought to demonstrate the geological make up of the ground being a combination of middle sands overlying boulder clay, Sherwood sandstone, Manchester marls, Collyhurst Sandstone, Millstone grit, upper and lower Bowland shales, Hodder mudstone and Clitheroe Limestone. The site is located within the Bowland Basin predominately active in the Carboniferous period 300 – 360 million years ago. Within the basins are a series of regional extensional faults the largest of which is the Woodsfold Fault which outcrops at the surface approximately 3km east of the site and dips approximately west beneath the site and some 650m below the shale gas target geological horizon. It has been assumed as a worst case scenario that all faults within the area of the well site are critically stressed although this is not always the case. Using a worst case scenario means that the mechanism of transmitting an increase in fluid pressure to a fault plane and hence induced seismicity is considered to be feasible for all faults that are critically orientated. A study of such would be carried out as part of the initial well drilling and used to prepare the fracking plan to be submitted to DECC for approval prior to any fracking being carried out.

In terms of natural seismicity the UK is not a particularly active seismic region but is considered to have a low to moderate rate of seismicity. Within the UK, West Lancashire is interpreted to be a relatively low seismicity region. BGS records a magnitude of $3.7M_L$ a $4.7M_L$ every 10 years and $5.6M_L$ every 100 years. Currently the BGS earthquake catalogue does not contain information on events less than $2.0M_L$ although it is expected that over 2000 events at $0.5M_L$ occur every year in the UK. $0.5M_L$ is the red light threshold in the Governments traffic light system mitigation measure. Consequently the applicant considers that the events associated with Preese Hall well site at 2.3 and $1.5M_L$ were within the range of magnitudes commonly felt across the UK and which are not unusual in occurring every year in significant numbers.

To assist in monitoring back ground seismicity an array of 4 monitors were installed at the Beckonsall site, some 15km south of Blackpool and recorded background seismicity over a 6 month period. The monitoring recorded two natural seismic events which were also recorded by BGS, one near Ludlow ($2.8M_L$) and one near Wigan ($1.6M_L$) demonstrating natural seismicity near the Fylde. .

The results from modelling with all the data compiled indicate that the maximum likely magnitude of induced seismic events associated with fracking would exceed the levels of Preese Hall if no mitigation measures were employed and injection volumes used at the time were to be used again.

It is not proposed to inject similar volumes as part of the proposed operations and therefore the anticipated events would be significantly lower. An assessment of the impacts on the following receptors has been made:

- Wells – including the site exploration well and other wells.
- Infrastructure – including roads, railway, bridges, utilities, pipelines.
- Special buildings – including listed buildings, schools, hospitals, churches, monuments, stately homes, listening stations.
- Residential buildings.
- Industrial/commercial buildings.

Hydraulic fracturing will cause induced seismicity. An assessment of ground motion hazard and other seismic related effects such as liquefaction, slope stability and subsidence has been carried out. The assessment on ground motion concludes that no damage to structures is anticipated and there would not be significant effect at levels up to $1.5M_L$ although seismic events may be perceptible to some people in sensitive environments. The effects on well integrity at this level is considered to be not significant as is the effects on liquification potential, slope stability, settlement from gas extraction, earthquakes from gas extraction, fluid migration and changes in the stress regime, or effects on ground motion hazard causing salt cavern instability at the proposed Preesall Saltfield Underground Storage Project.

For the prescribed levels to be exceeded, it would necessitate fluids to be injected to the same levels as at Preese Hall, for the traffic light system to fail or fluid transmitted into a fault. It is expected that the mitigation measure will be employed to prevent a level of $3.1M_L$ being exceeded. If it were reached then it is expected vibrations could be felt up to 65km away, minor cosmetic damage to local sensitive structures, rare minor damage to the most sensitive civil infrastructure with no damage anticipated to reinforced buildings. However, the likelihood of such a level being generated is considered to be very low with medium consequences and the risk of magnitude no significant.

As part of the initial flow testing there is likelihood that residual seismic events would be experienced but not in excess of those caused by fracturing. It is not anticipated that such events would be felt at the surface but would be recorded as part of the monitoring. This would similarly be the case for any extended flow testing and therefore any risk is expected to be negligible and not significant.

With regard to cumulative and interactive effects in the event the site at Preston New Road is operationally active, this is considered to minor and not significant for both fracturing operations and flow and extended flow testing.

To ensure that the limits of movement are not exceeded it requires the implementation of a traffic light system which utilises the data collected by the surface seismic monitoring array, the application for which is reported elsewhere on this agenda. This system wood be required to be employed by DECC. Green level is where pumping of fracking fluids would continue providing that induced seismicity is less than $0M_L$; if an event occurs in the amber range of $0M_L$ to $0.5M_L$ while pumping fracturing fluids the stage can be completed and the flow back procedure would be initiated. If an event were to occur in the red range while pumping the fracture stage would be aborted and the flow back procedure would be initiated. Throughout this process results would have to be submitted to DECC and would inform future operations.

An assessment has also been carried out to determine whether the extraction of shale gas could cause settlement of the ground surface. The assessment acknowledges that settlement from extractive hydrocarbon industries has occurred in the past by either:

1. Removing large quantities of rock, for example in the coal industry; or
2. Removing liquid and gas in pore spaces between the rock causing the rock to consolidate, for example in the oil and gas industries.

The assessment recognises that settlement, and more importantly deflection, of the ground surface can cause architectural and structural problems to buildings, services and infrastructure. However, shale gas production does not involve remove rock from underground and therefore the first potential mechanism for causing settlement would not occur.

The second potential mechanism for causing settlement, consolidation or compaction due to extraction of liquids and gas, will not occur because the amount that shale rock changes with the extraction of gas is expected to be almost zero. In addition, it is noted that the ground surface is some 2.5 to 3km or more above the target reservoir, the horizontal wells in the shale will be no more than 8.5 inches in diameter, and the fractures created are equivalent in size to a grain of sand.

The assessment concludes that there is no mechanism for the extraction of gas to cause deflection of the ground surface and notes that the proposal is an exploration well and is not (at present) planned for full scale production. As such there is no plan to extract any great quantity of gas, just to investigate the possible rates of gas flow in the Bowland Basin. Therefore, the risk that the extraction of shale gas will cause deflection of the ground surface during exploration at the Site is considered to be so low as to be negligible.

Subject to the employment of such mitigation it is concluded that there would not be any risk unacceptable levels of seismic movements occurring associated with the hydraulic fracturing process.

Policy and Guidance

In terms of European legislation EIA is required for deep drilling projects and surface installations for the extraction of oil or gas to assess all relevant environmental risks including seismic hazard.

In the UK all petroleum licences are owned by the Crown and the right to exploit them is governed by DECC. DECC has adopted a traffic light system based on the recommendations of a number of bodies including The Royal Society and The Royal Academy of Engineering. The traffic light system requires monitoring by remote seismometers buried at the surface or at depth to undertake real time monitoring as part of the hydraulic fracturing process to inform, the duration and intensity of fluid injection during hydraulic fracturing stages to ensure that prescribed limits of induced seismicity are not exceeded – $0.5M_L$ – the red light threshold to be used to limit induced seismicity to below the level that may be felt by humans.

There are no policies relating to seismicity in the NPPF, the Joint Lancashire Minerals and Waste Development Plan or the Fylde Local Plan.

In terms of guidance there have been numerous documents and publications but the following are considered most relevant for the purposes of seismicity:

DCLG - Planning practice guidance for onshore oil and gas - provides advice on the planning issues associated with the three phases of extraction of hydrocarbons. It identifies the key regulators for hydrocarbon extraction including DECC who issues

Petroleum Licences, gives consent to drill under the Licence once other permissions and approvals are in place, and have responsibility for assessing risk of and monitoring seismic activity, as well as granting consent to flaring or venting. Seismic assessment of the geology of the area to establish the geological conditions, risk of seismic activity and mitigation measures to put in place is required by the DECC for all hydraulic fracturing processes;

The Royal Society: Shale gas extraction in the UK: a review of hydraulic fracturing June 2012 – The UK Government's Chief Scientific Adviser asked the Royal Society and the Royal Academy of Engineering to carry out an independent review of the scientific and engineering evidence relating to the technical aspects of the risks associated with hydraulic fracturing to inform government policymaking about shale gas extraction in the UK. The terms of reference of this review were:

- What are the major risks associated with hydraulic fracturing as a means to extract shale gas in the UK, including geological risks, such as seismicity, and environmental risks, such as groundwater contamination?
- Can these risks be effectively managed? If so, how?

With regard to seismicity the review recognises concerns about seismicity induced by hydraulic fracturing. Advises that Natural seismicity in the UK is low by world standards. On average, the UK experiences seismicity of magnitude 5 ML (felt by everyone nearby) every twenty years and of magnitude 4 ML (felt by many people) every three to four years. The UK has lived with seismicity induced by coal mining activities or the settlement of abandoned mines for a long time. British Geological Survey records indicate that coal mining-related seismicity is generally of smaller magnitude than natural seismicity and no larger than 4 M_L. Seismicity induced by hydraulic fracturing is likely to be of even smaller magnitude. There is an emerging consensus that the magnitude of seismicity induced by hydraulic fracturing would be no greater than 3 M_L (felt by few people and resulting in negligible, if any, surface impacts). Recent seismicity induced by hydraulic fracturing in the UK was of magnitude 2.3 M_L and 1.5 M_L (unlikely to be felt by anyone). The risk of seismicity induced by hydraulic fracturing can be reduced by traffic light monitoring systems that use real-time seismic monitoring so that operators can respond promptly. Monitoring should be carried out before, during and after shale gas operations to inform risk assessments. Methane and other contaminants in groundwater should be monitored, as well as potential leakages of methane and other gases into the atmosphere. The geology of sites should be characterised and faults identified. Monitoring data should be submitted to the UK's regulators to manage potential hazards, inform local planning processes and address wider concerns. Monitoring of any potential leaks of methane would provide data to assess the carbon footprint of shale gas extraction.

In particular the review considers that vibrations from a seismic event of magnitude 2.5 ML are broadly equivalent to the general traffic, industrial and other noise experienced daily and sets out the average annual frequency of seismic events in the UK in the following table:

Magnitude (ML)	Frequency in the UK	Felt effects at the surface
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-3.0	Not detected by BGS' network	Not felt
-2.0	Not detected by BGS' network	Not felt
-1.0	Not detected by BGS' network	Not felt
0.0	Not detected by BGS' network	Not felt
1.0	100s each year	Not felt, except by a very few under especially favourable conditions.
2.0	25 each year	Not felt, except by a Very few under especially favourable conditions.
3.0	3 each	Felt by few people at rest or in the upper floors of buildings; similar to the passing of a truck.
4.0	1 every 3-4 years	Felt by many people, often up to tens of Kilometres away; some dishes broken; pendulum clocks may stop.
5. 0	1 every 20 years	Felt by all people nearby; damage negligible in buildings of good design and construction; few instances of fallen plaster; some chimneys broken.

The assessment concludes that the health, safety and environmental risks associated with hydraulic fracturing (often termed 'fracking') as a means to extract shale gas can be managed effectively in the UK as long as operational best practices are implemented and enforced through regulation. Hydraulic fracturing is an established technology that has been used in the oil and gas industries for many decades. The UK has 60 years' experience of regulating onshore and offshore oil and gas industries.

The review made 10 recommendations. Recommendation 3 is most pertinent to mitigate seismicity:

- BGS or other appropriate bodies should carry out national surveys to characterise stresses and identify faults in UK shales. Operators should carry out site-specific surveys to characterise and identify local stresses and faults.
- Seismicity should be monitored before, during and after hydraulic fracturing.
- Traffic light monitoring systems should be implemented and data fed back to well injection operations so that action can be taken to mitigate any induced seismicity.
- DECC should consider how induced seismicity is to be regulated. Operators should share data with DECC and BGS to establish a national database of shale stress and fault properties so that suitable well locations can be identified.

Summary of Consultee comments and Representations

LCC Director of Public Health: has undertaken a HIA on the two drill sites and identified that the key risks to health and wellbeing of the population from the two proposed sites are a lack of public trust and confidence in the regulatory process and the industry, stress and anxiety from uncertainty about the industry that could lead to poor mental wellbeing; potential noise related health effects due to continuous drilling for at least five months for the initial borehole on each site and for three months for each of the subsequent three boreholes per site (14 months of continuous drilling), and potential health risks due to the presence of mining wastes generated as part of the drilling and hydraulic fracturing process being retained on site if adequate off site treatment facilities are not found.

A number of key recommendations to inform the planning process have been made and for the purposes of seismicity include the need to:

- Undertake an independent verification of the assessment of air quality, transport, waste management and induced seismicity prior to determining the planning applications.

A number of aims of the assessment include the need to:

- To establish an independent, reliable, single source of local information on shale gas exploration in Lancashire.

As part of the objectives, the HIA recommends the need to:

- To develop a framework to establish a baseline and ongoing monitoring of environmental and health conditions.

And with regard to data collection and analysis (an indicative list), this should include:

- Characterisation of the extent of fracture propagation and the permeability of layers above and beyond the faults

Whilst the EA is a statutory consultee and DECC and the HSE has been consulted, they have not provided any specific advise or comments on the potential impacts of seismicity. As part of the scoping opinion provided by the County Council earlier in 2014 the County Council appointed specialist seismologists to advise what should be included in the EIA relating to seismology. The seismologists have undertaken a review of the EIA in terms of seismology and following the clarification of a number of issues with the applicant are satisfied that the proposed mitigation and adherence to national requirements would ensure that induced seismicity would not cause unacceptable impacts. A number of conclusions are drawn and recommendations made as summarised below:

- With a sensitive, buried array of monitoring instruments (e.g. in 100m boreholes), then it is highly likely that many more small magnitude induced events would be detected than the number felt by people. However, this is not the normal situation, which is to detect events using distributed regional monitoring stations that are sometimes supplemented with additional local

stations, on the surface, following the initial occurrence of mining events. The BGS catalogue of UK earthquakes (covering the many natural ones as well as induced) shows that a few hundred coal mining induced events have been felt over the past 40 years. These events have been fairly common in UK coalfields where the local communities have largely accepted small tremors as not being a particular nuisance except where, on rare occasions, one has been of greater than magnitude $2.0M_L$. These mining events occur generally at very shallow depths of 0.5 to 1.0km, so are felt, for low magnitudes, as people are close to the energy source.

- In addition to the proposed monitoring, consideration should be given to establishing a plan to conduct macro seismic surveys for any events that residents report they feel. Some will be spurious (e.g. a lorry really was passing), others may be genuine as there is a small probability of exceeding the peak ground motions predicted and even a small probability of exceeding the $1.5M_L$ "maximum" event on occasion. The data collected would help to calibrate predictions, and the exercise would be reassuring and provide the opportunity to explain that damaging events are not in the offing.
- BGS report that small natural earthquakes are commonly felt – on average, 2-3 each month somewhere in the country. During fracking and fluid flow at a geothermal project in Cornwall felt, induced events were very rare. Only one was felt by residents ($2.0M_L$) with another only by staff working at the drilling site ($0.7M_L$). The BGS local, surface array detected more than 1000 which were not felt, and the projects' down hole instruments detected many thousands. The actions already taken as reported in the Statement of Community Involvement are supported as are those proposed through the continuation of the Community Liaison Group and various public lines of communication throughout the projects. It is recommend that, in addition to the efforts made and those proposed for the future, consideration be given to establishing a plan to conduct macro seismic surveys for any events that residents report they feel. Some will be spurious (e.g. a lorry really was passing); others may be genuine as there is a small probability of exceeding the peak ground motions predicted and even a small probability of exceeding the $1.5ML$ "maximum" event on occasion. The data collected would help to calibrate predictions, and the exercise would be reassuring and provide the opportunity to explain that damaging events are not in the offing.
- Calculating the probability of exceeding the $1.5ML$ scenario earthquake is difficult, and the likelihood of such an occurrence is a small possibility. If there were to be an event at that level, the impacts would be low; no damage but perhaps a low level of nuisance to a few people. The strengthening of two-way communications with residents would allay concerns; i.e. conveying more information about any felt and establishing a rapid response to anything reported felt.
- It is accepted that there will be continuous recording and no breaks, regardless of the level of operations, throughout the whole of the exploratory period. This will ensure that when the number of minor, instrumentally detected events falls to, or near to, zero, there will be objective evidence to demonstrate this and to learn from the patterns of seismicity associated with different phases of the operations. It is understood that battery consumption is higher during fracking operations (in order to achieve real-time

communications), and drops between those operations but without compromising data collection.

DECC: The proposed activities include hydraulic fracturing for shale gas and that they require the operator to produce Environmental Risk Assessments, taking account of guidance published to the industry by DECC in April 2014, which flows from the recommendations of the Royal Academy of Engineering and the Royal Society, in their report on the hazards of hydraulic fracturing for shale gas published in June 2012.

Drilling of wells requires Secretary of State consent under the terms of the licence and DECC will undertake a number of checks regarding well targeting and operator funds and insurance before giving consent. DECC also requires for hydraulic fracturing, the implementation of measures to mitigate seismic risk including the submission to DECC of a detailed Hydraulic Fracturing Programme (HFP) for each well to be hydraulically fractured. DECC will monitor the conduct of fracturing operations in accordance with the HFP.

Proposals to flare gas during the initial testing phase will require the consent from the Secretary of State under the Energy Act 1976 and any venting is subject to DECC consent. Any venting should be reduced to a minimum. DECC's standard online drilling consent allows 96 hours of testing. To test for a longer period, the applicant will need to apply to DECC for a paper-based Extended Well Consent. DECC will expect the operator to minimise flaring during the period of any Extended Well Consent.

Abandonment of any well requires the Secretary of State's consent under the terms of the licence. DECC will check for completeness of well data before giving consent.

Many of the representations make reference to the risks associated with hydraulic fracturing and object to the proposals on this specific issue for the following summarised reasons:

- Triggering of earth tremors are massive risks to undermining of sub surface strata and creating instability and sink holes.
- Risk of earth tremors not adequately addressed given past experience of test drilling in Fylde and particularly at Preese Hall.
- Earthquake risk / causes earthquakes and sink holes - injury to humans, property, roads and wildlife.
- Strong risk of earthquake near to nuclear power station at Heysham and other nuclear establishments and risk of damage to proposed underground gas storage facility at Preesal.
- Last time drilling in Lancashire – earthquakes caused house to shake leading to cracks in plaster. Patio sank.
- UK geology – too many local faults will allow leakage. Faults still moving. In previous drilling using unproven technology an undetected fault moved and failed the borehole. Too risky.
- Earth movement happened in Lancashire as a result of initial testing – safety assurances are of no value and events cause fear to adults and children.

- David Smythe, Professor of Geophysics at Glasgow University – research raised questions about dangers of fracking in UK. Induced seismic activity.
- Link between fracking and previously geologically stable areas – Ohio/US.
- Fracking could destabilise the entire bedrock beneath the Fylde, upon which sits several mine workings and unstable ground conditions – running sand etc.
- PNR area moss land – significant risk to local properties of subsidence especially Carr Bridge Residential Caravan Park.
- Intention is to drill into a fault line (fault 1) with Harves Ho and Moor Hey faults adjacent, will this induce seismic activity. Contrary to DECC guidance to avoid drilling wells into or close to existing pre stressed regional faults. Consequences are unknown.
- Traffic light system of seismic monitors provides warning only, will not stop an earthquake.
- Earthquake risk –contrary to DM2.
- Annular pressure checks at Preese Hall are not independent.

Assessment

Considerable concern has been expressed to the potential impacts of seismicity particularly in light of the apparently uncontrolled events associated with Preese Hall and the consequent risk of ground contamination associated with fracking fluids and gas as a result of migration from the geological horizon via the well and via unknown stressed fault lines. There is continued fear that induced seismicity will cause earthquakes and damage to properties and should not be permitted under private property without the consent of the landowner. There is a fear that there is insufficient understanding of the geology of the area and that fracking will cause irreparable damage both to the target geological horizon and potentially to those above and below it both in the short and long term that cannot be actually predicted. In view of these perceived fears considerable review and assessment of seismicity has been carried out, most particularly by The Royal Society which concludes that health, safety and environmental risks associated with hydraulic fracturing (often termed 'fracking') as a means to extract shale gas can be managed effectively in the UK as long as operational best practices are implemented and enforced through regulation. The review is clear that at $1.0M_L$ there are 100s of natural seismic events in the UK and which are not felt, except by a very few people under especially favourable conditions. DECC will control fracking in a way, through a traffic light system that prevents fracturing generating more than $0.5M_L$ which means induced seismicity will not be felt at all, or only by a few under especially favourable conditions. Whilst perceived fears are understandable, they cannot be supported by independent review and guidance. It is safe to assume that BGS or other appropriate bodies will carry out national surveys to characterise stresses and identify faults in UK shales and operators will carry out site-specific surveys to characterise and identify local stresses and faults. It is proposed that seismicity will be monitored before, during and after hydraulic fracturing (see application LCC/2014/0097). Monitoring has already been carried out in the Becconsall area. A traffic light monitoring systems would be implemented and data fed back to well injection operations so that action can be taken to mitigate any induced seismicity and which would be overseen by DECC and whom the county council can be satisfied will operate within its own regulatory framework.

With regard to possible subsidence DECC has reported (Review and Recommendations for Induced Seismic Mitigation (April 2012) that there are no documented cases of fracturing operations causing subsidence or tremors large enough to cause damage at the surface and that unlike coal mining, shale gas production does not remove large quantities of rock from underground, which can cause subsidence. The report notes that subsidence could occur when rock is compressed and collapses in on itself, but that shale rock is not easily compressed, so subsidence is unlikely and that rock samples would be tested before any commercial production is approved. The conclusions of the applicant and the previous conclusions of DECC are accepted. It is considered that the proposed exploration and appraisal of shale gas would not lead to any subsidence at surface and should there be an opportunity for any further stage of exploration that could lead to commercial exploitation, that would require the benefit of planning permission and would be the subject of greater scrutiny by DECC.

With regard to the representations received it is not likely that seismic activity would lead to injury to humans or wildlife or destabilise the geology in a way that would generate earthquakes that would place the Heysham power station or the proposed underground gas storage project at Preesall at risk. There is no verified evidence of damage to property as a consequence of the seismic events at Preese Hall or that the surface strata was undermined in any way or present a risk of subsidence to moss land or nearby properties. The County Council is not aware of any verified evidence to support that fact induced seismicity would led to pollution of surface or ground water or that the process could be safely carried out. A 3D survey has been carried out to give a clear understanding of the geological conditions and faulting in the area and the sites, depth and direction of drilling and horizons proposed to be fracked have been chosen and designed in a way to minimise seismic movement and which, if undertaken in accordance with a traffic light system would prevent the migration of fluids. There are no mine workings in the Fylde.

With regard to specific points raised DECC has advised that faults should be avoided, whatever their scale where hydraulic fracturing is involved. From the viewpoint of seismic hazards, there is no need to be concerned about drilling through a fault, as opposed to hydraulically fracturing into or near a fault. Drilling, as such, is not in the experience of the oil industry an operation associated with seismic activity. DECC is not aware of any factor in the geology around the proposed drilling sites which should require avoidance of all faults, so far as the drilling phase of operations are concerned.

It is maintained that the 3D seismic survey is inadequate in coverage, in particular because the proposed Roseacre drilling site is very near the edge of the survey area and the resolution of faults is consequently poor at that location. DECC considers that drilling through a fault does not entail any seismic hazard. The location of the site, or more precisely the trajectory of the initial vertical well, is not material to the adequacy of the 3D survey so far as seismic hazards is concerned. What matters is the resolution of faults available in the areas in which fracturing is proposed. A DECC geoscientist has reviewed Cuadrilla's 3D data on a workstation at their office, and considers that the data quality is adequate in those areas to enable detection of all faults likely to be significant from the viewpoint of seismic hazard. DECC will scrutinise the Hydraulic Fracturing Plans (HFPS) and the plans for monitoring the

growth of the fractures to ensure that the stimulated rock volume does not extend too close to any of the mapped faults.

It is said that faults should be assumed to be transmissive unless proved otherwise. This comment is not directly relevant to seismic hazards; the purpose of the HFPs and their scrutiny by DECC is to ensure that the full extent of the stimulated rock volume preserves a safe distance from any detectable fault. The fracturing fluids will therefore never enter the fault, and will not be transmitted along it.

It is said that Cuadrilla's definition of faults is defective. However, the purpose of the definitions adopted is to distinguish between "local" faults, which Cuadrilla propose to drill through, and regional faults, which they do not intend to drill through. DECC does not see drilling through faults as material to the assessment of seismic risk. As to the location and extent of fracturing operations, which are very material, Cuadrilla plans to avoid all detectable faults, which is the correct approach.

It is said that the current regulatory system is inadequate, in that no criteria have been specified in the "traffic light" system for shutting down operations, other than temporarily. DECC would not agree that this is a shortcoming. The association between hydraulic fracturing and seismic activity remains a relatively novel discovery and a developing area of knowledge. However, the data from the Preese Hall tremors indicate that careful monitoring of seismic activity in real time is likely to detect precursor events, providing scope to halt operations, reduce stresses, and avoid any more substantial tremor. That is the purpose of the traffic light system. But in the present state of knowledge, any predetermined protocol for action which should follow a red-light event would risk excessive precaution on the one hand, or avoidable disturbance to nearby residents on the other.

DECC's intention in any such instance is to explore the implications of the occurrence of the red-light event promptly but thoroughly, with a view to deciding whether operations can be resumed without undue risk of disturbance to local residents; and if so, what operations are acceptable and whether any further precautions are appropriate. DECC thinks this strikes an appropriate balance in present circumstances between precaution and protection and have no doubt that their powers are sufficient to curtail operations in any such case should it prove necessary.

Whilst the concerns are understandable it is concluded that they cannot be supported and that the County Council can assume and be satisfied that the development would be carried out to meet the requirements of DECC.

Conclusions

It is concluded that induced fracturing will generate seismic movement but providing it is within the limits of a traffic light system it will not cause unacceptable impacts and would be overseen by DECC to ensure it would be carried out safely.

It is considered that the proposed exploration and appraisal of shale gas would not lead to any subsidence at surface.

The development is therefore considered to comply with national guidance and is not inconsistent with the policies of the development plan.

Appendix 10

Land Use

Proposal

The applicant has undertaken an assessment of the potential for the proposal to impact on the agricultural land use in and around the site. The agricultural land affected (7.5ha) has been assessed as moderate in terms of its agricultural land quality. The exploration activities would involve surface works and below ground works. The surface works would include the construction, operation and restoration of the well pad, access track and potentially any infrastructure required to connect the site to the gas grid during extended flow testing. Soil would be excavated to create a well pad and associated drainage ditch and then would be utilised to construct earth banks seeded with grass and wild flowers at the northern and southern ends of the well pad. The proposed development would last for up to 6 years. Due to the clay content of the soil there is the potential for an adverse significant effect on soil resources from compaction from heavy plant and machinery during the construction of the access track and well pad and presence of the site. Stripped soils would be retained on site, stored and used in site restoration.

A soil survey has been carried out and data on farming practices collated. The site forms part of a 162ha farm holding of which 7.5 is proposed to be used for the development – approximately 1.5%. The land is grassland grazed by milking cattle, produces hay crops for sale, dairy replacements and beef are reared and used for winter grazing by sheep. The land lost to the site would be replaced by an additional 8ha of rented land. Approximately 1.5ha is classed as good quality (Class 3a) with approximately 1.1 ha moderate quality (Class 3b).

The assessment concludes the impact on the loss of agricultural land is not significant.

Stripped soils would be retained on site, stored and used in site restoration.

Policy

National Planning Policy Framework (NPPF)

Paragraph 28 of the NPPF seeks to support the sustainable growth and expansion of all types of business and enterprise in rural areas.

Paragraph 112 of the NPPF states that local planning authorities should take into account the economic and other benefits of the best and most versatile agricultural land. Where significant development of agricultural land is demonstrated to be necessary, local planning authorities should seek to use areas of poorer quality land in preference to that of a higher quality.

Paragraph 122 states that local planning authorities should focus on deciding whether the development itself is an appropriate use of the land and the impact of

the use, rather than the control of processes or emissions themselves where these are subject to approval under control pollution regimes.

Paragraph 144 sets out matters to consider in determining applications for mineral development including (in summary) giving great weight to the benefits of mineral extraction, and ensuring that there is no unacceptable adverse impacts on the natural and historic environment.

Joint Lancashire Minerals and Waste Local Plan

Policy DM2 of the JLMWLP supports developments for mineral operations (including hydrocarbons) where it can be demonstrated that all material, social, economic or environmental impacts that would cause demonstrable harm can be eliminated or reduced to acceptable levels. In assessing proposals, account will be taken of the proposal's setting, baseline environmental conditions and neighbouring land uses, together with the extent to which its impacts can be controlled in accordance with current best practice and recognised standards.

Fylde Local Plan

Policy SP2 states that development in such areas will not be permitted except where proposals are essentially required for the purposes of agriculture, horticulture or forestry or other use appropriate to a rural area.

Policy EP22 of the Fylde Local Plan does not permit development which would involve the permanent loss of the best and most versatile agricultural land where it could reasonably take place on previously developed sites, on land within the boundaries of existing developed areas or on poorer quality agricultural land.

Emerging Fylde Local Plan

Policy GD1 directs development towards existing settlements and within settlement boundaries .National Policy and any relevant Local Plan policies will be used to assess development outside settlement boundaries.

Policy EC3 seeks to protect the best and most versatile agricultural land outside settlement boundaries unless it is necessary to deliver development allocated in the local plan or for strategic infrastructure.

Summary of consultees and representations

There are no consultees specifically for land use.

There is no heading for objections relating to land use but representations objecting to the proposal include the following:

- The proposal will destroy/degrade/permanently damage the beautiful Lancashire/Fylde countryside by industrialisation and traffic.

- Rich arable land / grazing land will be polluted from leaching of chemicals onto the land and water supply with subsequent entry into the food chain, rendering produce unsalable.
- Cannot sacrifice food growing, need to keep prime farming land safe for food production, for local economy and to avoid world food shortages.
- Impact on coastal settlements from potential loss of jobs in tourism/farming
- Fracking fluid contains carcinogens, toxins, radioactive and hazardous materials which will contaminate land and water sources affecting food production and drinking water.

Assessment

The applicant has stated that policies CS1 and CS4 of the JLMWDF predate the proposed development and as such the development is not a departure from the Core Strategy. Rather, the JLMWDF is silent and out of date in regard to land use and shale gas exploration. It is acknowledged that the JLMWDF does not make reference to this type of proposal and therefore the application must be assessed against national policy, the local development plan in this case the Fylde Local Plan, the emerging Fylde Local Plan and any other material considerations. Whilst the JLMWDF may not be relevant with regard to specific land use based policies for shale gas, the proposal would still need to be assessed against the development management policies relating to the criteria to assess waste and mineral applications as set out in the JLMWLP.

The main land use issues include the impact of the development within open countryside and the potential loss of agricultural land.

The proposal map that accompanies the Fylde Local Plan identifies the site as being in Open Countryside and is subject to Policy SP2. This policy states that development in such areas will not be permitted except where proposals are essentially required for the purposes of agriculture, horticulture or forestry or other use appropriate to a rural area. The emerging Fylde Local Plan includes Policy GD1 which directs development towards existing settlements and makes clear that development outside settlement boundaries would be assessed against national policy and other relevant local plan policies.

Whilst it is acknowledged that minerals can only be worked where they are found, the Bowland Shale occurs beneath most of the Fylde area and therefore there may some flexibility as to where an exploration site can be located. A suggestion has been put forward that this type of development would be more suited to an industrial location. The applicant maintains that there has been an active decision to choose site locations away from large populations centres so that the development would only affect a small number of people and would minimise the extent of any potential disturbance. The site has also been identified due to its relatively consistent geology to undertake gas exploration. Therefore, given the temporary nature of the proposal, the geological conditions and the need to ensure that there is a separation between exploration sites and main areas of population, the location within the open countryside could be found acceptable.

The exploration site and access covers an area of approximately 2.65ha and is located within a parcel of agricultural land approximately 7.2ha. Approximately 1.5ha is classed as good quality (Class 3a) with approximately 1.1 ha moderate quality (Class 3b). Policy EP22 of the Fylde Local Plan protects the permanent loss of the best and most versatile agricultural land (Grades 1, 2 and 3a). The applicant has advised that the majority of the land associated with the well pad and access track has been assessed as moderate quality. The Environmental Statement states that there is the potential for an adverse significant effect on soil resources from compaction due to the clay content in the soil, whilst the access track and well pad are constructed. The applicant has advised that they would implement best practice measures for the excavation and handling of soils to mitigate this aspect during construction. Whilst the main land use issue would be the loss of agricultural land associated with the main site and the monitoring arrays, it is considered that this would be minimal and for a temporary period. A condition requiring the reinstatement of the land following cessation could be imposed. As the development is for a temporary period it would not involve the permanent loss of agricultural land and would not therefore conflict with Policy EP22 of the Fylde Local Plan.

With regard to representations received, the proposal is for a temporary period. It would not destroy/degrade/permanently damage the Lancashire/Fylde countryside by industrialisation and traffic. The land is not arable, is used for grazing and subject to the employment of good practices in accordance with conditions, permits or licences grazing land would not be polluted from leaching of chemicals onto the land and water supply with subsequent entry into the food chain, rendering produce unsalable. The loss of agricultural land is small scale and would not adversely affect prime farming land for food production, or affect the local economy or create world food shortages. It would not result in an unacceptable impact on coastal settlements from potential loss of jobs in tourism/farming.

Conclusion

The impact of the proposal in terms of land use planning would not be significant. The loss of agricultural land would be for a temporary period and provided that appropriate mitigation measures are imposed with regard to soil compaction and conditions controlling the storage of soils and the reinstatement of the land, the proposal would be acceptable. The proposal would not be contrary to the policies of the NPPF or the policies of the development plan.

Appendix 11

Landscape and Visual Amenity

Proposal

The applicant has undertaken an assessment of the landscape and visual amenity of the site and area within a 5km radius. As part of the EIA an assessment has been undertaken of the impacts of the proposal on the landscape and visual effects. It concludes there would be no significant landscape effects although there would be very localised direct change due to the development temporarily altering a very small proportion of the local character area during construction of the well pad but no effect during other phases. The visual findings conclude there would be significant adverse visual effects arising during the drilling, hydraulic fracturing and flow testing phases. Seven of the principal viewpoints would experience significant adverse visual effects. Six of these are residential receptors within and one with a recreational viewpoint. No significant adverse visual effects were judged to occur on any receptor more than 930m from the site during any phase of the project.

The Preston New Road site is currently in agricultural use and is surrounded on all sides by agricultural pasture and arable fields. The field boundaries in the area are formed by native hedgerows, wire and timber fencing, largely without mature trees except for around farms and individual properties. Hedgerows line the local roads at a height of 1.5 – 1.8m. There are numerous field ponds and minor drainage ditches following field boundaries. The land surrounding the site is generally undulating sloping towards Carr Bridge Brook shallow valley north of the site and Preston New Road to the south at an elevation of around 14m OAD. Land rises to the north east to the nearest settlements of Little Plumpton at approximately 25m AOD and Great Plumpton at 35m AOD. The nearest residential properties are those located along Preston New Road to the south. There are two registered Historic Park and Gardens on the edge of the 5km radius study area. There are six conservation areas none of which are in close proximity to the site. There are 27 listed buildings the closest of which is 1.5km away from the site and no of which have an intervisibility with the site. The nearest protected tree is 700m away on Preston New Road. The site is not covered by any national landscape designations. There are no public footpaths near the site.

In terms of landscape impact, the development would require the removal of approximately 30m of hedgerow and individual trees along the frontage to Preston New Road and the lowering to 1m of a further 245m length of hedgerow to form the visibility splays at the site access. A further 100m of hedgerow would be lowered to provide access to the western most connection to the gas grid.

The compound and access road would be surfaced with tarmac / hardcore which would form the base for the equipment to be used for the exploration operations. The soils stripped from the area of the compound would be used to form mounds up to 4 metres in height. The site would be secured by 4m high weld mesh fencing located on the outside of the perimeter bunds which would also extend along the length of the access road. The applicant also proposes screen planting immediately adjacent to the fencing to provide additional landscaping.

A number of shipping containers (single storey in height) to provide for storage of equipment, workshops and office / site welfare would be required and which would be readily seen from Preston New Road. The main elements of the development in terms of visual impact would be the drilling rig which would be up to 53m in height depending on the type of rig used, various cranes used for assembly of the rig and other equipment, a well services rig of 36m height, two sand storage silos each 15m in height and two flare stacks of around 10m in height. Not all of these elements would occur at the same time but the worst case from a visual impact perspective would arise when the drilling rig is being used in combination with the 36m high rig associated with the initial flow testing. This would occur for approximately four, three month periods over the duration of the development.

Mitigation measures are proposed in the form of 4m bunds around the well pad, landscaping around the well pad to help filter views, allowing hedgerows to grow taller, minimisation of light spill, gap filling in existing hedgerows.

It is concluded there would be no cumulative effects from other developments proposed or committed that would have and significant impact on visual amenity. The land is of moderate agricultural quality and it is concluded that there would be no significant effects on farming practices.

Policy

The NPPF states that the planning system should contribute to and enhance valued landscapes and that developments should include appropriate landscaping. Policy DM 2 of the Lancashire Minerals and Waste Local Plan states that development for minerals operations will be supported where it can be demonstrated to the satisfaction of the mineral planning authority that all material environmental impacts can be eliminated or reduced to acceptable levels. The policy requires that proposals should make a positive contribution towards factors such as landscape character.

Policies SP2 and EP11 of the Fylde Local Plan relate to development in country side areas and building design and landscape character.

Summary of consultee comments and Representations

LCC Landscape: Focusing on a 2.0km radius from the centre of the application site, the elements of the development which have the most potential for creating significant landscape and visual impacts are drilling, hydraulic fracturing and flow testing operations which involve the use of a drilling rig (up to 53m high), fracturing rig, well services rig and flare stacks.

It is recommended that additional photomontages for viewpoints 3, 6 and 10 to a prescribed methodology are submitted as the submitted images to do reflect the true scale of the proposed development, with the rig appearing approximately 3x smaller than it will in reality.

The site falls within the County Council's Coastal Plain landscape character type and The Fylde landscape character area, which are characterised by rural farmland,

hedgerows, shelter belts and field ponds, slightly undulating topography, long views across the landscape and a strong sense of openness. The application site has these landscape characteristics along with some significant landscape detractors including electricity pylons, the M55 and the A583.

A detailed assessment of the potential impacts and significance on the landscape and receptors, taking account of the development site and area landscape characteristics has been undertaken with the following summarised observations:

- Major significance on views from The Gables and Plumpton Hall.
- Moderate to major significance on the local landscape character and views from Preston New Road, Staining Wood Farm, Plumpton Lane and Moss House Lane.
- Minor significance on landscape fabric and the views from Westby Road and Great Plumpton.
- Negligible to minor significance on the character type and area, landscape amenity and the views from Little Plumpton, Peel Road, Ballam Road and Westby.
- Negligible significance on the landscape value of the site and wider landscape.
- No significant cumulative effects with the proposals at Roseacre.

The assessment of the proposal has also taken account of the effects of time, with regard to the duration of the landscape effects, and has also taken account of mitigation proposals which will reduce the impact of low level site structures.

The proposed development would have some temporary but reversible localised landscape and visual effects of moderate-major significance. However, these are not considered to significantly affect the overall character of the Coastal Plain Landscape Character Type or The Fylde Landscape Character Area. In addition, the likely effects of the development proposals on the landscape's value and fabric would not be significant and, there would be no significant cumulative effects. For these reasons, the overall temporary effects of the proposals are deemed to be acceptable in landscape terms.

The applicant's options for mitigating the most significant localised effects are limited due to the height of the drill well (potentially 53m), characteristics of the receiving landscape and the 3 year operations period which does not leave enough 'growing time' for planting to have any significant impact. So, whilst there is much about the proposals which could be deemed acceptable in landscape terms, especially in the context of the wider landscape, the applicant needs to address the likely significant localised effects to ensure that overall, this form of temporary industrial development is successfully assimilated into the rural landscape. The most appropriate way of achieving this would be through implementation of the additional mitigation measures outlined above.

It is concluded that significant localised landscape and visual effects are unavoidable although there is scope to further mitigate the likely effects by reducing the height of the drilling rig to a maximum of 35m; finish the drilling and fracturing rigs in a more

suitable colour than red/white as proposed and to finish the various cabins and other temporary buildings in a more appropriate colour than blue as proposed.

The Campaign to Protect Rural England: No objection subject to conditions requiring mitigation measures for landscape and visual amenity.....

Westby-with-Plumpton Parish Council: Express concern to the visual impact of the site.

Many of the representations received object to the visual impact of the site and the potential impact of long term development and the cumulative impacts of more sites. The objections are summarised as follows:

- Fracking wells are only viable for a short number of years, this development will open the way for hundreds across the Fylde with untold environmental damage.
- Potential for 1000's of well pads across the Fylde if these are approved, reports suggest a need for 80 to 33,000 wells to exploit the Bowland Shale.
- Fylde will become industrialised with thousands of wells feeding the south.
- Once interest rates rise, the development will fail and leave damage to environment and landscape for future generations to clear up.
- The proposal will destroy/degrade/permanently damage the beautiful Lancashire/Fylde countryside by industrialisation and traffic.
- Inappropriate development in the greenbelt.
- Application is contrary to Policies SP2, SP5 and EP11 as it is not in keeping with the landscape character due to its character and appearance.
- The development will be a blight/blot/scar on the rural landscape and will get worse when in full production, turning area into an industrial zone.
- The visual impact from the M55 motorway and the A583 will promote an industrial image and deter tourists
- A 53m high rig will have a significant landscape impact and is inappropriate and unnecessary in this area
- The tall structures will be on site for approximately 29 months and will be a third of the size of Blackpool Tower
- The title page image is misleading as it shows a 30m rig and not a 53m rig
- Staining Wood properties will suffer the highest impact on visual amenity but they are not shown in the ES photo montage.
- The new access road and hedgerow changes are not minor landscape changes.

Assessment

The County Council produced a landscape character assessment as part of the Lancashire Structure Plan which has been retained for development control purposes. The assessment defines the key features of each landscape character tract and identifies forces for change and policy to preserve landscape character. The site is located within the Fylde Coastal Plain landscape character tract, the key features of which include the large arable fields giving long views over the landscape, areas of semi natural woodland along brooks and watercourses and

meandering rural lanes. The assessment identifies that communications masts and other prominent developments will be particularly prominent on local skylines.

In terms of landscape impact, it is important to recognise that the proposal is for a temporary exploration site for a period of approximately four years after which the site would be restored unless the appraisal stage demonstrates the commercial viability for exploitation and for which a further planning permission would be required. Whilst there would be landscape impacts arising from the development, very few natural features such as trees or and therefore it should be possible to restore the site boundaries to their existing condition. The long term impacts on landscape should therefore be minor

The development would have some impact on the character of Preston New Road mainly from the removal and reduction in height of hedgerow on both sides of the road and from the construction of the new access road and security fencing. This would have an urbanising impact but only for a limited length and following completion of the development, the access and hedgerows could be reinstated to their existing condition.

The earth mounding up to 4m in height combined with the screening provided by the existing hedgerows would also mitigate some of the visual impacts of the development including the perimeter fencing, site buildings and the items of plant and equipment that are below four metres in height. The applicant is also proposing to undertake planting around the boundaries of the site. However, it is considered that this would only make a limited contribution to the landscaping of the site given the small areas of land proposed and the lack of time for any planting to mature.

The main visual impacts would arise from the drilling rig and other tall items of plant required to drill the borehole and undertake the fracturing operations. Due to the height of these elements the visual mitigation provided by bunding and existing natural features would be limited and therefore the rig would be a highly visible feature especially given the flat landscape of the area. However, the visual impacts arising from the tallest elements of the plant would be intermittent over the four year period of the development as it is likely that the drilling rig would be removed from site after each borehole is completed. Whilst the impacts associated with the drill rig could be reduced by using a lower rig, the impacts are not considered to be so great as stipulating this by condition and which could be considered unreasonable and unnecessary.

A further visual impact would be from the lighting used as part of night time working. During the drilling operations, the site would be operational on a 24 / 7 basis for a period of around 5 months for the initial borehole and 3 months for the subsequent 3 boreholes where lighting would be required on the rig and around many ground structures. The site is in a very rural area and therefore at present experiences very little light pollution. Whilst it may be possible to reduce the impacts of lighting by shielding and appropriate direction, the lighting required during the drilling operations is still likely to be a particularly noticeable impact in this area but only during the limited period of drilling operations (see lighting assessment Appendix 12).

With regard to the concerns of the parish council and those representations received, the proposal must be considered on its merits and not on the basis of cumulative impacts with any future developments. The development is for a temporary period and would not lead to the industrialisation of the Fylde in its independence and it cannot be assessed against possible future developments. Policy DM 2 of the Lancashire Minerals and Waste Local Plan states that development for minerals operations will be supported where it can be demonstrated to the satisfaction of the mineral planning authority that all material environmental impacts can be eliminated or reduced to acceptable levels. The policy requires that proposals should make a positive contribution towards factors such as landscape character. The development is temporary in nature and would not have a long term impact or be permanent enough to make a positive contribution to the landscape. It is considered that whilst the impacts could not be eliminated they could be reduced to acceptable levels for a limited period.

The site does not fall within the Green Belt and Policy SP5 of the Fylde Local Plan is not relevant. Whilst the proposal would be contrary to Policy SP2 minerals can only be worked where they occur and in this case would be for a temporary period in the scale proposed. Policy EP11 relates to new development and the need for it to be in keeping with the landscape character types. The proposed development due to its temporary nature and nature of development cannot be designed in a way to meet the requirements of this policy. The structures would be significant in scale, most particularly the height of the proposed drill rig and associated illumination. However, whilst the drill rig would be present over an extended period, it would not be there at all times which contribute to reducing the visual impact. It is acknowledged that the nearest properties at Staining Wood and Fox Chase would see the site, but they are located to the south of Preston New Road which is illuminated and some distance away from the site and the hedgerows and screening mounds would provide some visual mitigation.

In summary, given the undulating and open nature of the landscape, the development would have some significant landscape impacts but only for a limited period and in the main restricted to locations near to the site, in particular properties at Staining Wood and Fox Chase and from Preston New Road. The development would not affect any conservation areas, listed buildings or protected trees. It would not require the removal of any significant existing landscape features and therefore any landscape change would not be of a permanent nature. The development is therefore considered acceptable in terms of landscape impacts. However, it is considered that any planning permission should be subject to conditions relating to the colour of the drilling rigs and other equipment, the design and location of the perimeter landscaping mounds, the colour and design of fencing, lighting design and control and details of the restoration and aftercare of the site to include the replanting of any hedgerows that are removed and restoration.

Conclusion

It is concluded that the proposal would generate significant localised landscape and visual impacts and which would be unavoidable due to the nature and duration of the proposal. However, whilst the duration is over an extended period of time, it would still be temporary. Mitigation measures are proposed and there is scope to further

mitigate the likely effects by reducing the height of the drilling rig to a maximum of 35m; finish the drilling and fracturing rigs in a more suitable colour than red/white as proposed and to finish the various cabins and other temporary buildings in a more appropriate colour than blue as proposed. Subject to such conditions it is considered that the proposal would not be contrary to Policy D2 of the Lancashire Minerals and Waste Local Plan and whilst it could be seen as contrary to Policy EP11 of the Fylde Local Plan, the proposed development, due to its nature for a temporary period it could not be designed in a way to meet the requirements of this policy.

Appendix 12

Lighting

Proposal Outline

As part of the EIA an assessment has been undertaken of the effects of the potential night time light obtrusion from the project in view of the site being in a rural location away from built up areas and where there is little existing night time lighting. The assessment has used national policy and light obtrusion guidance including the Institute of Lighting Professionals (ILP) Guidance Note for the Reduction of Obtrusive Light.

The assessment identifies the consequences of light obtrusion are associated with loss of dark night skies, loss of visibility of stars, perception of an unsatisfactory nocturnal environment and harming of wildlife habitats. Light obtrusion could also have detrimental effects on human health and present physiological and ecological problems. It may also constitute unnecessary energy waste.

Baseline nocturnal lighting measurements were taken at selected viewpoints identified as part of the landscape and visual impact assessment to provide a nocturnal baseline study around the site and which were used as a basis for the light assessment in November 2013 between 19.00 and 01.30 hours. The measurements identified sky glow above Preston, Blackpool and Lytham St Annes. The nearest receptors of light from the operations would be the villages of Little Plumpton and Great Plumpton. The most significant forms of obtrusive lighting is street lighting on the A583 which borders to the south of the site; from two local farms that have floodlights which produce high levels of luminance along with sky glow associated with Fylde Industrial estate and Blackpool Pleasure Beach in the distance.

The construction of the well pad, access track and gas pipeline would take place during normal daytime hours but there may be temporary lighting required in the event works continue when natural light has diminished during normal working hours and which may be seen from local properties depending on the time of the year and topography and if required is likely to cause some minor adverse effect due to its design for temporary usage. Security lighting would comprise low power over-door bulkhead luminaires using low energy light sources which are unlikely to exceed ILP guidance.

The project proposes 24 hour drilling and fracturing operations involving the need for lighting of working areas during hours of darkness. This would include the need for elevated parts of the drilling rig to be illuminated to ensure safe working practices. Site and security lighting would also be required. Whilst not confirmed it is likely that the lighting for the site would comprise four mobile lighting towers with four 400W floodlights each; for the drilling rig, nine 500W floodlights and fourteen 2x35W luminaires mounted at varying heights; and tank lighting two 2x 18W luminaires.

The assessment states that the light into windows and light source intensity can be designed to be compliant with ILP guidance. The luminance of the rig would be generally below the limit for the taller sections of the rig, where the rig would be most

visible from a distance, although the low level luminance on the site cabins would exceed the limit for obtrusive light. Given the drilling of the wells would last initially 5 months, then for up to three months albeit with intervals, although the lighting would be temporary it would be greater than a week and would have a significant effect without mitigation.

A similar impact to that associated with site development can be expected from fracturing activities, initial flow testing, the installation and operation of extended flow testing equipment, namely not a significant effect.

The assessment is that the Preston New Road and Roseacre Wood are sufficiently distant from each other that there would not be a combined or cumulative lighting impact on receptors from both sites.

The assessment concludes that due to the combination of few sources of night time lighting in the vicinity of the site, the use of lighting during the project without mitigation would result in a significant effect for drilling and fracturing and a not significant effect for site construction, initial flow testing and extended flow testing.

It also concludes that avoidance of light pollution beyond the site boundary would minimise any significant residual effect on local wildlife habits or residents and would result on a negligible or minor effect meaning the residual effects would not be significant.

It is proposed to mitigate potential effects during the construction, initial and extended flow periods by employing best practice, confining lighting to the task area, orientating lights and operating a curfew.

With regard to drilling and fracturing, lighting will be employed in accordance with ILP guidance using the lowest powered light sources possible; direct lighting to tasks avoiding wide area lighting; target light using precision optics; shield plant lighting from view from the nearest properties and sensitive habitats; employ low key security lighting with movement sensor controls or part light diming; maximise the shielding effect of site cabins; minimise the height of lighting columns (6m); employ a curfew and monitor the site and respond to complaints promptly.

It is considered that by implementing such measures the lighting could be kept below lighting limits for light into windows and overall light intensity to the extent that residual effects would not be significant. The mitigation measures would reduce the magnitude of the developments impact on sky glow and building luminance levels from the equipment at the site and the surface of the well pad. However, it is recognised that because of the low levels of night time light sources around the site, the lighting effects would remain significant and mitigation would be necessary.

Summary of Consultee comments and Representations

LCC Lighting: No objection to the proposals and has advised that the lighting design generally complies with the required standards, with the exception of predicted sky glow, which marginally exceeds permitted standards.

He does not anticipate any issues to surrounding area, highway or users.

LCC Director of Public Health: recommends that an assessment of light pollution as part of the site operations should be carried out, and if there are likely to be significant impacts associated with light pollution from the sites that cannot be mitigated or controlled, the Applicant should be requested to consider the opportunity to offer to fit blackout blinds to those homes most likely to be affected.

Fylde Borough Council: Object to the proposal given the potential general disturbance to nearby residents. Fylde Borough Council's Environmental Health advise that as the site will be a 24 hour operation and require illumination at night, a plan should be provided detailing the predicted lux levels originating from the site to the vicinity. The area is rural so will be very dark at night and any increase in illumination will be more prevalent. Under normal circumstances the light levels should comply with the following guidance:

- Lighting proposals within the open countryside will only be permitted if the applicant can demonstrate to the Local Planning Authority that the scheme proposed is the minimum needed for security and/or working purposes and that it minimises the potential for obtrusive light from glare or light trespass to an acceptable level. Artificial lighting in the open countryside can have a demonstrable effect on 'dark skies', one of the special qualities of the rural landscape. With regard to lighting related to mineral extraction sites, the following additional guidance should be followed:
 - Mount lights below the roof height of buildings, and perimeter fencing, and direct light.
 - downwards, to where it is required.
 - Position lights so that they are shielded by buildings or permanent plant and are not visible from the surrounding countryside.
 - Avoid lights mounted on the side of the buildings that shine directly out, dazzling users of the facility.
 - Consideration should also be given to night glow from the flare and measurements/calculations shall be produced to demonstrate lux levels as a result of this unit.

Objections have been received against light pollution and in particular relating to:

- Disturbance to residents from light pollution
- Floodlights ruining night sky.
- Staining Farm 1 & 2 (10 properties) – expect illuminated 53m rig will have unavoidable impact on local residents.
- Light pollution increases sleep problems and causes health problems
- The flares will cause light pollution.
- Negative impacts at night are large. Detrimental impact on humans and wildlife.
- Site lit brightly at night including access road - would become an island of light - like an oil refinery/industrial site.
- Proposed lighting not in keeping with rural area. Significant direct impact on local residents.
- Contrary to EP28 – avoid or minimise harm.
- Contrary to SP5.

- Flare should not be visible.
- Flare should be fitted with suitable silencing.
- Flare flume dispersal modelling should be a priority.

Policy

Section 11 of the NPPF relates to conserving and enhancing the natural environment. Paragraph 125 encourages good design, planning policies and decisions to limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.

Policy DM2 of the LMWLP supports proposals for minerals operations where it can be demonstrated that all material social, economic or environmental impacts that would cause demonstrable harm can be eliminated or reduced to acceptable levels.

Policy EP28 of the Fylde Borough Local Plan relates to Light Pollution. In relation to proposals involving external lighting, light pollution must be addressed and provision made to avoid or minimise harm relating to loss of local character, loss of amenity or reduction in highway safety. The policy requires lighting schemes to be well designed and the light intensity not excessive in relation to its function and that light sources must be directed at the object to be illuminated to minimise extraneous emissions.

Assessment

The applicant's assessment concludes that because of the low levels of night time light sources around the site, the lighting effects would be significant and mitigation would be necessary. There is no doubt that the site falls within a rural area although there is some light pollution associated with street lighting on the A583, floodlighting from nearby farms and night glow from the urban areas of Lytham, Blackpool and Preston, Fylde Industrial Estate and Blackpool Pleasure Beach in the distance. There are phases of the development that would not generate light pollution, namely site construction, initial flow testing and extended flow testing. However, operations involving drilling and hydraulic fracturing would create light pollution because of their extended nature of greater than one week. There would be more light at a higher elevation associated with the drilling operations in view of the need for operational safety. Whilst this would be temporary it would be over an extended period of initially five months for the first bore hole and three months for each subsequent borehole. Similar lighting would be required throughout the fracturing operations thereby generating light over a continuous minimum period of 19 months. This would result in some sky glow and building luminance that could be significant.

The flare would be enclosed and therefore there would be no light pollution associated with such.

The County Council's lighting advisor has raised no objection to the proposals and has advised that the lighting design generally complies with the required standards, with the exception of predicted sky glow, which marginally exceeds permitted standards. He does not anticipate any issues to surrounding area, highway or users.

The Director of Public Health has recommended that an assessment of light pollution as part of the site operations should be carried out, and if there are likely to be significant impacts associated with light pollution from the sites that cannot be mitigated or controlled, the Applicant should be requested to consider the opportunity to offer to fit blackout blinds to those homes most likely to be affected.

Lighting has properly been assessed; it concludes there would be some light pollution at night. This would be for a temporary period but would be significant particularly when seen from the A583, nearest residential properties at Staining Farm and the villages of Little and Great Plumpton. Notwithstanding it would be for an extended period of time, with the mitigation measures proposed, and which could be controlled by condition, on balance, it is considered that lighting could be made acceptable and that the impacts associated with such would not be so great to affect amenity on a permanent basis or lead to unacceptable effects on nature conservation to constitute a sustainable reason for refusal. It would not be appropriate to require blackout blinds to be fit to those properties most likely to be affected.

Conclusion

Subject to the mitigation measures proposed, and which could be controlled by condition, it is considered on balance that the proposed lighting for a temporary period would be acceptable for the purposes of the NPPF Policy DM2 of the LMWLP and Policy EP28 of the Fylde Local Plan.

Appendix 13

Noise

Proposal

The applicant's Environmental Statement contains a chapter that assesses the noise and vibration impacts from the project and their effects on the surrounding sensitive receivers.

Baseline noise levels have been established by a measurement survey. This data is used to assess the potential significance of any effects. The site is in a rural location. However the proximity of the M55 to the north and A583 to the south means that during the day time road noise is a particular feature of the current environment.

Different stages of the project will have different noise levels. The noisiest activities are most likely to occur within the first two to three years of the project. However, the noise levels for all stages of the project have been assessed. The applicant says the only stage with the potential to result in a significant noise effect is where hydraulic fracturing occurs during night time (2300-0700) where noise limits are at their most stringent.

The applicant proposes to mitigate this by only operating the pumps used (only for up to 3 hours at a time during hydraulic fracturing) during weekday daytime and Saturday mornings.

Vibration impacts have been ruled out by the applicant because of the nature of the project, method of construction for the well pad, arrays and pipeline connection for the extended flow testing.

The nearest properties to the site are at Staining Wood Cottages (270m south of the site) and Plumpton Hall Farm which includes two residential properties. It is approximately 380m to the east of the well pad boundary. There are a small number of other properties very near to Staining Wood Cottages at Foxwood Chase. These are a small distance further from the site than Staining Wood Cottages.

Assessing existing noise levels and ensuring control of noise at Plumpton Hall Farm and Staining Wood Cottages will ensure that other (more distant) noise sensitive premises are protected from noise from the site.

Consultee responses and representations

LCC Director of Public Health: has provided specific advice to inform the planning process and provide public health advice to protect and improve the health of local residents living near the proposed shale gas exploration sites of Preston New Road (planning application numbers LCC/2014/0096 and 0097) and Roseacre Wood (planning application numbers LCC/2014/0101 and 0102). The advice was published as a Health Impact Assessment (HIA) in November 2014.

The Health Impact Assessment makes 45 recommendations to a broad range of agencies, suggesting actions before, during and after any permissions or permits are granted. Appendix J contains 16 specific recommendations to inform the determination of this application. Recommendation number one relates to noise:

1. *Consider the need for further noise assessment, particularly on the proposed Roseacre Wood site and if necessary, require additional mitigation measures to reduce noise associated with the development of the sites and more particularly the drilling and hydraulic fracturing phases of the development and which could be controlled by conditions attached to any planning permission.*

Fylde Borough Council: objects for the following summarised reasons:

- The proposed drilling operations would be in relatively close proximity to residential properties and the noise and general disturbance from 24 hour drilling operations and associated activity would be significant.
- Contrary to Policy DM2 of the Minerals and Waste local Plan.
- Contrary to Policies EP26, EP27 and EP28 of the Fylde Borough Local Plan, which is considered to be in conformity with the provisions of the NPPF.

Fylde Borough Council also resolved that the following summarised noise related comments of the Council's Environmental Protection Team be considered:

- The exclusion of a sensitive noise receptor in the applicants noise report may mean current calculations are artificially elevated resulting in the prediction that noise levels will not exceed current background levels.
- Recommend that the applicant ensures that there are continuous sound level monitoring at the nearest residential property to ensure sound levels accord with WHO guidelines.
- The sound levels are currently less than WHO guidelines so residents may experience an increase in noise. Ideally criteria should be set such that "as a result of the activity at the site no dwelling shall experience sound levels that are more than 5dB above current background levels between 07.00 – 23.00 and no increase in background level between 23.00 and 07.00"
- Recommend that no HGVs arrive at or leave the site between 23:00 and 07:00.

Westby-with- Plumptons Parish Council: Recommends the application be refused because of noise pollution day and night from the 24hour operation.

Kirkham Town Council: Objects to the proposal on a number of grounds including noise.

Medlar-with-Wesham Parish Council: Objects to the proposal on a number of grounds including noise.

CPRE Lancashire: Is concerned about noise levels during the night for local residents and wildlife and is reassured by the commitment by the applicant not to frack outside normal working hours (viz. between 19.00 and 07.00) due to pumping equipment. To minimise noise pollution, they suggest the use of generators which

emit less than an agreed level of perceived decibels 200 metres outside the site boundary and by not using drilling equipment overnight during the period 1900-0700 hours. They also suggest that planning approval, if given, should be subject to a condition requiring these noise reduction standards.

Friends of the Earth: Local resident groups believe that the applicant may have failed accurately to identify baseline noise levels, meaning those impacts on wintering birds (and other ecology) and the steps proposed to mitigate are called into question.

Other representations

A large number of other representations raise concerns in relation to the following summarised noise concerns:

- There will be an unacceptable level of noise / noise pollution.
- The proposed times and duration for hydraulic fracturing are excessive in an area people have chosen to live in for the peace and quiet.
- A 50db noise level during fracturing is too loud to be acceptable.
- 24 hours a day of drilling, compressor and generator noise alongside associated traffic noise will disturb residents and have negative impacts on shift workers.
- Carr Bridge residential park, residents aged 55-90 years old of which many are not in good health. They chose to live on the site for the pleasant, quiet, rural location but are greatly concerned about drilling and traffic noise.
- The impact of 24/7 noise for a local autistic child will be unbearable.
- How far away will compressor stations be heard? The thump of compressors could be sensed up to 2 miles away.
- Traffic noise will affect the peace and quiet, with HGVs thundering past properties.
- The applicants EIA site noise assessment is incorrect for Foxwood Chase as the majority of residents are retired so if the noise exceeds acceptable limits it will have a significant effect on their daily enjoyment of homes and gardens.
- The applicants EIA traffic noise assessment is incorrect for Foxwood Chase as the properties are in close proximity to the site entrance and will hear HGV's and other vehicles decelerating and accelerating on entry and exit to the site, resulting in varying noise levels not constant as reported in the EIA.
- The applicants EIA traffic assessment is incorrect as the increase in traffic noise will be significant as the noise from one HGV is equivalent to noise from 10-15 cars and there will be 100 lorries per day.
- There will be a detrimental effect from noise in Great Plumpton, due to the prevailing wind blowing from the west carrying noise to the village. The ES has not provided information on noise levels for the village.
- There will be negative impacts from noise to the nearby dog kennels and the horse welfare centre.
- There is no information regarding noise from explosives detonation and impact on residents.
- The proposed site is a quiet field so the noise will be new and concentrated

- The noise of the site will impact on local residents and visitors enjoyment of the site for leisure including walking.
- There needs to be baseline and continuous acoustic monitoring at neighbouring houses.
- Cuadrilla exceeded set noise levels at Balcombe.
- The proposal will be contrary to Noise Policy Statement for England, Defra 2010 and NPPF 2012 Paragraph 144 due to observed adverse effects from large scale, long term noise duration.
- The proposal will be contrary to FBLP Policy EP27 by emitting unacceptable constant noise in a relatively quiet rural area.
- There will be unacceptable noise impacts on wildlife
- Jacobs found the background noise level at Staining Wood Cottages to be 6dB lower than that found by Arup, despite the Jacobs survey being taken at a noisier period of the night.
- The question regarding BSI 5228-1 being a suitable standard has not been satisfactorily answered.
- It is not clear if low-frequency noise generated by all aspects of the site construction and operation, and their effects on the health and well-being of nearby residents has been taken into account.
- There are still outstanding questions arising from Jacobs review of Arup's Environmental Statements.
- Baseline traffic volumes have been overestimated in the Environmental Statement throwing doubt on their findings.
- It is not clear if the change in traffic profile, and particularly the effect of accelerating and decelerating HGV's on noise and annoyance has been fully and correctly taken into account.

Policy

Paragraph 109 of the NPPF states that the planning system should contribute to and enhance the natural and local environment by *inter alia* preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability.

Paragraph 123 of the NPPF states that *planning policies and decisions should aim to:*

- *avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;*
- *mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;*
- *recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and*
- *Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.*

Assessment of 'significant adverse impacts' is directed to the DEFRA publication *Explanatory Note to the Noise Policy Statement for England*.

In the accompanying practice guidance for the NPPF the management of the noise associated with particular development types is considered in a number of separate documents. For minerals development there is National Planning Practice Guidance: Minerals (PPG).

In relation to noise the PPG states that applicants *should carry out a noise impact assessment, which should identify all sources of noise and, for each source, take account of the noise emission, its characteristics, the proposed operating locations, procedures, schedules and duration of work for the life of the operation, and its likely impact on the surrounding neighbourhood.*

Proposals for the control or mitigation of noise emissions should:

- *consider the main characteristics of the production process and its environs, including the location of noise-sensitive properties and sensitive environmental sites;*
- *assess the existing acoustic environment around the site of the proposed operations, including background noise levels at nearby noise-sensitive properties;*
- *estimate the likely future noise from the development and its impact on the neighbourhood of the proposed operations;*
- *identify proposals to minimise, mitigate or remove noise emissions at source;*
- *Monitor the resulting noise to check compliance with any proposed or imposed conditions.*

The PPG continues by adding that *Mineral planning authorities should take account of the prevailing acoustic environment and in doing so consider whether or not noise from the proposed operations would:*

- *give rise to a significant adverse effect;*
- *give rise to an adverse effect; and*
- *Enable a good standard of amenity to be achieved.*

In line with the Explanatory Note of the Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure would be above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation.

The PPG recommends appropriate noise standards and advises that *Mineral planning authorities should aim to establish a noise limit, through a planning condition, at noise-sensitive property that does not exceed the background noise level ($L_{A90,1h}$) by more than 10dB(A) during normal working hours (0700-1900). Where it will be difficult not to exceed the background level by more than 10dB(A) without imposing unreasonable burdens on the mineral operator, the limit set should be as near that level as practicable. In any event, the total noise from the operations should not exceed 55dB(A) LAeq, 1h (free field). For operations during the evening (1900-2200) the noise limits should not exceed the background noise level ($L_{A90,1h}$) by more than 10dB(A) and should not exceed 55dB(A) LAeq, 1h (free field). For any operations during the period 22.00 – 07.00 noise limits should be set to reduce to a*

minimum any adverse impacts, without imposing unreasonable burdens on the mineral operator. In any event the noise limit should not exceed 42dB(A) LAeq,1h (free field) at a noise sensitive property.

Where the site noise has a significant tonal element, it may be appropriate to set specific limits to control this aspect. Peak or impulsive noise, which may include some reversing bleepers, may also require separate limits that are independent of background noise (e.g. Lmax in specific octave or third-octave frequency bands – and that should not be allowed to occur regularly at night.)

For particularly noisy short term events such as soil stripping and road construction the PPG advises:

Increased temporary daytime noise limits of up to 70dB(A) LAeq 1h (free field) for periods of up to eight weeks in a year at specified noise-sensitive properties should be considered to facilitate essential site preparation and restoration work and construction of baffle mounds where it is clear that this will bring longer-term environmental benefits to the site or its environs.

Where work is likely to take longer than eight weeks, a lower limit over a longer period should be considered. In some wholly exceptional cases, where there is no viable alternative, a higher limit for a very limited period may be appropriate in order to attain the environmental benefits. Within this framework, the 70 dB(A) LAeq 1h (free field) limit referred to above should be regarded as the normal maximum.

Policy DM2 of the Joint Lancashire Minerals and Waste Local Plan (JLMWLP) states that development for minerals operations will be supported where it can be demonstrated that all material social, economic or environmental impacts that would cause demonstrable harm can be eliminated or reduced to acceptable levels. In assessing proposals account will be taken of the proposal's setting, baseline environmental conditions and neighbouring land uses, together with the extent to which its impacts can be controlled in accordance with current best practice and recognised standards.

Policy EP27 of the Fylde Borough Local Plan states that development which would unnecessarily and unacceptably result in harm by way of noise pollution will not be permitted. Where appropriate, planning permission will be granted subject to conditions to minimise or prevent noise pollution. This policy is considered not to be in conflict with the NPPF.

Assessment

The Environmental Statement contains a noise assessment including details of existing background noise levels at noise sensitive receptors and details of predicted noise levels from proposed operations including traffic, drilling and hydraulic fracturing. The assessment outlines the available British Standards and guidance in relation to noise measurement and recommended acceptable noise levels. From this the applicant employed noise levels based on recommendations and guidance set out in BS5228-1:2009 – *Code of practice for noise and vibration control on construction and open sites*, which the applicant considers is the most appropriate by virtue of being representative of the nature of the proposed development.

Drilling would take place for 24 hours per day. The first drilling phase would last for five months. Three other separate drilling phases would then follow. Each of the three phases would last for three months. Between each drilling phase would be a hydraulic fracturing stage that would last for two months. Hydraulic fracturing would not take place at night time, and would last for three hours per day. Cumulatively there would be 14 months of 24 hour drilling.

The applicant has advised that different stages of the proposed development would generate different noise levels and noise levels for all stages of the project have been assessed. The applicant has concluded that the only stage with the potential to result in a significant noise effect would be where hydraulic fracturing occurs during night time (2300-0700) where noise limits are at their most stringent. The applicant proposes to mitigate this by only operating the pumps used (only for up to 3 hours at a time during hydraulic fracturing) during weekday daytime and Saturday mornings.

Vibration impacts have been ruled out by the applicant because of the nature of the project, method of construction for the well pad, arrays and pipeline connection for the extended flow testing.

The assessment concludes that there would be no significant adverse impacts on sensitive receptors and consequently no further mitigation is required. Nevertheless, a number of possible noise reduction measures are suggested and the applicant has more recently stated that recommended noise limits in the PPG could be achieved.

Proposed mitigation measures for drilling include:

- Installing enclosures to mud pumps.
- Fitting noise absorbent materials to the housing containing shale shakers and generators.
- Identify items of pipework or equipment that can be fitted with rubber bushings to reduce vibration and impact noise.

Proposed mitigation measures for hydraulic fracturing include:

- Confine fracturing pumping operations to Monday to Friday 0700 to 1900 and Saturdays 0700 to 1300 only with no fracturing on Sundays or Bank Holidays.
- Installation of an acoustically designed, up to 5m high hoarding around the fracturing pumps

Additionally, real time noise monitoring could be installed throughout the development.

The applicant's background noise readings and predicted noise levels are considered to be sufficiently robust and have been verified by independent noise measurements undertaken by consultants on behalf of LCC with the exception that background noise readings were found to be lower than those set out in the ES. Furthermore, it is concluded that it is unlikely there are any tonal or impulsive aspects to the noise from the drilling rig or from the hydraulic fracturing phase of the project.

The closest residential properties to the site are at Staining Wood Cottages (270m south of the site) and Plumpton Hall Farm which includes two residential properties. It is approximately 380m to the east of the well pad boundary. There are a small number of other properties very near to Staining Wood Cottages at Foxwood Chase. These are a small distance further from the site than Staining Wood Cottages.

Background noise levels at Staining Wood Cottages have been recorded as low as 29.5 dB L_{A90} at night (LCC's own measurements) and 56 dB L_{A90} during the day. Noise from operations is predicted to raise background noise levels by approximately 12.5 dB at night.

Background noise levels at Plumpton Hall Farm have been recorded as low as 26 dB L_{A90} at night (LCC's own measurements) and 50 dB L_{A90} during the day.

The difference between existing low background noise levels and predicted noise levels is of concern. Fundamentally, the PPG states that *Mineral planning authorities should take account of the prevailing acoustic environment and in doing so consider whether or not noise from the proposed operations would give rise to a significant adverse effect and whether it would enable a good standard of amenity to be achieved.*

PPG-Minerals seeks to ensure that noise is minimised as far as practicable and it should be demonstrated that noise would be no more than 10dB above background during daytime and evening working at noise sensitive receptors (subject to a maximum of 55dB) and that for any operations during the period 22.00 – 07.00 noise would be reduced to a minimum, without imposing unreasonable burdens on their operations subject to a ceiling noise limit not exceeding 42dB(A) LAeq,1h (free field) at a noise sensitive property.

Fylde Borough Council's Environmental Health Team has commented that residents may experience an increase in noise with the proposed development and ideally criteria should be set such that "as a result of the activity at the site no dwelling shall experience sound levels that are more than 5dB above current background levels between 07.00 – 23.00 and no increase in background level between 23.00 and 07.00".

Clearly there is a balance to be struck between not imposing unreasonable burden on developers and ensuring that there would be no impact or an acceptable impact on local residents and the environment. The applicant has indicated that a range of noise attenuation measures could be employed to reduce noise levels but that further attenuation would result in unreasonable burden. What constitutes unreasonable burden has not been explained.

Notwithstanding assurances by the applicant that *PPG –Minerals* maximum noise levels could be achieved for both day and night periods, it is considered that there has not been clear demonstration that noise impacts would be reduced to an acceptable level given the low background levels in the area. Therefore it is concluded that noise from the proposed operations would be above the significant observed adverse effect level (SOAEL) as defined in the *Noise Policy Statement for England*. This is the level above which significant adverse effects on health and quality of life occur.

Conclusion

The proposed development would be contrary to Policy DM2 of the JLMWLP and Policy EP27 of the Fylde Borough Local Plan as it has not been satisfactorily demonstrated that noise impacts would be reduced to acceptable levels and would therefore unnecessarily and unacceptably result in harm to the amenity of neighbouring properties by way of noise pollution.

Appendix 14

Resources and waste

Proposal Outline

The applicant has undertaken an assessment of the management of waste, including inert, non-hazardous and hazardous waste, and including waste water. The wastes described would be solid, liquid and gas and both oil and gas are defined as minerals. The waste produced would be:

- Non-hazardous and inert waste.
- The accumulation of injected hydraulic fracturing fluid which would remain in the underground target formation and has become waste;
- Above ground hazardous waste including the temporary deposit and accumulation of hazardous waste in storage containers as the wells are successively drilled. The hazardous waste would include flow back water and drill cuttings coated with residual Low Toxicity Oil Based Muds ("LTOBM").
- The incineration by flaring of hazardous waste, namely natural gas above 10 tonnes per day, as an activity listed in schedule 1 of the Environmental Permitting (England and Wales) Regulations 2010.

The management of waste is set out in a waste management plan and subject to environmental permits that are regulated by the EA and needed by the applicant to carry out their proposed operations. The permits set out the conditions needed to manage waste and naturally occurring radioactive material (NORM). Now permits are issued, Cuadrilla will have to comply with the proposed conditions that are designed to ensure that operations do not cause harm to people or the environment.

The assessment concludes that all types of waste would not result in a significant effect; that there is sufficient capacity to treat flow back fluid even though at peak times it could use up to 68% of identified treatment capacity but which would have a significant effect. Consequently re-use of flow back fluid is proposed to reduce this effect. Fracturing at the site would be staggered with Roseacre Wood to avoid increasing weekly waste water production rates to minimise cumulative effects. In the event on site storage and treatment capacity is exceeded, operations would be suspended.

General measures would be employed to reduce the quantity of waste generated, increase the re-use, recycling and recovery of materials and improve waste management.

Policy

National Planning Policy Framework (NPPF)

Paragraphs 11-14	Requirement for Sustainable Development
Paragraph 17	Core Planning Principles
Paragraphs 56-66	Requirement for Good Design

National Planning Policy Guidance (NPPG)

Water supply, wastewater, water quality Quality and infrastructure

**Joint Lancashire Minerals and Waste Development Framework Core Strategy
Development Plan documents (LMWDF)**

Policy CS1	Safeguarding Lancashire's Mineral Resources
Policy CS5	Achieving Sustainable Minerals Production

**Joint Lancashire Minerals and Waste Local Plan – Site Allocation and
Development Management Policies – Part One (LMWLP)**

Policy NPPF 1	Presumption in favour of sustainable development
Policy DM2	Development Management

Fylde Borough Local Plan

Policy EP23	Pollution of Surface Water
Policy EP24	Pollution of Ground Water
Policy EP26	Air Pollution

Summary of consultee comments and representations

LCC Director of Public Health: Has undertaken a Health Impact Assessment (HIA) on the two drill sites and identified that the key risks to health and wellbeing of the population from the two proposed sites are a lack of public trust and confidence in the regulatory process and the industry, stress and anxiety from uncertainty about the industry that could lead to poor mental wellbeing; potential noise related health effects due to continuous drilling for at least five months for the initial borehole on each site and for three months for each of the subsequent three boreholes per site (14 months of continuous drilling), and potential health risks due to the presence of mining wastes generated as part of the drilling and hydraulic fracturing process being retained on site if adequate off site treatment facilities are not found.

As part of the recommendations it is recommended that:

11. Further clarification or new information on the occurrence and magnitude of equipment likely to be contaminated with radioactive waste and how such waste would be managed on the site and disposed of should be sought.
12. Should planning permission be granted, it should be a pre requisite that no activity can start until the onsite and offsite waste treatment capacity is defined.

Westby-with- Plumptons Parish Council: Objects. Recommend the application should be refused for a number of reasons including the following specifically to resource and waste:

- Air pollution to any degree is unacceptable.
- Concerns regarding water contamination and the disposal of contaminated water.

Medlar-with-Wesham Parish Council and Kirkham Town Council: Recommend the application should be refused for a number of reasons including the following specifically to resource and waste:

- Potential flow back water site leakages and spillage during disposal and transportation.
- No information on water treatment plans. Where will flow back water be treated and will any new treatment plan accept waste from other UK sites.

Friends of the Earth: has objected to the proposal and further information for a number of reasons including waste. They have also commissioned consultants to advise on waste. The reasons for objecting are summarised as follows:

- Insufficient information on how overflow water and wastewater discharges, and pollutants, will affect the local environment and protected sites.
- Management of contaminated wastewater is wholly inadequate. There is a lack of treatment centres, resulting in potential capacity issues, especially if flow back rates are higher than estimated. This is not an adequate solution.
- Contrary to Planning Policy (Statement 10) as the application produces huge quantities of waste.
- It is unclear what waste quality standards would be applied by the applicant to ensure that concentration of pollutants in the wastewater did not accumulate beyond safe levels as a result of re-use for fracking and how risks to the environment and health and safety would be mitigated.
- Further investigation is required before the Council can lawfully grant an application to drill.
- Legacy of underground waste which will be present is denied, not a temporary development as it will create permanent contaminated wastewater
- Risks from flow back fluid and waste water.
- Risks of storage of waste to protected ecological areas.

Concerns have been expressed in representations received objecting to the proposal relating to the production, management and transportation of waste and the location and capacity of waste management facilities.

- Huge amounts of toxic/hazardous waste and waste water will be produced with inadequate measures in places to treat and dispose of it.
- Significant risks associated with its waste transportation and disposal.
- Risk of a devastating impact on local environment from waste management.
- There are no adequate treatment facilities / insufficient capacity for huge volumes of hazardous and contaminated waste with radium.
- Burying radioactive waste in landfill sites is ridiculous.
- How can massive amounts of waste water be disposed of without significantly affecting the landscape.
- How will large volumes of waste water be managed in times of heavy rain and localised flooding.
- Flowback fluid recycling risk assessment does not recognise resultant flow back waste will have increased toxicity /chemical composition.
- DECC has said that there is no clear and safe way to treat flowback water.

- Flow back water from Preese Hall, when tested at Davyhulme was too toxic to treat, so returned to Preese Hall.
- Safety concerns over separating process for flow back fluid.
- Cuadrilla has dumped thousands of gallons of contaminated waste water into Manchester Ship Canal (from Barton Moss) and was allowed to get away with it. The EA cannot guarantee that this will not happen again.
- Flowback fluid will be 'lost' to avoid expense of disposal. How can this be regulated?
- Waste products will be stored in sealed containers which demonstrates Cuadrilla have no idea how to treat waste
- Toxic waste will be stored near schools and residential areas
- Risk of children jumping into a cavern of chemically poisoned water
- Potential unknown hazards will be transported on roads as the waste will not have been analysed instantly on site.
- US have documented accidents and spills from transportation of shale gas waste materials.
- Is there sufficient security to keep hazardous waste from being misused.

Assessment

An assessment of the proposals has been carried out. With regard to inert, non-hazardous and hazardous waste associated with the construction, drilling, hydraulic fracturing, initial and extended flow testing and decommissioning it is considered that subject to compliance with the permits issued by the EA the quantities generated would not result in a significant effect.

The treatment of the quantity of waste water generated by the project would result in a significant effect and so mitigation to reduce this effect is proposed to include recycling of flow back water and staggering of operations. In particular there would be a requirement, wherever possible, to re-use the flow back fluid once the gas has been separated. This would reduce the amount of waste which needs to be disposed at an offsite facility. About 10-40% of the injected fluid is predicted to return to the surface.

The applicant proposes to leave some fracture fluid deep underground. The EA is of the view that leaving some of the retained fluid in situ is the 'Best Available Technique'. The EA has assessed the components of the fluid to be used in fracking process and is satisfied that it is non-hazardous. They are also satisfied that the fluid that would be retained underground would be non-hazardous and that over time the retained fluid would become indistinguishable from the water already present in the target formation.

Naturally occurring radioactive material (NORM) is present in many geological formations including oil and gas bearing strata such as shale formations. The flow-back fluid that returns to the surface following hydraulic fracturing as well as the sediments and scales in gas or water process vessels, is likely to contain sufficient NORM that it will be classed as radioactive waste. The level of radioactivity is considered to be extremely low. The EA has assessed the impact and proposals for NORM disposal and is satisfied that the applicant has demonstrated that it can have

suitable arrangements in place with licenced waste disposal companies for its treatment.

Drill cuttings can be contaminated with hazardous waste. All hazardous waste must be stored in solid steel containers which are subject to inspections. The EA has advised that they are satisfied with the proposed arrangements.

With regard to representations received, it is considered that waste can be acceptably contained and that there are available facilities with capacity to accommodate the waste to which safe purpose designed transport would deliver it. The permit restricts the available storage on site and the continued production of such in the event off site facilities were unavailable. The site can be contained in a way top prevent discharge or over spill off site and provide secure storage facilities. The permit applies the necessary controls on waste quality standards. There would be no risk of migration of fracking fluids that could result in cross contamination of water resources and leaving fluids in the ground would not result in contamination in their own right. The waste is not toxic and would not be stored close to residential properties or schools and the site would be secure preventing unauthorised access.

Paragraph 122 of the NPPF requires that planning authorities should not seek to control processes or emissions were these are subject to approval under separate pollution control regimes and that LPA's should assume that these regimes will operate effectively. Nonetheless, paragraph 112 of PPG Minerals, notes that before granting permission the local planning authority should be satisfied that the issues dealt with under other regimes can be adequately addressed by taking advise from the relevant regulatory body'. The County Council has consulted with the EA and which has not objected.

The EA has granted the environmental permits needed to carry out the proposed operations. The permits set out the conditions needed to manage waste and NORM. Now permits are issued, the applicant will have to follow the proposed conditions that are designed to ensure that operations do not cause harm to people or the environment.

The EA is satisfied that the permit and associated conditions will require that extractive wastes are managed in a way that minimises harm to human health and the impact on the environment. The operator has demonstrated this through a waste management plan that accompanies the permit. The EA is satisfied that the proposals are in line with the waste hierarchy.

Conclusion

Resource and waste issues have been assessed by the applicant. It is considered that the quantity of inert, non hazardous and hazardous waste that would be generated along with the quantity of wastewater and industrial waste water would not result in a significant effect. The EA has been consulted and has advised on the regulatory regime that would be employed to manage the risks and that they are satisfied that that such risks could be managed in a way that would not cause any unacceptable impact. It is considered that the waste can be managed in an acceptable way. The County Council should assume that these regimes will operate effectively and can be satisfied that the issues dealt with under other regimes can be adequately addressed. It is considered that the proposal could be acceptably controlled by other regulatory regimes and would not have any unacceptable impacts

and would comply with national guidance and policies and the policies of the development plan.

Appendix 15

Transport / Access Issues

Proposal

The applicant proposes to access the site via a new access from the north side of the A583 (Preston New Road). Traffic to the site could travel either east or west along the A583 in order to gain access to the M55 at junctions 3 or 4. Both routes to the motorway are comprised of major roads and would not require HGV traffic to pass through major built up areas.

The access would be created by breaking through the existing hedgerow on the north side of the A583 to create an access point of sufficient width to allow two way passages of HGV's. The access road to be surfaced to withstand HGV traffic would then lead to the site compound. The works to create the access would require the removal of approximately 190m of hedgerow including two trees in order to create the required visibility splays.

In the vicinity of the site access, the A583 has a large central hatched area arising from when the road used to have three lanes with a central overtaking lane. The applicant proposes to use part of the central hatched area in order to create a right turning lane for vehicles entering the site from the east.

The ES includes an assessment of traffic impacts which includes details of the anticipated traffic flows and an assessment of likely impacts in terms of highway capacity and safety.

The traffic movements associated with the development would vary over the duration of the project depending upon the activities being undertaken. During stage 1 (construction of the site), which would last approximately 2 months, there would be an average of 22 two way HGV movements per day (maximum of 48). During stage 2 (mobilisation of rig, drilling of first borehole and demobilisation of rig) lasting five months, there would be an average of 14 two way HGV movements (maximum of 50). For drilling of the subsequent three wells, the duration of the movements would be over a shorter period of three months but would equate to around 17 two way HGV movements per day. For hydraulic fracturing, (taking one to two months for each well) the average two way HGV movements would be around 10 per day. For the initial flow testing, (around three months), it is anticipated that the average two way movements would be around 5 per day. The extended flow testing would generate minimal HGV movements whilst the decommissioning and restoration of the site over approximately 2 months would generate an average of 22 two way HGV movements.

The peak traffic flows will occur as a result of combined traffic associated with activities at more than one well. The total traffic numbers in the ES are based on such conditions. The peak traffic generated would be around 50 two way HGV movements per day which would occur for around one week on eight occasions over the life of the project.

The forecast traffic flows are below the thresholds in Department for Transport Guidance for Transport Assessments which define when a full transport assessment is required. The main traffic impacts arising from the development therefore relate to the size of vehicles rather than vehicle numbers. The assessment has therefore concentrated on selection of the appropriate access routes to the site.

Policy

The policies of the NPPF support sustainable development as does policy NPPF 1 of the Joint Lancashire Minerals and Waste Local Plan – Site Allocation and Development Management Policies. Policy DM2 of the Joint Lancashire Minerals and Waste Local Plan – Site Allocation and Development Management Policies seeks to ensure that proposals do not have an unacceptable impact on amenities.

Summary of consultations and representations

The Highways Agency has raised no objection subject to the traffic levels not exceeding those predicted for the strategic highways network and that the costs of any mitigation to the highway assets needs to be covered by the instigator should damage occur due to project activities

LCC Developer Support (Highways): No objection subject to conditions and notes. The proposal is temporary in nature. The proposed access routes are via A583 Preston New Road from both the Preston and Blackpool directions as well as utilising the M55 via junctions 3, near Medlar, and Junction 4 (Peel Hill). The M55 forms part of the Strategic Road Network and the Highways Agency have indicated the presented forecast volume of traffic generated by the development would not be likely to result in a material impact upon their network.

The A583 Preston New Road is a principal Distributor Road between Blackpool and Preston and it is considered that the increase in traffic from the proposal (which includes a large proportion of HGV's) can be accommodated on this part of the network.

The existing traffic figures on the network and the forecast volume generated by the development are presented in the submitted Transport Statement. The ES includes a number of tables that highlight 12hour traffic data for HGV's and total vehicle flows (2way); and also peak hour (pm) flow which is compared against the theoretical capacity of the highway. The ES provides levels of generated HGV's and light vehicles for a number of key stages being:

- Site set up/construction,
- Drilling (of wells),
- Fracturing,
- Testing, and
- Decommissioning

The information presented within the ES has been considered and additional analysis of potential generated trips per day for each phase which has resulted in differing numbers of vehicles. Forecasting for each stage includes greater levels of

deliveries/servicing (HGV's), security, visitors and staff which are considered reasonable. In addition the influence of program slippage (daily) has been considered as well as uncertainty during the fracturing stage. In addition the impacts during the peak period/hours have been considered. It is concluded that the impacts would be higher, the following simple table highlights that presented in the ES, the forecasts and the net difference.

Comparison of Environmental Statement Daily Maximum Data (2way) and that Considered by LCC Based on the Above Influences								
Stage	Description	ES			LCC			Net Increase
		Light	Heavy	Total	Light	Heavy	Total	
1	Set up/Construction	12	48	60	38	58	96	36
2	Mobilisation	32	40	72	48	46	94	22
	Drilling	36	36	70	50	38	89	19
	Demobilisation	32	50	82	48	53	101	19
3	Mobilisation	22	27	43	36	41	77	34
	Fracturing	30	24	54	35	36	71	17
4+	Impacts lower than those highlighted above							

These (LCC) maximum daily flows highlighted above, are not at a level that are a significant cause for concern when location and appropriate routeing options to access the site without conflict or compromising the surrounding network or environment is considered. This assumes that suitable access is delivered together with other supporting changes.

The ES included limited information on peak periods. The peak hours for the highest occurring stage which results in the demobilisation (and cleanout) stage (as highlighted in bold in the table), which is expected to last for 2 days.

Assuming that a daily profile based 30-35% of all HGV's and 45% of all cars arriving and departing in each peak period that lasts up to 90mins with the remaining 30-40% of HGV's and 10% cars being prorated throughout the day. Based on this would result in up to 14HGV and 14 cars movements (2way) during each peak hour. As above, these (LCC) maximum hourly flows are not at a level that are a significant cause for concern when location and appropriate routeing options to access the site without conflict or compromising the surrounding network or environment is considered. This assumes that suitable access is delivered together with other supporting changes.

Given the differences in assessment flows an area wide Monitoring Regime should be put in place to provide detailed information regarding actual traffic generated by the proposal by type including time of day. This would help to identify if any changes to the site operation or routeing in line with background changes and this information could be used by the developer to better inform any future, similar, proposals for exploration/monitoring at other sites.

Given the increase in HGV numbers it is also considered appropriate for a road condition monitoring regime to be put in place and which would ensure the condition

of the local highway in the vicinity of the site is monitored and maintained as appropriate.

There are very limited pedestrian movements in location of the site access. There are no Public Rights of Way or Bridleways in the immediate vicinity of the site or the site access. A footway is present on the south side of the A583. There are road cycle lanes in both directions on A583 Preston New Road in the vicinity of the proposed site access. The on road cycle lanes should be maintained at 1.5m through the proposed site access and the detailed design, to be agreed, should include measures to enhance the visibility and safety of the on-road cycle lanes. This should include cycle symbol markings, coloured surfacing and signing.

Accident Data has been provided in Appendix C of the Transport Statement for a five year period between 2008 and 2013. In the study area there were four accidents in the last five years. With consideration for the existing accident record it is not expected that the increase in traffic from the proposal will have a material impact on safety on this part of the network.

The proposed main site access is shown in ARUP drawing, Figure 2 of the Transport Statement (Drawing PNR-ARP-CH-001)

A secondary access is proposed some 800m to the west. This 'Farm Gate' style access is only to be used by National Grid for occasional maintenance purposes. This access is shown in ARUP drawing, Figure 3 of the Transport Statement (Drawing PNR-ARP-CH-002).

The speed limit on the A583 in the vicinity of the proposed junction is 50mph. Visibility splays of 4.5m x 215m have been agreed in each direction and should be provided and maintained for the duration of the use of the site access. In addition suitable junction turning radii will be required to allow large vehicles to enter/exit the junction without undue delay on the mainline which would impact on the safe operation of traffic on the A583. The junction layout to allow for a HGV to enter at the same time as a second HGV is waiting to exit.

The layout of the site access road is shown it to be proposed as 4m wide. This is not adequate to allow two HGV's to pass and would result in large vehicles waiting on the main A583 carriageway and which would not be acceptable). Adequate road width is required exiting/entering the highway for a distance on the access road that includes sufficient space for waiting HGV vehicles to ensure no parked/stationary vehicles on the public highway (at any time).

The Stage 1 Road Safety Audit has identified that the existing centreline and hatching markings mean that some drivers/riders may attempt to overtake close to the site access. The main road right turn facility should be protected by a double white line system on both approaches. This needs to be delivered by the development as part of the offsite highway works.

Advanced warning signs will be required to inform road users of the new road layout ahead and any necessary signing will be incorporated into the detailed design of the main access junction, which is to be delivered as part of a s278 agreement.

Parking on site must be adequate to ensure that site vehicles do not park, even temporarily, on the A583 or on the site access road thus impacting on the safe and efficient movement of the highway network.

In regard to the dirt and dust created by site construction and exploration works traffic, this will need to be managed. Wheel washing facilities will be necessary and this should be controlled by an appropriate condition.

Should planning permission be granted conditions relating to details required to be submitted for the construction of the access points to the site, the internal access road, traffic management plan, off site highway works, construction method statement, monitoring of highway conditions, provision of drainage, and measures to prevent air and ground and surface water pollution should be imposed.

Westby-with- Plumptons Parish Council and Medlar-with-Wesham Parish Council and Kirkham Town Council: Object to the proposed increase in HGV movements and the associated impact on the highway and amenity of nearby residents. CPRE propose that heavy good vehicles servicing the site should not operate or park in the vicinity of the site (but may park on the site) during the overnight period 2100-0700 and that the operator should not move heavy plant or equipment to or from the site during the same period without the consent of the Highway Authority. In addition, operation procedures provide for and ensure the use of wheel cleaning equipment for vehicles leaving the site and ensure that the local highways are kept clear of mud and debris emanating from the site

LCC Director of Public Health: has requested that a full assessment of the impacts of additional traffic associated with the proposals on road safety should be carried out and appropriate traffic management options considered to address the public concerns. Further, should planning permission be granted, provision should be made with the applicant to maintain road safety, and road safety and any related incidents on the access to both the sites should be monitored.

Representations have been received objecting to the proposal principally due to the increased numbers of HGV's travelling to and from the site delivering materials and the risks associated with such, primarily associated with waste water from the fracturing operations.

Concern is expressed to the site access and the conflicts it would cause with existing traffic, pedestrians, horse riders, bus services and bus stops and local access issues for residents at Foxwood Chase and Carr Bridge Park and the impacts on the amenities of nearby residents due to the increase in numbers of vehicles and associated noise and vibration.

It is maintained the proposal would be contrary to policies SP7 and SP9 of the Fylde Local Plan.

Assessment

The site is located on the A583 which is a major highway carrying around 13,000 vehicles per day including over 250 HGV's. The proposed development would therefore only increase total traffic on this road by around 1%. The increase in HGV's would be greater but would still be within the carrying capacity of this road. In either direction, the A583 enables access to the motorway network without passing any major residential communities or locations with established highway safety of capacity issues and therefore either route to the M55 is considered to be an acceptable route for the traffic that would be generated by this proposal. LCC Developer Support (Highways) considers that the proposed routing and existing highway network is capable of accommodating the predicted traffic levels for each phase of the proposed development over a temporary period. It is recommended further details would be required regarding the construction of the access points to the site, the internal access road, traffic management plan, off site highway works, construction method statement, monitoring of highway conditions, provision of drainage and measures to prevent air and ground and surface water pollution and which could be required by condition.

In terms of detailed design, the applicant proposes to modify the existing road markings on the A583 in the vicinity of the proposed access so that part of the existing cross hatched area in the centre of the road is converted into a dedicated right turn lane. Such arrangements would prevent traffic delays on the A583 caused by vehicles turning into the site and would also enhance road safety. The design of the junction has been the subject of a safety audit which has recommended that the right turn facility be protected by no overtaking lines on the approach to the junction and also to ensure that the lanes past the central refuge are of adequate width to ensure cyclist safety is not compromised.

The Highways Agency is satisfied the strategic network can accommodate the proposed increase in traffic and subject to conditions relating to the access, LCC Developer Support (Highways) is satisfied the access could be safely accommodated.

The site would generate an increase in HGV movements on the strategic highway network but which it is considered capable of accommodating. The proposed route via the motorway network would be acceptable and would not pass through any major residential areas. There would be some localised impact on the nearest residential properties at Foxwood Chase but the impacts associated with such for a temporary period on a strategic highway are not considered to be so great as to constitute a sustainable reason for refusal. It is considered there would be no greater impact on residents at Carr Bridge as a result of the increase in traffic. Such an increase would be temporary and relative to different phases of the development unlike increases in traffic associated with more permanent forms of development. The policies referred to are not relevant to developments of this nature.

It is therefore considered that the proposal would not generate unacceptable increase in vehicle movements, that the existing highway could accommodate such and consequently the proposal would not be in conflict with the policies of the development plan.

Conclusions

The proposed route via the motorway network would be acceptable and would not pass through any major residential areas. There would be an increase in HGV movements on the strategic highway network but it is considered there is sufficient capacity to accommodate such.

There would be some localised loss of amenity as a result of an increase in movements, most particularly to those residential properties close to the access, but this would be for a temporary period; it is considered that such impacts would not be so great as to constitute a sustainable reason for refusal.

Subject to conditions regarding the construction of the access points to the site, the internal access road, traffic management plan, off site highway works, construction method statement, monitoring of highway conditions, provision of drainage and measures to prevent air and ground and surface water pollution, restricted hours of operation, vehicle cleanliness and replacement of any lost hedgerow, it is considered that the development would be acceptable in terms of highway safety and capacity issues and would not be in conflict with the policies of the development plan.

Appendix 16

Water Resources

Proposal Outline

The applicant has undertaken an assessment of the impact of the proposal on water supplies and surface water runoff or drainage and the consequent impact on flood risk. As a result there are no existing hard surfaces that could impede rainwater from entering the soil or exacerbate surface water flooding. The Site is not located within an area prone to flooding from rivers (the nearest watercourse to the Site is Carr Bridge Brook which is located 250m north).

The construction of the well pad would include the installation of an impermeable plastic membrane to be laid to prevent infiltration from the well pad through the underlying soils and water bodies. A min 300mm thick layer of crushed and compacted stone would be laid on top of the membrane. Ditches would be constructed around the perimeter of the well pad with the outer edge of the ditch raised 50mm above the well pad surface. The ditches would provide the means to collect storm water. The void space in the granular fill, ditches and the 50mm "air freeboard" would provide a storage volume to attenuate drainage flows from the site.

An isolation valve would be fitted to the discharge pipe from the site. During drilling and hydraulic fracturing operations, the valve would be closed preventing storm water from leaving the site. During these periods storm water would be removed by tanker to a licenced wastewater treatment works. At other times when the water quality in the ditch system meets the requirements of EA the site would drain freely to Carr Bridge Brook. An interceptor installed at the outfall would provide further security that discharges to watercourses would meet quality criteria.

The water requirements for the Project would be provided by a pipe connection to an adjacent United Utilities (UU) water main. Cuadrilla has consulted with UU to confirm that they could provide the quantity and flow rate of water needed for the Project. UU have confirmed that this supply would not affect their current customers (including residential properties). The use of mains water negates the need to transport water to the site by tanker to reduce transport impacts. Estimated daily water use during hydraulic fracturing activities has been reduced from $765^3\text{m} \text{ per day}$ to $600^3\text{m} \text{ per day}$ by reducing the proposed number of hydraulic fracturing stages and reusing flow back water to make up part of the fracturing fluid for the subsequent fracturing stages. Flowback fluid would be subject to physical treatment using ultra violet disinfection to control bacterial growth. If possible collected storm water would also be used to make up part of the fracturing fluid volume.

The assessment concludes that subject to such measures the proposed development would not have a significant effect on surface water runoff, drainage or water supplies.

Summary of consultee comments and representations

United Utilities PLC (UU): No objection subject to the inclusion of a specific worded condition to protect assets in Preston New Road from HGV movements.

With regards to water supply to the site, UU has advised that the principal water demand would be during the hydraulic fracturing operations. During other times, water would be required to support the drilling operation, site cleaning and welfare operations. The water demand during hydraulic fracturing operations is anticipated to be approximately 765m³ of water per day (a maximum of one hydraulic fracturing stage will be carried out in a single day). This water would be supplied from the United Utilities (UU) potable water network.

UU have confirmed that the 15" trunk main to the western corner of the site has the capacity to supply the site without restrictions (see Appendix 5 of the application ES for confirmation). UU have reported that the main has a history of bursts so installation of a pressure management valve (PMV) and flow meter would be required in order to reduce the burst risk. UU have also stated it may be possible to re-zone their network so the site would be the only user of the main.

To meet the current and future water quality needs of their customers across the Fylde, as well as fulfilling their obligations to their quality regulator (the DWI), a circa £13 million scheme to clean and upgrade the Lytham pipeline, which runs from Singleton into Blackpool is currently being planned. To allow for this work to take place a new 630mm water supply main section is being installed; the main will be completed in 2015. Consequently a new water supply point of connection has been identified on the new stretch of water main.

To facilitate the water supply needs of the temporary shale gas exploration scheme, and maintain the integrity of the new main an additional connection point is to the installed (at the Applicant's expense) while the main is being laid. A separate metered supply to each unit will be required at the Applicant's expense and all internal pipe work must comply with current Water Supply (Water Fittings) Regulations 1999

Medlar-with-Wesham Parish Council and Kirkham Town Council: Objects to the proposal for a number of reasons including the potential impact on resident's water supplies; potential well failure and the huge potential for land contamination, particularly to aquifers and agricultural land; and potential flow back water site leakages and spillage during disposal and transportation.

Westby-with-Plumpton Parish Council: Objects to the proposal for a number of reasons including the potential impacts on the natural drainage system and potential damage to any asbestos in the underground system; and concerns regarding water contamination and the disposal of contaminated water.

Public Health England (PHE): Has raised no objection subject to the local planning authority being satisfied on a number of issues including the proposed definition of significant variation for other determinants regarding....and surface water and ground water potential contaminants.

Environment Agency (EA): No objection in principle and recommends the following:

- A scheme to dispose of surface water between the drill pad and Carr Bridge Brook to be submitted to ensure the proposed development does not increase the risk of pollution to Carr Bridge Brook.
- Routine monitoring of on-site surface water quality and maintenance, and inspection of surface water drains, valves and interceptors to ensure correct and efficient operation.
- Surface water run-off retained on site during operations to be tankered away for off-site disposal and to not be discharged to the watercourse.
- To consider whether the Control of Pollution (Oil Storage) (England) Regulations 2001 apply. If not any facilities, above ground, for the storage of oils, fuels or chemicals to be sited on impervious bases and surrounded by impervious bund walls.

With regard to flood risk the EA confirmed that the proposed development is located in Flood Zone 1 which is defined as having a low probability of flooding in the National Planning Practice Guidance. The Agency has reviewed the Flood Risk Assessment submitted with the application and is satisfied that the development would not be at risk of flooding or increased flood risk off-site.

With regard to radon release during the flaring of gas, the Environment Agency confirmed that radon is exempt from their permitting by the Natural Gas Exemption Order 2002 and from regulation under the Environmental Permitting Regulations 2010. This is on the basis of its low risk, widespread use and that it was not amenable to regulation. Discharges of radon in natural gas, being flared or vented at gas sites is not subject to regulation under radioactive substances regulation (RSR).

Friends of the Earth: have raised objection on a number of issues including the impact of the proposal on groundwater, flooding and water resources for the following summarised reasons:

- Potential groundwater contamination as a result of mechanical failure of equipment, well integrity issues, membrane defects, well degradation, geological faults, and increased run off leaving the site.
- Watercourses could be conduits transferring contamination to other areas.
- Where there is a risk of significant adverse impact on surface water quality then the development is only acceptable in terms of the Water Development Framework in the circumstances set out in the River Basin Management Plan for the North West.
- Risk of flooding to Carr Bridge Residential Park and Moss House Lane properties.
- The EIA does not consider impacts on water circulation from polluted water and the unsustainable use of water, given the large amounts of water required
- Risks to the availability of water supplies and water pressure problems for nearby residents.

Representations include objections relating to water resources, drainage and flooding for the following summarised reasons:

- Excessive amounts of a scarce resource, fresh water, will be used.
- Existing water suppliers and handlers may struggle to cope.
- Public drinking water must be preserved at all costs and not depleted particularly in times of drought.
- Vast amounts of water should not be utilized for gas drilling, especially given water shortages in recent years
- Water usage is unsustainable, it should be safeguarded
- Why not use saline water?
- The mains water supply in the area has a history of bursts and poor water pressure and fracking will deteriorate if further.
- The negotiations and works by United Utilities are not clear or complete.
- Drinking water is more important resource than gas. Risk of contaminating water supply is too big a risk.
- Need more work to establish the safety of the process in relation to ground water contamination.
- Need baseline and continuous groundwater monitoring with work suspended if contamination / adverse effects are found.
- Monitoring wells for groundwater quality and gas concentrations should be mandatory.
- Even if tightly regulated an unforeseen accidental discharge could contaminate groundwater and the damage cannot be rectified.
- Millions of litres of polluted / toxic water will be left to drift underground, approximately 30miles around each well with long term damage.
- Faults can act as conduits and enable fracking fluids to migrate to water sources.
- Excessive rain could impact on the containment capacity of the well pad. Land adjacent to Carr Brook and Moss House Lane already prone to flooding.
- Proposed site is on a hill and any polluted waste water will leach into dykes and waterways including Carr Brook, and into farm land and out into the River Ribble.
- Preese Hall well was damaged and toxic waste water could be leaking into dykes and streams feeding into the River Wyre.
- The Water Framework Directive requires that a development should not go ahead unless it is proven that there is no risk to groundwater.
- Contrary to FBLP Policy EP24 as water quality will be affected by leaking wells.

Policy

National Planning Policy Framework (NPPF)

Paragraphs 11-14	Requirement for Sustainable Development
Paragraph 17	Core Planning Principles
Paragraphs 100	Flood Risk
Paragraph 103	Requirement for Flood Risk Sequential Test

Technical Guidance to the NPPF: Flood Risk and Minerals Policy

Paragraphs 5	Flood Risk
Paragraphs 20-51	Minerals Policy

National Planning Policy Guidance (NPPG)

Flood Risk and Coastal Change	Flood Risk Assessment
Water supply, wastewater, water quality	Quality and infrastructure

Joint Lancashire Minerals and Waste Local Plan – Site Allocation and Development Management Policies – Part One (LMWLP)

Policy NPPF 1	Presumption in favour of sustainable development
Policy DM2	Development Management

Joint Lancashire Minerals and Waste Supplementary Planning Guidance

SPD	Oil and gas exploration, production and distribution (draft)
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Fylde Borough Local Plan

Policy EP23	Pollution of Surface Water
Policy EP24	Pollution of Ground Water

Assessment

An assessment of the potential impacts of the proposal on water supplies and surface water runoff or drainage and the consequent impact on flood risk has been carried out. UU has confirmed that the water required for the hydraulic fracturing process would be sourced from a 15" trunk main located to the western corner of the site which has the capacity to supply the site without restrictions to their potable water network. The applicant has also confirmed that flow back water would be reused in the next hydraulic fracturing event. The direct source of water from the mains would reduce the amount of HGV movements to and from the site and the reuse of flow back water would reduce the amount of water required.

The site would be constructed on an impermeable membrane laid to prevent infiltration from the well pad through the underlying soils and water bodies. Ditches would be constructed around the perimeter of the well pad with the outer edge of the ditch raised 50mm above the well pad surface. The ditches would provide the means to collect storm water. The void space in the granular fill, ditches and the 50mm "air freeboard" would provide a storage volume to attenuate drainage flows from the site.

An isolation valve fitted to the discharge pipe from the site would prevent storm water from leaving the site during drilling and fracking operations. During these periods storm water would be removed by tanker to a licenced wastewater treatment works. At other times when the water quality in the ditch system meets the requirements of EA the site would drain freely to Carr Bridge Brook. An interceptor installed at the

outfall would provide further security that discharges to watercourses would meet quality criteria.

The EA has raised no objection in principle subject to conditions requiring a scheme to dispose of surface water between the drill pad and Carr Bridge Brook to ensure the proposed development does not increase the risk of pollution to Carr Bridge Brook; routine monitoring of on-site surface water quality and maintenance, and inspection of surface water drains, valves and interceptors to ensure correct and efficient operation; surface water run-off retained on site during operations to be tankered away for off-site disposal and to not be discharged to the watercourse; and facilities, above ground, for the storage of oils, fuels or chemicals to be sited on impervious bases and surrounded by impervious bund walls.

With regard to flood risk the EA confirmed that the proposed development is located in Flood Zone 1 which is defined as having a low probability of flooding in the National Planning Practice Guidance. The EA has reviewed the Flood Risk Assessment submitted with the application and is satisfied that the development would not be at risk of flooding or increased flood risk off-site.

With regard to representations received measure would be in place to contain the site and prevent increased run off leaving the site thereby preventing the risk of contamination to ground and surface water and the nearest watercourses. The site falls with a Flood Zone 1 which is defined as having a low probability of flooding in the National Planning Practice Guidance. The EA is satisfied that the development would not be at risk of flooding or increased flood risk off-site. There would therefore be no risk of flooding to Carr Bridge Residential Park and Moss House Lane properties. UU has confirmed that the proposal would have no impact on potable water supply or the supply of water to residential properties and for which upgrades to the current system are currently being put in place. Flow back water will be reused to minimise the use of potable water. The aquifer is saline and not used for potable water. The reasons for objecting to the proposal on the potential impacts on water supplies and surface water runoff or drainage and the consequent impact on flood risk cannot be supported.

Conclusion

It is concluded that the proposal would have no adverse effect on potable water supply and would not be an unacceptable use of potable water. Flow back water would be reused resulting in lower quantities of potable water being required. Water will be supplied direct to the site thereby reducing the number of HGVs travelling to and from the site.

The site would be contained and managed to ensure the protection of surface and ground water and nearby water courses. The site is in a Flood Zone 1 which is defined as having a low probability of flooding. The EA has reviewed the Flood Risk Assessment submitted with the application and is satisfied that the development would not be at risk of flooding or increased flood risk off-site.

The development is therefore considered to comply with the national guidance and policies and the policies of the development plan.

Appendix 17

Public Health

Proposal

The applicant has provided an overview of potential public health impacts relevant to the proposal. The overview is set out as a separate chapter in the Environmental Statement (ES). The applicant also sets out an assessment of any potential public health impacts in each of the various chapters of the ES (e.g., noise, air quality, water, etc).

In February 2014, Public Health England (PHE) identified a range of public health concerns that should be addressed in the preparation of the applicant's ES. This was in response to the scoping opinion request by the applicant. PHE raised the following points:

- Identification of where within the ES receptors that could be affected by health impacts are identified;
- Highlighting where, within the ES, the impacts from construction decommissioning have been assessed;
- How potential health impacts relating to emissions to air and water have been assessed and where in the ES these are documented;
- Specific issues concerning emissions to air;
- Specific issues concerning emissions to water;
- How potential health issues relating to land quality and contamination have been assessed;
- How potential health issues relating to waste management have been assessed;
- Other health related issues such as the management of pollution incidents, the regulation of the site and how potential public stress and anxiety have been taken into account by the Project; and
- The organisations that have been consulted regarding health related issues during the EIA process.

The following issues have been explored in detail by the applicant in separate chapters of the ES, and have also been summarised in an overview section of the ES on public health (chapter 20).

- Noise;
- Air quality;
- Water (surface and groundwater);
- Perception effects
-

This report and its appendices similarly makes an assessment of the applicant's proposal in separate sections (e.g. noise, air, water, etc) and provides an overview in this appendix on public health.

Noise

The site is located away from residential properties. The noise impact of the project has been assessed in the Noise Chapter (Chapter 16 of the ES).

Baseline noise levels have been established by a measurement survey by the applicant. This data is used to assess the potential significance of any effects. The site is in a rural location. However the proximity of the M55 to the north and A583 to the south means that during the day time road noise is a feature of the current environment.

Different stages of the project will have different noise levels. The noisiest activities are most likely to occur within the first two to three years of the project. However, the noise levels for all stages of the project have been assessed by the applicant.

The applicant concludes that only stage with the potential to result in a significant noise effect is where hydraulic fracturing occurs during night time (2300-0700) where noise limits are at their most stringent. This will be mitigated by only operating the pumps used (only for up to 3 hours at a time during hydraulic fracturing) during weekday daytime and Saturday mornings. Vibration impacts have been ruled out by the applicant because of the nature of the project, method of construction for the well pad, arrays and pipeline connection for the extended flow testing.

The Roseacre Wood and Preston New Road sites are sufficiently distant from one another that there will not be combined or cumulative lighting impacts on receptors from both sites.

The applicant has concluded that the Project will not have significant noise effects on the nearest residential properties or businesses.

Air Quality

The applicant has assessed air quality impacts in Chapter 6 and Appendix E of the ES.

The predicted air quality emissions from the Project have been compared to Air Quality Objectives and Limit Values for the different pollutants likely to be emitted by the Project activities (Section 6.7 of the ES). These objectives and limit values are based on minimizing health effects as a result of acute or chronic exposure to potentially sensitive individuals. It is noted that the PM10 levels have been screened out by the applicant as being insignificant.

Dust

The applicant concludes that given that the site is located within an area of agricultural land and has not been subject to historical development there is a negligible risk of contaminated dust being generated during the construction of the well pad, access track, extended flow testing infrastructure, gas pipeline and the seismometer arrays.

The risk to nearby receptors has been assessed by the applicant. This assessment has concluded that there is a negligible to low risk of dust being created by the Project and it will not result in a significant effect. This is because there is sufficient distance between the Site and potentially sensitive receptors. Furthermore, the scale and duration of the Project activities (construction of the access track and well pad and decommissioning) will not be carried out over a long period of time (less than 2 months for each activity).

Emissions from generators

The applicant has provided details of equipment that will be used at the site, i.e. pumps, fracturing water transfer pumps, generators, blender units and service rigs. The equipment will be used during the drill phases for the duration of the drilling. During the hydraulic fracturing the engines will be run for only a few hours at a time. Given the size of the generators and engines and the relatively short period of operation, these sources have been scoped out of the assessment by the applicant. A table summarising the generators used on site is provided in Appendix F of the ES. Further information was requested from the applicant to justify the decision to remove the generators from the scope of the assessment. This has been provided.

Emissions from road traffic.

To assess the impacts from road traffic an initial screening exercise was undertaken by the applicant that examined the likely changes in vehicle numbers on the road and compares these with criteria from the Design Manual for Roads and Bridges (DMRB) to determine whether a more detailed assessment was required. The criteria are not exceeded so no significant air quality impacts are likely, according to the applicant's assessment. Again, further information was requested to justify this decision and this has been provided.

Emissions from the Flare

The Air Quality chapter of the ES (Chapter 6) includes a forecast and assessment of the potential quantity and effects of NORM in the form of gas (specifically radon) that may be present in the gas that is burnt in the flare stacks. These predictions have been compared to an annual dose limit of 300 microSv/yr for a single source. The predicted emissions from the combustion of gas in the flares is 0.3 microSv/yr. This is one thousand times lower than the International Commission on Radiological Protection (ICRP) limit. Therefore, the applicant concludes, the levels of NORM emitted to the atmosphere by the Project do not present a significant risk to health.

The flares that will be used to burn gas generated during initial flow testing are the main source of emissions to air associated with the Project. The concentrations and distribution of pollutants (specifically NO₂ and benzene) have been modelled by the applicant so that the effect on air quality, and indirectly health, can be predicted at potentially sensitive receptor locations around the site (residential properties). The ES air quality assessment concludes that the levels of NO₂ and benzene are well within the regulatory limits and therefore do not present significant risk to health.

In summary the air quality effects from the project have been assessed for dust, NO₂, PM10, PM2.5, benzene and NORM. The assessment by the applicant for all of these parameters has concluded that the emissions from the project will not be significant.

Surface and groundwater

As part of the analysis reported in Chapter 11 of the ES, a review of potable water abstractions was undertaken by the applicant. There are no surface or groundwater abstractions in the vicinity of the surface or below ground works that are used for potable water. This is based on a review of abstraction points registered with the EA and local authorities.

Potable water within the vicinity of the site is provided by United Utilities by their mains potable water supply.

The applicant states the design of the wells, including multiple layers of containment through the shallow sections of the wells, and the characteristics of the geology below the site means that there are no plausible pollutant pathways between the well and drinking water supplies.

The well pad has also been designed to provide the level of containment required by the Environment Agency's Pollution Prevention Guidelines. This, it is reasoned, in combination with the implementation of the Environmental Operating Standards (See Appendix E of the ES), will minimise the risk of surface spills of potentially polluting materials affecting surface watercourses, soils, crops and animals.

For these reasons the applicant concludes that the risk of a pollutant linkage being created that could then impact on human health is negligible.

Perception Effects

The applicant states that the key health effects raised by residents during the various consultation events prior to submission of the various planning applications are:

- Risk from radioactive materials;
- Risk from flammable gases;
- Risks from the presence of potentially hazardous materials at the site;
- Risk from emissions to air (including flaring);
- Risk from induced seismicity;
- Risk of pollution to ground and surface water
- Road safety and traffic concerns; and
- Concerns regarding potential sensitive groups or individuals (e.g. children or people with pre-existing health conditions).

In order to respond to these issues, the applicant has undertaken or will undertake the following:

- Provided information about shale gas exploration and the processes of drilling, hydraulically fracturing and flow testing wells;
- Undertaken early engagement with the wider community to allow them to communicate their concerns, to feed into the development of an

- Environmental Risk Assessment (ERA) and then the development of the planning applications for Roseacre Wood and Preston New Road;
- Provided evidence on known risks either as part of the ERA, the ES, other documentation supporting the planning applications and applications for Environmental Permits;
 - Develop a programme of environmental monitoring during the exploration works and mechanism to publicise the results and provide affected parties with a means to raise concerns and communicate with the applicant throughout the life of the Project; and
 - Development of a framework for environmental management of the site, through implementation of a comprehensive Environmental Operating Standards (see Appendix E of this ES).

Summary of consultee comments and representations

A number of statutory consultees and other bodies have referenced potential health impacts in their responses to the consultation. The responses and representations that specifically reference potential health impacts are summarised as follows:

LCC Director of Public Health

On 6 November 2014 the County Council's Cabinet endorsed a Health Impact Assessment (HIA) of the Potential Health Impacts of the Proposed Shale Gas Exploration sites in Lancashire.

The HIA was prepared by the County Council's Director of Public Health (DPH) to inform the planning, environmental permitting and consenting process by the County Council and the regulatory roles of Environment Agency(EA), Department of Energy and Climate Change (DECC) and the Health and Safety Executive (HSE) respectively.

The HIA concluded that shale gas exploration, like any other industrial activity, has its risks to the health and wellbeing of the population. Having completed the HIA for each of the two sites the DPH has concluded that the key risks to the health and wellbeing of the residents who live near the two proposed sites in Lancashire include:

- Lack of public trust and confidence, stress and anxiety from uncertainty that could lead to poor mental wellbeing
- Noise related health effects due to continuous drilling, and
- Issues related to capacity for flowback waste water treatment and disposal.

The DPH advises that these risks and other issues highlighted in this report can be mitigated by LCC, EA, DECC, and the HSE to protect the health and wellbeing of local residents. In particular:

- There is also a need to be vigilant during the operations, and in emergency preparedness.

- A robust baseline and long term monitoring of environmental and health conditions is required in order to reassure communities and to understand the cumulative and long term effects.
- Local communities should be actively involved and the risks should be communicated in a transparent and reliable manner that is proportionate to the exploratory phase of the industry. This needs a closer working relationship between the industry, national and local agencies as well organisations with an interest in local shale gas exploration.
- If this industry is to develop further, there is a need for shale gas specific spatial strategy at a local level and an onshore oil and gas industry specific integrated regulatory framework at a national level. Further research on effects of shale gas development on health and wellbeing will help to improve the policy and regulatory framework as the industry moves into production phase.

The HIA contains 45 recommendations aimed at range of organisations (e.g., the County Council, the EA, DECC, the HSE, the LGA, the applicant, etc). Some of the recommendations are relevant to the determination of this planning application, while others relate to the development of the industry more generally. Indeed, Appendix J of the HIA contains 16 recommendations for the County Council in its role as mineral planning authority.

The 16 recommendations are set out below:

1. Consider the need for further noise assessment, particularly on the proposed Roseacre Wood site and if necessary, require additional mitigation measures to reduce noise associated with the development of the sites and more particularly the drilling and hydraulic fracturing phases of the development and which could be controlled by conditions attached to any planning permission.
2. Establish with the Applicant that liability and compensation arrangements are in place to cover any structural damages to properties that can be attributed to an unlikely event of induced seismicity.
3. Undertake an independent verification of the assessment of air quality, transport, waste management and induced seismicity prior to determining the planning applications.
4. Seek agreement with the Applicant to establish an independent comprehensive baseline and on-going long term monitoring of environmental and health conditions prior to any activity on the sites. An indicative framework is described at the end of this document.
5. The Director of Public Health should be informed of the results of the measurements and any breaches to the planning condition or environmental permit.
6. Consider the need to seek further clarification from the Applicant that the cumulative impacts of the operations from the flare, generators, vehicles and drilling will not exceed the national air quality objective thresholds, particularly for PM 10, 24 hour mean levels.
7. As part of either the planning or permitting process, the Applicant should be required to submit regular data on the ambient air quality on site measuring all the common air pollutants relevant to the activity and report them regularly.

- PM10 and PM2.5 should be reported separately (PM10 stands for particulate matter less than 10 microns in diameter).
8. The Roseacre Wood site is within 55m of a National Grid gas transmission pipeline. Interconnections into national transmission pipelines are proposed at both sites. Advice should be sought and an assessment undertaken as to whether the nearby gas transmission pipelines are considered to be a major hazard.
 9. Any extended flow testing provided for by any planning permissions should be aligned with the permits to be issued by the Environment Agency.
 10. An assessment of light pollution as part of the site operations should be carried out, and if there are likely to be significant impacts associated with light pollution from the sites that cannot be mitigated or controlled, the Applicant should be requested to consider the opportunity to offer to fit blackout blinds to those homes most likely to be affected.
 11. Further clarification or new information on the occurrence and magnitude of equipment likely to be contaminated with radioactive waste and how such waste would be managed on the site and disposed of should be sought.
 12. Should planning permission be granted, it should be a pre requisite that no activity can start until the onsite and offsite waste treatment capacity is defined.
 13. Further clarification should be sought that any specific risks due to using the MoD site for accessing the Roseacre Wood site have been addressed before any planning permission is granted.
 14. A full assessment of the impacts of additional traffic associated with the proposals on road safety should be carried out and appropriate traffic management options considered to address the public concerns, particularly in respect of the Roseacre Wood site.
 15. Should planning permission be granted, provision should be made with the Applicant to maintain road safety, particularly on the access routes to Roseacre Wood site and road safety and any related incidents on the access to both the sites should be monitored.
 16. In the event planning permissions are granted, any breach of planning conditions should be reported to the Director of Public Health so that necessary steps can be taken in protecting and improving the health of local communities from issues arising due to the alleged or identified breaches of planning control.

The Director of Public Health has also set out indicative proposals for long term monitoring associated with the project. The aim is to establish baseline and ongoing monitoring through a shale gas observatory to:

- monitor environmental and health conditions
- Support risk communication and reassurance to local communities on the safety and impacts of shale gas activities in Lancashire.
- Govern and manage the observatory in consultation with various stakeholders including the local communities, the industry, and the regulatory agencies.

The DPH believes that establishing a shale gas monitoring unit in Lancashire as an independent source of reliable information will help with the understanding of any environment and health impacts and the communication of risks to the local

communities. It will also support the development of future policy and practice of shale gas extraction.

Public Health England: has sought a number of clarifications regarding the planning application in two separate consultation responses. In turn, the clarifications and questions contained in both PHE responses have been satisfactorily addressed as a result of further information or clarification provided by the applicant.

In nearly all cases, the applicant has clarified how and where the PHE comments are addressed in the Environment Statement submitted with the planning application. Many of the clarifications requested by PHE are already addressed in the ES, or are controlled by the Environment Agency through the permit process.

PHE conclude that although onshore oil and gas extraction and related activities have the potential to cause pollution to air, land and water, the currently available evidence indicates that the potential risks to public health from exposure to the emissions associated with such extraction are low if the operations are properly run and regulated.

Based solely on the information contained within the application provided, PHE has no significant concerns in relation to the potential emissions from the site adversely impacting the health of the local population from this proposed activity, providing that the applicant takes all appropriate measures to prevent or control pollution, in accordance with the relevant sector technical guidance or industry best practice.

PHE agrees with the proposals to undertake baseline monitoring of ground waters, surface waters and local air quality to better assess the impact on the environment from any development.

However, it says the details of the baseline monitoring prior to operations need to be provided to ensure it will allow assessment of the impact of operations on the local environment. Baseline monitoring, and on-going monitoring, is a requirement of the Environment Agency permit as set out in the Waste Management Plan (which is part of the permit). In addition, a pre-operational condition of the permit requires the applicant to obtain written approval from the Agency for an Environmental Management and Monitoring Plan (EMMP) at least 4 weeks before commencement of the gas flaring activity. This will include details of the baseline air quality study undertaken before activities commence, together with details of the ambient air monitoring programme proposed during and after the period of gas flaring.

PHE say the levels of radon are very small and there are no grounds for concern about the potential radiological impact of radon arising from the proposed activities. Similarly, on naturally occurring radioactive material (NORM) PHE confirm the dose is significantly below PHE's recommended level and is not a concern.

Fylde Borough Council: objects to the proposal. The Borough Council believes operations would be in relatively close proximity to residential properties and the noise and general disturbance from 24 hour drilling operations and associated activity would be significant. The Borough Council says the proposal is contrary to

the provisions of Policy DM2 of the Minerals and Waste Local Plan and Policies EP26, EP27 and EP28 of the Fylde Borough Local Plan which are considered to be in conformity with the provisions of the National Planning Policy Framework.

The Borough Council questions the validity of the locations used by the applicant to measure existing levels of background noise. The Council also expresses concern about the increase in noise levels from a quiet rural background. Continuous noise monitoring is requested, as is the absence of HGVs overnight in order to prevent disturbance to residents.

In terms of air quality, the Borough Council states the increase in road traffic is unlikely to approach the “action” level of $40\mu\text{g}/\text{m}^3$ but the area will see a rise in air pollution albeit not very significant but due to low current levels there will be a significant percentage increase. It is the Borough Council’s intention to relocate one of the NO_x tubes that is used to monitor road traffic pollution in another area to this location.

In addition, the Borough Council requests that the applicant shall ensure that there is continuous monitoring of air quality as a result of increase road traffic to demonstrate that air quality guidelines are being met.

Dust – the site has been categorised as “medium” with reference to likelihood of dust creation and dispersal. Due to the sensitivity of the environment and the residents the Borough Council advise that the site is categorised as “large”.

Lighting – the Borough Council makes a number of suggestions about the practical orientation and positioning of lights, together with guidance that should be used.

Westby-with- Plumpton Parish Council: Recommends the application be refused for the following summarised reasons and which also relate to application LCC/2014/0096:

- The proposed development would introduce an industrial form of development into a rural setting which will be of detriment to resident's quality of life.
- The value and saleability of properties will drastically diminish
- The proposed development is located too close to some resident's properties.
- Noise pollution day and night from the 24hour operation.
- Air pollution to any degree is unacceptable
- Evidence of earth tremors from Cuadrilla's activities elsewhere
- Residents concerns over structural damage to properties, including Carr Bridge Residential Park, from vibrations from heavy plant and machinery.
- Concern regarding the visual aesthetic of the site, which requires screening.
- Major concerns over the highway access to the site, which is a renowned blackspot. Traffic lights should be installed.
- Concern regarding the suitability of A and B roads for additional traffic and the Kingfisher pub roundabout for larger vehicles.

- No evidence is given regarding compensation availability for damage occurring due to the fracking process, including structural damage, long-term land side effects and flooding.
- Impacts on the natural drainage system and potential damage to any asbestos in the underground system.
- Concerns regarding water contamination and the disposal of contaminated water.
- Inconvenience of anti-fracking protestors, affecting resident's quality of life and in turn the need for and cost liability of extra policing.
- Parishioners feel they are 'guinea pigs' in a fracking trial that is being rushed through without guarantees regarding environmental effects, safety precautions and compensation for affected people, properties and the environment.
- Concern regarding control and enforcement of the rules and regulations.

The Parish Council has requested that if the proposal is granted permission that the site and process is policed at all times; the residents are kept informed of all processes; emergency contingency plans are made public; compensation guarantees are put in place; access to land is pre-approved by landowners and a liaison committee is established to with representatives from the applicant, neighbouring properties, police, planning and environment officers from Lancashire and Fylde councils.

Kirkham Town Council: Object to the proposed exploration activities as a whole and are of the view that the benefits are outweighed by the potential major problems relating to seismicity; air, land and aquifer pollution risk; light pollution; flow back water; vehicle movements; noise; water supplies; visual impact, property values and insurance; potential future expansion and impact on local wildlife.

Medlar-with-Wesham Parish Council: Object to the proposed exploration activities as a whole and are of the view that the benefits are outweighed by the potential major problems relating to seismicity; air, land and aquifer pollution risk; light pollution; flow back water; vehicle movements; noise; water supplies; visual impact, property values and insurance; potential future expansion and impact on local wildlife.

Friends of the Earth: object to the proposal. They argue the public health section of the ES does not review the evidence on the adverse public health impacts of unconventional gas, nor acknowledge that the development of the industry has outpaced the knowledge about health impacts.

Friends of the Earth cite a number of health studies as a growing body of the negative impacts of shale gas on health:

- Concerned Health Professionals of New York has published a compendium of scientific, medical and media findings demonstrating risks and harms of fracking, which references over 300 pieces of research.
- A US National Institute of Environmental Health Sciences study which found a correlation between intensity of shale gas development and heart and neural defects in newborns, within a 10 mile radius of maternal residence.

- A pilot study from the US Centres for Disease Control and Prevention found dangerous levels of human exposures of benzene from shale gas sites, which is known to leak from wells, along with methane, during drilling and tracking operations.
- Breast Cancer UK has reviewed the evidence on health risks and the chemicals used in drilling and tracking fluids and concluded that "Breast Cancer UK has strong concerns about the potentially adverse health effects of increased exposure to harmful chemicals as a result of tracking".
- The US National Institute for Occupational Safety and Health (NIOSH) identified exposure to silica (from sand used in tracking process) as a health hazard to workers conducting some hydraulic fracturing operations during field studies.
- The Umweltbundesamt (German Federal Environment Ministry) has found that "there is great lack of basic information that would be needed for any well-founded assessment of the pertinent risks and the degree to which they can be controlled by technical means".

Friends of the Earth also question the impact of the proposal on cycling and walking in the area; the decision to leave air emissions from the generators out of scope of the ES; and the track record of the applicant.

Friends of the Earth submitted a second representation on 19 December 2014. The public health aspects of the representation are summarised as follows:

- Peer reviewed medical evidence from the USA and other countries on the impacts on health of shale gas extraction cannot be ignored
- Reference is made to research by the Council of Canadian Academies and by Physicians, Scientists and Engineers for Healthy Energy from North America which indicates adverse health impacts.

Medact: Is a public health charity whose members are public health specialists. Medact is currently producing a paper (to be published in February 2015) on the health effects of hydraulic fracturing in the UK, based on the evidence about its safety and direct impact on health; its wider social, ecological and economic impacts; and the threat presented by greenhouse gas emissions.

Medact say a report is needed because of the absence of an authoritative and comprehensive assessment of the health-related costs and risks associated with fracking. Medact say the report produced by Public Health England is inadequate and incomplete and arrived at an erroneous conclusion. Madact also claim the Health Impact Assessment prepared by the County Council's Director of Public Health is incomplete, and claims that the limited focus on eight 'exploratory wells', without including an assessment of projected county-wide industrial-scale fracking is irresponsible and illogical.

Although Medact's position paper will not be published until February 2015, they say the planning application for exploratory wells at Preston New Road and Roseacre Wood should not be granted. Under current circumstances, they say these applications pose unacceptable risks to the health and well-being of local residents.

It is stated that pollution will occur at all stages of the shale gas process, and pollutants include carcinogens, mutagens, teratogens, respiratory irritants and neurological, endocrine and haematological disrupters/toxins.

Medact say the extent of human exposure to the various hazards will vary from site to site, depending on multiple factors including the proximity, size and demographic characteristics of local communities; local geological factors; and the operating practices of fracking companies. In terms of the latter, the extent of pollution and human exposure will depend on various factors such as the structural integrity of wells; composition of fracking fluid; frequency of surface spills and leakage of hydraulic fracturing and natural contaminants from storage containers and during transportation; and the number of heavy transport vehicles.

Medact also cite concerns about regulation and say that fracking is incompatible with the UK's efforts to reduce greenhouse gas emissions.

Representations

The following is a summary of the issues raised in representations that refer specifically to public health:

- Full short term and long term public health effects are unknown.
- Growing evidence of serious risk to human health.
- Other countries have banned shale gas development on health grounds.
- American reports have linked air pollution/gas flaring, contamination and groundwater contamination from shale gas developments with health impacts
- US shale gas air pollution reported to have 50 hazardous chemicals of which 35 affect the brain and nervous system.
- In New York State a 3 year moratorium on shale gas followed a report from hundreds of health professionals regarding health impacts.
- Lancet, British Medical Journal and the Medical Journal of America have linked the proximity of shale gas sites with increased health risks.
- Lancet article reported insufficient regulations to safeguard public health.
- NHS website states that the gases emitted are highly toxic and cancer inducing.
- Breast Cancer UK has reported that fracking chemicals are linked to an increased risk of breast cancer.
- The risk to human health is frightening, Lancashire residents are terrified.
- The council should protect people's lives and not destroy them, it's too dangerous to risk the health of local people.
- People will get sick and die, it will be a living hell.
- Need before and after baseline check on residents health.
- Reported health risks include neurological conditions (brain damage, memory problems, sensory conditions), cancer, breast cancer, leukaemia, heart defects, respiratory disease, infertility, neural tube defects, congenital heart defects, reduced Apgar scores for newborn babies, dermalogical conditions (skin rashes), chemical burns, poisoning, sickness, stress, emotional distress and sleep problems.

- Risk of exposure to sulphur dioxide, polycyclic aromatic hydrocarbons, radon and particulate matter which have health implications.
- Risk of exposure to carcinogenic gases (benzene) neurotoxins (toluene) and central nervous system impacts (xylene).
- Elderly residents (including Carr Bridge residents) with respiratory conditions including COPD, asthma and heart problems have moved to the countryside to improve their health and life expectancy, but now concerned that the development will affect their health, particularly from methane which is an asphyxiate.
- Potential for toxins to enter the food chain risking starvation and death.
- Silica sand can cause pulmonary, lung cancer and cardiovascular diseases
- Blind people will not be able to see that water is discoloured.
- Health impacts will cause a strain on the NHS as people become ill.
- Need to think about present and future generations including elderly and younger generations safety.
- The EIA does not consider impacts on humans.
- There are no guarantees that the health of local people will not be adversely affected. No decision should be made until a Health Impact Assessment (HIA) / investigation into health risks (supported by empirical data) has been completed.
- Regulations can't mitigate against health impacts from accidental waste spillage and well failure.
- No amount of money is worth the risks of the health of the community.
- Will Cuadrilla pay compensation for health impacts.
- The proposal is contrary to NPPF Paragraphs 120 and 144 as it poses a considerable risk to human health.
- The proposal is contrary to Policy EMP5 as the chemicals in the air make it contrary to health.

Policy

National Planning Practice Guidance states that the range of issues that could be considered through the decision-making processes in respect of health includes, among other issues, how potential pollution and other environmental hazards, which might lead to an adverse impact on human health, are accounted for in the consideration of new development proposals.

Policy DM2 of the JLMWLP states that development for minerals operations will be supported where it can be demonstrated that all material social, economic or environmental impacts that would cause demonstrable harm can be eliminated or reduced to acceptable levels. In assessing proposals account will be taken of the proposal's setting, baseline environmental conditions and neighbouring land uses, together with the extent to which its impacts can be controlled in accordance with current best practice and recognised standards.

Policy EP27 of the Fylde Borough Local Plan states that development which would unnecessarily and unacceptably result in harm by way of noise pollution will not be permitted. Where appropriate, planning permission will be granted subject to conditions to minimise or prevent noise pollution.

Assessment of Impacts

The County Council's Director of Public Health has provided specific advice to inform the planning process and provide public health advice to protect and improve the health of local residents living near the proposed shale gas exploration sites of Preston New Road (planning application numbers LCC/2014/0096 and 0097) and Roseacre Wood (planning application numbers LCC/2014/0101 and 0102). The advice was published as a Health Impact Assessment (HIA) in November 2014.

The Health Impact Assessment makes 45 recommendations to a broad range of agencies, suggesting actions before, during and after any permissions or permits are granted. Appendix J contains 16 specific recommendations to inform this planning process.

Given the advice is specific to this application, it is appropriate that an assessment is undertaken in relation to each of the 16 recommendations in Appendix J.

- 1. Consider the need for further noise assessment, particularly on the proposed Roseacre Wood site and if necessary, require additional mitigation measures to reduce noise associated with the development of the sites and more particularly the drilling and hydraulic fracturing phases of the development and which could be controlled by conditions attached to any planning permission.*

The County Council appointed specialist noise consultants (Jacobs) to review the applicant's noise assessment, and to also undertake some background monitoring at night time.

The applicant's predicted night time noise level of 42dB (at the nearest property – taking account of the façade to free-field conversion factor of minus 3dB) is 12.5 dB higher than the lowest night time value recorded by Jacobs at Staining Wood Cottages (29.5 dB).

Drilling will take place for 24 hours per day. The first drilling phase will last for five months. Three other separate drilling phases will follow. Each of the three phases will last for three months. Between each drilling phase will be a hydraulic fracturing stage that will last for two months. Hydraulic fracturing will not take place at night time, and will last for three hours per day. Cumulatively there will be 14 months of 24 hour drilling.

The predicted night time noise levels at the nearest properties (Staining Wood Cottages) are at the national night time standard of 42dB. The elevation of 12.5 dB above background levels at night time at the nearest property, for such a sustained period, will be perceived as noticeable and disruptive. This will have significant adverse effects on the health and quality of life of the nearby residents

The applicant has stated that, through mitigation measures, the standards in the NPPF (PPG-N) can be complied with. This was the subject of a further consultation under Regulation 22. The applicant has clarified the day time noise prediction from the hydraulic fracturing phase is 53dB at Staining Wood Cottages. Hydraulic

fracturing is the loudest phase of the project. Noise from hydraulic fracturing would occur for three hours per day, for 30 to 45 days over a two month period. There will be 4 of these two month periods over the 5.5 year lifetime of the project. Each of these two month periods for fracturing will be interspersed by a three month period of drilling.

The 53dB level accounts for the applicant's mitigation which was submitted after the ES and was consulted upon as part of the further consultation. 53dB is just below the national standard in the NPPF (PPG-N).

Noise is emitted by off-site traffic (including HGVs) associated with the proposal. For the construction phase the data shows that even the worst case assessment gives no increase in daytime traffic noise levels. For the drilling, hydraulic fracturing, initial flow test, and extended flow test phases, off-site traffic shows only a very small increase in traffic noise levels (0.1dB) above the existing traffic noise. This is not significant.

Noise will be emitted from the construction phase (about 8 weeks). Construction activities will only take place during the day. The construction noise levels are predicted to be 54dB at Plumpton Hall Farm and 58dB at Staining Wood Cottages. These levels are for a short period.

2. *Establish with the Applicant that liability and compensation arrangements are in place to cover any structural damages to properties that can be attributed to an unlikely event of induced seismicity.*

The applicant has provided a letter of confirmation from their insurance brokers (Willis Energy). This confirms Cuadrilla Resources Ltd (Cuadrilla):

- Purchased Third Party Liability insurance on an industry standard policy form which will respond to valid claims for their legal liability for loss or damage to third parties.
 - Willis Energy have benchmarked for Cuadrilla the limit of liability purchased by other onshore Oil and Gas operators with similar type and scale of operations and found Cuadrilla's limit to be in the upper quartile of this group.
 - For the avoidance of doubt this policy covers Cuadrilla Resources Ltd and all subsidiaries including Cuadrilla Elswick Ltd and Cuadrilla Bowland Ltd.
3. *Undertake an independent verification of the assessment of air quality, transport, waste management and induced seismicity prior to determining the planning applications.*

Air Quality.

Lancashire County Council Scientific Services (LCCSS) carried out a review of the air quality chapters (including radon) of the Environmental Statements.

This concluded that the documents provide sufficient detail to show that the companies have carried out the assessment in a satisfactory manner and that the conclusions drawn from the assessment are valid.

The review found that the documents for both sites identified the following emissions from the activities before, during and after operations: fugitive dust, nitrogen oxides and particulate matter, volatile organic compounds (VOCs) and odours.

The review suggested there are other potential pollutants not mentioned in the assessment which may adversely affect air quality. These include sulphur dioxide, hydrogen chloride and other potentially carcinogenic VOCs. It was suggested that the assessment should explicitly consider these chemicals, but if the consideration concludes these chemicals are of little or no concern this should be confirmed. Further information has been provided by the applicant in relation to these points:

Sulphur Dioxide & Hydrogen Chloride

Results of testing of gas from Cuadrilla's Preese Hall well did not detect any sulphurous compounds or chlorine compounds in the gas. It is therefore assessed as very unlikely that there will be any significant concentrations of sulphur dioxide or hydrogen chloride in the gas produced at the proposed site. Monitoring of the gas quality will be undertaken once the site is operational. This will mitigate the risk of any unexpected pollutant emissions going undetected. In addition, the EA permit (which incorporates the Waste Management Plan) provides for ambient sulphur dioxide monitoring.

Potentially Carcinogenic VOCs

The air quality assessment has identified the most significant VOCs (volatile organic compounds) as benzene and benzo[A]pyrene (BaP) (selected to represent carcinogenic VOCs). The main pollutants of concern which are included in the air quality objectives are benzene and BaP (Benzo[a]pyrene). The benzene results are included within the ES, section 6.7.5.

BaP: Due to limited amounts of information on polycyclic aromatic hydrocarbons (PAHs) being available in the UK, for the assessment at Preston New Road a precautionary approach has been taken by the applicant by making assumptions based on data from Alberta, Canada. The information has been used to determine the emissions of BaP that could potentially result in a breach of the UK objective for BaP (0.25ng/m³ annual mean).

Analysis undertaken by M.Strosher et al looking at the composition of flare gas from natural gas extraction sites in Canada is the report which has been used for the assumptions made for the Preston New Road site, which in discussion with the Environment Agency is considered the best source of information regarding BaP content of shale gas.

The applicant has made a worst case assumption for the Preston New Road site in the ES (chapter 6) that assumes that C6 hydrocarbons constitute 0.1% of the total emissions. The Alberta report indicates that BaP is around 1/1000th of the amount of Benzene. Using this as the worst case assumption, the potential contribution from the Preston New Road site can be calculated. Based on this approach the highest predicted annual mean concentration is 0.0224 ng/m³ which is well below the UK objective (0.25ng/m³).

In summary, the findings in the ES and the further information submitted by the applicant conclude that the risk of any impacts of VOCs emissions from the flare on local receptors would be not significant.

In addition, the EA permit (which incorporates the Waste Management Plan) requires ambient monitoring of VOCs and BTEX (benzene, toluene, ethylbenzene, and xylenes) and indirect monitoring of the flare of VOCs among other chemicals.

The Environment Agency has undertaken its own detailed assessments of the emissions to air that will arise from the flow testing operations (i.e. from the flare) and the potential impact of these emissions on human health and ecological receptors.

Detailed air dispersion modelling has been carried out by the Agency. This considered the potential impacts of the main pollutants that could be emitted from the combustion of natural gas based on its expected composition:

- Oxides of nitrogen / nitrogen dioxide
- Benzene (a volatile organic compound)
- PAH emissions (a reference to benzo-a-pyrene)

Particulate emissions have been covered by a qualitative assessment as the Agency would not expect particulate (PM10) to result from gaseous emissions.

Sulphur dioxide (SO₂) was not included in the Agency's assessment because the applicant provided information based on other gas extraction locally that no hydrogen sulphide (H₂S) has been identified during monitoring of the drilling muds or gas.

Having undertaken a detailed assessment, the Agency is satisfied that the emissions from the flare would be insignificant at locations closest to the site.

In terms of public health impact of the flare emissions, the Agency's audit checks, modelling and sensitivity analysis confirms there will be no exceedences of standards established for human protection. Indeed, the modelling assumed the flares would be operating for 24 hours, 365 days per year per well. The actual proposal is for the flares to operate for no more than 90 days per well.

Transport

The County Council's Strategic Highways Planning Manager has assessed the applicant's transport assessment. With consideration for all the information provided, he can support this application in respect of the transport element as long as all necessary access works and associated measures are delivered and secured through appropriate conditions as necessary.

Waste Management

Under the Mining Waste Directive, an operator of a mining waste operation must draw up a waste management plan (WMP) for the minimisation, treatment, recovery and disposal of extractive waste.

The Environment Agency has assessed the applicant's WMP and approved the plan as a whole, subject to conditions in the permit. The Agency is satisfied that the permit requirements, including the requirements of the WMP, will protect the environment and that the Mining Waste Directive is met.

Induced Seismicity

The County Council commissioned AB Consulting (Edinburgh) to undertake an assessment of induced seismicity of the planning applications for Roseacre Wood and Preston New Road.

AB Consulting (ABC) reviewed the ES submitted by Arup, on behalf of the applicant, and presented a number of questions on key issues in order to seek clarification. Arup then responded.

A discussion meeting then took place between Arup, Cuadrilla, and ABC, providing the opportunity to better understand the background to these exchanges and clarifications.

Through these exchanges more clarity on the key issues was identified to the extent that ABC is satisfied with the applicant's proposal to manage induced seismicity.

4. *Seek agreement with the Applicant to establish an independent comprehensive baseline and on-going long term monitoring of environmental and health conditions prior to any activity on the sites. An indicative framework is described at the end of this document.*

The Royal Society/Royal Academy of Engineering report 'Shale Gas Extraction in the UK' (2012) recommends that monitoring arrangements should be developed to detect possible well failure post abandonment. The report says that continuous ground gas monitoring and aquifer sampling could be similar to that carried out before and during fracturing operations. Temporary monitoring equipment could be used, such as that used to monitor emissions from landfill sites or even semi-permanent monitoring stations could be installed. The report suggests that monitoring would be at a reduced frequency, perhaps every few years, but says this requires techniques that can reliably distinguish between methane from non-shale operations in the areas of abandoned wells.

The report recommends:

"Arrangements for monitoring abandoned wells need to be developed. Funding of this monitoring and any remediation work needs further consideration."

The applicant has agreed to undertake baseline monitoring before the project starts. Indeed the Environment Agency (EA) permit requires monitoring for a period of three months before operations commence. The Agency requires over 50 determinants to be monitored for air, surface water and ground water.

Post decommissioning monitoring will require the operator to provide sufficient evidence to satisfy the EA that, following decommissioning of the well, there will not be any unacceptable residual, on-going impacts on the environment before surrender of the permit would be accepted by the EA. Monitoring at the site will therefore continue into the post decommissioning period and will have to demonstrate this. The EA's powers to set monitoring requirements are also more flexible than planning conditions or a section 106 legal agreement because any requirements imposed by the EA may then be adjusted by it according to conditions at the site and monitoring data derived at the time.

A planning authority's reliance on other (non-planning) regulatory bodies to provide the appropriate controls and conditions in relation to their statutory responsibilities has been established through the courts on many occasions. Most recently it was re-confirmed in the Balcombe Judgment (Frack Free Balcombe Residents Association v West Sussex County Council – 5th December 2014). Paragraph 102 of the judgment is particularly relevant:

"the existence of the statutory regimes applied by the HSE, the EA and the DECC shows that there are other mechanisms for dealing with the very proper concerns which the Claimant's members have about the effects on the environment. The Claimant and its members' concerns are in truth not with the planning committee's approach of relying on the other statutory regimes, but rather with the statutory bodies whose assessments and application of standards they disagree with. That does not provide a ground of legal challenge to the decision of the planning committee."

In light of this judgment as well as national guidance (NPPF paragraph 122) the applicant does not believe it is necessary or appropriate to impose planning conditions or a section 106 legal agreement with respect to matters, such as longer term monitoring, that are within the remit of other regulatory regimes.

Nevertheless, while there is a question around the appropriateness of using a planning condition or section 106 agreement to provide for such monitoring, the County Council would have pursued a Unilateral Undertaking with the applicant to provide for such in the event of a recommendation to grant permission.

The Director of Public Health's locally commissioned Health Impact Assessment has highlighted potential health impacts arising from a perceived mistrust of the regulatory bodies involved in the process. He has recommended that an independent monitoring body should be set up – supported by funding from the applicant. This body would be intended to be an additional independent repository for all of the information collected (both environmental and health related) – enabling a single point of reference and providing independent, easily understandable interpretation of the publicly available data.

The proposed arrangements, if a recommendation for approval was made, would include data and information collected by other agencies and would not seek to be a replacement of the functions provided under other statutory provisions. It would provide the local repository and interpretation of monitoring data as well as filling any missing gaps that may be required to provide local reassurance. Local governance

of the monitoring arrangements would provide the reassurance to the local communities.

5. *The Director of Public Health should be informed of the results of the measurements and any breaches to the planning condition or environmental permit.*

The Director of Public Health will be informed of the results of the measurements and any breaches to the planning conditions if planning permission is granted. The Environment Agency, Health and Safety Executive and Department of Energy and Climate Change will be invited to do similar if permission is granted.

6. *Consider the need to seek further clarification from the Applicant that the cumulative impacts of the operations from the flare, generators, vehicles and drilling will not exceed the national air quality objective thresholds, particularly for PM 24 hour mean levels.*

Further clarification was sought from the applicant through a Regulation 22 information request as follows:

PM10 from generators and vehicles:

An assessment of PM10 (particulate matter of 10 microns diameter or less) from generators and vehicles has been undertaken and presented for both the Preston New Road and the Roseacre Wood proposed exploration sites as part of a further information request. Detailed dispersion modelling has been used to assess the impacts from the generators and the vehicle movements to/from the site. A number of worst case assumptions have been made in the modelling to ensure a conservative approach has been taken. The modelling shows that no significant effects are likely to result.

In order to calculate the total cumulative impacts from generators and traffic the scheme related concentrations are added together. The findings from this cumulative assessment of PM10 for the Roseacre Wood and Preston New Road site during operations are that the results indicate no receptor is likely to experience a change of greater than, or equal to 1% of the annual mean objective (40 $\mu\text{g}/\text{m}^3$). As such no significant effects are likely to result from cumulative impacts. The total concentrations are also well below the air quality objectives for PM10

PM10 from Flaring

The generation of PM10 emissions from the flare has been scoped-out of the assessment due to the gas composition and high efficiency of combustion. This has been agreed with the Environment Agency and is described in the permit:

"Particulates have been covered by a qualitative assessment as we would not expect PM10 to result from gaseous emissions. It formed part of the air quality assessment submitted by the applicant and is included in the habitats section for completeness".

Indeed the Agency has further clarified its position in relation to particulates from flaring of natural gas in that when there is full and efficient combustion (based on

temperature and retention time) the emissions are not likely to contain particulate matter.

An enclosed flare, which is a requirement for these activities, allows more control of the process, and the temperature can be continuously monitored along with the retention time to ensure the combustion process is complete. The gas flow to the flare and the gas composition are also measured.

In this case the applicant will produce an Environmental Management and Monitoring Plan before they are operational which will need to be approved by the EA; this plan will contain details of appropriate control measures they will put in place should efficient combustion not be achieved.

PM10 from Drilling

No PM10 emissions from drilling would be expected as the material drilled would be wet. Also any dust-creating processes on site would be mitigated by following the site Environmental Operating Standard (see ES:4.13.1 & Appendix E).

7. *As part of either the planning or permitting process, the Applicant should be required to submit regular data on the ambient air quality on site measuring all the common air pollutants relevant to the activity and report them regularly. PM10 and PM2.5 should be reported separately.*

The Environment Agency permit requires, through the Waste Management Plan (section 9.6, version 7 of the WMP), monitoring of 13 ambient air quality parameters including PM2.5 and PM10. This will be done prior to operations commencing to establish a baseline, during operations and after operations have ceased. Four sampling positions will remain constant at the perimeter of the site. The parameters are: methane, carbon monoxide, hydrogen sulphide, nitrogen dioxide, nitrogen monoxide, sulphur dioxide, ozone, total petroleum hydrocarbons, VOCs, BTEX, PM2.5 and PM10, dust. Results will be published monthly and submitted to the Agency for check and verification.

Monitoring of particulates will be undertaken throughout the operational period of the site using Frisbee-type dust gauges with directional adhesive strips (for nuisance dust) plus pumped gravimetric sampling for PM10 and PM2.5 will be located at four locations in close proximity to key receptors.. The sampling period for gravimetric monitoring for PM10 and PM2.5 will be 24 hours.

In addition the Agency requires point source emission monitoring from the flare for oxides of nitrogen, carbon monoxide, total volatile organic compounds, and methane (using emission modelling calculations)

8. *The Roseacre Wood site is within 55m of a National Grid gas transmission pipeline. Interconnections into national transmission pipelines are proposed at both sites. Advice should be sought and an assessment undertaken as to whether the nearby gas transmission pipelines are considered to be a major hazard.*

This recommendation is not relevant to this Preston New Road application. However, advice has been sought from the Health and Safety Executive and National Grid, and there is not a major hazard.

9. *Any extended flow testing provided for by any planning permissions should be aligned with the permits to be issued by the Environment Agency.*

This planning application includes extended flow testing and the Environment Agency has confirmed the permit does similar.

10. *An assessment of light pollution as part of the site operations should be carried out, and if there are likely to be significant impacts associated with light pollution from the sites that cannot be mitigated or controlled, the Applicant should be requested to consider the opportunity to offer to fit blackout blinds to those homes most likely to be affected*

An assessment of light pollution has been undertaken as part of the determination.

The project will involve 24 hour operations during drilling and hydraulic fracturing. Lighting of working areas will also be necessary during winter when standard working hours overlap with the hours of darkness. Low-level security lighting will also be required so that the site operatives and security staff can carry out their monitoring activities during night time hours.

Lighting has properly been assessed; it concludes there would be some light pollution at night. This would be for a temporary period but would be significant particularly when seen from the A583, nearest residential properties at Staining Farm and the villages of Little and Great Plumpton. Notwithstanding it would be for an extended period of time, with the mitigation measures proposed, and which could be controlled by condition, on balance, it is considered that lighting could be made acceptable and that the impacts associated with such would not be so great to affect amenity on a permanent basis or lead to unacceptable effects on nature conservation to constitute a sustainable reason for refusal. It would not be appropriate to require blackout blinds to be fit to those properties most likely to be affected.

Subject to the mitigation measures proposed, and which could be controlled by condition, it is considered on balance that the proposed lighting for a temporary period would be acceptable for the purposes of the NPPF Policy DM2 of the LMWLP and Policy EP28 of the Fylde Local Plan.

- 11 *Further clarification or new information on the occurrence and magnitude of equipment likely to be contaminated with radioactive waste and how such waste would be managed on the site and disposed of should be sought.*

From the outset, it is important to stress that the levels of radiation associated with contaminated waste are very low and come from Naturally Occurring Radioactive Materials (NORM). Nevertheless, NORM is regulated through the Radioactive Substances Regulations

The applicant has provided further information following an information request. Section 5.2 of the Waste Management Arrangement of the Radioactive Substances Regulations (RSR) permit applications to the Environment Agency state the build-up of insoluble carbonate and/or sulphate scales inside pipes is a possibility due to a change in pressure or temperature as the water is brought to the surface. It is highly unlikely however, due to the short term nature of the operations that any significant scale will build up inside the pipes. In the unlikely event that significant scaling of components occurs (and is identified via the proposed contamination monitoring regime), it shall be ensured that the pipework/component is capped/sealed to prevent release of material, and the Agency will be contacted for advice.

Similarly, physico-chemical changes within the accumulating waters may lead to the formation of small volumes of precipitate, which could contain elevated concentrations of radionuclides. The potential for such waste will be addressed by the contamination monitoring regime.

The Best Available Technique (BAT) statement section 3.2 of the RSR permit application to the Environment Agency states: “*given the potential for the scaling-up of pipework (with insoluble radium carbonate and sulphate scales), and/or the contamination of phase separator equipment/material, allowance has also been made for the generation of a relatively small quantity of solid radioactive waste. Accumulation and disposal of a nominal 40 MBq each of Ra-226 and Pb-210, and 16 MBq each of Ra228 and Th-228 has been requested within the Permit application.*”

Section 7.1 goes on to state: “*As soon as practicable, after identification And characterisation, low-level solid waste would be transferred to a suitable EPR10-permitted treatment or disposal facility.*”

Section 7.2 (contamination monitoring) states. “*A number of baseline samples will be taken prior to commencement of works on the sites, to determine background concentrations of radionuclides in the local area. A background contamination survey will also be performed (using a suitable alpha/beta contamination monitor). A contamination monitoring programme will be devised, to ensure that any significant (albeit improbable) environmental contamination is promptly identified. This will include alpha/beta contamination monitoring of key areas/surfaces, including:*

- *Well-head (and immediately surrounding site surface)*
- *Separator equipment [external surfaces, and any internal surfaces opened for maintenance/access (and the immediately surrounding site surface)]*
- *Storage tanks (internal surfaces where practicable, external valves and immediately surrounding site surface)*

Consignments of flowback fluid will also be screened externally for contamination, prior to leaving site. At close of works, all potentially-contaminated equipment will be screened prior to leaving site. The frequency, actions and responsibilities associated with monitoring shall be documented in the site Environmental Management and Monitoring Plan (EMMP).”

Section 7.3 goes on to state: “*Solid waste would be stored within a secure container, or within a secure lay-down area, as appropriate. Where appropriate, pipework/components would be capped to prevent release of contamination.*

In addition flowback tanks will be monitored on arrival at site to establish a baseline radiation contamination level. Prior to leaving site further radiation contamination monitoring will identify any elevated levels of radiation. In the unlikely event an elevated level is identified above baseline levels the tanks will be cleaned to remove any precipitate and subsequently disposed at an offsite waste treatment facility.”

12. *Should planning permission be granted, it should be a pre requisite that no activity can start until the onsite and offsite waste treatment capacity is defined*

The Environment Agency permit (through the Waste Management Plan which it incorporates) sets out controls for the management of waste onsite and offsite.

Onsite, the permit controls the storage arrangements for different the waste types. The maximum volume of storage and storage structure are prescribed. For example, a maximum of 3,000m³ is given for flowback fluid at any one time, and this must be regularly removed to an offsite permitted waste facility. Flowback fluid must be stored in steel solid tanks (approx. 6mm thickness with annual non-destructive testing inspection)

The Agency has assessed the application and is satisfied that the waste can be safely dealt with. If an appropriate permitted outlet for the waste cannot be found, the Agency permit requires that operations will have to stop.

As explained in the assessment of recommendation 4, in light of case law as well as national guidance (NPPF paragraph 122) it is not appropriate to impose planning conditions with respect to matters that are within the remit of other regulatory regimes. The mineral planning authority should focus on whether the development itself is an acceptable use of the land, and the impact of the use, rather than the control of processes or emissions themselves where these are subject to approval under pollution control regimes. The County Council should assume that these regimes (in this case the regulation of waste disposal) will operate effectively.

In terms of onsite waste management spill containment protocols, assessment of the containment capacity of the well pad is presented in the ES. Appendix B to the ES identifies that a total volume of 1170m³ will be provided to contain spilt fluids. This volume is provided by use of the perimeter ditches, voids within the stone matrix and min 50mm air freeboard. Section K2.4 of Appendix K to the ES refers to Environment Agency guidance, in particular EA PPG26 'Drums and intermediate bulk containers', on the recommended storage capacity to contain spills and leaks of potentially polluting liquids. Where more than one tank is situated in a single bund the bond volume should be at least 25% of the aggregate tank contents. Section K2.4 of the ES details the aggregate tank contents as 3176m³ and identifies that 25% of this volume (795m³) is significantly less than proposed containment volume provided at the site. It is concluded that there is adequate capacity to contain spills assessed in accordance with EA guidance.

Section 4.5.4 of the ES describes the proposed construction of the well pad. Migration of any spilt fluid to underlying soils and ground waters will be prevented by the 1mm thick fully welded HDPE [plastic] membrane - such membranes are commonly used to construct water retaining structures such as swimming pools. Joints in the membrane are fully tested for water tightness and certified as part of the construction process. The membrane is protected against puncturing by the geotextile materials placed above and below the membrane. Further protection against puncturing is also provided by the geogrid placed below the granular sub-base layer (see Appendix B of the ES).

13. *Further clarification should be sought that any specific risks due to using the MoD site for accessing the Roseacre Wood site have been addressed before any planning permission is granted.*

This recommendation is not relevant to the Preston New Road proposal. Nevertheless, the MOD maintains no safeguarding objections to the application but requested some further assessments are undertaken. The MOD does not object to the applicant's proposal to utilise this route across MOD property and will establish relevant terms of access directly with the applicant to facilitate this.

14. *A full assessment of the impacts of additional traffic associated with the proposals on road safety should be carried out and appropriate traffic management options considered to address the public concerns, particularly in respect of the Roseacre Wood site.*

A full assessment of traffic impacts associated with the proposed development has been carried out by the applicant as part of the EIA. An assessment of the impacts has been carried out against the policies of the NPPF, the development plan policies and in light of advice received from the Highways Agency, LCC Developer Support (Highways) and with regard to those views received in representations. The assessment is in Appendix 17.

The applicant proposes to access the site via a new access from the north side of the A583 (Preston New Road). Traffic to the site could travel either east or west along the A583 in order to gain access to the M55 at junctions 3 or 4. Both routes to the motorway are comprised of major roads and would not require HGV traffic to pass through major built up areas.

The peak traffic flows would occur as a result of combined traffic associated with activities at more than one well. The total traffic numbers in the ES are based on such conditions. The peak traffic generated would be around 50 two way HGV movements per day which would occur for around one week on eight occasions over the life of the project.

The forecast traffic flows are below the thresholds in Department for Transport Guidance for Transport Assessments which define when a full transport assessment is required. The main traffic impacts arising from the development therefore relate to the size of vehicles rather than vehicle numbers. The assessment has therefore concentrated on selection of the appropriate access routes to the site.

The site is located on the A583 which is a major highway carrying around 13,000 vehicles per day including over 250 HGV's. The proposed development would therefore only increase total traffic on this road by around 1%.

The proposed route via the motorway network would be acceptable and would not pass through any major residential areas. There would be an increase in HGV movements on the strategic highway network but it is considered there is sufficient capacity to accommodate such

The proposed route and access would be acceptable to the Highways Agency and to LCC Developer Support (Highways). Subject to conditions controlling the detailed junction design, access, the usage of such during restricted hours to minimise impacts, ensure vehicle cleanliness and replace any lost hedgerow, it is considered that the development would be acceptable in terms of highway safety and capacity issues and would not be in conflict with the policies of the development plan.

- 15 *Should planning permission be granted, provision should be made with the Applicant to maintain road safety, particularly on the access routes to Roseacre Wood site and road safety and any related incidents on the access to both the sites should be monitored.*

The recommendation is to not grant planning permission.

16. *In the event planning permissions are granted, any breach of planning conditions should be reported to the Director of Public Health so that necessary steps can be taken in protecting and improving the health of local communities from issues arising due to the alleged or identified breaches of planning control*

The recommendation is to not grant planning permission.

Health studies referred to in representations.

Many representations received by the County Council refer to research conducted in North America and overseas that indicate shale gas extraction is linked to adverse health impacts. A large number of studies are referenced. Some of the research referred to examines a wide range of other studies to draw conclusions about health impacts.

While much research exists, and is growing in volume each year, it is difficult to gain an objective view of the veracity of the research. Anti-fracking campaigners frequently point to studies that indicate increased health risks (e.g. elevated risks of cancer or birth defects) as a result of shale gas activity in North America. Conversely, pro-fracking campaigners point to numerous methodological flaws in the research. It is also difficult to translate the findings of research from North America into the UK environment. Operating and regulatory practices are very different.

In June 2014, Public Health England (PHE) published a review into the potential health impacts of shale gas extraction. The review drew on significant scientific

evidence in peer reviewed or published reports up to January 2014. Much of the research cited in representations to the County Council was reviewed by PHE.

PHE say there have been very few epidemiological studies or health risk assessments published in the peer reviewed literature. Epidemiology is the branch of medical science that investigates all the factors that determine the presence or absence of diseases and disorders. It aims to assess the cause of a disease, and seeks to look beyond associations which might be a result of chance, bias or confounding effects.

Two of the most frequently cited studies in representations relate to work by a research group in the School of Public Health at the University of Colorado. The studies look at possible associations between health status and exposure to air pollutants from shale gas activities.

McKenzie et al (2012) used a risk assessment methodology which considers cancer and non-cancer endpoints separately to assess the potential health impact of air emissions from shale gas extraction and related activities. PHE say it should be noted that the risk assessment methodology used in this study is not recommended for use in the UK.

McKenzie et al (2014) examined a possible link between air pollution and adverse birth outcomes, including congenital malformations.

Both papers are considered in some detail by PHE.

In McKenzie et al (2012) the key finding was that the estimated risks for cancer were elevated for those residents living within half a mile of the gas wells during well completion.

PHE say the research has a number of limitations and uncertainties, many of which are acknowledged by the authors. These include:

- Small sample size and the limited amount of data on emissions around well completion sites
- Further work is needed to profile emissions during the stages of gas well development
- Non-methane pollutant emissions appear to vary substantially by field type, number of well heads, completion process and types of controls in place. This makes application of the results to other shale gas extraction sites difficult
- A limited number of volatile organic compounds was explored. Other pollutants such as aldehydes, diesel exhaust, ozone and particulate matter, were not considered.
- The existing background level of pollution needs further assessment to enable pollution caused by shale gas extraction and related activities to be reliably assessed
- The impact of local meteorology and topography means that the results are not easily applicable to other areas and other extraction sites.

Also, PHE point out the approach used for cancer risk assessment in the US is not recommended for use in the UK by the UK advisory Committee on Carcinogenicity of Chemicals in Food, Consumer Products and the Environment (COC) if the risk values used are derived from animal data.

The same research group has examined a possible link between maternal exposure to air pollutants associated with shale gas extraction activities and birth outcomes such as congenital heart defects, neural tube defects and low birth weight (McKenzie et al, 2014). Public Health England has similarly reviewed this study.

McKenzie et al (2014) reported a positive association between exposure and prevalence of congenital heart defects. The association with neural tube defects was considerably weaker.

PHE's review concludes that the reported risks have wide confidence intervals which weaken the reported association and chance findings cannot be excluded, given the number of analyses carried out. The exposure assessments relied upon an indirect approach rather than direct measurements of exposure. Furthermore, the study was unable to differentiate between the phases of well development, which could be important in terms of the type of and amount of pollutants emitted.

Maternal education, age, smoking status and alcohol consumption were considered as potential confounding factors, but it is not clear that confounding was adequately addressed for socioeconomic status or previous experience of birth defects.

Overall, the study suggests a possible link between maternal exposure to air pollutants which may arise from shale gas extraction activities and a range of birth defects, particularly congenital heart defects, although the authors acknowledge that further research is needed to examine whether a link with shale gas drilling was causal.

PHE state the obvious limitations in terms of exposure assessment highlight the need for such health studies to have access to robust assessments of exposure both before and after development of a site for gas exploration and extraction.

Further criticism of the McKenzie et al (2014) research came from the Chief Medical Officer and Executive Director of the Colorado Department of Public Health and Environment in the USA. In a statement from the Department, the Chief Medical Officer said:

“...we disagree with many of the specific associations with the occurrence of birth defects noted within the study. Therefore, a reader of the study could easily be misled to become overly concerned.”

Among a range of limitations, the statement points out:

- “*The study showed decreased risk of pre-term birth with greater exposure. This seems counterintuitive, and again, makes the study difficult to interpret. (The study data showed that the nearer the mother lived to a well, the less*

likely the mother was to give birth prematurely or to have a low-birth-weight baby.)”

- *“As the authors noted, they don’t necessarily know where the mother lived at the time of conception or during the first trimester of pregnancy, when most birth defects occur. This makes interpretation of their study difficult.”*

Another study cited in representations is the research by Kassotis et al (2013). The study, reported in the national media at the time, indicated that chemicals used in fracking could cause infertility, cancer and birth defects.

PHE reviewed the study. The researchers detected endocrine disrupting activity (oestrogenic, anti-oestrogenic or anti-androgenic activity) in laboratory tests for a selection of 12 chemicals used in natural gas extraction in the US. Endocrine disruptors are chemicals that, at certain doses, can interfere with the endocrine (or hormone) system in mammals. These disruptions can cause cancerous tumors, birth defects, and other developmental disorders.

Endocrine disrupting activity was also detected in groundwater and surface water considered to have been contaminated by fluids/wastewater from natural gas extraction processes (i.e. from spills/leaks), again using a laboratory test system.

PHE report that the authors suggested that the reported endocrine disrupting activity of the chemicals used in natural gas extraction may have contributed to the endocrine disrupting chemical activity detected in the water samples, i.e. in areas where contamination spills of fluids/wastewater used in gas extraction may have occurred. PHE say this is a single study showing a relatively weak response in laboratory tests.

The County Analyst has also reviewed this research and highlighted limitations in the study which include a lack of direct identification of shale gas chemicals in the water that was tested. In other words, the chemicals found in water samples could have come from many sources, including agriculture, industry or from natural sources.

PHE has reviewed other research on health and shale gas, and its report can be found here:

<https://www.gov.uk/government/publications/shale-gas-extraction-review-of-the-potential-public-health-impacts-of-exposures-to-chemical-and-radioactive-pollutants>

In summary, as well as highlighting the limitations of the studies, PHE state that direct application of the north American research to the UK situation is impossible because of the wide differences between the two countries. It is clear from experience in the US that emissions vary widely depending on the phase of development, operational practices, the geology, local topography and meteorology, and the types of activities and equipment on-site.

PHE state that such variability makes direct application to the UK situation impossible, but shows that control of emissions from shale gas extraction and related activities will be of central importance. PHE say that comprehensive air monitoring and associated assessments of health risks will be required in the UK to inform

regulation of each phase of the operation. Such assessments should also consider the cumulative impact of multiple wells. It will be important to ensure that environmental monitoring is undertaken in advance of, as well as during, operations.

At present there is limited environmental and health surveillance data within the published literature in relation to existing shale gas extraction operations. There have been very few epidemiological studies (as opposed to statistical associations) and those that have been carried out generally lack robust exposure assessments according to PHE.

There are also fundamental differences between north America and the United Kingdom in relation to the potential risks from shale gas, according to the Royal Society/Royal Academy of Engineering report 'Shale Gas Extraction in the UK':

- The operating practices of shale gas companies in the USA are different from those in the UK (Para 3.1.4).
- The UK's regulatory approach is commended (Para 6.1)

Conclusion

The County Council's Director of Public Health has provided specific advice to inform the planning process and provide public health advice to protect and improve the health of local residents living near the proposed shale gas exploration sites of Preston New Road (planning application numbers LCC/2014/0096 and 0097) and Roseacre Wood (planning application numbers LCC/2014/0101 and 0102). The advice was published as a Health Impact Assessment (HIA) in November 2014.

The Health Impact Assessment makes 45 recommendations to a broad range of agencies, suggesting actions before, during and after any permissions or permits are granted. Appendix J contains 16 recommendations to specifically inform the determination of this application (together with the Roseacre applications).

Given the advice is specific to this application, an assessment has been undertaken in relation to each of the 16 recommendations in Appendix J of the HIA. All of the recommendations in Appendix J have been addressed as part of this determination.

Recommendation 1 states: 'Consider the need for further noise assessment, particularly on the proposed Roseacre Wood site and if necessary, require additional mitigation measures to reduce noise associated with the development of the sites and more particularly the drilling and hydraulic fracturing phases of the development and which could be controlled by conditions attached to any planning permission'.

The predicted night time noise levels at the nearest properties (Staining Wood Cottages) are at the national night time standard of 42dB. The elevation of 12.5 dB above background levels at night time at the nearest property, for such a sustained period, will be perceived as noticeable and disruptive. This will have significant adverse effects on the health and quality of life of the nearby residents.

Recommendation 4 states: 'Seek agreement with the Applicant to establish an independent comprehensive baseline and on-going long term monitoring of environmental and health conditions prior to any activity on the sites'.

The applicant has questioned the appropriateness of providing for such long term monitoring through the planning system, and has cited national guidance and case law as justification for this position. Nevertheless, while there is a question around the appropriateness of using a planning condition or section 106 agreement to provide for such monitoring, the County Council would have pursued a Unilateral Undertaking with the applicant to provide for such in the event of a recommendation to grant permission.

Many representations received by the County Council refer to research conducted in north America and overseas that indicate shale gas extraction is linked to adverse health impacts.

While much research exists, and is growing in volume each year, it is difficult to gain an objective view of the veracity of the research. Anti-fracking campaigners frequently point to studies that indicate increased health risks (e.g. elevated risks of cancer or birth defects) as a result of shale gas activity in north America. Conversely, pro-fracking campaigners point to numerous methodological flaws in the research. It is also difficult to translate the findings of research from north America into the UK environment. Operating and regulatory practices are very different.

In June 2014, Public Health England (PHE) published a review into the potential health impacts of shale gas extraction. The review drew on significant scientific evidence in peer reviewed or published reports up to January 2014. Much of the research cited in representations to the County Council was reviewed by PHE.

PHE say there have been very few epidemiological studies or health risk assessments published in the peer reviewed literature. Epidemiology is the branch of medical science that investigates all the factors that determine the presence or absence of diseases and disorders. It aims to assess the cause of a disease, and seeks to look beyond associations which might be a result of chance, bias or confounding effects.

PHE highlight significant methodological flaws in the research that has been cited to the County Council.

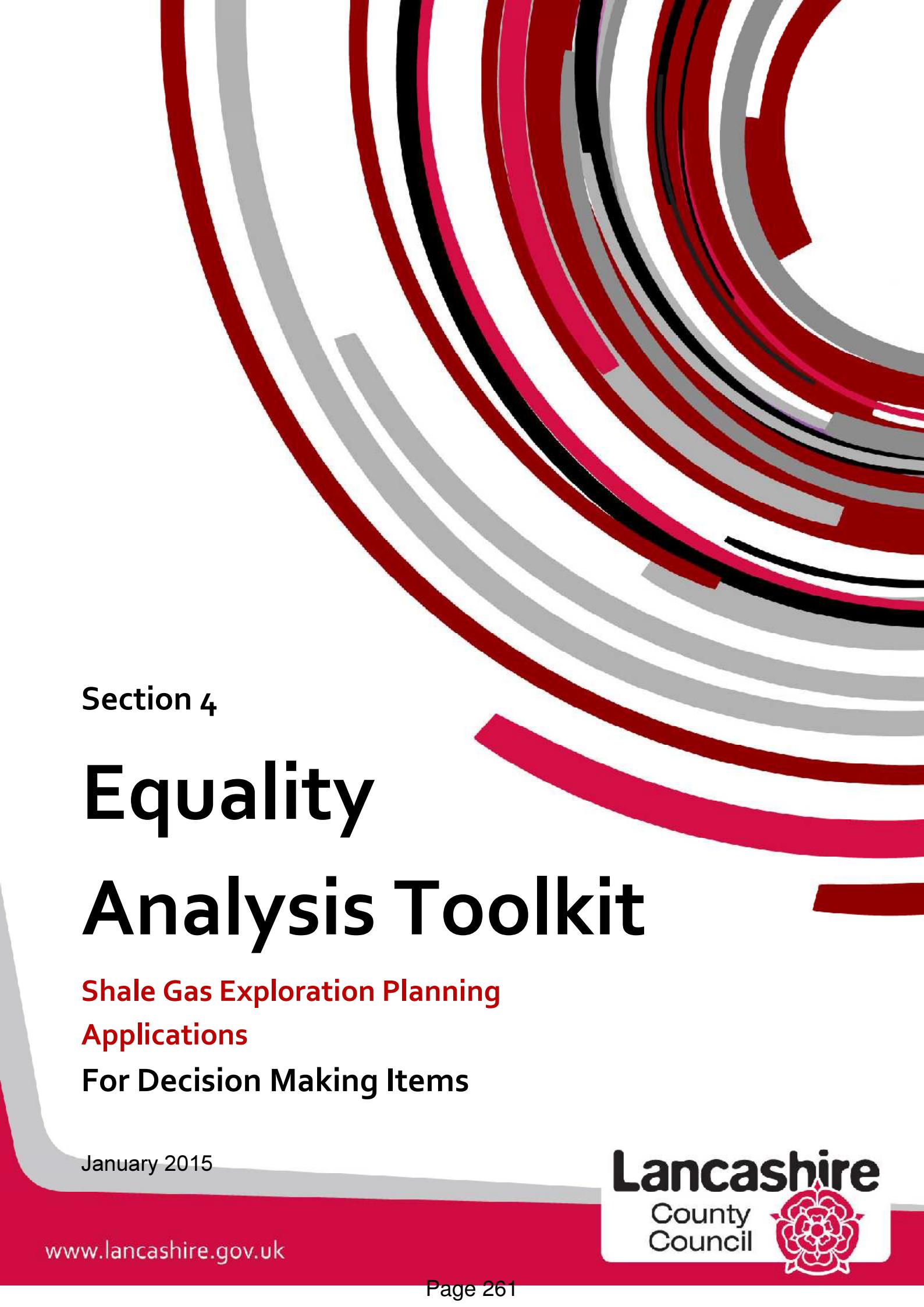
Moreover, one study frequently cited by objectors (McKenzie, 2014) has been publicly criticised by the Chief Medical Officer and Executive Director of the Colorado Department of Public Health and Environment in the USA as follows: "we disagree with many of the specific associations with the occurrence of birth defects noted within the study. Therefore, a reader of the study could easily be misled to become overly concerned."

PHE state that direct application of the north American research to the UK situation is impossible because of the wide differences between the two countries. It is clear from experience in the US that emissions vary widely depending on the phase of development, operational practices, the geology, local topography and meteorology,

and the types of activities and equipment on-site. PHE state that such variability makes direct application to the UK situation impossible. There are also different regulatory practices in the UK.

At present there is limited environmental and health surveillance data within the published literature in relation to existing shale gas extraction operations. There have been very few epidemiological studies (as opposed to statistical associations) and those that have been carried out generally lack robust exposure assessments according to PHE.

Nevertheless, because of the significantly increased noise levels above background, the proposed development would be contrary to Policy DM2 of the JLMWLP and Policy EP27 of the Fylde Borough Local Plan as it has not been satisfactorily demonstrated that noise impacts would be reduced to acceptable levels and would therefore unnecessarily and unacceptably result in harm to the amenity of neighbouring properties by way of noise pollution.



Section 4

Equality Analysis Toolkit

**Shale Gas Exploration Planning
Applications
For Decision Making Items**

January 2015

What is the Purpose of the Equality Decision-Making Analysis?

The Analysis is designed to be used where a decision is being made at Cabinet Member or Overview and Scrutiny level or if a decision is being made primarily for budget reasons. The Analysis should be referred to on the decision making template (e.g. E6 form).

When fully followed this process will assist in ensuring that the decision-makers meet the requirement of section 149 of the Equality Act 2010 to have due regard to the need: to eliminate discrimination, harassment, victimisation or other unlawful conduct under the Act; to advance equality of opportunity between persons who share a relevant protected characteristic and persons who do not share it; and to foster good relations between persons who share a relevant protected characteristic and persons who do not share it.

Having due regard means analysing, at each step of formulating, deciding upon and implementing policy, what the effect of that policy is or may be upon groups who share these protected characteristics defined by the Equality Act. The protected characteristic are: age, disability, gender reassignment, race, sex, religion or belief, sexual orientation or pregnancy and maternity – and in some circumstance marriage and civil partnership status.

It is important to bear in mind that "due regard" means the level of scrutiny and evaluation that is reasonable and proportionate in the particular context. That means that different proposals, and different stages of policy development, may require more or less intense analysis. Discretion and common sense are required in the use of this tool.

It is also important to remember that what the law requires is that the duty is fulfilled in substance – not that a particular form is completed in a particular way. It is important to use common sense and to pay attention to the context in using and adapting these tools.

This process should be completed with reference to the most recent, updated version of the Equality Analysis Step by Step Guidance (to be distributed) or EHRC guidance - [EHRC - New public sector equality duty guidance](#)

Document 2 "Equality Analysis and the Equality Duty: Guidance for Public Authorities" may also be used for reference as necessary.

This toolkit is designed to ensure that the section 149 analysis is properly carried out, and that there is a clear record to this effect. The Analysis should be completed in a timely, thorough way and should inform the whole of the decision-making process. It must be considered by the person making the final decision and must be made available with other documents relating to the decision.

The documents should also be retained following any decision as they may be requested as part of enquiries from the Equality and Human Rights Commission or Freedom of Information requests.

Support and training on the Equality Duty and its implications is available from the County Equality and Cohesion Team by contacting

AskEquality@lancashire.gov.uk

Specific advice on completing the Equality Analysis is available from your Directorate contact in the Equality and Cohesion Team or from Jeanette Binns

Jeanette.binns@lancashire.gov.uk

Name/Nature of the Decision

The County Council has received applications for planning permission for the temporary exploration and appraisal of shale gas and for the installation of surface and buried monitoring arrays at the following sites and surrounding areas:

- Preston New Road – Little Plumpton, Fylde West. Located north of Preston New Road (the A583), to the west of Little Plumpton (Cuadrilla Bowland Ltd).
- Roseacre Wood - Roseacre, Fylde East. Located to the south of the village of Roseacre (Cuadrilla Elswick Ltd)

For the purposes of Equality Impact Assessment the applications are being considered together, so that the cumulative impact of the applications can be considered. If planning permission is granted to both sites, the proposed works would run in parallel.

What in summary is the proposal being considered?

An oil and gas company called Cuadrilla Bowland and Cuadrilla Elswick Ltd (Cuadrilla) is applying for temporary planning permission to develop two new sites to explore for shale gas by drilling, hydraulically fracturing, (fracking) and testing the flow of gas and for a series of surface and buried monitoring stations to monitor for seismic movement and water quality. The proposed sites are at Preston New Road, Little Plumpton, Lancashire and Roseacre Wood, Roseacre, Lancashire and surrounding areas for the monitoring arrays.

The planning applications are accompanied by environmental statements which have been produced as a result of the environmental impact assessment of the proposed development. The environmental statements describe the impacts of the proposed developments and proposed mitigation and are an important consideration in the determination of the planning applications.

Is the decision likely to affect people across the county in a similar way or are specific areas likely to be affected – e.g. are a set number of branches/sites to be affected? If so you will need to consider whether there are equality related issues associated with the locations selected – e.g. greater percentage of BME residents in a particular area where a closure is proposed as opposed to an area where a facility is remaining open.

At both of the drilling sites, Cuadrilla is proposing a working area of 1.55 ha in order to construct a well pad. In addition, seismic monitoring equipment is proposed to be installed within 4 km of the sites.

For the purposes of the Equality Impact Assessment a radius of 1.5 km around each site was used to select the Lower Super Output areas (LSOAs) surrounding each site. It is considered that the impact of the development (for Equality Impact Assessment purposes) will not extend to any significant degree out with these areas, with the exception of the traffic route to the proposed sites, which will also be assessed.

The Lower Super Output areas within 1.5km of the Cuadrilla test sites at Preston New Road (grid reference E337408 N432740) and Roseacre Wood (grid reference E343904 N436438) were selected. In total there were 5 LSOAs, 2 within 1.5km of the Preston New Road site and 3 within 1.5km of the Roseacre Wood site. A map showing the test sites and the selected LSOAs is available. 2011 Census statistics were examined for these LSOAs to see how they compared to the rest of Fylde, Lancashire, the North West, England and England and Wales for a number of key indicators. A spreadsheet showing all the census statistics for the selected indicators is available and more information about the 2011 Census is available at <http://www.ons.gov.uk/ons/guide-method/census/2011/index.html>. The main findings are listed below.

Could the decision have a particular impact on any group of individuals sharing protected characteristics under the Equality Act 2010, namely?

- Age
- Disability
- Gender reassignment
- Pregnancy and maternity
- Race/ethnicity/nationality
- Religion or belief
- Sex/gender
- Sexual orientation no data
- Marriage or Civil Partnership Status census

In considering this question you should identify and record any particular impact on people in a sub-group of any of the above – e.g. people with a particular disability or from a particular religious or ethnic group.

It is particularly important to consider whether any decision is likely to impact adversely on any group of people sharing protected characteristics to a disproportionate extent. Any such disproportionate impact will need to be objectively justified.

The physical, social, community and economic impacts of the proposal are well documented in the Environmental Statement that accompanies the planning applications.

Further to this, the Equality Impact Assessment considers the projects for their impact on the following groups.

- Age
- Disability
- Gender reassignment
- Pregnancy and maternity
- Race/ethnicity/nationality
- Religion or belief including strongly held 'green' beliefs
- Sex/gender

- Sexual orientation no data
- Marriage or Civil Partnership Status census

Representations made by individuals to the County Council have commented that the following groups could be impacted. The groups can be defined by:

- Age,
- Disability
- Pregnancy and maternity
- Sex and gender

The potential impacts have been recorded below, along with an assessment of their significance.

If you have answered "Yes" to this question in relation to any of the above characteristics, – please go to Question 1.

If you have answered "No" in relation to all the protected characteristics, please briefly document your reasons below and attach this to the decision-making papers. (It goes without saying that if the lack of impact is obvious, it need only be very briefly noted.)

Question 1 – Background Evidence

What information do you have about the different groups of people who may be affected by this decision – e.g. employees or service users (you could use monitoring data, survey data, etc. to compile this)? As indicated above, the relevant protected characteristics are:

- Age
- Disability including Deaf people
- Gender reassignment/gender identity
- Pregnancy and maternity
- Race/Ethnicity/Nationality
- Religion or belief
- Sex/gender
- Sexual orientation
- Marriage or Civil Partnership status (in respect of which the s. 149 requires only that due regard be paid to the need to eliminate discrimination, harassment or victimisation or other conduct which is prohibited by the Act).

In considering this question you should again consider whether the decision under consideration could impact upon specific sub-groups e.g. people of a specific religion or people with a particular disability. You should also consider how the decision is likely to affect those who share two or more of the protected characteristics – for example, older women, disabled, elderly people, and so on.

2011 Census statistics were examined for these Lower Supper Output Areas (LSOAs) to see how they compared to the rest of Fylde, Lancashire, the North West, England and England and Wales for a number of key indicators. A spreadsheet showing all the census statistics for the selected indicators is available and more information about the 2011 Census is available at <http://www.ons.gov.uk/ons/guide-method/census/2011/index.html>. The main findings are listed below.

Age

For the majority of age ranges the proportion of residents in the area is within 1% of the proportions for England. The exceptions are the 45 to 59, 60 to 64 and 65 to 74 age ranges which are all slightly higher than the national levels. (Age 45 to 59 22% compared to 19.4% in England, age 60 to 64 7.7% compared to 6% in England, age 65 to 74 11% compared to 8.6% in England).

They are also higher than the North West and Lancashire levels but are roughly in line with Fylde as a whole.

Health and Disability

Residents in the selected area are less likely to have their day to day activities limited a lot by health or disability than residents in Fylde, Lancashire, North West and England. This difference is particularly noticeable with the rest of Fylde with only 7.6% of residents in the selected area stating their day to day activities are limited a lot compared to 10.4% in Fylde.

The residents in the selected areas are also more likely to be in very good health than the other geographies with just over half, 50.9%, stating they are in very good health. This compares very favourably with Fylde (44.6%), Lancashire (45.9%), North West (46.5%) and England (47.2%).

Ethnicity

The vast majority of residents in the selected areas are white (97.3%) this is a similar proportion to Fylde as a whole (97.5%) but is significantly higher than Lancashire (92.3%), North West (90.2%) and England (85.4%).

There are also significant variations between the proportions of Asian/Asian British residents in the selected areas (1.3%) and Fylde (1.1%) compared to Lancashire (6.1%), the North West (6.2%) and England (7.8%).

Nationality

Two-thirds of the residents in the selected areas (66.7%) identify themselves as English only. This proportion is broadly similar to those in Fylde, Lancashire and the North West but is higher than for England, with only 60.4% identifying themselves as English only.

Approximately a fifth of the residents of the selected area (20.4%) have no English identity which is roughly 2% lower than for Fylde, Lancashire and the North West. Nearly a third of residents in England have no English identity (32.9%).

Religion

A higher proportion of residents in the selected area are religious than the other geographies with 78.1%. This compares to 75.4% in Fylde, 74.8% in Lancashire, 74% in the North West and just 68.1% in England.

Of the residents who are religious in the selected area the vast majority, 98.5%, are Christian. The proportion of residents who are Christian in Fylde is similar at 97.7% but is much lower in Lancashire (92%), the North West (90.0%) and England (87.2%).

Conversely, of the residents who are religious in the selected area the proportion who are Muslim is 0.4% which is significantly lower than the proportion in Lancashire (6.4%), the North West (6.8%) and England (7.4%).

Gender

The gender split in the selected area is 49.5% male and 50.5% female. This split is broadly in line with the whole of England which has a 49.2% male and 50.8% female split.

Marital and Civil Partnership Status

There are a significantly lower proportion of single residents in the selected area compared to the other geographies, with just less than a quarter (24.2%) compared to approximately a third in Lancashire (32.1%), the North West (35.6%) and England (34.6%). However, the proportion of single Fylde residents is only slightly higher than the selected LSOAs at 26.4%.

The proportion of married residents in the selected LSOAs is much higher than for the other geographies. Nearly three-fifths are married in the selected LSOAs (58.6%) compared to less than half in Lancashire (47.8%), the North West (44.8%) and England (46.6%).

The proportion of residents in same sex civil partnerships is less than 1% with a similar level for all the other geographies.

Question 2 – Engagement/Consultation

How have you tried to involve people/groups that are potentially affected by your decision? Please describe what engagement has taken place, with whom and when.

(Please ensure that you retain evidence of the consultation in case of any further enquiries. This includes the results of consultation or data gathering at any stage of the process)

The County Council has carried out extensive consultation on the current planning applications for the Preston New Road and Roseacre Wood sites. Over 25,000 representations have been received and we will carefully consider all the views expressed before any decision is taken.

All the applications, Environmental Statements, plans and the further information submitted in support of the applications for Preston New Road and Rosacre Wood are available to view at:

- the County Council website
 - at Lancashire County Council, County Hall, PO Box 100, Preston, PR1 0LD
 - The Planning Department, Fylde Borough Council, One Stop Shop, Lytham St Annes,
 - Kirkham Library, St Anne's Library, Lytham Library and Ansdell Library.
- The planning applications and environmental statements can also be

downloaded from the Cuadrilla website free of charge:
www.cuadrillaresources.com.

The consultation process on the applications has cumulatively resulted in over 25,000 representations being received for all the applications. Because of the numbers of representations received, it has meant that the County Council is unable to make every representation available to view on the County Council's website. However, representations made by letter or email including names and addresses have been placed on the application files and which are open to inspection by the applicant and groups or individuals by appointment, at Lancashire County Council Offices, County Hall, Preston, PR10LD.

Notwithstanding the consultation period has ended, the County Council has provided assurance that it will continue to carefully consider all views expressed on the proposals before any decision is taken. A summary of representations, including the numbers of representations received objecting and supporting the proposals, will be included in the reports to the Development Control Committee when the applications are presented for determination. Statutory consultee responses and those representations received from groups or bodies will continue to be made available to view online and as hard copies on the respective files at the County Council's offices.

The County Council would normally have 16 weeks to determine the applications for the sites given they constitute Environmental Impact Assessment development. However the County Council extended the consultation period for the applications at Preston New Road and Roseacre Wood having received confirmation from Cuadrilla first that they would agree to a time extension to determine the applications to accommodate the extended consultation period.

During the consultation period the County Council received representation from an individual that suggested there might be impacts of the proposal on vulnerable people in the caravan park to the west of the Preston New Road Site and that they should be provided with their own copies of the Preston New Road applications due to their inability to access them online or at the respective council offices or public libraries. The site is approximately 1,200m away from the boundary of

the caravan park. The applicant subsequently made hard copies of all the application documents available for inspection at the caravan site office. Copies of the consultation documents are also contained in local libraries, and there is a short door-to-door bus service from the caravan site to Kirkham library.

Question 3 – Analysing Impact

Could your proposal potentially disadvantage particular groups sharing any of the protected characteristics and if so which groups and in what way?

It is particularly important in considering this question to get to grips with the actual practical impact on those affected. The decision-makers need to know in clear and specific terms what the impact may be and how serious, or perhaps minor, it may be – will people need to walk a few metres further to catch a bus, or to attend school? Will they be cut off altogether from vital services? The answers to such questions must be fully and frankly documented, for better or for worse, so that they can be properly evaluated when the decision is made.

Could your proposal potentially impact on individuals sharing the protected characteristics in any of the following ways?

- Could it discriminate unlawfully against individuals sharing any of the protected characteristics, whether directly or indirectly; if so, it must be amended? Bear in mind that this may involve taking steps to meet the specific needs of disabled people arising from their disabilities
- Could it advance equality of opportunity for those who share a particular protected characteristic? If not could it be developed or modified in order to do so?
- Does it encourage persons who share a relevant protected characteristic to participate in public life or in any activity in which participation by such persons is disproportionately low? If not could it be developed or modified in order to do so?

- Will the proposal contribute to fostering good relations between those who share a relevant protected characteristic and those who do not, for example by tackling prejudice and promoting understanding? If not could it be developed or modified in order to do so? Please identify any findings and how they might be addressed.

For the purposes of equality impact assessment the following sources have been used to analyse the practical impacts on groups with protested characteristics.

- The planning applications are accompanied by Environmental Statements which have been produced as a result of the environmental impact assessment of the proposed development. The Environmental Statements describe the impacts of the proposed developments and are an important consideration in the determination of the planning applications.
- In November 2014, the County Council's cabinet endorsed the recommendations of the Director of Public Health in his report on the 'Potential Impacts of the Proposed Shale Gas Exploration Sites in Lancashire'. The report contains 45 recommendations relating to a broad range of shale gas issues and processes.
- The consultation process on all the applications has cumulatively generated over 25,000 representations from individuals, groups and organisations which will be analysed to inform the Equality Impact Assessment.

For the purposes of Equality Impact Assessment the practical impacts of the proposed sites are identified and analysed as:

Traffic

This topic is concerned with a proposed increase in heavy goods vehicles travelling to and from the sites. It is particularly concerned with the effects on the groups with the protected characteristics defined as

- *Age and disability.*

It is concluded that the projects have the potential to make an impact on some groups with protected characteristics including those defined as age and disability. Impacts might be capable of being minimised through the delivery of a Traffic Management Plan (TMP) if an acceptable plan can be delivered, and if permission is granted. On current evidence, the traffic impacts are unacceptable.

Environmental pollution factors and health

The topic is concerned with the effects of potential pollution of the environment , which includes pollution of water, ground and air on groups with protected characteristic and in particular:

- health and disability
- And pregnancy and maternity.

The County Council has consulted the Environment Agency, Public Health England and the Health and Safety Executive, none of which have raised any objections or significant concerns to any of the applications. The Environment Agency says it is 'minded to grant' Cuadrilla the environmental permits needed to carry out their proposed operations at Roseacre Wood. Permits have been granted for the site at Preston New Road. The draft permits/ permits set out the conditions needed to protect groundwater, surface water and air quality, and to ensure there are no unacceptable impacts on people. Cuadrilla will have to comply with the conditions which are designed to ensure that operations do not cause harm to people or the environment. The Agency is satisfied that pollutants will be limited so as not to cause pollution or impact on people.

The County Council must assume that the sites would be managed in accordance with the regulatory requirements of the Environment Agency, the Health and Safety Executive and the Department of Energy, Climate and Change and industry specific guidance. National Planning policy requires that planning authorities should not seek to control processes or emissions where these are subject to approval under separate pollution control regimes and that LPA's should assume that these regimes will operate effectively. Nonetheless, paragraph 112 of

PPG Minerals, notes that before granting permission the County Council should be satisfied that the issues dealt with under other regimes can be adequately addressed by taking advice from the relevant regulatory body'.

The County Council agreed to a proposal by the Director of Public Health to undertake a Health Impact Assessment (HIA) of shale gas exploration and appraisal in Lancashire, at the two proposed new sites in Roseacre and Preston New Road. The Director of Public Health has overseen the preparation of the HIA and has produced a report based on the findings of the HIA. The HIA report and recommendations were considered by Cabinet on 6th November 2014. The recommendations are an important consideration in the determination of planning the applications for Preston New Road and Roseacre Wood and will be implemented if planning permission is granted

- It is therefore considered that the majority of anticipated environmental impacts of the works (except for noise impacts – see next section) on the areas identified can be satisfactory controlled through the regulatory regimes and the recommendations and controls that will be conditions of planning permission if granted.**

Community and socio economics

This topic is concerned with the effects on community, social and economic factors. These are temporary projects that could last up to a maximum of six years, but have the potential to generate impacts that may have an adverse effect on community, social and economic factors.

The projects have the potential to create economic benefits through jobs and service creation and a community benefit scheme that will make payments for each well that is fractured (a maximum of £400,000 at each site).

Concerns have been expressed in consultation responses from individuals and groups that existing businesses will be impacted on including the established market garden economy, agriculture and tourism. Marketing Lancashire (the tourism board) has publically countered this view, arguing that the hospitality industry would benefit.

There are no statistics that support either view. It is considered that groups with protected characteristics would not be disproportionately affected by this element.

In terms of community cohesion, recent experience has shown that drill sites can attract public attention and a degree of protest and environmental extremist activities may also occur. The Lancashire Constabulary have been consulted on the proposals and have not objected. It is assumed that public order would be maintained by the police and that Cuadrilla would fully engage in this process.

- **It is concluded that the projects (centred on 8 experimental boreholes) will not have a significant socio-economic effect on communities particularly in groups with protected characteristics.**

Noise

This topic is concerned with the noise generated by the projects particularly from the operation of the plant and machinery associated with drilling and fracking and the movement of HGV. It is particularly concerned with the effects on the groups with the protected characteristics defined as

- disability
- age

The County Council's assessment of noise impacts shows there will be an unacceptable impact on noise pollution for residents of the nearest properties. However, there is no reason to conclude this will have a disproportionately higher impact on people with protected characteristics. Nevertheless, the impact on the general population nearby is unacceptable and it is recommended that both planning applications are refused.

- **It is concluded that noise impacts on the general population nearby is unacceptable, but this will not disproportionately impact on people with protected characteristics to any greater degree than it will impact on the people without protected characteristics.**

Question 4 –Combined/Cumulative Effect

Could the effects of your decision combine with other factors or decisions taken at local or national level to exacerbate the impact on any groups?

For example - if the proposal is to impose charges for adult social care, its impact on disabled people might be increased by other decisions within the County Council (e.g. increases in the fares charged for Community Transport and reductions in respite care) and national proposals (e.g. the availability of some benefits). Whilst LCC cannot control some of these decisions, they could increase the adverse effect of the proposal. The LCC has a legal duty to consider this aspect, and to evaluate the decision, including mitigation, accordingly.

If Yes – please identify these.

The potential impacts of both the Preston New Road site and Roseacre Wood site have been considered together.

The Environmental Impact Assessment has also assessed the potential impact of the Projects combined within 10km of the site. This has been assessed and concluded that the projects will not result in greater number of significant effects when combined compared to each in isolation, or with those from other developments in the vicinity.

Question 5 – Identifying Initial Results of Your Analysis

Repeat of what was in 3. Summary

As a result we would suggest conditions

As a result of your analysis have you changed/amended your original proposal?

Please identify how – no

For example:

Adjusted the original proposal – briefly outline the adjustments

Continuing with the Original Proposal – briefly explain why

Stopped the Proposal and Revised it - briefly explain

The proposals will have an impact on people living nearest to the sites, but this will not have a disproportionate impact on people with protected characteristics compared to people without. The impact will be universal for nearby residents. Nevertheless, it is recommended that permission is refused because of the noise impact on people living nearest to the sites.

Question 6 - Mitigation

Please set out any steps you will take to mitigate/reduce any potential adverse effects of your decision on those sharing any particular protected characteristic. It is important here to do a genuine and realistic evaluation of the effectiveness of the mitigation contemplated. Over-optimistic and over-generalised assessments are likely to fall short of the “due regard” requirement.

Also consider if any mitigation might adversely affect any other groups and how this might be managed.

Mitigation is detailed in the Environmental Statements that accompany the Planning Applications. If planning permission is granted, the conditions and controls that fall within the responsibility of the County Council would be enforced. However, it is recommended that planning permission is refused for both sites.

Question 7 – Balancing the Proposal/Countervailing Factors

At this point you need to weigh up the reasons for the proposal – e.g. need for budget savings; damaging effects of not taking forward the

proposal at this time – against the findings of your analysis. Please describe this assessment. It is important here to ensure that the assessment of any negative effects upon those sharing protected characteristics is full and frank. The full extent of actual adverse impacts must be acknowledged and taken into account, or the assessment will be inadequate. What are required are an honest evaluation, and not a marketing exercise. Conversely, while adverse effects should be frankly acknowledged, they need not be overstated or exaggerated. Where effects are not serious, this too should be made clear.

The County Council has a duty to meet the requirement of section 149 of the Equality Act 2010.

The County Council is also the strategic planning authority for mineral and waste developments in the county. This involves managing the planning process according to planning rules set out by the government to assess applications for mineral developments, including mineral exploration and appraisal. The County Council must determine applications in accordance with planning law. A planning application can only be refused if it is contrary to the policies of the development plan and there are sustainable reasons to do so. If planning permission is granted, the County Council would monitor and inspect the operations to ensure they comply with any conditions imposed. The County Council has to be fair and neutral in the way it considers planning applications within the limitations of planning law.

The County Council does not work in isolation when determining planning applications and works closely with other regulators, agencies and bodies in determining applications. For example, safety and environment are important factors and the advice provided by other agencies is carefully considered before decisions are taken.

This assessment has been undertaken for the purposes of judging that the County Council has met its own requirements under the duty.

The assessment has concluded that impact of the proposal can be mitigated so that they will not have a significant impact on groups with protected characteristics.

Question 8 – Final Proposal

In summary, what is your final proposal and which groups may be affected and how?

This assessment has been undertaken for the purposes of judging that the County Council has met its own requirements under the duty.

The assessment has concluded that the noise impact of the proposal on people living nearest to the sites is unacceptable, but this would not disproportionately impact people with protected characteristics compared to people without.

Question 9 – Review and Monitoring Arrangements

Describe what arrangements you will put in place to review and monitor the effects of your proposal.

If planning permission is granted the developer is required to operate within the conditions imposed on the planning permission. Monitoring and inspection visits will form a key part of the successful implementation of any planning permission, to ensure the operator complies with any conditions imposed on the planning permission. The frequency with which sites are visited will depend on the nature and scale of the development. Sites where breaches of planning control have been identified will be visited more regularly.

Where a breach of planning control is identified the council will take appropriate and proportionate action to remedy the breach using the

powers at its disposal, in accordance with the Development Control Enforcement Policy¹.

Monitoring will also be carried out through the other regulatory regimes, by the Environment Agency and the Health and Safety Executive, and by an independent body on behalf of the operator which reports to the Health and Safety Executive and DECC.

Equality Analysis Prepared By Clare Phillips

Position/Role Specialist Advisor

Equality Analysis Endorsed by Line Manager and/or Chief Officer

Decision Signed Off By

Cabinet Member/Chief Officer or SMT Member

Please remember to ensure the Equality Decision Making Analysis is submitted with the decision-making report and a copy is retained with other papers relating to the decision.

Where specific actions are identified as part of the Analysis please ensure that an EAP001 form is completed and forwarded to your Directorate's contact in the Equality and Cohesion Team.

Directorate contacts in the Equality & Cohesion Team are:

Karen Beaumont – Equality & Cohesion Manager

¹ <http://www.lancashire.gov.uk/corporate/web/viewdoc.asp?id=47630>

Karen.beaumont@lancashire.gov.uk

Contact for Adult & Community Services Directorate

Jeanette Binns – Equality & Cohesion Manager

Jeanette.binns@lancashire.gov.uk

Contact for Environment Directorate, Lancashire County Commercial Group and BTLS

Saulo Cwerner – Equality & Cohesion Manager

Saulo.cwerner@lancashire.gov.uk

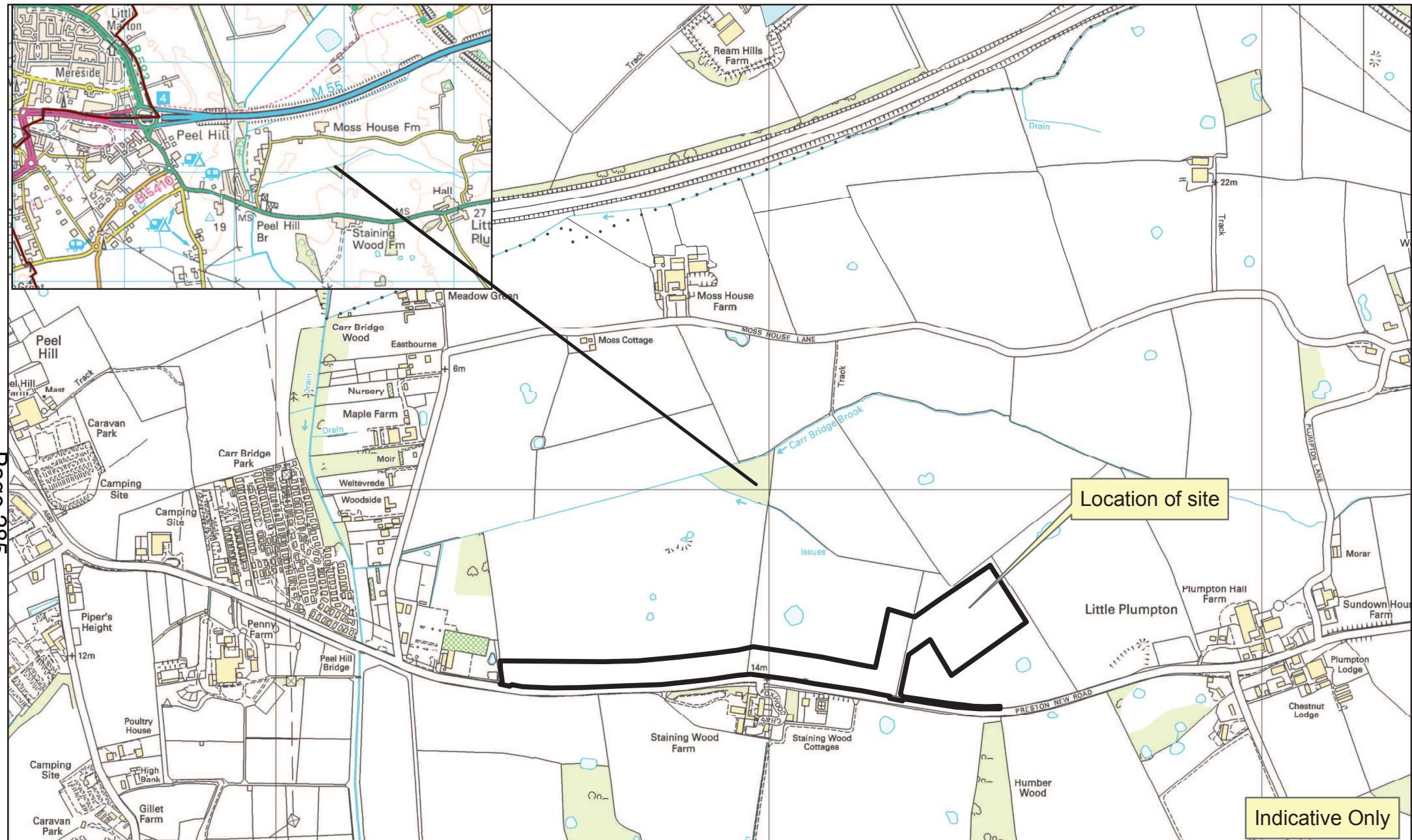
Contact for Children & Young Peoples Directorate

Pam Smith – Equality & Cohesion Manager

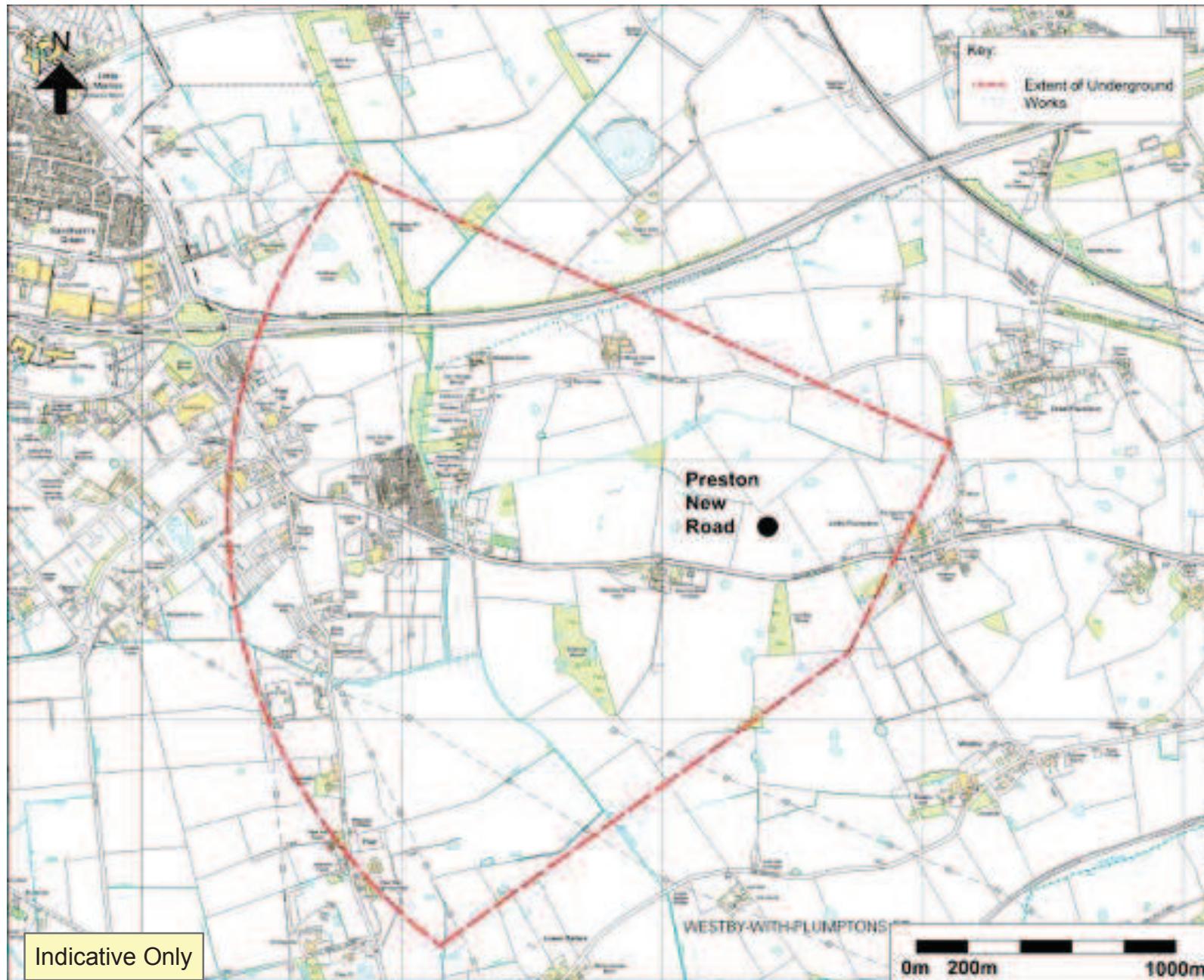
Pam.smith@lancashire.gov.uk

Contact for Office of the Chief Executive and the County Treasurer's Directorate

Thank you



APPLICATION LCC/2014/0096 CONSTRUCTION AND OPERATION OF A SITE FOR DRILLING UP TO FOUR EXPLORATION WELLS, HYDRAULIC FRACTURING OF THE WELLS, TESTING FOR HYDROCARBONS, ABANDONMENT OF THE WELLS AND RESTORATION, INCLUDING PROVISION OF AN ACCESS ROAD AND ACCESS ONTO THE HIGHWAY, SECURITY FENCING, LIGHTING AND OTHER USES ANCILLARY TO THE EXPLORATION ACTIVITIES, INCLUDING THE CONSTRUCTION OF A PIPELINE AND A CONNECTION TO THE GAS GRID NETWORK AND ASSOCIATED INFRASTRUCTURE TO LAND TO THE NORTH OF PRESTON NEW ROAD, LITTLE PLUMPTON. AGRICULTURAL LAND THAT FORMS PART OF PLUMPTON HALL FARM TO WEST OF THE FARM BUILDINGS, NORTH OF PRESTON NEW ROAD, OFF PRESTON NEW ROAD, LITTLE PLUMPTON, PRESTON



APPLICATION LCC/2014/0096 EXTENT OF THE UNDERGROUND OPERATIONS AS EXTENDED TO THE SURFACE. PRESTON NEW ROAD

Agenda Item 4

Development Control Committee
Meeting to be held on 28 January 2015

Electoral Division affected: FYLDE WEST, FYLDE SOUTH, ST ANNES SOUTH
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Fylde Borough Council: application number. LCC/2014/0097
Application for monitoring works in a 4 km radius of the proposed Preston New Road exploration site comprising: the construction, operation and restoration of two seismic monitoring arrays comprising of 80 buried seismic monitoring stations and 10 surface seismic monitoring stations. The seismic monitoring stations will comprise underground installation of seismicity sensors; enclosed equipment and fenced enclosures. The surface array will also comprise monitoring cabinets. The application is also for the drilling of three boreholes, each installed with 2 monitoring wells, to monitor groundwater and ground gas, including fencing at the perimeter of the Preston New Road exploration site near Little Plumpton

Contact for further information:
Development Management, 01772 531929, Environment Directorate
DevCon@lancashire.gov.uk

Executive Summary

Planning permission is sought for the installation of monitoring works in a 4 km radius of the proposed Preston New Road exploration site comprising: the construction, operation and restoration of two seismic monitoring arrays comprising of 80 buried seismic monitoring stations and 10 surface seismic monitoring stations. The seismic monitoring stations will comprise underground installation of seismicity sensors; enclosed equipment and fenced enclosures. The surface array will also include the siting of monitoring cabinets. The application is also for the drilling of three boreholes, each installed with 2 monitoring wells, to monitor groundwater and ground gas, including fencing at the perimeter of the Preston New Road exploration site near Little Plumpton.

The application is associated with application LCC/2014/0096 reported elsewhere on this agenda. The applications are supported by a planning statement and an Environmental Statement that assesses the potential impacts of the proposals on the application site and surroundings; a description of the proposed development; scheme alternatives; air quality, archaeology and cultural heritage, greenhouse gas emissions; community and socio economics; ecology; hydrogeology and ground gas; induced seismicity; land use; landscape and visual amenity; lighting; noise; resources and waste; transport; water resources and public health.

Recommendation – Summary

That after first taking into consideration the environmental information and further information, as defined in the Town and Country Planning (Environmental Impact Assessment) Regulations 2011, planning permission be **granted** subject to conditions controlling time limits, working programme, site operations, times and hours of working, highway matters, protection of public rights of way, drainage,

noise, protection of trees, ecological and archaeological protection, restoration and aftercare.

Applicant's Proposal

Planning permission is sought for the installation of an array of monitoring boreholes within a 4 km radius of the proposed Preston New Road exploration site (application reference LCC/2014/0096). The proposed array would comprise of 80 buried seismic monitoring stations and 10 surface seismic monitoring stations.

The array is proposed in support of the application for the construction and operation of a site for drilling up to four exploration wells, hydraulic fracturing of the wells, testing for hydrocarbons, abandonment of the wells and restoration, including provision of an access road and access onto the highway, security fencing, lighting and other uses ancillary to the exploration activities, including the construction of a pipeline and a connection to the gas grid network and associated infrastructure (ref LCC/2014/0096). It is proposed to develop the array in tandem with the development of the site the subject of planning application LCC/2014/0096 and before any of the wells for shale gas are hydraulically fractured to enable data to establish baseline data on naturally occurring seismicity for a period of at least four weeks before the commencement of hydraulic fracturing.

It is proposed to drill 80 underground seismic monitoring stations in the form of boreholes to be drilled up to 100m in depth and diameter of 150mm. The array stations are proposed to be drilled by a truck mounted drilling rig similar to those used for drilling water wells utilising an area of approximately 20m x 20m and would take approximately four days to complete – one day to mobilise, two days to install and one day to demobilise. Each well head would comprise of a concrete pad or collar with an inspection cover mounted flush with the ground surface located at sites away from buildings, roads and other potential sources of interference surrounded by small wooden fenced enclosures approximately 2m x 2m x 1.2m high. Excavated materials would be reused on site. Each borehole would generate approximately 3m³ of bentonite slurry waste and 0.03m³ of cement waste which would be removed off site. Each well would house seismic monitoring equipment designed to provide data on the location, extent and direction of the fractures that occur within the shale rock during hydraulic fracturing and allow the hydraulic fracturing process to be refined throughout the hydraulic fracturing activities.

The surface array would be a network of shallow buried seismic monitoring stations comprised of up to 10 shallow pits to a depth of approximately 0.8m below ground level within which sensitive seismometers would be placed. It would take two days to install each surface array point, which would be dug by hand or mini digger utilising an area approximately 20m x 20m after which they would be surrounded by a 2m x 2m x 1.2m high wooden fenced enclosure. Excavated materials would be reused on site and no waste materials would be exported off site. The monitors are designed to monitor and provide data to mitigate the level of induced seismicity from hydraulic fracturing operations so they are below a level of magnitude that will not damage buildings or infrastructure and is unlikely to be felt by people. The installation of each surface array station would also include small junction boxes to house batteries, data logging equipment, modem and GPS units housed in a kiosk approximately 1.1m high and located between 1m and 3m from the seismometer.

There would be approximately 10 traffic movements necessary for the construction of each array point comprising 6 light vehicles for the transportation of staff and four tractors transporting drilling equipment. The completed array sites would be visited to change batteries used to power the seismometers and up to 2 light vehicle movements per day per location during the periods of hydraulic fracturing.

It is also proposed to drill three pairs of groundwater monitoring wells within the proposed site fence line but outside the impermeable liner and drainage ditches. The wells would be drilled using a small drilling rig to a depth of 20 - 30m and diameter of 150mm. Excavated materials would be reused on site. Each borehole would generate approximately 3m³ of bentonite slurry waste and 0.03m³ of cement waste which would be removed off site. It is expected each station would be constructed over a period of 3 – 5 days. Continuous monitoring devices to record ground water quality and gas concentrations in the monitoring wells would be deployed. They are designed to allow groundwater quality and ground gas base line data to be collected prior to drilling and then used during and post exploration and for an a period to be agreed following abandonment.

The applications are supported by a Planning Statement (PS), Supporting Documents, an Environmental Statement (ES) and a Non Technical Summary (NTS). The PS includes a Sustainability Appraisal and the Supporting Documents include a Flood Risk Assessment, Utilities Statement and a Statement of Community Involvement.

The ES provides a full description and assessment of the following:

- The application site and surroundings
- A description of the proposed development
- Scheme alternatives
- Air quality
- Archaeology and cultural heritage
- Greenhouse gas emissions
- Community and socio economics
- Ecology
- Hydrogeology and ground gas
- Induced seismicity
- Land Use
- Landscape and visual amenity
- Lighting
- Noise
- Resources and waste
- Transport
- Water resources
- Public health

The proposed drill site and monitoring array all fall within the applicants Petroleum Exploration Development Licence issued by the Department of Energy and Climate Change.

The applicant submitted further information in support of the Environmental Impact Assessment and in response to matters raised by a number of consultees, groups and individuals. The further information relates primarily to matters raised in respect of the drill site on air quality, seismology, ecology, policy, highway matters, noise and public health although some information relates to the proposed monitoring stations, most particularly in respect of ecology, seismology and policy.

Description and Location of Site

The surface array and buried array would all be located in rural locations within a 4 km radius of the proposed Preston New Road exploration site. Access to each array station would be taken either directly from the public highway via existing field access points or from existing agricultural tracks or bridleways. No new access points are proposed. Some of the access points to the array stations are in close proximity to residential properties although the stations themselves are generally well removed or even remote from sensitive properties. Some access points serve more than one proposed array station. Detailed plans of the proposed array and access points are set out in the ES (Volume 2C, Section 9 Appendix R2). A plan identifying the location of the proposed array stations is attached to this report.

The site and surrounding array stations are located within open countryside in the Coastal Plain. The area is characterised by intensively managed areas of arable, horticultural and dairy farmland although there are also small areas of mosslands and peat bogs, a small number of species rich meadows / fens and ancient woodlands. Some of the proposed monitoring points are in close proximity to Biological Heritage Sites (BHS).

Background

The proposed monitoring boreholes are in support of planning application LCC/2014/0096 (reported elsewhere on this agenda) and which includes reference to the interests in shale gas exploration in the Fylde to date. Reference is made in the ES to the opportunity to use existing monitoring boreholes installed as part of the development of a site at Annas Road providing they are suitable to use and which are included in the proposed array as part of this application; if they are not suitable it is proposed to re-drill them.

The array is proposed in support of the application for the construction and operation of a site for drilling up to four exploration wells, hydraulic fracturing of the wells, testing for hydrocarbons, abandonment of the wells and restoration, including provision of an access road and access onto the highway, security fencing, lighting and other uses ancillary to the exploration activities, including the construction of a pipeline and a connection to the gas grid network and associated infrastructure (ref LCC/2014/0096). It is proposed to develop the array in tandem with the development of the site the subject of planning application LCC/2014/0096 and before any of the wells for shale gas are hydraulically fractured to enable data to establish baseline data on naturally occurring seismicity for a period of at least four weeks before the commencement of hydraulic fracturing.

A planning application has also been submitted for the construction and operation of a site for drilling up to four exploration wells, hydraulic fracturing of the wells, testing for hydrocarbons, abandonment of the wells and restoration, including provision of

an access road and access onto the highway, security fencing, lighting and other uses ancillary to the exploration activities, including the construction of a pipeline and a connection to the gas grid network and associated infrastructure at a site at Roseacre Wood, Roseacre (ref LCC/2014/0101).

An application has also been submitted to support that application for a monitoring array (ref LCC/2014/0102). It is proposed to develop the array in tandem with the development of the site the subject of planning application LCC/2014/0101 and before any of the wells for shale gas are hydraulically fractured to enable data to establish baseline data on naturally occurring seismicity for a period of at least four weeks before the commencement of hydraulic fracturing.

The two array applications are very similar in principle in terms of their purpose, design and intention. Consequently there are many common issues to the two applications in terms of their design and intention and how they have been assessed. The two reports relating to such are therefore very similar.

Planning Policy

Strategic Policy

European Policy

EU Habitats Directive

EU Directive – Control of Major Accidental Hazards Involving Dangerous Substances

National Policy

DECC About shale gas and hydraulic fracturing (fracking) 30 July 2013

House of Commons Standard Note Shale Gas and Fracking 22 January 2014

Regulatory Framework

HSE	Shale gas and hydraulic fracturing (fracking) Q&A date?
EA	Regulatory Position Statement Onshore oil and gas well decommissioning and abandonment for well prior to 1 October 2013
UKOOG	UK Onshore Shale Gas Well Guidelines – Exploration & Appraisal phase 1 February 2013
CIWEM	Shale Gas and Water January 2014

Planning Policy

National Planning Policy Framework (NPPF)

The following paragraphs are relevant with regard to the requirement for sustainable development, core planning principles, the requirement for good design, conserving and enhancing the natural environment and facilitating the sustainable use of minerals.

Paragraphs 11-14	Requirement for Sustainable Development
Paragraph 17	Core Planning Principles

Paragraphs 56-66	Requirement for Good Design
Paragraphs 100-103	Flood Risk
Paragraphs 109-112	Conserving and Enhancing the Natural Environment
Paragraphs 118-125	Conserve and Enhance Biodiversity
Paragraphs 142-148	Facilitating the Sustainable use of Minerals
Paragraphs 186-216	Decision-making

Planning Practice Guidance (NPPG)

Air Quality	Air quality impacts
Climate Change	Mitigation and adaption measures
Design	Key design points
Flood Risk and Coastal Change	Flood Risk Assessment
Health and Well Being	Healthy communities / environmental risks
Land Stability	Risk of Unstable Land/ subsidence
Light Pollution	Obtrusive light impacts
Minerals	Mineral Extraction
Natural Environment	Protect biodiversity
Noise	Manage noise impacts
Water supply, wastewater, water quality	Quality and infrastructure

Joint Lancashire Minerals and Waste Development Framework Core Strategy Development Plan documents (LMWDF)

- Policy CS1 Safeguarding Lancashire's Mineral Resources
 Policy CS5 Achieving Sustainable Minerals Production

Joint Lancashire Minerals and Waste Local Plan – Site Allocation and Development Management Policies – Part One (LMWLP)

- Policy NPPF 1 Presumption in favour of sustainable development
 Policy DM2 Development Management

Onshore Oil and Gas Exploration, Production and Distribution – Supplementary Planning Document - The Supplementary Planning Document will provide guidance on the interpretation and application of the policies in the adopted Joint Lancashire Minerals and Waste Core Strategy and Site Allocation and Development Management Local Plan, describing how these policies can be applied to developments for onshore oil and gas exploration, production and distribution.

Fylde Borough Local Plan

Policy SP2	Development in Countryside Areas
Policy EP11	Building Design and Landscape Character
Policy EP12	Conservation of Trees and Woodland
Policy EP19	Protection of Ecology
Policy EP21	Protection of Archaeological interests
Policy EP23	Pollution of Surface Water
Policy EP24	Pollution of Ground Water
Policy EP26	Air Pollution
Policy EP27	Noise Pollution

Consultations

The following bodies have been consulted or made representations on the application and supporting documents as initially submitted and in some cases on subsequent information / clarification provided by the applicant in response to requests for further information on issues raised. Their views in respect of the application as initially submitted and on the clarification information provided by the applicant are summarised as follows

Department of Energy and Climate Change: No comments received

Ministry of Defence (Safeguarding): No safeguarding objection.

Blackpool Borough Council: No objection but given the most densely built up area to the exploration site is in Blackpool questions whether a monitoring station should be provided on Sandam's Green to the north of Clifton Road, an area of public open space..

Fylde Borough Council: object to the proposal as the proposed buried monitoring arrays and associated works would result in the unnecessary industrialisation of the countryside locations and would detract from the rural character of the locality. It is also considered that the harm to the rural character of the area is not outweighed by the need to provide the proposed monitoring stations as part of the proposal. In the event planning permission is approved for the proposed exploratory drilling site contrary to the wishes of the Borough Council, it is requested that any planning permission granted be limited to the monitoring equipment deemed necessary by the Department of Energy and Climate Change.

Westby-with- Plumpton Parish Council: Recommends the application be refused for the following summarised reasons and which also relate to application LCC/2014/0096:

- The proposed development would introduce an industrial form of development into a rural setting which will be of detriment to resident's quality of life.
- The value and saleability of properties will drastically diminish
- The proposed development is located too close to some resident's properties.
- Noise pollution day and night from the 24hour operation.
- Air pollution to any degree is unacceptable
- Evidence of earth tremors from Cuadrilla's activities elsewhere
- Residents concerns over structural damage to properties, including Carr Bridge Residential Park, from vibrations from heavy plant and machinery.
- Concern regarding the visual aesthetic of the site, which requires screening.
- Major concerns over the highway access to the site, which is a renowned blackspot. Traffic lights should be installed.
- Concern regarding the suitability of A and B roads for additional traffic and the Kingfisher pub roundabout for larger vehicles.
- No evidence is given regarding compensation availability for damage occurring due to the fracking process, including structural damage, long-term land side effects and flooding.
- Impacts on the natural drainage system and potential damage to any asbestos in the underground system.

- Concerns regarding water contamination and the disposal of contaminated water.
- Inconvenience of anti-fracking protestors, affecting resident's quality of life and in turn the need for and cost liability of extra policing.
- Parishioners feel they are 'guinea pigs' in a fracking trial that is being rushed through without guarantees regarding environmental effects, safety precautions and compensation for affected people, properties and the environment.
- Concern regarding control and enforcement of the rules and regulations.

The Parish Council has requested that if the proposal is granted permission that the site and process is policed at all times; the residents are kept informed of all processes; emergency contingency plans are made public; compensation guarantees are put in place; access to land is pre-approved by landowners and a liaison committee is established to with representatives from the applicant, neighbouring properties, police, planning and environment officers from Lancashire and Fylde councils.

Kirkham Town Council: Object to the proposed exploration activities as a whole and are of the view that the benefits are outweighed by the potential major problems relating to seismicity; air, land and aquifer pollution risk; light pollution; flow back water; vehicle movements; noise; water supplies; visual impact, property values and insurance; potential future expansion and impact on local wildlife.

Medlar-with-Wesham Parish Council: Object to the proposed exploration activities as a whole and are of the view that the benefits are outweighed by the potential major problems relating to seismicity; air, land and aquifer pollution risk; light pollution; flow back water; vehicle movements; noise; water supplies; visual impact, property values and insurance; potential future expansion and impact on local wildlife.

Health & Safety Executive: The proposed operations will be conducted in accordance with recognised regulations standards and good industry practice. From a well's operations perspective the Executive has no issues or concerns with the proposals

Public Health England (PHE): makes extensive comments regarding both the planning applications. PHE agrees with the proposals to undertake baseline monitoring. However, details of the schedule for monitoring of gas and groundwater (e.g. frequency and duration) including base line data should be provided with the Environmental Management and Monitoring Plan. Details of what constitutes significant variation to baseline data resulting in the suspension of activities and subsequent investigation should be provided as part of the Environmental Management and Monitoring Plan.

Environment Agency: No objection in principle. In the event permits are issued for application LCC/2014/0096 they would include a need for monitoring.

Some of the proposed monitoring stations are located close to watercourses which are designated as Main Rivers and are subject to Land Drainage Bylaws. The proposed arrays that may fall within 8m of a Main River are identified and works within 8m of such may require prior written consent.

Highways Agency (HA): No objection in principle to the proposal but has made the following comments:

- With regard to the Strategic Road Network (SRN) if the traffic levels associated with the development exceed the levels in the Transport Assessment the Highways Agency should be informed.
- The cost of any mitigation to the highway asset needs to be covered by the instigator should damage occur due to project activities.

National Air Traffic Services: No objection. An initial objection was made that the proposed development would infringe on safeguarding criteria. Following further discussions with the applicant and a more in-depth analysis, it is now considered that the potential for impact on electronic infrastructure can be managed and there is no safeguarding objection.

Civil Aviation Authority: No objection

Blackpool Airport Ltd: No objection to the proposed drilling site subject to satisfactory bird mitigation that would not compromise safety standards. (No specific comment received in respect of the proposed array).

National Grid Gas: National Grid has a Major Accident Hazard Pipeline in the vicinity, Peel Hill –Thornton and associated service pipes. The Building Proximity Distance (BPD) is 14.5m minimum distance. When working in the vicinity National Grid Specification SSW22 applies.

United Utilities PLC: No objection subject to conditions being imposed requiring the submission of a method statement to ensure the protection of UU assets.

Police Emergency Planning: No comment

Natural England: Initially objected to the proposal due to there being insufficient information to demonstrate that the requirements of Regulations 61 and 62 of the Habitats Regulations had been considered and that the consultation did not include a Habitats Regulation Assessment. Further information in respect of air quality and SPA birds was requested. The objection was withdrawn following the submission of additional information and a Shadow Habitat Regulation Assessment by the applicant.

The Campaign to Protect Rural England: Any further 3d surveys should be carried out using the most up to date technologies such as a fibre-optic array rather than any older less sensitive or reliable technology such as an electromagnetic geophone array and that should planning permission be granted a condition requiring such be imposed.

Community Association for the Protection of Wrea Green: Object for the following summarised reasons:

- Potential health and safety impacts.
- Lack of a seamless regulatory regime.
- Risk of pollution to water courses.

- Air quality impacts associated with increased vehicular movements and flaring of gas.
- Safety of storage of waste water.
- Inadequate self policing of the fracking operations.
- Noise monitoring.
- Available water supply and impacts on such in times of drought.
- Potential well failure.

RSPB: Believes the regulatory regime for fracking is not fit for purpose and support the concerns of Natural England regarding the impacts on winter wildfowl.

LCC Developer Support (Highways): No objection. An assessment of impacts of the proposed access routes on traffic Flows, Vulnerable Road Users - Cyclists, Pedestrians & Equestrians; and safety has been carried out. Access to the monitoring points from the A583 Preston New Road from both the Preston and Blackpool directions as well as utilising the M55 via junctions 3, near Medlar, and Junction 4 (Peel Hill) and the subsequent use of the local network is not expected to generate traffic flows in volumes that will be of a material concern. Vehicles should not park or obstruct the highway network during monitoring at any location.

Some of the proposed access points affect Public Rights of Way (PROW). A condition survey and monitoring regime should be put in place at each proposed monitoring site to ensure the condition of the local highway including Public Rights of Way (PROW) in the vicinity of the each site is monitored and maintained and any damage rectified at the applicants expense and which should be the subject of a condition. Conditions are also proposed requiring any, access and off-site highway works to be constructed in accordance with the details approved and the submission of a management plan. A number of informatics to the applicant are also proposed.

LCC Public rights of way: The following footpaths are affected:

- 021 Site 148039 affects Public Footpath 05-14-06
- 023 Site 138315 affects Public Footpath 05-14-07
- 024 Site 138312 affects Public Footpath 05-14-06
- 032 Site 148020 affects Public Footpath 05-15-09
- 034 Site 148005 and 1387352 affects Public Footpath 05-15-10
- 035 Site 138362 affects Public Footpath 05-10-05
- 035 Site 148006 affects Public Footpath 05-14-06
- 016 Site 108 affects Public Footpath 05-02-12

Map of Public Rights of Way only records a public right of way on foot for the above listed public rights of way and in 2 cases a public right of way is recorded for pedestrians, equestrians and cyclists. Any person taking a motorised vehicle along a public footpath or bridleway without lawful authority commits an offence. Where lawful authority is given the driver of the vehicle is still subject to the provisions of the Road Traffic Act 1988. Typically the use of a public footpath by vehicles has a detrimental effect on the surface.

With respect to Site 108 (Plan 016) access is along Public Bridleway 05-02-12. This has been the subject of previous reports from members of the public with regards to the surface and use of the route by vehicles. The applicant needs to inform staff and contractors as to their responsibilities when using motorised vehicles on public rights

of way and this is something that should be covered by a risk assessment. The applicant will need to assess and record the condition of the surface prior to construction and monitor the condition of the surface of the public rights of way whilst the routes are in use by the applicants vehicles or there contractors. The applicant should confirm what measures will be taken to mitigate wear and tear on the public rights of way surface.

Public Rights of Way must not be obstructed during the proposed development. It is the responsibility of the landowner to ensure that the necessary procedures are followed for the legal diversion of the Public Right of Way if this should be necessary. The granting of planning permission does not constitute the diversion of a Definitive Right of Way. If it is necessary for Public Rights of Way to be temporarily diverted or temporarily closed, this is the responsibility of the landowner to ensure that this is done following the appropriate legal procedures. A temporary closure will only be granted where it is the intention to re-open the right of way upon expiration of the closure on the route recorded on the Definitive Map of Public Rights of Way.

The Town and Country Planning Act 1990 has provision for diverting Definitive Public Rights of Way if a diversion is necessary to allow the development to take place. The Highways Act 1980 also has provision for the diversion of Definitive Rights of Way, though with regards to new developments, the Town and Country Planning Act 1990 is the appropriate legislation to use. It should be noted by the applicant that objections may be raised using either of the above Acts. Lancashire County Council Public Rights of Way Team will not process a diversion application in relation to these paths in connection with a development proposal. Should the paths be obstructed during the development or be obstructed after the development has taken place this would constitute a criminal offence against which action may be taken. The development must not commence until the necessary procedures are in place, either allowing the development to take place without affecting the right of way as recorded on the Definitive Map of Public Rights of Way and subsequent diversion orders and side roads orders, or if it is necessary to divert the above listed Public Rights of Way, then the necessary Orders must be confirmed prior to construction to avoid enforcement action should the above Public Footpath become affected. There is no provision under the Town and Country Planning Act 1990 to allow a retrospective diversion of paths that are already affected by either partially completed or completed development.

LCC Emergency Planning: The applications do not impinge on any COMASH or REPPIR sites but do pass through an area through which a major hazard pipeline passes. This would be a matter for National Grid.

LCC Specialist Advisory Services:

Landscape: Due to their small scale and understated appearance the proposed temporary surface and buried arrays would have only localised and very minor landscape and visual effects. In addition there would be, on average, a separation distance of approximately 0.5km between them which would be far enough to significantly mitigate any cumulative effects. The proposed temporary surface and buried arrays would likely not have any significant landscape and visual effects either individually or in combination with other structures.

Ecology: The proposed monitoring array could have impacts on great crested newts, bats, badgers, water voles, ground nesting birds, reptiles, common toads and brown hare although not in a way that could not be managed or mitigated.

Prior to the commencement of works, a Biodiversity Mitigation Strategy shall be submitted for approval in writing and subsequent implementation in full and maintenance thereafter. The scheme shall include, but not be limited to, details of measures for the avoidance/ mitigation of impacts on protected and priority species (amphibians, bats, nesting and wintering birds, badgers, reptiles, water vole, brown hare) and their habitat during construction and operation of the development.

Prior to the commencement of works, a revised Ecological Mitigation Strategy (landscaping, habitat creation and enhancement) shall be submitted for approval in writing and subsequent implementation in full. The Strategy shall provide details of the creation and enhancement of habitats to offset hedgerow losses and to compensate for impacts on the habitat of protected and priority species. A revised habitat mitigation (Ecological Mitigation Strategy) and species mitigation (Biodiversity Mitigation Strategy / CEMP) should be secured by planning condition.

Archaeology: The Archaeology and Cultural Heritage chapter of the ES has been undertaken in line with the requirements of the County Archaeology Service (LCAS). LCAS agrees with the assessment that the site has a low potential to contain previously unknown archaeological finds or features. The proposed mitigation measures are considered to be appropriate. LCAS recommend therefore that should the application be approved a condition is attached that development should not take place until the implementation of a programme of archaeological work is secured.

LCC Director of Public Health: Has undertaken a Health Impact Assessment on the two main drill sites and identified that the key risks to health and wellbeing of the population from the two proposed sites are a lack of public trust and confidence in the regulatory process and the industry, stress and anxiety from uncertainty about the industry that could lead to poor mental wellbeing; potential noise related health effects due to continuous drilling for at least five months for the initial borehole on each site and for three months for each of the subsequent three boreholes per site (14 months of continuous drilling), and potential health risks due to the presence of mining wastes generated as part of the drilling and hydraulic fracturing process being retained on site if adequate off site treatment facilities are not found.

A number of key recommendations to inform the planning process include:

1. Consider the need for further noise assessment, particularly on the proposed Roseacre Wood site and if necessary, require additional mitigation measures to reduce noise associated with the development of the sites and more particularly the drilling and hydraulic fracturing phases of the development and which could be controlled by conditions attached to any planning permission.
2. Establish with the Applicant that liability and compensation arrangements are in place to cover any structural damages to properties that can be attributed to an unlikely event of induced seismicity.
3. Undertake an independent verification of the assessment of air quality, transport, waste management and induced seismicity prior to determining the planning applications.
4. Seek agreement with the Applicant to establish an independent

comprehensive baseline and on-going long term monitoring of environmental and health conditions prior to any activity on the sites.

5. The Director of Public Health should be informed of the results of the measurements and any breaches to the planning condition or environmental permit.
6. Consider the need to seek further clarification from the Applicant that the cumulative impacts of the operations from the flare, generators, vehicles and drilling will not exceed the national air quality objective thresholds, particularly for PM10, 24 hour mean levels.
7. As part of either the planning or permitting process, the Applicant should be required to submit regular data on the ambient air quality on site measuring all the common air pollutants relevant to the activity and report them regularly. PM10 and PM2.5 should be reported separately.
8. The Roseacre Wood site is within 55m of a National Grid gas transmission pipeline. Interconnections into national transmission pipelines are proposed at both sites. Advice should be sought and an assessment undertaken as to whether the nearby gas transmission pipelines are considered to be a major hazard.
9. Any extended flow testing provided for by any planning permissions should be aligned with the permits to be issued by the Environment Agency.
10. An assessment of light pollution as part of the site operations should be carried out, and if there are likely to be significant impacts associated with light pollution from the sites that cannot be mitigated or controlled, the Applicant should be requested to consider the opportunity to offer to fit blackout blinds to those homes most likely to be affected.
11. Further clarification or new information on the occurrence and magnitude of equipment likely to be contaminated with radioactive waste and how such waste would be managed on the site and disposed of should be sought.
12. Should planning permission be granted, it should be a pre requisite that no activity can start until the onsite and offsite waste treatment capacity is defined.
13. Further clarification should be sought that any specific risks due to using the MOD site for accessing the Roseacre Wood site have been addressed before any planning permission is granted.
14. A full assessment of the impacts of additional traffic associated with the proposals on road safety should be carried out and appropriate traffic management options considered to address the public concerns, particularly in respect of the Roseacre Wood site.
15. Should planning permission be granted, provision should be made with the Applicant to maintain road safety, particularly on the access routes to Roseacre Wood site and road safety and any related incidents on the access to both the sites should be monitored.
16. In the event planning permissions are granted, any breach of planning conditions should be reported to the Director of Public Health so that necessary steps can be taken in protecting and improving the health of local communities from issues arising due to the alleged or identified breaches of planning control.

Indicative framework for long term monitoring of environmental and health conditions

1. Context

It is understood that a range of data will be collected by the operator and reported to the regulatory authorities, particularly the EA. What this will constitute is not available to LCC's public health department until the environment permit, planning condition and environmental operating standards are agreed. This document is written with that gap in knowledge. Following the Applicant's surrender of the permit to the EA (who must be satisfied that environmental conditions are acceptable and will remain so before accepting the surrender), current practice suggests there will not be a requirement for long term monitoring of the environment in and around the restored sites of former wells. Establishing a shale gas monitoring unit in Lancashire as an independent source of reliable information will help with the understanding of any environment and health impacts and the communication of risks to the local communities. It will also support the development of future policy and practice of shale gas extraction.

2. Aim

To establish an independent, reliable, single source of local information on shale gas exploration in Lancashire.

2.1 Objectives

- To develop a framework to establish a baseline and ongoing monitoring of environmental and health conditions
- To support risk communication and reassurance to local communities on the safety and impacts of shale gas activities in Lancashire.
- The governance and management of the shale gas observatory should be determined in consultation with various stakeholders including the local communities, the industry, and the regulatory agencies.

3. The framework for data collection

It is expected that most of the data will be collected under the existing regulatory regime. Hence, the focus should be collating the data in one place with independent verification, analysis and communication of risks to the public in a transparent, reliable and proportionate manner.

Both qualitative and quantitative methods of data collections should be used. It is anticipated that the data collection will start prior to any activities beginning if the applications are approved. It will mainly focus on the geographical area affected by the two planning applications. This is currently understood to be approximately a 2 kilometres radius from the proposed location of the well pads.

The time period for long term monitoring should be at least 30 years post abandonment or until such time there is national guidance on long term monitoring. The suggested 30 year time period is based on the long term monitoring of landfill gas migration.

3.1 Data collection and analysis (an indicative list)

- Profiling of drill cuttings, fracturing fluids to identify substances hazardous to human health including NORM.
- Information on decontamination of equipments.

- Characterisation of the extent of fracture propagation and the permeability of layers above and beyond the faults.
- Characterisation of combustion gases at the flare, particularly the levels of hydrocarbons, radon, methane, volatile organic compounds and any other substances deemed hazardous to human health.
- Levels of fugitive emissions at well pads, on potential pathways and at receptor households.
- Ground water monitoring of methane.
- Measuring long term well integrity.
- Particulate Matter at source and confirmation of the modelling findings for receptors in the ES.
- Levels of noise at source and receptors.
- Information on any existing private water supplies that aren't covered by abstraction license within 2 km zone.
- Sampling of ground/food chain.
- Information on local climate within the 2 km zone to identify potential hotspots.
- Safety profile of transport routes and modelling to minimise road traffic accidents.
- Safety profile of waste management sites.
- Household survey of human health and wellbeing, and sampling of environmental conditions within the 2km zone. The sampling to be based on modelling from source data.
- Survey of any other sensitive receptors in the vicinity of the two sites.
- Analysis of routinely collected data on health and health care utilisation.
- Analysis of occupational health surveillance data collected by the operator.

Representations – The application has been advertised by press and site notice, and neighbouring residents informed by individual letter.

Friends of the Earth: Object to both applications for the reasons summarised in the report for application LCC/2014/0096 which primarily relate to the unacceptability of reliance on hydrocarbons as an energy source and the unacceptable environmental and social impacts associated with such.

Fifty one letters of representation have been received, one in support of the proposal and fifty objecting to the proposal for the following summarised reasons, many of which object to fracking and associated impacts in general as well as being specific to the proposed monitoring array:

- Oppose fracking in principle.
- Will lead to an adverse impact on property valuations and an inability to obtain home insurance.
- Will introduce more traffic and lead to the industrialisation of a rural area.
- One monitoring station is within 100m of a residential property and close proximity to a public footpath.
- Unacceptable impact on land and property.
- Will have a negative effect on reducing greenhouse gases.
- Fracking will cause air, surface and ground water pollution with emissions to atmosphere from the flare stack and the need to manage polluted water.
- Fracking is inappropriate in such close proximity to sites with ecological designations such as Lytham Moss and the Ribble Estuary SPA and would

have an adverse impact on wildlife, in particular migrating birds. The arrays, if constructed in winter would adversely affect wintering wildfowl.

- The regulations are not fit for purpose and a reduction in resources will lead to less regulation.
- Fracking will lead to adverse health impacts and a number of health studies in America are referenced.
- Risks from seismological movement and damage to property.
- Inadequate consultation and damage to private land as part of the initial 3d survey.
- If the application is approved then by implication so would application LCC/2014/0096 and which would be a foot in the door for more similar developments.
- Would adversely affect agricultural land, water courses and the environment.
- Contrary to Fylde Borough Council Objective 1.50 (no2) 'to limit development in the open countryside, to that appropriate to a rural area and necessary for the well being of the rural community.'
- Local opinion in opposition to fracking should be supported. The applicant has no 'social licence' to propose developments of this nature in this area.
- There is some confusion over the size of the construction platforms and the use of concrete. If a 20mx20m square concrete pad is to be retained they would have an unacceptable cumulative impact on the environment
- The applicant does not have a valid exploration for the area.
- Contrary to the polices of the development plan – Policy EP24, SP2, SP7, SP9, EP26, EMP5, EP11 and EP15 of the Fylde Local Plan and Policy DM2 and CS5 of the LMWP.
- The site on Copp Lane, Great Eccleston is opposite a local school; an increase in traffic would increase dangers and compromise safety.

The letter of support is from a resident who resides near the Annas Road site who is of the view that the applicant managed the site well and that it had negligible impact on the locality; that there was no reason to complain about noise or traffic both of which were not an issue or even noticeable relative to existing noise or traffic.

A representation (Glasgow University) in support of the proposals considers that the microseismic monitoring are appropriately designed and are necessary for monitoring the fracking process in the boreholes and recommend if granted conditions requiring:

- The data and results of the microseismic monitoring be made available to appropriate specialists with suitable track records for analysis and such analysis to include estimation of the strength of ground vibration at points at the Earth's surface to determine whether any unacceptable nuisance has affected any of the local population.
- All data and results from the drilling and microseismic monitoring to be published, maybe after an embargo period of say 3 years.
- The applicant to pay for the analysis of the drilling and microseismicity data.

Advice

Planning permission is sought for the installation of an array of monitoring boreholes within a 4 km radius of the proposed Preston New Road exploration site. The array

would comprise of 80 buried seismic monitoring stations and 10 surface seismic monitoring stations.

The array is proposed in support of the application for the construction and operation of a site for drilling up to four exploration wells, hydraulic fracturing of the wells, testing for hydrocarbons, abandonment of the wells and restoration, including provision of an access road and access onto the highway, security fencing, lighting and other uses ancillary to the exploration activities, including the construction of a pipeline and a connection to the gas grid network and associated infrastructure (ref LCC/2014/0096). It is proposed to develop the array in tandem with the development of the site the subject of planning application LCC/2014/0096 and before any hydraulic fracturing takes place to enable data to establish baseline data on naturally occurring seismicity for a period of at least four weeks before the commencement of hydraulic fracturing.

It is also proposed to drill three pairs of groundwater monitoring wells to a depth of 20 – 30m within the proposed site fence line but outside the impermeable liner and drainage ditches.

The applications are supported by a Planning Statement (PS), Supporting Documents, an Environmental Statement (ES) and a Non Technical Summary (NTS). The PS includes a Sustainability Appraisal and the Supporting Documents include a Flood Risk Assessment, Utilities Statement and a Statement of Community Involvement.

The application for the development of the drilling site is reported elsewhere on the agenda and a full assessment of the proposal and impacts associated with such has been undertaken. The ES has been prepared in respect of both applications but inevitably there is more assessment of the proposed drilling operations the subject of application LCC/2014/0096. The ES presents an over view of the proposal in respect of the sources of natural gas, the exploration and appraisal of the Bowland Shale, provides details of the site locations, the context, geology, hydrogeology and hydrology, a development summary, sequencing of activities, surface and below ground works, monitoring arrays, construction of the well pad and access track, well design, fracturing, flow testing, extended flow testing, decommissioning and restoration.

The ES sets out the scheme alternatives and why the sites for drilling were selected which principally relate to interpretation of geological information gleaned from a 3D geological survey demonstrating the makeup of the geology and the most attractive areas of geology to undertake further investigations. This selection process along with the direction of drilling has determined the nature and location of the proposed monitoring array. The ES undertakes an assessment of the proposed drilling site and array in respect of a number of subject areas. The conclusions of the assessment in respect of the monitoring array are summarised as follows:

- Air Quality – the assessment concludes that there would be no significant impacts on air quality associated with the installation of the surface and buried array due to the location of such, limited earth works and vehicle movements.
- Archaeology and cultural heritage – none of the proposed locations for the surface or buried array fall within the boundary of a designated heritage asset. The ES concludes that the installation of the array would not have any

significant effect and would not have any cumulative significant effect and no mitigation is proposed.

- Greenhouse gas emissions: for the purpose of the array these would be restricted to vehicles accessing the sites for installation purposes and then for access associated with monitoring. It is expected that greenhouse gas emissions attributable to the installation of the array would be derived from vehicle movements and which would equate to 1% of the project carbon footprint. Consequently no emission mitigation measures have been identified.
- Community and socio economics: for the purposes of the array, a small team of specialists would carry out the installation works over a short period of time and which are unlikely to generate any community or socio economic costs or benefits to the area.
- Ecology: an extensive ecological assessment for the proposed well site and array has been carried out including field surveys, habitat surveys, surveys for badgers, water voles, bats, amphibians, ornithological, wintering birds and breeding birds. An ecological baseline appraisal was carried out for each of the array stations involving walk over surveys and assessment relating to the potential for wintering birds. Wintering bird surveys were undertaken for all the array stations that were considered to have moderate or high potential for wintering birds. The site and surrounding array stations are located within the Coastal Plain. The area is characterised by intensively managed areas of arable, horticultural and dairy farmland although there are also small areas of mosslands and peat bogs, a small number of species rich meadows / fens and ancient woodlands. Due to the areas proximity to the Ribble and Wyre estuaries the area is visited by large flocks of wintering wildfowl. Which feed and roost on farmland on the coastal plain. Numerous field ponds support great crested newts and water voles populate field drains and water courses. There are no statutory designations within the maximum extent of the surface and buried array stations. Whilst there are seven Biological Heritage Sites (BHS) within the 4km search radius covering the maximum extent of the array stations, none of the proposed stations are located within a BHS although two are located adjacent to Lythan Moss BHS and others within distances varying between 200m and 1km of the BHSs. Using the County Councils ecological records (LERN), no protected species were identified within a proposed array station or within the immediate vicinity although water vole, great crested newts, otters, king fisher's, barn owls and bats were identified within the search radius surrounding the array stations. Harvest mice, hedgehogs and brown hares have been recorded as well as the presence of a number of BAP bird species. No array site was identified as having high potential for wintering birds although 46 of the array sites were identified as having moderate potential for wintering birds and at which winter surveys were carried out. It is concluded that due to the small footprint of the array and their positions adjacent to boundary features that the construction of the arrays would lead to any loss of habitat which supports wintering wildfowl but that there could be potentially significant impact during installation works at 15 of the array sites. In terms of habitats, there would be some risk to ground nesting birds during installation activities. To mitigate the potential impacts on wintering wildfowl it is proposed to construct the arrays outside the wintering bird season. Pre start checks would be made in respect of nesting birds or vegetation would be managed in advance to make sure the area is not suitable for nesting birds. In respect of breeding and wintering birds, monitoring data is proposed to be

collected and down loaded remotely preventing the need for vehicles to approach the arrays thereby reducing the potential for disturbance. Whilst some access will be required (e.g. to change batteries), this would be minimised by the employment of best practices.

- Hydrogeology and ground gas: An extensive assessment of the geology of the area has been undertaken and the potential presence of gas and ground water identified. It is proposed to establish the pre-development (baseline) condition of the site for ground gas and groundwater by the construction of three ground gas monitoring wells around the proposed well pad perimeter. In respect of the surface and buried array management will be employed during construction works to contain potential contaminants arising from suspended sediment from exposed soils and diesel or lubricants from vehicles to ensure any risk is low. Subject to the employment of such measures it is concluded that the risk to water courses, human health through exposure to contaminated surface water or soil, crops or livestock and ground water is low/not significant.
- Induced seismicity: The installation of the surface and below ground array would comprise construction activities at various locations; there is no mechanism for induced seismicity in the construction of either and therefore no effects. The array is designed to record induced and natural seismicity and provide a baseline of background seismicity for the site which would be recorded for at least 4 weeks prior to the commencement of fracking operations and thereafter throughout any hydraulic stimulation as part of the proposed traffic light system to be employed.
- Land Use: An assessment of the impact of the project on agricultural land uses in and around the drill site has been undertaken. The construction of the array would result in a temporary short term impact on farm land. The duration and scale of the construction of the array are such that the potential impact is considered to be negligible and not give rise to a significant effect.
- Landscape and visual amenity: A full landscape assessment has been carried out for the proposed drilling site and the proposed monitoring array. The sites for the monitoring array have been selected following an interactive design /micro siting process to select the least visually intrusive locations for array's, especially in respect of the significant adverse visual effects for users of footpaths. The assessment concludes that the construction of the surface and buried array would only have a minor very localised, low key physical change to the landscape character in discrete areas and no further mitigation would be necessary. Similarly there would be only temporary, very localised and negligible effects on visual receptors accessible by the public confined to routes followed by public rights of way and consequently no further mitigation is considered necessary.
- Lighting: An assessment of the proposed lighting and impacts of such for the drill site and monitoring array has been carried out. It is intended for the surface and buried array to be installed in the daylight and therefore there would be no impact. In the event installation were to extend to twilight hours lighting may be required for a very temporary period at localised points. If this were to be the case lighting would be confined to the task area, orientated away from any dwellings and a curfew operated to minimise the duration. The impacts are therefore considered to be not significant.
- Noise: A full noise assessment for the site and monitoring array has been carried out. The assessment for the surface and buried array is based on a qualitative review of the plant, machinery, equipment and processes required

to install them. The assessment concludes that given the nature of the plant to be used and the short duration of such in the locations proposed there would be no significant effects from noise and no mitigation is required.

- Resources and waste: A full assessment of the resources and waste associated with the drill site and the surface and below ground array has been undertaken. In terms of the construction of the ground water monitoring boreholes, surface and buried arrays, soil and stone would be 'non waste' and be retained and reused on the site. Cement and general waste would be non hazardous and would be recycled where feasible or disposed of to landfill. Developing each of the ground water monitoring boreholes and buried array would generate 3m³ of bentonite slurry (and 0.03m³ of waste cement) which would be disposed at a specialist facility. Any contaminated materials from oil or diesel would be treated as hazardous and either recovered or disposed of at a specialised facility.
- Transport: A full traffic assessment has been carried out for the drill site and monitoring array. For the purposes of the monitoring stations, access routes from the highway network have been identified with a view to minimising the length of the route from the highway network and using existing highway access points where practical. Installation of the surface and buried array will be constructed using a rig that will be towed onto the site by a tractor or similar with two support vehicles. Traffic flows would be negligible over the short installation phase and thereafter 1 – 2 light vehicles per week. Due to the low level of traffic involved the assessment concludes that there would be a neutral effect on traffic and highway users thus not requiring any mitigation.
- Water resources: An assessment of the drill site and monitoring array effects on water supplies and surface water runoff or drainage and the consequent risk of flooding. For the purposes of the array the effects have been assessed on any water usage from installation activities and any increased runoff from the installation of the surface and buried arrays due to a change in impermeable surface through alteration in ground / surface materials. The installations are small and not susceptible to flooding and do not alter ground levels or alter the current level of flood risk. There would be no requirements for water supplies as part of their construction or operation. If water were to be required it would be brought in by bowser. The assessment concludes the predicted environmental effects to be negligible and not significant.
- Public health: Consideration has been given to public health concerns associated with the project on communities and groups of the population rather than individuals. The overview is based on issues raised by Public Health England's (PHE) request to ensure that a chapter in the ES should indicate where public health related issues have been covered by different sections of the ES such as air quality, socio-economics and community and hydrogeology and ground gases. PHE set out a number of recommendations relevant to the exploration and appraisal activities. Some of the recommendations relate to baseline and environmental monitoring and socio - economic impacts such as increase traffic and impacts on local infrastructure are relevant to the proposed monitoring array. Health topics including noise, air quality, water (surface and ground water), perception effects, effects on community facilities and social networks and physical activity have been considered. The assessment concludes in respect of the project and not specifically in respect of the array which it has been concluded would not have any impacts. Nevertheless, it concludes that the project would not have any significant effects on health.

The proposed development of both the array and the site at Preston New Road is considered to fall within the definitions of both 'exploration' and 'appraisal' as set out in Planning Practice Guidance (PPG): Minerals.

The main material planning considerations are whether:

- There is a need for the development.
- The development is acceptable in terms of highway capacity and road safety.
- The development is acceptable in terms of impact on amenity and public health.
- The development is acceptable in terms of impacts on the water environment.
- The development is acceptable in terms of impact on landscape.
- The development is acceptable in terms of impacts on ecology.

It should be noted that even though the application is submitted in support of planning application LCC/2015/0096 and is addressed as part of the EIA, in itself it does not constitute EIA development and must be considered on its own merits.

Policy

The NPPF sets out the Governments' policies and how they are to be applied. Whilst it does not form part of the development plan it is a material consideration when determining planning applications. Paragraph 144 gives great weight to the benefits of mineral extraction including to the economy, ensuring there is no unacceptable adverse impacts on the natural and historic environment, human health or aviation safety, take into account cumulative impacts mitigating unavoidable noise, dust and vibrations and providing for high standards of restoration at the earliest opportunity.

The NPPF sets out a presumption in favour of sustainable development and approving development that accords with the development plan providing development protects and enhances the natural and local environment, that pollution and other adverse effects are minimised, that new development is appropriate for its location taking into account impact of pollution on health and the environment, that impact of noise health and quality of life are mitigated and which can be achieved by the use of planning conditions.

Planning Practice Guidance

Planning Practice Guides (PPGs) were first published in March 2014 to accompany the NPPF. As with the NPPF, these are a material consideration in considering planning applications.

PPG: Minerals (March 2014) sets out the Government's approach to planning for mineral extraction in both plan-making and the planning application process.

Paragraph 12 sets out the relationship between planning and other regulatory regimes noting that "*the planning system controls development and the use of land in the public interest*" including ensuring development is appropriate for its location and an acceptable use of land. Significantly it notes that "*the focus of the planning system should be on whether the development itself is an acceptable use of the land and the impacts of those uses, rather than any control processes, health and safety*

issues or emissions themselves where these are subject to approval under regimes. Mineral planning authorities should assume that these non-planning regimes will operate effectively.”

Paragraph 13 sets out the environmental issues minerals planning authorities should address including noise, air quality, lighting, visual impact, traffic, risk of contamination to land, geological structure, flood risk, impacts on protected landscapes, surface and in some cases ground water issues, and water abstraction.

Paragraph 14 sets out issues which are for other regulatory regimes to address. For hydrocarbon extraction this links to paragraphs 110 to 112 which set out the key regulators in addition to the Mineral Planning Authority, namely:

- Department of Energy and Climate Change (DECC): issues petroleum licences, gives consent to drill, responsibility for assessing risk of and monitoring seismic activity, grant consent for flaring or venting.
- Environment Agency: protect water resources (including groundwater aquifers), ensure appropriate treatment of mining waste, emissions to air, and suitable treatment/management of naturally occurring radioactive materials (NORMs). Assess chemical content of fluids used in operations.
- Health and Safety Executive: regulates safety aspects of all phases of extraction, particularly ensuring the appropriate design and construction of a well casing for any borehole.

Paragraph 17 notes that the cumulative impact of mineral development can be a material consideration in determining planning applications.

Paragraphs 91 to 128 relate specifically to hydrocarbon extraction.

Paragraph 93 notes that planning permission is required for each phase of hydrocarbon extraction, while paragraph 94 notes that applications can cover more than one phase and paragraph 118 notes that both vertical and horizontal drilling can be included in one application.

Paragraph 95 explains that the exploratory phase of hydrocarbon extraction:

“seeks to acquire geological data to establish whether hydrocarbons are present. It may involve seismic surveys, exploratory drilling and, in the case of shale gas, hydraulic fracturing.”

Paragraph 100 explains that the appraisal phase

“...can take several forms including additional seismic work, longer-term flow tests, or the drilling of further wells. This may involve additional drilling at another site away from the exploration site or additional wells at the original exploration site...Much will depend on the size and complexity of the hydrocarbon reservoir involved.”

Paragraph 124 states that Mineral Planning Authorities should take account of Government energy policy ‘which makes it clear that energy supplies should come from a variety of sources’ including onshore oil and gas. It also refers (and electronically links) to the Annual Energy Statement 2013 which notes, among other things, that the UK needs to make the transition to low carbon in order to meet

legally-binding carbon emission reduction targets (paragraph 1.2) and that levels of production from the UK continental shelf are declining so the UK will become increasingly reliant on imported energy (paragraph 1.3). The three stated priorities in delivering the UK's energy policies in the near term are:

- “*helping households and businesses take control of their energy bills and keep their costs down;*
- *unlocking investment in the UK's energy infrastructure that will support economic growth; and*
- *playing a leading role in efforts to secure international action to reduce greenhouse gas emissions and tackle climate change.*” (paragraph 1.6).

Paragraph 3.69 states:

“With oil and gas remaining key elements of the energy system for years to come (especially for transport and heating), the Government is committed to maximising indigenous resources, onshore and offshore, where it is cost-effective and in line with safety and environmental regulations to help ensure security of supply.”

Other PPGs

PPG: Air Quality notes that when deciding whether air quality is relevant to a planning application, considerations could include whether the development would (in summary): significantly affect traffic (through congestion, volumes, speed, or traffic composition on local roads); introducing new point sources of air pollution; give rise to potentially unacceptable impact (such as dust) during construction; or affect biodiversity (paragraph 5).

PPG: Climate Change notes that addressing climate change is one of the core land use planning principles the NPPF expects to underpin decision taking.

Section 38 (6) of the Planning and Compulsory Purchase Act 2004 requires planning applications to be determined in accordance with the Development Plan, unless material considerations indicate otherwise. In considering the issues that arise from the proposed development, it is necessary to take into consideration the relevant policies of the Development Plan and the planning history of the site and all other material planning considerations. Government policy is a material consideration that should be given appropriate weight in the decision making process.

The Development Plan for the site is made up of the Joint Lancashire Minerals and Waste Development Framework Core Strategy DPD (LMWDF), the Joint Lancashire Minerals and Waste Local Plan – Site Allocation and Development Management Policies (LMWLP), and the Fylde Borough Local Plan. Paragraph 33 of the National Planning Policy Framework Technical Guidance requires that planning authorities should provide for restoration and aftercare of mineral working sites to high environmental standards at the earliest opportunity through the imposition of appropriate conditions.

Policy CS1 of the LMWDF seeks to ensure that Lancashire's Mineral Resources will be identified and conserved where they have an economic, environmental or heritage value. Mineral resources with the potential for extraction now or in the future

will be identified as Mineral Safeguarding Areas and protected from permanent sterilisation by other development.

Policy CS5 of the LMWDF seeks to ensure, amongst other criteria, that our natural resources including water, air, soil and biodiversity are protected from harm and opportunities are taken to enhance them; workings will not adversely contribute to surface water flooding; proposals for mineral workings incorporate measures to conserve, enhance and protect the character of Lancashire's landscapes; the amenity, health, economic well-being and safety of the population are protected by the introduction of high operating standards, sensitive working practices and environmental management systems that minimise harm and nuisance to the environment and local communities throughout the life of the development, and the sensitive environmental restoration and aftercare of sites take place, appropriate to the landscape character of the locality and the delivery of national and local biodiversity action plans.

Policy DM2 of the LMWLP supports developments for mineral operations (including hydrocarbons) where it can be demonstrated that all material, social, economic or environmental impacts that would cause demonstrable harm can be eliminated or reduced to acceptable levels. In assessing proposals, account will be taken of the proposal's setting, baseline environmental conditions and neighbouring land uses, together with the extent to which its impacts can be controlled in accordance with current best practice and recognised standards. Development will be supported in accordance with the requirements of Policy CS5 of the LMWDF. Impacts and issues to be considered are the quality of design, layout, form, scale and appearance of buildings; the control of emissions from the proposal including dust, noise, odour, light and water; the control of the numbers, frequency, timing and routing transport related to the development and, the restoration within agreed time limits, to a beneficial after use and the management of landscaping.

The Fylde Borough Local Plan contains a number of policies for the general control of development in the Fylde area and was adopted in 2005. The Borough Council are producing a replacement Local Plan. However this is at an early stage of preparation and therefore carries limited weight at present. Due to the age of the existing local plan, it may be that some policies of the existing local plan carry limited weight, particularly where they are not consistent with the NPPF. However the policies referred to in the report are considered to still retain weight and are consistent with the NPPF.

Need for the development

The NPPF notes that "*Minerals are essential to support sustainable economic growth and our quality of life*" and that "...minerals are a finite natural resource, and can only be worked where they are found..." (para 142). Paragraph 144 requires that in determining planning applications local planning authorities "*give great weight to the benefits of mineral extraction, including to the economy*", though this must be balanced against the weight given to environmental impacts of a development.

Paragraph 124 PPG states that minerals provides a clear steer that nationally, energy should come from a variety of sources, including oil and gas, and states that mineral planning authorities should take account of Government energy policy, which

makes it clear that energy supplies should come from a variety of sources, including onshore oil and gas.

The Government's Annual Energy Statement referred to in paragraph 124 of the PPG notes that energy policy is underpinned by two key factors: the need to reduce carbon emissions and to ensure energy security. It makes it clear that while renewable energy must form an increasing part of the national energy picture, oil and gas remain key elements of the energy system for years to come.

One of the three key priorities outlined in the Annual Energy Statement is '*unlocking investment in the UK's energy infrastructure that will support economic growth*'. Paragraph 3.69 of the Statement notes the Government is committed to maximising indigenous resources, subject to safety and environmental considerations.

Taking this into account, the proposed monitoring array is considered to accord with the approach set in national guidance by investing in energy infrastructure to establish whether indigenous oil and gas reserves are available and worth exploiting in Lancashire.

Local policy issues and assessment of impacts

The proposed array is associated with the proposal to undertake exploration and appraisal of shale gas reserves as part of planning application LCC/2014/0096. The array is required to undertake monitoring of seismic movement to initially establish base line data of naturally occurring seismicity and ground water conditions. They would then be used throughout the fracking activities to record seismic movement associated with the fracking operations as part of the traffic light system of controlling fracking operations and to identify the presence of gas in ground water in the event it were to migrate from the fractured geological horizon or from the wells themselves. The array would be part of the proposed fracking process and would accord with the national guidance to ensure fracking could be carried out in a way to minimise risk and disturbance associated with seismicity and risk of polluting ground water. The principle is therefore found acceptable and would accord with Policy CS1 of the LMWDF in that they would be making a contribution to the identification and proving of a mineral resource.

The purpose of the array would ensure natural resources including water, air, soil and biodiversity are protected from harm. They would not adversely contribute to surface water flooding or adversely affect the character of Lancashire's landscapes. They are designed to protect the amenity, health, economic well-being and safety of the population and contribute to the required standards of mineral exploration that seeks to employ sensitive working practices and environmental management systems that minimise harm and nuisance to the environment and local communities throughout the life of the exploration stage of the development. Subject to conditions the array would not have an adverse effect on the ecology of the area. In this respect they would accord with Policy CS5 of the LMWDF.

Policy DM2 of the LMWLP supports developments for mineral operations (including hydrocarbons) where it can be demonstrated that all material, social, economic or environmental impacts that would cause demonstrable harm can be eliminated or reduced to acceptable levels.

Policy SP2 of the Fylde Local Plan prescribes the types of development that would be acceptable in Countryside Areas. Policy EP11 requires new development to be sited in keeping with landscape character types. Policy EP12 provides for the protection of trees, woodlands and hedgerows. Policy EP19 seeks to protect ecological interests. Policy EP21 provides for the protection of archaeological interests. Policy EP23 protects surface water resources. Policy EP24 seeks to project groundwater. Policy EP26 seeks to control air pollution. Policy EP27 seeks to control noise pollution.

The proposed above and below ground monitoring array is directly associated with the exploration and appraisal of shale gas and would be installed over an extended rural area. It is designed to ensure that such exploration and appraisal could be carried out in a controlled manner and in a way to protect the environment by establishing base line conditions for naturally occurring seismicity and ground water conditions before the commencement of fracking and then during the fracking and post fracking and appraisal phases. The stations would be very small localised individual features consisting of ground covers surrounded in agricultural fencing and which would be in keeping with the rural location. They would be constructed over a very short period and would not cause any loss of amenity during the construction or operational phases. Given their proposed locations they would not readily be seen from public view. They would not adversely affect trees or hedgerows. Conditions could be imposed to protect ecological and archaeological interests. They would not affect surface or ground water and there would be no material impact on air or noise pollution either as part of their construction or operation.

The ground water monitoring boreholes are proposed to be constructed in association with the development of the main site subject of planning application LCC/2014/0101. Their construction would not cause any loss of amenity either in their independence or in conjunction with the development of the main site.

In this respect the proposed monitoring array is considered acceptable for the purposes of Policy DM2 of the LMWLP and Policies SP2, EP1, EP12, EP19, EP21, EP23, EP24, EP26 and EP27 of the Fylde Local Plan.

The majority of the statutory consultees have raised no objection to the proposed monitoring array subject to the imposition of conditions where appropriate, most particularly relating to the protection of ecological and archaeological interests. Fylde Borough Council, Westby-with- Plumpton Parish Council, Kirkham Town Council and Medlar with Wesham Council all object to the application and its relationship to planning application LCC/2014/0096. Specifically to this proposal the reasons for objecting relate to the industrial form of development into a rural setting which will be of detriment to resident's quality of life and lead to the devaluation of property and lead to noise pollution.

With regard to the views of the County Council's Director of Public Health, his comments primarily relate to the proposed process of drilling and fracking and whilst not specifically referring to the array application makes a number of recommendations to inform the planning process, some of which by implication relate to the proposed monitoring array. He recommends that there should be a long term monitoring period of at least 30 years post abandonment of the wells or until such time there is national guidance on long term monitoring. The following areas of

data collection and analysis are particularly relevant to the proposed monitoring array: he proposes a number of areas:

- Characterisation of the extent of fracture propagation and the permeability of layers above and beyond the faults
- Ground water monitoring of methane.
- Measuring long term well integrity.
- Sampling of ground/food chain.

The very purpose of the proposed array is to monitor induced seismicity and ground water quality. The array for monitoring seismicity does not need to be the subject of retention in the long term. The ground water monitoring in particular is designed to identify the potential for the migration of gas and contamination of ground water associated with the drilling process and its potential to contaminate the ground and by implication the food chain. Should planning permission be granted for planning application LCC/2014/0096 they would be constructed at the outset to establish base line monitoring conditions and thereafter retained throughout the proposed drilling process and beyond until such time as they are considered to be no longer required by operator and would be abandoned as part of the surrender of permits to the EA. It would be for the EA to determine whether monitoring is no longer required. However, there is no certainty what this period may be or that it would extend to the 30 years post abandonment of the wells as recommended. The 30 years is based on landfill site monitoring. Modern landfills for putrescible materials are required to be contained for permitting processes; the design of landfill sites involves the construction of purpose designed engineered cells involving a number of base layers and the employment of geotechnical membranes to contain leachate and prevent leakage and contamination of surface and ground water. Landfill sites are at surface and present a very different potential risk in terms of the impacts that may arise and the implications of such to those associated with fracking. The target geological horizon for fracking is at considerable depth and above which is a geology that is impermeable to the migration of gas or contaminated fluids. The greatest potential for migration of such is around or via the well casing. The well casing would be constructed in accordance with the requirements of the HSE and engineered using a combination of steel and concrete. It is the long term failure of such that has generated concern based on experiences elsewhere, hence the recommendation to monitor such over an extended period. The integrity of well casings is a matter for the HSE and ground and surface water protection is a matter for the EA. It is therefore considered that the need or otherwise for long term monitoring post abandonment of any wells is a matter for the HSE and or the EA as part of the permitting process and is not a matter for the landuse planning process. For the purposes of the planning guidance the county council should assume that other regimes will operate effectively and that they can rely on the assessment of other regulatory bodies. Nevertheless before granting planning permission the county council needs to be satisfied that issues can or will be adequately addressed by taking the advice from the relevant regulatory body.

A planning authority's reliance on other (non planning) regulatory bodies to provide the appropriate controls and conditions in relation to their statutory responsibilities was recently addressed in case law (December 2014) relating to a drilling site in West Sussex {R [on the application of Frack Free Balcombe Residents Association] v West Sussex County Council [2014] EWHC 4108 (Admin)}. Paragraph 102 of the judgment is particularly relevant to this issue:

"the existence of the statutory regimes applied by the HSE, the EA and the DECC shows that there are other mechanisms for dealing with the very proper concerns which the Claimant's members have about the effects on the environment. The Claimant and its members' concerns are in truth not with the planning committee's approach of relying on the other statutory regimes, but rather with the statutory bodies whose assessments and application of standards they disagree with. That does not provide a ground of legal challenge to the decision of the planning committee."

In light of this judgment as well as NPPF guidance (Para 122) it is not necessary or appropriate to impose planning conditions or require an applicant to enter into a S.106 legal agreement with respect to matters, such as longer term monitoring, that are clearly within, and properly, the remit of other regulatory regimes and bodies.

With regards to this application it is considered that the County Council can be satisfied that the HSE and EA will ensure drilled wells are properly abandoned and monitored for whatever period is necessary before the permits can be surrendered. It is therefore not necessary to impose a condition specifying any period for monitoring or requesting the applicant to enter into any legal agreement relating to such.

With regard to the views of CPRE, the applicant has already carried out a detailed 3D geophysical survey of the subsurface area where underground works are proposed at Roseacre Wood. This survey was carried out at an appropriate resolution for finding faults. No more 3D seismic surveys are proposed and the proposed monitoring of micro-seismicity induced during hydraulic fracturing operations will be carried out using the array proposed as part of this application. This is considered to be going beyond that recommended in reports by The Royal Society and The Royal Academy of Engineering. The sensitivity of the instruments will be to at least two orders of magnitude below the required seismic background noise level. This method of monitoring induced seismicity and the seismometers proposed are to "best industry practice". Monitoring of the fracture growth will be carried out using the buried seismic array. The fibre optic arrays described by CPRE relate to down hole monitoring of *"reservoir pressure and temperature, distributed-temperature sensing (DTS), flow, and phase-fraction sensing...and seismic systems* during drilling and are not appropriate for the surface or buried monitoring arrays and therefore a condition as proposed is not considered necessary.

Representations

With regard to the representations received some of these are made specifically to the proposed development the subject of this application; some overlap with that proposed as part of planning application LCC/2014/0096 and which is understandable given the proposed interrelationship of the two applications. A number of representations have been received from 50 individuals and a number of groups and organisations objecting to the proposal. The primary reasons for objecting are against fracking in principle, and therefore opposed to any associated development, and maintaining that if the drilling site is refused then the array application should similarly be refused. In respect of the specific objections to this application there is concern that installation of the array would lead to more traffic and affect public rights of way. Whilst there would be more traffic associated with the installation of the array this would be minimal and over a very short period of 2 – 3

days for each station and which would be accessed via existing field access points. Maintenance of the stations would generate one or two vehicles per week. It is considered that the vehicle movements associated with such would be of a scale that could be accommodated on the public highway and would not lead to any adverse impact on highway amenity, residential access or on users of public rights of way. The monitoring stations once constructed would be accessed via existing field access points, would be 4m² surrounded by 1.2m high wooden agricultural fencing. It is considered they would not be visually intrusive nor constitute an industrialisation of the countryside. They would not have a negative impact on land or property, contribute to greenhouse gases or cause air, surface or ground water pollution. Whilst concerns about fracking are understandable the purpose of the array is to provide base line data and protect the environment in the event drilling and fracking goes ahead. With regard to impacts on ecology concern has been expressed to the inadequacy of the surveys undertaken in respect of great crested newts, barn owls, bats, water voles, nesting birds and wintering wildfowl and that further surveys should be carried out. This view is not shared. It is considered that given the nature, duration of installation and locations of the array, the stations would not have an adverse impact on ecology to the degree maintained, that the ecological surveys and assessments are sufficient and that adequate management to minimise the impact on such is both proposed and could be controlled by condition.

The purpose of the array is to provide base line data and protect the environment. Whilst the application is interrelated to the proposal to drill and frack it must still be considered on its merits and against the policies if the development plan. Given the scale, nature and purpose of the proposed array it is considered that it would not lead to the industrialisation of the countryside and not cause unacceptable impacts on the amenities of the area or on residential properties. The reasons for objecting cannot therefore be supported.

Conclusion

Notwithstanding the application is integrally linked to the application for exploration and appraisal of shale gas at Preston New Road (LCC/2014/0096) it must still be considered on its own merits. The proposed monitoring array is designed to ensure that such exploration and appraisal could be carried out in a controlled manner and in a way to protect the environment by establishing base line conditions for naturally occurring seismicity and ground water conditions before the commencement of fracking and then during the fracking and post fracking and appraisal phases. The stations and would be very small localised individual features consisting of ground covers surrounded in agricultural fencing and which would be in keeping with the rural location. They would be constructed over a very short period and would not cause any loss of amenity during the construction or operational phases. The highway has sufficient capacity to accommodate the construction traffic and would not lead to any greater loss of road safety. Given their proposed locations they would not readily be seen from public view other than from public rights of way and would not have any impact on amenity, landscape or public health. They would not adversely affect trees or hedgerows. Conditions are proposed to protect ecological and archaeological interests. They would not affect surface or ground water and would not generate air or noise pollution either as part of their construction, operation or restoration phases.

The array has been designed to provide baseline and monitoring information associated with planning application LCC/2014/0096 and has been assessed as part of the ES which is common to both applications. Whilst planning application LCC/2014/0096 is recommended for refusal the application for the array must be considered on its merits. The conclusion is that it would not cause any unacceptable harm and would not be unacceptable for the purposes of the policies to the NPPF or the local development plan. To refuse it just because of its association with planning application LCC/2014/0096 would not be correct and would be unlawful. It is therefore considered that the proposed array is acceptable and can be supported.

However, it is considered that it should only be treated as temporary development and provision be made for its removal in the future whether it is developed in its independence or in conjunction with any successful application for drilling and hydraulic fracturing.

With regards to the water monitoring boreholes they are specifically designed and located for the purposes of planning application LCC/2014/0096. The County Council's Director of Public Health has recommended if planning permission were to be granted (and they were to be implemented as part of planning application LCC/2014/0096), there would be merit in retaining them for an extended period post abandonment of the well site to enable monitoring to be carried out to establish the presence of leaking gas or contaminated fluids. However, it is considered that this should be a matter for the HSE and the EA as part of their permitting process and that the County Council should assume that the regulatory process will be employed by those bodies and be satisfied that the necessary works to abandon the wells and monitor the quality of ground water would be carried out by those regulatory bodies should planning permission be granted for planning application LCC/2014/0096 or any further planning application.

In this respect the proposed monitoring array is considered acceptable for the purposes of the policies of the NPPF and the policies of the development plan.

In view of the scale, location and nature of the proposed development it is considered no Convention Rights as set out in the Human Rights Act 1998 would be affected.

Recommendation

That after first taking into consideration the environmental information and further information, as defined in the Town and Country Planning (Environmental Impact Assessment) Regulations 2011, planning permission be **granted** subject to the following conditions:

Time limits

1. The development shall commence not later than 3 years from the date of this permission.

Reason: Imposed pursuant to Section 91 (1) (a) of the Town and Country Planning Act 1990.

2. Written notification of the date of each of the following events shall be made to the County Planning Authority within 7 working days of each event:
 - a) The commencement of the development for the drilling and installation of each of the 80 buried seismic monitoring stations, the burying of the 8 surface seismic monitoring stations and construction of the associated enclosed equipment and the erection of the fenced enclosures to all the array points and the drilling of the 3 ground water monitoring boreholes and erection of fenced enclosures.
 - b) The completion of the drilling and installation of each of the 80 buried seismic monitoring stations, the burying of the 8 surface seismic monitoring stations and construction of the associated enclosed equipment and the erection of the fenced enclosures to all the array points and the drilling of the 3 ground water monitoring boreholes and erection of fenced enclosures.
 - c) The removal of the seismic monitoring equipment from each of the 80 buried seismic monitoring stations and the 8 surface seismic monitoring stations and the removal of all associated enclosed equipment and fenced enclosures to all the array points and the 3 ground water monitoring boreholes.
 - d) The commencement of the plugging and abandonment of the each of the 80 buried seismic monitoring stations and 3 ground water monitoring boreholes and the restoration of the sites of the 80 buried seismic monitoring stations, the 8 surface seismic monitoring stations and removal of associated enclosed equipment and fenced enclosures to all the array points and the drilling of the 3 ground water monitoring boreholes in accordance with the conditions to this permission.
 - e) The completion of the plugging and abandonment of the each of the 80 buried seismic monitoring stations and 3 ground water monitoring boreholes and the restoration of the sites of the 80 buried seismic monitoring stations, the 8 surface seismic monitoring stations and the removal of all associated enclosed equipment and fenced enclosures to all the array points and the 3 ground water monitoring boreholes in accordance with the conditions to this permission.

Reason: To enable the County Planning Authority to monitor the development to ensure compliance with this permission and to conform with Policy CS5 of the Joint Lancashire Minerals and Waste Development Plan.

3. The 80 buried seismic monitoring stations, the 8 surface seismic monitoring stations and associated enclosed equipment and fenced enclosures to all the array points and the 3 ground water monitoring boreholes authorised by this permission shall be removed and the land restored in accordance with the conditions to this planning permission within 5 years from the date of notification of commencement of the first surface or buried monitoring station or ground water monitoring borehole as required by condition 2a of this permission.

Reason: To enable the County Planning Authority to monitor the development to ensure compliance with this permission and to conform with Policy CS5 of the Joint Lancashire Minerals and Waste Development Plan.

4. The development of the surface array, buried array and water monitoring boreholes shall only be carried out outside the period 31st October and 31st March.

Reason: To safeguard the ecological interests in the area and to conform with Policy 23 of the Lancashire Minerals and Waste Local Plan and Policies EP23 and EP24 of the Fylde Borough Local Plan.

Working programme

5. The development shall be carried out, except where modified by the conditions to this permission, in accordance with the following documents:

- a) The Planning Application received by the Director of Transport and Environment on 2 June 2014.
- b) Submitted Plans and documents received by the Director of Transport and Environment on 2 June 2014:

Drawing No. PNR-MW-001
Drawing No. PNR-MW-010
Drawing No. PNR-MW-011
Drawing No. PNR-MW-012
Drawing No. PNR-MW-013
Drawing No. PNR-MW-014
Drawing No. PNR-MW-015
Drawing No. PNR-MW-016
Drawing No. PNR-MW-017
Drawing No. PNR-MW-020
Drawing No. PNR-MW-021
Drawing No. PNR-MW-022
Drawing No. PNR-MW-023
Drawing No. PNR-MW-024
Drawing No. PNR-MW-025
Drawing No. PNR-MW-026
Drawing No. PNR-MW-027
Drawing No. PNR-MW-028
Drawing No. PNR-MW-029
Drawing No. PNR-MW-030
Drawing No. PNR-MW-031
Drawing No. PNR-MW-032
Drawing No. PNR-MW-033
Drawing No. PNR-MW-034
Drawing No. PNR-MW-035
Drawing No. PNR-MW-036

- c) All schemes and programmes approved in accordance with this permission.

Reason: To minimise the impact of the development on the amenities of the area and to conform with Policies SP2, EP11, EP12, EP13, EP14, EP18 and EP28 of the Fylde Borough Local Plan.

Hours of working

6. No soil stripping, delivery or removal of materials, plant and equipment, site development installation of the surface array, buried array and ground water monitoring wells or restoration shall take place except between the hours of:

07.30 to 18.30 hours Mondays to Fridays (except public holidays)
07.30 to 13.00 hours on Saturdays

No soil stripping, delivery or removal of materials, plant and equipment, site development installation of the surface array, buried array and ground water monitoring wells or restoration shall take place on Sundays or public holidays.

This condition shall not apply to the operations of drilling the borehole or the carrying out of essential repairs to plant and equipment used on the site.

Reason: In the interests of the amenities of the area and to conform with Policies 2 and 74 of the Lancashire Minerals and Waste Local Plan.

Highway matters

7. Measures shall be taken at all times during the site construction, operational and restoration phases of the development to ensure that no mud, dust or other deleterious material is tracked onto the public highway by vehicles leaving the site.

Reason: In the interests of highway safety and local amenity and to conform with Policies 2 and 37 of the Lancashire Minerals and Waste Local Plan.

8. All vehicles shall enter or leave the sites of the surface and buried array and the ground water monitoring well sites in a forward direction.

Reason: In the interests of highway safety and local amenity and to conform with Policies 2, 37 and 74 of the Lancashire Minerals and Waste Local Plan.

11. No development shall commence until details of the site layout and a condition survey of the access to Site 108 (Plan 016) which is along Public Bridleway 05-02-12 has been submitted to and approved in writing by the County Planning Authority. The site layout shall avoid the public right of way and the access survey shall record the condition of the surface prior to construction and provide for the monitoring of the condition of the surface of the public rights of way whilst the route is in use by vehicles associated with the construction and operational phases of the development. The results of the survey on completion of each phase of the development shall be submitted to the County Planning Authority within 7 days of the completion of each phase and where deterioration of the surface has occurred, details shall identifying what measures will be taken to mitigate wear and tear on the public right of way surface shall be submitted to the County Planning Authority for approval in writing. The approved measures shall be carried out within 28 days of their approval and the public right of way shall thereafter be maintained in accordance with the approved measures until the completion of the restoration of the site.

Protection of trees and hedges

12. No development including the storage of excavated materials shall take place within the extreme circumference of the branches of any tree.

Reason: To protect existing trees within or adjacent to the site in the interests of the visual amenities of the area and to conform with policy 8 of the Lancashire Minerals and Waste Local Plan.

13. All hedges and trees in close proximity to the monitoring station site shall be retained and protected from any damage throughout the construction phase of development.

Reason: In the interests of visual and local amenity and the local environment and to conform with Policy EP12 of the Fylde Local Plan.

Protection of Ecology

14. Prior to the commencement of development, a Biodiversity Mitigation Strategy shall be submitted to the County Planning Authority for approval in writing. The Strategy shall include, but not be limited to, details of measures for the avoidance/ mitigation of impacts on protected and priority species (amphibians, bats, nesting and wintering birds, badgers, reptiles, water vole, brown hare) and their habitat during the construction and operational phases of the development. The Strategy shall provide for no parts of the array shall be constructed during the winter wildfowl season between 31st October and 31st March. The approved Strategy shall be implemented in full.

Reason: To safeguard the ecological interests in the area and to conform with Policy 23 of the Lancashire Minerals and Waste Local Plan and Policies EP23 and EP24 of the Fylde Borough Local Plan.

15. Prior to the commencement of development, a revised Ecological Mitigation Strategy (landscaping, habitat creation and enhancement) shall be submitted for approval in writing. The Strategy shall provide details of the creation and enhancement of habitats to compensate for impacts on the habitat of protected and priority species. The approved Strategy shall be implemented in full.

Reason: To safeguard the ecological interests in the area and to conform with Policy 23 of the Lancashire Minerals and Waste Local Plan and Policies EP23 and EP24 of the Fylde Borough Local Plan.

16. No trees or hedgerows shall be removed during the bird-breeding season between 1 March and 31 July inclusive unless they have been previously checked and found clear of nesting birds in accordance with Natural England's guidance and if appropriate, an exclusion zone set up around any vegetation to be protected. No work shall be undertaken within the exclusion zone until birds and any dependant young have vacated the area.

Reason: To protect nesting birds and to conform with Policy 23 of the Lancashire Minerals and Waste Local Plan and Policies EP23 and EP24 of the Fylde Borough Local Plan.

Archaeology

17. At least 14 days written notice of commencement of a works on any part of the monitoring array shall be given to the County Planning Authority. Access shall be afforded at any time during the development to an archaeologist nominated by the County Planning Authority to enable him to undertake a watching brief and observe the excavation and to record finds, items of interest and archaeological interest.

Reason: In the interests of archaeological understanding and to conform with policy EP21 of the Fylde Borough Local Plan.

Safeguarding of Watercourses and Drainage

18. Provision shall be made for the collection, treatment and disposal of all water entering or arising on the site during the installation of the array to ensure that there shall be no discharge of contaminated or polluted drainage to ground or surface waters.

Reason: To safeguard local watercourses and drainages and avoid the pollution of any watercourse or groundwater resource or adjacent land and to conform with Policy 23 of the Lancashire Minerals and Waste Local Plan and Policies EP23 and EP24 of the Fylde Borough Local Plan.

Control of noise

19. All plant, equipment and machinery used in connection with the installation and removal of the monitoring array and restoration of the sites shall be equipped with effective silencing equipment or sound proofing equipment to the standard of design set out in the manufacturer's specification and shall be maintained in accordance with that specification at all times throughout the construction and restoration phase of the development.

Reason: To safeguard the amenity of local residents and adjacent properties/landowners and land users and to conform with Policy 2 and 74 of the Lancashire Minerals and Waste Local Plan.

Restoration

20. Restoration shall be carried out in accordance with the following:

- a) All associated plant, kiosks, hardstandings, pollution control membranes, aggregates, hardcore and fencing shall be removed from the land of the surface array and buried array and for the ground water monitoring wells following their formal abandonment.
- b) The upper layers of the subsoil material shall be subsoiled (rooted) to a depth of 600mm with a heavy-duty subsoiler (winged) prior to the replacement of topsoils to ensure the removal of material injurious to plant life and any rock, stone, boulder or other material capable of preventing or impeding normal agricultural land drainage operations, including mole ploughing and subsoiling.
- c) Following the treatment of the subsoil, topsoil shall be placed over the site to a minimum depth of 150mm and shall be ripped, cultivated and

left in a state that will enable the land to be brought to a standard reasonably fit for agricultural use.

Reason: To secure the proper restoration of the site in the interests of the visual amenity of the area and to conform with Policy 106 of the Lancashire Minerals and Waste Local Plan.

Aftercare

21. Within 3 months of the certification in writing by the County Planning Authority of the completion of restoration, as defined in this permission, a scheme and programme for the aftercare of the sites of the surface and buried monitoring array and the ground water monitoring wells for a period of five years to promote the agricultural afteruse of the site shall be submitted to the County Planning Authority for approval in writing. The scheme and programme shall contain details of the following:
- a) Maintenance and management of the restored site to promote its agricultural use.
 - b) Weed control where necessary.
 - c) Measures to relieve compaction or improve drainage.
 - d) An annual inspection to be undertaken in conjunction with representatives of the County Planning Authority to assess the aftercare works that are required in the following year.

Reason: To secure the proper aftercare of the site and to conform with Policy 106 of the Lancashire Minerals and Waste Local Plan.

Notes

1. If bats are found or suspected at anytime during construction activities, work in that area should cease immediately until further advice has been sought from Natural England and/or the scheme ecologist. The scheme ecologist, Natural England or their agents in the Lancashire area will be able to locate a licensed bat worker to remove any bats present which might be harmed during the works. If bats are exposed during the works and are vulnerable to harm, gloves or a container should be used to move them to a dark and quiet area, until a bat worker has been contacted.
2. The grant of planning permission does not entitle a developer to obstruct a right of way and any proposed stopping - up or diversion of a right of way should be the subject of an Order under the appropriate Act. The following stations affect Footpath and Bridleway nos.:

- 021 Site 148039 affects Public Footpath 05-14-06
- 023 Site 138315 affects Public Footpath 05-14-07
- 024 Site 138312 affects Public Footpath 05-14-06
- 032 Site 148020 affects Public Footpath 05-15-09
- 034 Site 148005 and 1387352 affects Public Footpath 05-15-10
- 035 Site 138362 affects Public Footpath 05-10-05
- 035 Site 148006 affects Public Footpath 05-14-06
- 016 Site 108 affects Public Footpath 05-02-12

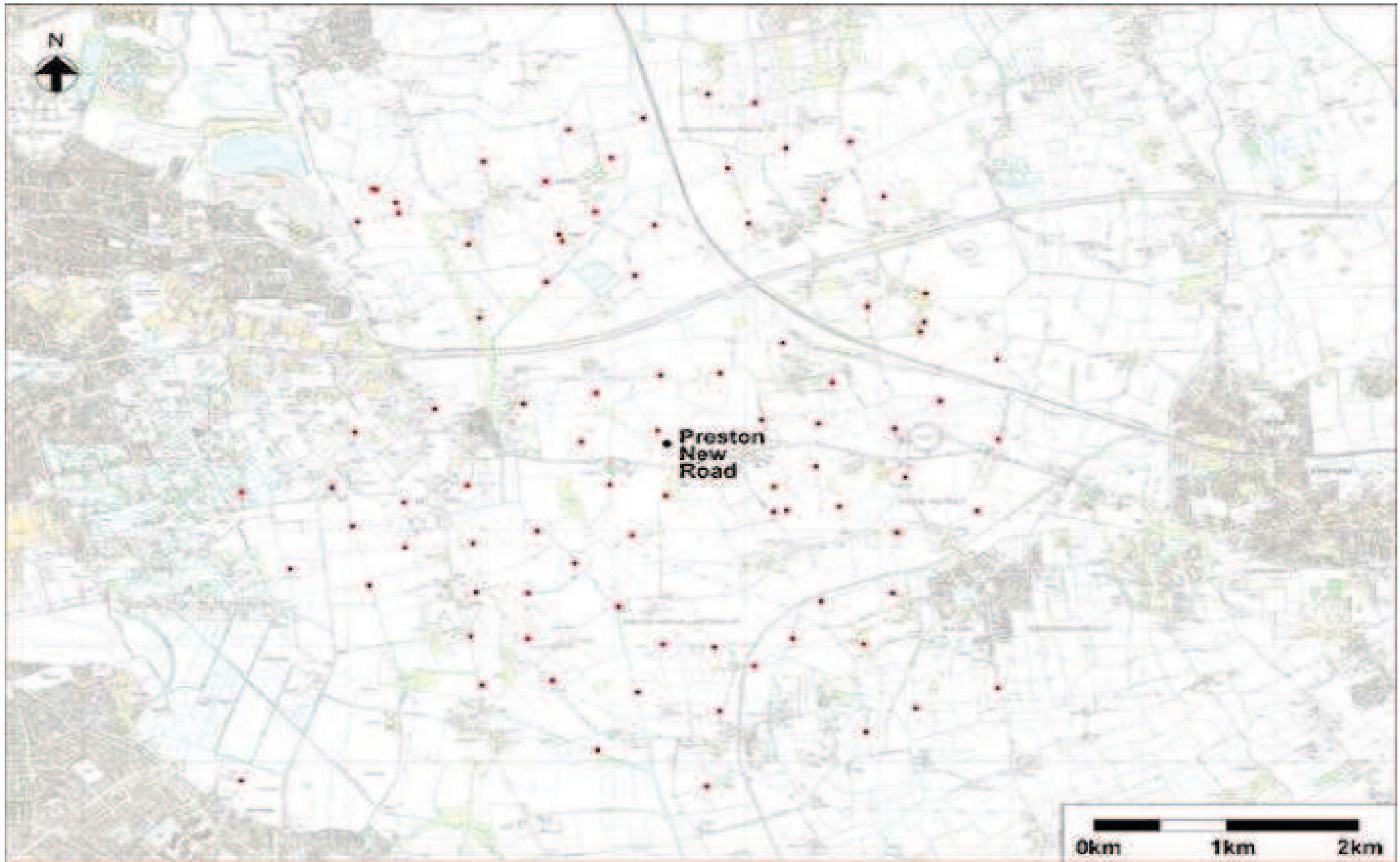
3. Some of the proposed monitoring stations are located close to watercourses which are designated as Main Rivers and are subject to Land Drainage Bylaws. The proposed arrays that may fall within 8m of a Main River are identified and works within 8m of such may require prior written consent. The applicant is advised to contact the Environment Agency.
4. The applicant's attention is drawn to the letter from United Utilities dated 24/10/14 attached to and forming part of this decision notice relating to the need to protect their assets and services.

Local Government (Access to Information) Act 1985
List of Background Papers

Paper	Date	Contact/Directorate/Ext
LCC/2014/0097	2 June 2014	Stuart Perigo/Environment/ 31948
LCC/2014/0096		
LCC/2014/0101	16/06/2014	
LCC/2014/0102	16/06/2014	

Reason for Inclusion in Part II, if appropriate

N/A



APPLICATION LCC/2014/0097 APPLICATION FOR MONITORING WORKS IN A 4 KM RADIUS OF THE PROPOSED PRESTON NEW ROAD EXPLORATION SITE COMPRISING: THE CONSTRUCTION, OPERATION AND RESTORATION OF TWO SEISMIC MONITORING ARRAYS COMPRISING OF 80 BURIED SEISMIC MONITORING STATIONS AND 10 SURFACE SEISMIC MONITORING STATIONS. THE SEISMIC MONITORING STATIONS WILL COMprise UNDERGROUND INSTALLATION OF SEISMICITY SENSORS; ENCLOSED EQUIPMENT AND FENCED ENCLOSURES. THE SURFACE ARRAY WILL ALSO COMPrISE MONITORING CABINETS. THE APPLICATION IS ALSO FOR THE DRILLING OF THREE BOREHOLES, EACH INSTALLED WITH 2 MONITORING WELLS, TO MONITOR GROUNDWATER AND GROUND GAS, INCLUDING FENCING AT THE PERIMETER OF THE PRESTON NEW ROAD EXPLORATION SITE. MONITORING WORKS IN A 4KM RADIUS OF THE PROPOSED PRESTON NEW ROAD EXPLORATION SITE, NEAR LITTLE PLUMPTON

Agenda Item 5

Development Control Committee
Meeting to be held on 29th January 2015

Electoral Division affected: FYLDE WEST

Fylde Borough Council: application number. LCC/2014/0101
Construction and operation of a site for drilling up to four exploration wells, hydraulic fracturing of the wells, testing for hydrocarbons, abandonment of the wells and restoration, including provision of an access road and access onto the highway, security fencing, lighting and other uses ancillary to the exploration activities, including the construction of a pipeline and a connection to the gas grid network and associated infrastructure land at Roseacre Wood, Roseacre.

Appendix 1 – 18

Contact for further information:
Development Management, 01772 531929, Environment Directorate
DevCon@lancashire.gov.uk

Executive Summary

Application - Construction and operation of a site for drilling up to four exploration wells, hydraulic fracturing of the wells, testing for hydrocarbons, abandonment of the wells and restoration, including provision of an access road and access onto the highway, security fencing, lighting and other uses ancillary to the exploration activities, including the construction of a pipeline and a connection to the gas grid network and associated infrastructure to land at Roseacre Wood, Roseacre.

Recommendation – Summary

That after first taking into consideration the environmental information and further information, as defined in the Town and Country Planning (Environmental Impact Assessment) Regulations 2011 submitted in connection with the application, planning permission be **refused** for the following reason:

1. The proposed development would be contrary to Policy DM2 of the JLMWLP and Policy EP27 of the Fylde Borough Local Plan as it has not been satisfactorily demonstrated that noise impacts would be reduced to acceptable levels and would therefore unnecessarily and unacceptably result in harm to the amenity of neighbouring properties by way of noise pollution.
2. The proposed development would be contrary to Policy DM2 of the Joint Lancashire Minerals and Waste Local Plan – Site Allocation and Development Management Policies in that it would generate an increase in traffic, particularly HGV movements, that would result in an unacceptable impact on the rural highway network and on existing road users, particularly vulnerable road users and a reduction in overall highway safety that would be severe.

Introduction

This application is one of two for the construction and operation of sites for drilling up to four exploration wells, hydraulic fracturing of the wells, testing for hydrocarbons, abandonment of the wells and restoration, including provision of access roads and access onto the highway, security fencing, lighting and other uses ancillary to the exploration activities, including the construction of pipelines and connection to the gas grid network and associated infrastructure. The application the subject of this report is to develop land at Roseacre Wood, Roseacre. The other application for similar development is on land to the north of Preston New Road (ref LCC/2015/0096).

The two applications are supported by applications for monitoring arrays. Application LCC/2015/0102 for a monitoring array associated with the Roseacre Wood site is also reported on this agenda and should be read in conjunction with this application.

Applicant's Proposal

Planning permission is sought for the construction and operation of a site for drilling up to four exploration wells, hydraulic fracturing of the wells, testing for hydrocarbons, abandonment of the wells and restoration, including provision of an access road and access onto the highway, security fencing, lighting and other uses ancillary to the exploration activities, including the construction of a pipeline and a connection to the gas grid network and associated infrastructure on land at Roseacre Wood, Roseacre. A supporting application for the installation of a monitoring array of 80 boreholes for seismic and water quality within the surrounding area has also been submitted (ref LCC/2014/0102).

The applications are supported by a Planning Statement (PS), Supporting Documents, an Environmental Statement (ES) and a Non Technical Summary (NTS). The PS includes a Sustainability Appraisal and the Supporting Documents include a Flood Risk Assessment, Utilities Statement and a Statement of Community Involvement.

The ES provides a full description and assessment of the following:

- The application site and surroundings
- A description of the proposed development
- Scheme alternatives
- Air Quality
- Archaeology and cultural heritage
- Greenhouse gas emissions
- Community and socio economics
- Ecology
- Hydrogeology and ground gas
- Induced seismicity
- Land Use
- Landscape and visual amenity
- Lighting
- Noise
- Resources and waste

- Transport
- Water resources
- Public health

The ES was also supported by further information submitted by the applicant in response to matters raised by consultees and in response to comments made by third parties and interest groups.

The main elements of the proposal are described below with a more detailed description in Appendix 1:

Proposal Development

The proposed development is for the exploration and analysis of shale gas reservoirs within the Bowland Shale formation in the Fylde district of Lancashire. The shale gas (also called methane gas or natural gas) is known to be distributed within the shale rock. The total area of the surface works is 6.54ha. In addition lateral drilling and hydraulic fracturing would be undertaken in an underground quadrant which would extend up to a distance of approximately 3km over an area of approximately 562ha as projected to the surface in a south and west from the centre of the well pad. Planning permission is sought for a 6 year period.

A well pad would be constructed and wells would be drilled into the shale rock. A process called hydraulic fracturing would then be used to help the gas flow out of the rock by pumping water and other materials into the shale to dislodge the gas. The gas then flows back to the surface within the flow back fluid.

The proposed development would explore the potential flow rate of the gas in order to establish whether the gas can be extracted and if it would be economically viable to do so. Following exploratory activities the site would be abandoned and restored unless the site is found to be economically viable, in which case a planning application would be submitted for production works before the site is decommissioned.

Site Location and Description

The proposed development involves surface works and underground works.

Surface Works

The development site for the surface works is a greenfield site located within Fylde district, at Roseacre Wood off Roseacre Road. The site is approximately 1480m north of the M55 Motorway with the nearest towns of Wesham / Kirkham approximately 3km away.

The site is located between the villages of Roseacre and Wharles, with Roseacre Hall and village approximately 180m to the north and Wharles approximately 465m to the south. The closest residential properties to the site are located at Roseacre village. Old Orchard Farm is approximately 270m to the south and Stanley Farm properties are approximately 435m to the north, with all accessed from Roseacre Road. The village of Elswick is located approximately 2km to the north. The Ministry of Defence facility, Defence High Frequency Communication Service (DHFCS)

Inskip is located approximately 35m to the east of the surface works site entrance at Roseacre Road. It is proposed that part of the access track would utilise an existing track through the DHFCS Inskip site, requiring two new junctions at Roseacre Road and Inskip Road.

The development site is currently in agricultural use, primarily for dairy cattle and is classified as Grade 3a (good) and grade 3b (moderate) quality agricultural land. The size of the development site would be approximately 6.54ha, of which an area of approximately 1.9ha would be for the exploration site, 2.2ha for the access works within DHFCS and an area of approximately 2.44ha for the extended flow test pipeline and the gas grid connection.

The majority of the surface works development site would be bounded by fields on all sides. Roseacre Road would form eastern boundary for the access track, prior to its continuation through DHFCS Inskip. DHFCS Inskip is characterised by a large amount of radio masts including 4 approximately 180m tall. Land within the communications facility is used by agricultural tenants for grazing.

The site is currently accessed along an existing farm track which runs from Roseacre Hall to Roseacre Road and part of this track would form the proposed access from Roseacre Road, through Roseacre Wood to the exploration site. Roseacre Wood is managed for the purpose of rearing waterfowl and Holmes Wood, 425m to the southwest of the development site is managed for rearing game birds. Neither of the woods has an ecological designation.

Land surrounding the development site is in agricultural use for grazing and arable farming. The site has relatively flat and gently undulating topography. The site is located within the Lancashire County Council landscape character classification Coastal Plain.

The development site has a height of approximately 17m AOD. Nigget Brook is a designated main river and runs through the site. The area is characterised by a network of realigned watercourses and agricultural ditches, which drain north towards the River Wyre. A number of ponds are also located around the development site within the agricultural fields and these may be used by grazing animals. The development site has been categorised by the Environment Agency as being in Flood Zone 1(low probability), this means that the probability of fluvial flooding each year is less than 0.1% (1 in 1000) from the nearby watercourses.

To the north and east and south of the site the south of the site is Roseacre Road, classified as minor road C309. Roseacre Road runs from Elswick, through Roseacre to Wharles. At Wharles, Roseacre Road junction allows access to Inskip Road (C309) heading northbound and Church Road (C296) heading southbound. The nearest 'A' class road to the site is the A585 Fleetwood Road, located 2.8km to the west.

Approximately 2km to the north of the development site National Cycle Route 90, known as the Northern Loop passes through the village of Elswick. There are two public rights of way footpaths in the vicinity of the development site. Footpath 5-13-FP4 is approximately 280m to the west of the site and 5-13-FP5 is approximately 560m to the south of the site. The footpaths connect the villages of Roseacre and

Wharles and provide access to the wider footpath network, including access to Moorside Road to the south and Medlar village to the west.

Underground Works

The maximum extent of the below ground works (for vertical and horizontal drilling and hydraulic fracturing) as projected to the surface would extend to a total area of 562ha in a quadrant shape. The northern extent of the quadrant would be around Elswick Leys settlement of Roseacre Road with the eastern extent of the quadrant around at DHFCS Inskip. The southern extent is DHFCS Inskip pass Old Orchard Farm to land around White Carr Farm, off White Carr Lane. The western boundary would run from Medlar Woods, northwards to Whin Wood and Scholar Bridge onto Elswick Leys.

The majority of the surface area of the underground works is currently in agricultural use. The surface also includes sections of roads including the Roseacre Road, White Carr Lane and Medlar Lane. The above ground area includes the village of Roseacre and residential/commercial properties including White Carr Farm, South Greenhills, North Greenhills and Elswick Leys properties.

Background

There is no relevant planning history to the proposed site.

A number of planning permissions have previously been granted for unconventional shale gas exploration operations involving the drilling of a vertical borehole and hydraulic fracturing in 2010. The ones at Grange Road, Preese Hall and Anna's Road in Fylde and Banks Marsh (Becconsall) in West Lancashire were implemented with boreholes being drilled.

The Preese Hall site was the only well that was drilled and then hydraulically fractured. The fracturing caused two seismic events. A moratorium on hydraulic fracturing was subsequently imposed by the Government in May 2011. The Government's Chief Scientific Officer appointed the Royal Society and the Royal Academy of Engineering to undertake an assessment whether hydraulic fracturing could be carried out safely. The conclusion was that it could subject to a number of recommendations. Consequently the Department of Energy and Climate Change (DECC) lifted the moratorium in December 2012, no further hydraulic fracturing has taken place. The boreholes at Annas Road and Preese Hall site have been abandoned and the wells plugged. The sites have or are being restored. The sites at Becconsall and Grange Road are the subject of planning applications for extended periods of pressure testing.

The applicant undertook a 3-dimensional (3D) geophysical seismic survey in June 2012, which covered an area of approximately 100km² to identify locations of geological faults and to identify the a workable area of the Bowland shale for exploration activity including hydraulic fracturing. The applicant owns and operates an existing gas production facility at Elswick that was first granted planning permission for exploration in the 1980's and went into production in the 1990s. However, this site targeted a different geological horizon to that currently proposed and did not involve high pressure hydraulic fracturing as currently proposed.

Policy

Strategic Policy

European Policy

EU Habitats Directive

National Policy and guidance

White Paper: Energy – Meeting the Challenge

Climate Change Act Of 2008

The UK Low Carbon Transition Plan

National Policy Statement for Energy

Gas Generation Strategy

DECC About shale gas and hydraulic fracturing (fracking) 30 July 2013

House of Commons Standard Note Shale Gas and Fracking 22 January 2014

HSE	Shale gas and hydraulic fracturing (fracking) Q&A
EA	Regulatory Position Statement Onshore oil and gas well decommissioning and abandonment for well prior to 1 October 2013
UKOOG	UK Onshore Shale Gas Well Guidelines – Exploration & Appraisal phase 1 February 2013
CIWEM	Shale Gas and Water January 2014

Planning Policy

National Planning Policy Framework (NPPF)

Paragraphs 11-14	Requirement for Sustainable Development
Paragraph 17	Core Planning Principles
Paragraphs 56-66	Requirement for Good Design
Paragraphs 100	Flood Risk
Paragraph 103	Requirement for Flood Risk Sequential Test
Paragraphs 109-112	Conserving and Enhancing the Natural Environment
Paragraphs 118-125	Conserve and Enhance Biodiversity
Paragraphs 142-148	facilitating the Sustainable use of Minerals
Paragraphs 186-216	Decision-making

National Planning Policy Guidance (NPPG)

Air Quality	Air quality impacts
Climate Change	Mitigation and adaption measures
Design	Key design points
Flood Risk and Coastal Change	Flood Risk Assessment
Health and Well Being	Healthy communities / environmental risks
Land Stability	Risk of Unstable Land/ subsidence
Light Pollution	Obtrusive light impacts
Minerals	Mineral Extraction
Natural Environment	Protect biodiversity
Noise	Manage noise impacts

Water supply, wastewater, water quality Quality and infrastructure

Planning Practice Guidance

Planning for Hydrocarbon extraction

Joint Lancashire Minerals and Waste Development Framework Core Strategy Development Plan documents (LMWDF)

Policy CS1	Safeguarding Lancashire's Mineral Resources
Policy CS5	Achieving Sustainable Minerals Production

Joint Lancashire Minerals and Waste Local Plan – Site Allocation and Development Management Policies – Part One (LMWLP)

Policy NPPF 1	Presumption in favour of sustainable development
Policy DM2	Development Management

Joint Lancashire Minerals and Waste Supplementary Planning Guidance

SPD	Oil and gas exploration, production and distribution (draft)
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Fylde Borough Local Plan

Policy SP2	Development in Countryside Areas
Policy EP11	Building Design and Landscape Character
Policy EP12	Conservation of Trees and Woodland
Policy EP15	European Nature Conservation Sites
Policy EP16	National Nature Reserves
Policy EP17	Biological Heritage Sites
Policy EP23	Pollution of Surface Water
Policy EP24	Pollution of Ground Water
Policy EP26	Air Pollution
Policy EP27	Noise Pollution
Policy EP28	Light Pollution

Consultations

The following bodies have been consulted on the application and supporting documents as initially submitted and on subsequent information / clarification /comment provided by the applicant in response to requests for further information or comments made. Their views in respect of the application as initially submitted and where appropriate on the clarification information provided by the applicant are summarised as follows:

Department of Energy and Climate Change (DECC): Has confirmed the details of the petroleum licence for the surface site and the maximum extent for underground drilling. The licences give exclusive rights within their area for exploration, boring for and getting petroleum, but do not waive any other legal requirement applicable to these activities, including requirements for planning permission.

DECC provided information on regulatory activity under its control.

The proposed activities include hydraulic fracturing for shale gas. DECC requires the operator to produce Environmental Risk Assessments, taking account of guidance published to the industry by DECC in April 2014, which flows from the recommendations of the Royal Academy of Engineering and the Royal Society, in their report on the hazards of hydraulic fracturing for shale gas published in June 2012.

Drilling of wells requires Secretary of State consent under the terms of the licence and DECC will undertake a number of checks regarding well targeting and operator funds and insurance before giving consent. DECC also requires for hydraulic fracturing, the implementation of measures to mitigate seismic risk including the submission to DECC of a detailed Hydraulic Fracturing Programme (HFP) for each well to be hydraulically fractured. DECC will monitor the conduct of fracturing operations in accordance with the HFP.

Proposals to flare gas during the initial testing phase will require the consent from the Secretary of State under the Energy Act 1976 and any venting is subject to DECC consent. Any venting should be reduced to a minimum. DECC's standard online drilling consent allows 96 hours of testing. To test for a longer period, the applicant will need to apply to DECC for a paper-based Extended Well Consent. DECC will expect the operator to minimise flaring during the period of any Extended Well Consent.

Abandonment of any well requires the Secretary of State's consent under the terms of the licence. DECC will check for completeness of well data before giving consent.

Ministry of Defence (Safeguarding): No safeguarding objections but raises the following comments and recommendations.

The site of the proposed development occupies the technical safeguarding zone surround the Information Systems and Services (ISS) Inskip technical site. Having assessed the proposed development the MOD has established that it will not cause a physical obstruction or have any serious impact upon the effect operation of the transmitter/receiver installations at ISS Inskip.

The application site will occupy electro-magnetic fields produced by transmitters at ISS Inskip. The applicant should undertake a suitable assessment of the risk of electromagnetic fields on a flammable atmosphere in accordance with British Standard specifications to ensure the operation of the drilling development proposed is undertaken safely and appropriate measures are applied, if necessary, to counter the risk of fire from electrical sparks.

The ISS Inskip site consists of an extensive complex of tall guyed masts and lattice towers with associated radio transmission equipment installations. The applicant should identify the ISS Inskip technical site as supporting sensitive equipment and it should be identified as a relevant receptor in their assessment of the effects of induced seismicity.

The applicant has included usage of a road across MOD land at ISS Inskip in order to obtain a direct route for works traffic accessing the application site. The MOD does not object to the applicant's proposal to utilise this route across MOD property and will establish relevant terms of access directly with the applicant to facilitate this.

Preston City Council: No observations received

Fylde Borough Council: Objects for the following summarised reasons:

The proposed drilling operations would be in relatively close proximity to residential properties and the noise and general disturbance from 24 hour drilling operations and associated activity would be significant.

Contrary to Policy DM2 of the Minerals and Waste local Plan.

Contrary to Policies EP26, EP27 and EP28 of the Fylde Borough Local Plan. These policies are considered to be in conformity with the provisions of the NPPF.

The Borough Council's Environmental Protection Team has advised and made recommendations as follows:

- The exclusion of a sensitive noise receptor in the applicants noise report may mean current calculations are artificially elevated resulting in the prediction that noise levels will not exceed current background levels.
- Recommend that the applicant ensures that there are continuous sound level monitoring at the nearest residential property to ensure sound levels accord with WHO guidelines.
- Recommend that no HGVs arrive at or leave the site between 23:00 and 07:00.
- The sound levels are currently less than WHO guidelines so residents may experience an increase in noise. Ideally criteria should be set such that "as a result of the activity at the site no dwelling shall experience sound levels that are more than 5dB above current background levels between 07.00 – 23.00 and no increase in background level between 23.00 and 07.00"
- Recommend that no HGVs arrive at or leave the site between 23:00 and 07:00.
- Recommend continuous monitoring of air quality as a result of increase in road traffic to demonstrate that AQ guidelines are being met, alongside EA monitoring of air pollutants from chemicals and flare burn off.
- Recommend dust significance should be reclassified from medium to large, due to a large site size and increased HGV movements on the roadways, with further mitigation measures to be implemented.
- Recommend a plan to be provided detailing the predicted lux levels originating from the site to the vicinity. As a rural area, which is very dark at night, any increase in illumination will be more prevalent. Lighting should only be permitted as the minimum needed for security and/or working purposes and that it minimises the potential for obtrusive light from glare or light trespass to an acceptable level and in accordance with guidance for mineral sites.

Fylde Borough Council subsequently provided a copy of a noise impact assessment on wintering birds, at the Annas Road Exploration Well site, which concludes that the noise from drilling operations will be essentially steady in character, producing decreasing levels from 58 – 42dB(A) in relation to increasing distances between 50m to 500m from the boundary of the well site. The Environmental Protection Team have noted that the survey data shows that the impulsive sound could be up to 16dB greater than the background noise in addition to the drilling operation. The impulsive noise levels are not included in the EIA report for the Roseacre site.

Elswick Parish Council: An initial objection to the proposal was withdrawn. The Parish Council does not object but makes the following summarised comments:

- In favour of the preferred traffic route which enables Elswick, a densely populated area to remain outside the routing of the tankers, ensuring the safety of over 200 children living in the village.
- A small group of residents have expressed concerns regarding the visual impact and character of landscape and the risk of methane/water contamination and environmental impacts.

Great Eccleston Parish Council: No observations to make

Medlar-with-Wesham Parish Council and Kirkham Town Council: The Council's object to the proposal as submitted and requests that it be refused planning permission for the following reasons:

- The potential major problems outweigh the benefits.
- The Chartered Institute of Environmental Health has highlighted shortcomings of the regulatory system regarding local environment and public health risks.
- Potential for earth tremors despite the traffic light system. Tremors can damage property and associated services including septic tanks. Any damage to underground services could result in watercourse pollution.
- Air pollution from gas emissions. Flaring can lead to over 250 pollutants including methane.
- Potential well failure and the huge potential for land contamination, particularly to aquifers and agricultural land.
- Light pollution from the 24hour operation.
- Potential flow back water site leakages and spillage during disposal and transportation.
- No information on water treatment plans. Where will flow back water be treated and will any new treatment plan accept waste from other UK sites.
- Increasing vehicle movements, particularly HGV's will exacerbate existing problems along the A585 and at the M55 Junction 3 at peak times.
- Increase in ambient noise levels from the continuous operation of this site and any future sites in the parish.
- Potential impact on resident's water supplies.
- The visual impact of the development cannot be minimised.
- Detrimental impact on property values and insurance premiums.
- Concern regarding future site expansion for production following exploratory phase. An increase in well heads will lead to further noise, traffic and pollution.
- Impact on local Wildlife including wintering and migrating birds, birds of prey, game birds, garden birds and bats from increased noise, traffic and lighting.

Newton-with-Clifton Parish Council: Objects to the proposal as submitted and requests that it be refused planning permission for the following reasons:

- The 'Wharles route' along Lodge Lane, Clifton Lane and Station Road is considered unsuitable for the projected number and type of HGVs and if approved is detrimental to highway safety and parish amenity
- The suggested routes has several potentially hazardous sections to highway safety and is lacking a sufficient number of constructed passing places
- The route comprises a dangerous right turn exit from Lodge Lane, Clifton onto the A583 which could adversely affect highway safety
- Clifton Lane/ Lodge Lane in Clifton is in close proximity to a children's recreational park and children have to cross the road to access the park. The proposed increase in type and volume of traffic is clearly hazardous to their highway safety.
- The site access/egress through Elswick is shorter in distance and as a consequence a reduced environmental impact.

Roseacre, Wharles and Treales Parish Council: Objects to the proposal for the following summarised reasons:

- Contrary to Policy SP2 and NPPF due to the huge industrial scale, associated utilities and infrastructure and thousands of HGV movements on narrow lanes.
- Cuadrilla has not adequately assessed alternative sites. The development should be located in a SP1 site which has appropriate infrastructure.
- The need for mineral extraction has not been demonstrated.
- Contrary to NPPF and CS5 as mineral development should have no adverse impacts on natural environment and human health.
- Cumulative effects for this site with Preston New Road and other potential sites have not been assessed.
- Not sustainable development due to location, road restrictions, water supply issues, permanent waste repository and lack of suitable waste treatment.
- Regulations are not robust to provide adequate protection. The safe operation of shale gas operations is not yet assured.
- Contrary to Policy EP26 and CS5 as the flare will emit 15,000 tonnes of methane and there is no mitigation for the health hazards of particulate matter.
- Contrary to NPPF as it will not support a low carbon future.
- Air quality monitoring regime is not acceptable. Need baseline data and real time publicly available data on a range of pollutants and the combined impact of flaring, fugitive emissions and equipment and transport emissions.
- Evidence from USA, America and UK Breast Cancer charity regarding emissions and risks to human health.
- Dust assessment is inadequate and does not take account of construction and daily utilisation of passing places through Wharles and Dagger Lane.
- Contrary to Policy EP27 and SP9 as it will not meet required noise limits and will have an adverse impact on the amenity of local residents.
- The baseline noise measurement is inadequate and the minimum approach for assessment of noise impact should be BS4112.
- Noise impacts on Stanley Mews have not been considered.
- There is no need for 24hr a day drilling, as per the UKOOG website guidance.

- Drilling noise levels might be exceeded, so need real time monitoring, with immediate enforcement if levels are exceeded.
- HGVs will have significant noise impacts causing health and wellbeing impacts including daytime nuisance and sleep disturbance.
- Contrary to Policy EP28 due to sky glow. As no mitigation is possible night-time operations should not be permitted.
- Drivers will have loss of visibility from glare from the installation.
- Contrary to Policy CL1 which requires minimal potable mains water in new developments with a need to recycle and conserve water resources.
- Potential water supply problems water required is higher than estimates.
- If tankered water is required, it will increase traffic and emissions.
- Water supply route re-zoning infers potential impact to Roseacre and Wharles
- Contrary to Policy EP25, treatment facilities are inadequate/ not available as there are no authorised treatment sites in the Northwest and proposed sites have insufficient capacity. Waste should not be transported great distances.
- Contrary to Policy CS9 as fracking fluids will create permanent waste on site.
- Flowback fluid calculations are disputed. Higher rates and no suitable disposal could result in risk of breach of the well pad containment area.
- The development is a harmful hazardous installation. Radioactive chemicals, including NORM are in flow back fluid chemicals.
- Contrary to Policies EP10, EP23, EP24, EP30 and CS5 as the development will not protect ponds, watercourses, groundwater or natural resources and will increase surface run off, resulting in poorer air and water quality.
- Any spills, well blowouts, accidents or releases into local drainage ditches (and wider watercourse system) poses could contaminate surface and groundwater. Monitoring will not mitigate due to lead times for test results.
- Risk of imperfectly sealed wells leaking into groundwater.
- Seismic activity could cause wells to leak and the heavily faulted geology could create pathways for seepage of fluid and gases into aquifers.
- Storm weather could increase surface water drainage volumes with risks to site containment and potential discharge of contaminated surface run-off.
- Contrary to Policies EP15, EP19 regarding impacts on protected species.
- No surveys of barn owls and brown hare and surveys for water vole and badger taken outside of recommended survey times.
- Wintering birds and the functional link between designated sites has not been considered, a full habitats assessment is needed.
- Adverse impacts on rural tourism, leisure and countryside character.
- Visual impact of the development could be reduced by enclosure of site works, horizontal rig and a waste methane generator instead of a flare stack.
- Local planning authority should support a thriving rural community, but this development will have an adverse impact on local communities.
- Local community is fearful for the future with adverse impacts on health and wellbeing, community cohesion and quality of life.
- Decline in house sales, if unable to sell cannot move on to next life stage.
- Health risks from carcinogenic silica, benzene, particulate matter and volatile compounds. Potential early mortality, asthma, stroke, heart disease, fertility issues, neural tube defects, congenital heart defects and low birth weights.
- HGV traffic volumes will have an unacceptable adverse impact on the community through air and noise pollution and general nuisance,

- Strongly dispute existing and proposed traffic data in comparison to own parish traffic survey and predictions, with particular regard to HGV requirements and movements throughout the life of the development.
- HGV movements could be higher subject to HGV availability and the quantity of construction materials, water and flow back fluid to be transported.
- The proposed HGV route is unsuitable with restricted sight lines, narrow carriageways, poor road surfaces and no kerb edgings.
- It is physically impossible for HGVs to go round corners without traversing centre line or all of the road in some places along the proposed route.
- Significant safety and conflict risks to all road users including walkers, cyclists, horse riders, children/pushchairs, mobility impaired, and for those accessing local farms, businesses and schools including Salwick school.
- Concern regarding impacts at Wharles village, Shorrocks Cottage, Dagger Road, Salwick Road, Station Road, Moss Lane East and Roseacre Road,
- Traffic increase to Roseacre Road, Inskip Road, Dagger Road will cause significant congestion and hazards to pedestrians and cyclists.
- Potential conflict between HGVs and agricultural machinery e.g. Dagger Lane
- Traffic especially HGVs should be using the primary route network.
- Traffic access and exist should be confined to DHFCS Inskip
- HGV movements should be restricted to 09.30-15.00hrs.
- Contrary to LTP objectives of safe and punctual travel between home and workplace and sustainable transport.
- Passing places for HGV will be restricted at all points along the route and proposed passing places are not suitable or in keeping with the surroundings.
- No consideration of utilisation of passing places at Wharles and Dagger Lane.
- Poor and hazardous road surfaces will be made worst by daily HGV use
- Potential cumulative effect with Westinghouse traffic and displacement of Salwick traffic over canal bridge and conflict at Treales near the school.
- No route identified for oversized vehicles during mobilisation / demobilisation.

Woodplumpton Parish Council: No observations received

Health & Safety Executive: No objection; the proposed operations will be conducted in accordance with recognised regulations standards and good industry practice. From a well's operations perspective there are no issues or concerns with the proposals

HSE has provided clarification of relevant regulations applicable to onshore well; how it regulates shale gas activity; what information it requires and working with the Environment Agency. HSEs regulatory framework ensures that information is provided at key stages in the lifecycle of a well and allows HSE inspectors to assess whether risks are being adequately controlled and if not to take the appropriate regulatory action.

The Health and Safety at Work Act 1974 (HSWA) requires those who create health and safety risks to workers or the public as part of their undertaking have a duty to manage and control the risks so far as is reasonably practicable. This is supplemented with more specific regulations particular to the extraction of gas and oil through wells, which includes shale gas operations.

The Borehole Sites and Operations Regulations 1995 (BSOR) applies to all onshore oil and gas wells. These Regulations require notifications to be sent to HSE about the design, construction and operation of wells, and the development of a health and safety plan which sets out how risks are managed on site.

To comply with BSOR the well operator must submit a notification to HSE at least 21 days before work commences. The notification includes information on the design of the well, the equipment to be used to construct it, the programme of work, the location, depth and direction of the borehole, the relationship to other wells and mines, the geology of the drilling site and identified risks and their proposed management. The HSE will assess the well design before construction starts and will identify any issues which will have an impact on well integrity. Any issues will be addressed by the operator and safety features will be incorporated into the design. Further notifications are required if there are any material changes to the information previously supplied.

The Offshore Installations and Wells (Design and Construction) Regulations 1996 (DCR) includes specific requirements for all wells, whether onshore or offshore, and include well integrity provisions which apply throughout the life of shale gas or oil wells. They also require the well operator to send a weekly report to HSE during the construction of the well so that inspectors can check that work is progressing as described in the notification.

To comply with DCR the operator must report to HSE every week during construction and during work to abandon the well, to provide HSE with assurance that the operator is constructing and operating the well as described in the notification. The weekly report details well integrity tests, the depth and diameter of the borehole, the depth and diameter of the well casing and details of the drill fluid density. The drill fluid density allows the inspector to gauge the pressure in the well and identify any stability issues.

If the operator is not complying with the notification, the HSE can take appropriate regulatory action. HSE uses a risk based interventions on particular sites and operators and to ensure well integrity. The HSE has a team of expert well engineers who cover hydrocarbon wells onshore and offshore. In considering well integrity a lifecycle approach is used including notifications, weekly well reports, operator meetings and on-site inspections being used to manage the risks appropriately.

The operator must also appoint an independent well examiner in a quality control role who will ensure that the well is designed, constructed, operated and abandoned in accordance with industry and company standards and that regulatory requirements are met. Specialist well engineers help develop best practice standards for the onshore industry with the United Kingdom Onshore Operators Group (UKOOG). All members of UKOOG have to comply with the latest standards published in February 2013.

A well operator must also report to HSE any occurrences covered by RIDDOR – Reporting of Injuries, Diseases and Dangerous Occurrences Regulations. These could include a blowout (i.e. an uncontrolled flow of well fluids); the unplanned use of blowout prevention equipment; the unexpected detection of hydrogen sulphide (H₂S) which is an explosive gas; failure to maintain minimum separation distance between wells and mechanical failure of any safety-critical element of a well. HSE can

investigate any well incidents that would have an effect on well integrity and ensure the operator improves their operations.

Since 2012, the HSE and the Environment Agency have an agreement covering joint regulation of shale gas operations. HSE and EA inspectors will meet all new and first-time operators of shale gas wells to advise them of their duties under the regulations and to jointly visit all shale gas sites during the exploratory gas phase of shale gas development.

In response to comments raised by Friends of the Earth in their representation to the proposed development, HSE have clarified the following

- HSE have continued to monitor Preese Hall site during abandonment activity and that there has been no unplanned release of fluids from the well.
- HSE will continue to monitor abandonment activity on all onshore and offshore wells to ensure all work is completed to industry standards and the risk of release of fluids from wells post abandonment is as low as reasonably practicable.
- With regard to risk of leaks from gas wells and the risk of exposure to benzene, the DCR sets out the requirement that there should be no unplanned release of fluids from the well so far as is reasonably practicable. The HSE will review well notification information to ensure that the operator is managing the risks in such a way that the well is designed, constructed and abandoned safely.
- BSOR Regulation 10 requires the well operator to provide all persons engaged in borehole operations with appropriate health surveillance.
- The HSE is aware of the warning issued by NIOSH regarding exposure to silica. The HSE will look at how the well operator manages exposure to silica. It is expected that sealed units will deliver sand to site and mix it into fracturing fluid so that the exposure risk is minimised.
- HSE do not consider that the regulations are inadequate, flawed or ineffectively applied and enforced. The UK health and safety regulations are robust and the regulatory regime governing oil and gas operations is world leading.
- HSE receives well notification information 21 days before work starts. Until the notification is received HSE cannot make a full appraisal of the design of the well and the programme of work and give assurance that the well operator is managing the health and safety risks appropriately including the risk of an unplanned release of fluids.

Public Health England (PHE): Initially recommended that the Local Planning Authority (LPA) request and consider further information regarding sensitive receptors, atmospheric pollution, risks to surface waters and groundwater, environmental monitoring, radon, NORM, resources and waste, dust, noise, light and odour, accidents and incidents.

The applicant provided further information to address the issues raised by PHE. PHE has subsequently advised that the planning authority should confirm:

- That they are satisfied with the applicants assessment of site emissions and whether generator and engine emissions can be scoped out of the assessment due to their size and short operational periods.

- That emissions from activities and infrastructure at the site (e.g. generators, pumps and blenders) have been considered within the baseline methodology and the subsequent dispersion modelling assessment.
- The applicant has considered emissions from start-up, shut-down, abnormal operation and accidents when assessing potential impacts.
- They are satisfied with the fugitive emissions assessment and are satisfied there will be mitigation measures in place to identify and minimise fugitive emissions if resulting air quality impacts are identified to be a concern once operational.
- The operator is happy to provide details on the baseline monitoring protocol in response to a planning condition.
- They are satisfied with details of monitoring locations, what is being monitored for, and the schedule for monitoring frequencies.
- They are satisfied with the proposed definition of significant variation for other determinants, regarding air emissions and surface water and ground water potential contaminants.
- They are satisfied with the applicant's proposal for drill cuttings coated with low toxicity oil based muds to not be covered.

PHE has also commented that whilst human health is not considered the primary receptor by the applicant that the public health section of the ES would have identified and considered routes by which emissions may lead to population exposure and consider them in the conceptual model. Potential public health impact should be considered during the assessment of probabilities.

Environment Agency (EA): No objection in principle and recommends the following:

- A scheme to dispose of surface water has been submitted to and approved in writing by, the local planning authority. The scheme shall include full details of the proposed separator and isolation valve and shall subsequently be implemented as approved.
- The developer should contact the Environment Agency with regard to works affecting Nigget Brook, a Main River watercourse
- Routine monitoring of the surrounding watercourses should be extended to include routine monitoring of on-site surface water quality and maintenance and inspection of surface water drains, valves and interceptors. Surface water run-off retained on site during drilling and hydraulic fracturing operations must be tankered away for off-site disposal and must not be discharged into the watercourse.
- The Control of Pollution (Oil Storage) (England) Regulations 2001 will apply if it is intended to store over 200 litres of oil at the site. If these regulations do not apply any facilities above ground for the storage of oils, fuels and chemicals should be in accordance with Environment Agency specifications regarding impervious bases and bund design as provided.
- Radon release during the flaring of gas is exempt from their Environment Agency permitting requirements by the Natural Gas Exemption Order 2002 and from regulation under the Environmental Permitting Regulations 2010. This is on the basis of its low risk, widespread use and that it was not amenable to regulation. Discharges of radon in natural gas, being flared or vented at gas sites is not subject to regulation under radioactive substances regulation (RSR).

- The Water Resources Act (WRA) 1991, Section 199 requires that the developer gives the Environment Agency advance notice of intent to drill a mineral investigation borehole.
- The proposed development is located in Flood Zone 1 which is defined as having a low probability of flooding in the National Planning Practice Guidance. The Agency has reviewed the Flood Risk Assessment submitted with the application and is satisfied that the development would not be at risk of flooding or increased flood risk off-site.

Highways Agency (HA): No objection due to there being no significant impact on the strategic road network, namely A585 (T) and M55.

National Air Traffic Services (NATS): No objection. The proposed development does not conflict with safeguarding criteria.

Civil Aviation Authority (CAA): No objection. The proposed structures would not formally constitute aviation en-route obstructions, but recommend that the planning authorities check for any safeguarding issues with local aerodromes e.g. Blackpool Airport and Warton Aerodrome and it would be sensible to establish the related viewpoints of local emergency services air support units.

The CAA initially thought the application had no flaring which could cause a danger to overflying aircraft. Following clarification that there would be routine flaring, the CAA confirmed that it is for the developer to be satisfied that the operations involving the flaring and/or venting of gas would not potentially endanger overflying aircraft or where there is a potential risk, to mitigate that level of risk. As the flare is to be contained in a flare stack it would seem reasonable for the developer to consider that flaring of gases would not be an issue to aircraft operation.

The assessment of whether gases released will be under pressure such as to cause turbulence affecting overflying aircraft also needs consideration. Any resultant turbulence, if generated, may dissipate within a few feet of the top of the stacks and the developer might consider that this represents no risk to the safety of aircraft.

Blackpool Airport Ltd: Initially objected on the basis that the proposal conflicted with safeguarding requirements as it presented a hazard to the safe operation of aircraft in the vicinity of Blackpool Airport. The hazard related to the potential for bird strike and it was recommended that a bird strike assessment and mitigation plan was undertaken. Clarification regarding the exclusion of mitigation measures by the applicant from the wintering bird survey was also requested.

Following the submission of a bird strike assessment by the applicant and written confirmation from Natural England and the county council that the mitigation has been agreed by them, Blackpool Airport would withdraw their objection.

Blackpool Airport have requested that bird management requirements should be re-evaluated if compensatory habitats are provided at the site; if bird numbers and behaviour change and start to pose a risk to aircraft or if land management / ownership or working practices by the site owner/operator changes.

National Grid Gas: No objection. The development site is in close proximity to a high pressure gas pipeline – Feeder 21 Carnforth to Treales. National Grid have no

objection to the proposal subject to the access track which runs over the pipeline being reinforced to protect the pipeline and for a Deed of Consent to be agreed prior to construction vehicles crossing the pipeline.

United Utilities plc: No objection subject to the inclusion of a specific worded condition to protect assets from HGV movements.

In the Environmental Statement for the application United Utilities confirmed the following:

The principal water demand would be during the hydraulic fracturing operations. During other times, water would be required to support the drilling operation, site cleaning and welfare operations. The water demand during hydraulic fracturing operations is anticipated to be approximately 765m³ of water per day (a maximum of one hydraulic fracturing stage will be carried out in a single day). This water would be supplied from the United Utilities (UU) potable water network.

A large trunk main 1.5km to the north of the site has the capacity to supply the well pad site without restrictions. However, due to its distance this is not the preferred point of connection. UU's preferred point of connection is the 6" main in Roseacre Road. UU have undertaken hydraulic modelling and confirmed that it should be possible to meet the 765m³ /day demand for the majority of the time from the 6" main in Roseacre Road with minor enabling works.

To ensure that supply can be maintained to other UU customers, UU propose to install a pressure sustaining valve [PSV] to ensure that the pressure in their network is maintained to meet their supply commitments to existing customers [principally local residential properties and farms]. During times of high demand on the network, the PSV would function to limit the Roseacre Wood site. In each scenario, the valve operates automatically, such that when demand on the network falls [for example during the night] Cuadrilla would be able to draw flows at a higher rate. This restriction can be overcome by providing sufficient on-site storage such that storage tanks could be filled at times of low demand. In addition the re-use of fracturing fluid and potential use of collected rainwater would help to reduce total water demand and hence the flow rate drawn from the UU mains networks.

Since the submission of the Environmental Statement, discussions have continued with United Utilities Water PLC to identify the best solution for all parties. To meet the needs of our customers and the Roseacre Wood Exploration scheme, the local water supply networks [District Meter Area (DMA)] will be reinforced [at the Applicant's expense] and re-zoned. The reinforcement works will be undertaken in a neighbouring DMA, this will increase its capacity and allow the boundary of the DMA to be extended [i.e. transfer properties into the newly reinforced DMA] and therefore free up capacity for the Roseacre Wood Exploration scheme.

Police Emergency Planning: No objection. Lancashire Constabulary has advised that the development will not impact upon the Constabulary apart from potential protests.

Natural England: No objection. An initial objection was made due to the need for further information to be supplied to the planning authority to check the likelihood for significant effects in accordance with the Habitats Regulations. Further information

was required to address impacts on air quality, Special Protection Area (SPA) birds, land use and cumulative effects.

Following the receipt of additional information from the applicant, Natural England concluded that the specific issues they had raised had been addressed and therefore withdrew their objection.

Natural England also confirmed that points raised by Friends of the Earth relating to matters within their remit have been resolved with the applicant such that Natural England withdrew its objection.

The Woodland Trust: Objects on the grounds that the application site includes a section of woodland called Roseacre Wood which appears to be ancient woodland. NPPF paragraph 118 requires refusal of a development if it results in the loss or deterioration of irreplaceable habitats including ancient woodland. Furthermore traffic using the proposed access track adjacent to the woodland would have a detrimental impact on the ancient woodland and contrary to NPPF paragraph 18.

Natural England was subsequently consulted to check the status of Roseacre Wood and confirmed that Roseacre Wood is not on the ancient woodland inventory and is not considered by Natural England to be ancient woodland. As a woodland BAP habitat it may have interesting biodiversity that would need to be taken into consideration.

The Wildlife Trust: Objects and request planning permission be refused. The reasons for objection relate primarily to the limitations of the ES and the application with regard to compliance with the NPPF, LMWP and the British Standard, Biodiversity - Code of Practice for Planning and Development as follows:

- Contrary to NPPF regarding no net loss of biodiversity, no mitigation strategy and the proposal will contribute to a high carbon economy.
- Contrary to Policy DM2, the application only makes a small contribution to biodiversity and has no habitat creation and long term management of the site
- No signed disclosure regarding competence of individuals preparing the ES.
- Survey limitations are not provided for all surveys.
- No consideration of wildlife corridors, stepping stone habitats and/or any area identified by local partnerships/record centres for habitat restoration/creation.
- No reference to ecological networks for grassland, wetland and woodland.
- The application does not include Ecological Constraints and Opportunities Plan (ECOP) cross referenced to other constraints.
- No contribution to wider biodiversity enhancement to help rebuild habitat networks, improve ecological resilience and adapt to climate change and deliver Lancashire Climate Change Strategy 2009-2020, England's Biodiversity Strategy, local BAP and Nature Improvement Area targets.
- No landscape or ecological management plan submitted.
- A legal agreement is required to safeguard management arrangements to protect biodiversity during construction and to conserve and enhance biodiversity through long term management, surveillance and monitoring.
- All environmental consents have not been approved/ licenced.
- The CEMP does not set out all necessary practical measures to ensure biodiversity features are protected during construction and operational activity.
- No commitment for a final statement of losses and gains arising.

- The applicant should consider enhancing hedges, grassland, ponds, ditches, field drains and woodland and creating species rich grassland, broadleaved woodland and species rich hedgerows and ponds.

The Wildlife Trust also recommends that the application should accord with the Are We Fit to Frack Guidelines, 2014 by the National Trust, The Wildlife Trust and Wetlands and Wildfowl Trust regarding regulation of the shale gas industry.

Following clarification from applicant, LWT withdrew some initial objection points relating to non-vascular plants and lichen and fungi, wintering and breeding birds, roadside verges, biodiversity loss measures and biosecurity measures.

The Campaign to Protect Rural England: No objection subject to conditions requiring mitigation measures for landscape and visual amenity, light pollution, noise pollution, transport impacts, hours of operation, flood risk, water pollution, site abandonment, fracking, site survey methods utilising fibre optic technology, flowback fluid, flaring, liability, economic impact and greenhouse gases and the use of shale gas as a transitional energy source whilst energy demand is reduced and cleaner technologies are developed.

Wildfowl & Wetlands Trust (WWT): Objection on the basis that:

- Fracking poses a risk to wildlife.
- Significant weaknesses in the regulatory framework identified by Fit to Frack assessment of the regulatory framework.
- Regulatory framework does not safeguard against long term damage to nature and water quality at the local level leading to potentially significant financial costs for local communities.
- Fossil fuel contributing to climate change, a serious long term threat to the natural environment and to economic and social wellbeing.
- Is there evidence of no adverse impact on protected areas or protected species and that sites are not hydraulically linked to such areas.

RSPB: Objection on the basis that:

- Difficult to conclude that there will definitely not be an impact on the three SPAs through functionally linked land due to a lack of data. Wintering bird surveys are required.
- Hydraulic fracturing which could lead to long-term damage to nature at the local level, leading to significant financial costs for local communities and taxpayer as well as contributing to climate change, which is the most serious long-term threat to the natural environment.
- Significant weaknesses in the regulatory framework identified by Fit to Frack assessment of the regulatory framework.

LCC Developer Support (Highways): Considers that the increase in traffic, particularly HGV movements would be severe, there would be a material impact on existing road users, particularly vulnerable road users and overall highway safety of which the potential is considered severe and therefore I am unable to support this application.

LCC Public Rights of Way: No Recorded Public Rights of Way are affected.

LCC Director of Public Health: Has undertaken a Health Impact Assessment (HIA) on the two drill sites and identified that the key risks to health and wellbeing of the population from the two proposed sites are a lack of public trust and confidence in the regulatory process and the industry, stress and anxiety from uncertainty about the industry that could lead to poor mental wellbeing; potential noise related health effects due to continuous drilling for at least five months for the initial borehole on each site and for three months for each of the subsequent three boreholes per site (14 months of continuous drilling), and potential health risks due to the presence of mining wastes generated as part of the drilling and hydraulic fracturing process being retained on site if adequate off site treatment facilities are not found.

A number of key recommendations to inform the planning process include:

1. Consider the need for further noise assessment, particularly on the proposed Roseacre Wood site and if necessary, require additional mitigation measures to reduce noise associated with the development of the sites and more particularly the drilling and hydraulic fracturing phases of the development and which could be controlled by conditions attached to any planning permission.
2. Establish with the Applicant that liability and compensation arrangements are in place to cover any structural damages to properties that can be attributed to an unlikely event of induced seismicity.
3. Undertake an independent verification of the assessment of air quality, transport, waste management and induced seismicity prior to determining the planning applications.
4. Seek agreement with the Applicant to establish an independent comprehensive baseline and on-going long term monitoring of environmental and health conditions prior to any activity on the sites.
5. The Director of Public Health should be informed of the results of the measurements and any breaches to the planning condition or environmental permit.
6. Consider the need to seek further clarification from the Applicant that the cumulative impacts of the operations from the flare, generators, vehicles and drilling will not exceed the national air quality objective thresholds, particularly for PM₁₀, 24 hour mean levels.
7. As part of either the planning or permitting process, the Applicant should be required to submit regular data on the ambient air quality on site measuring all the common air pollutants relevant to the activity and report them regularly. PM 10 and PM2.5 should be reported separately.
8. The Roseacre Wood site is within 55m of a National Grid gas transmission pipeline. Interconnections into national transmission pipelines are proposed at both sites. Advice should be sought and an assessment undertaken as to whether the nearby gas transmission pipelines are considered to be a major hazard.
9. Any extended flow testing provided for by any planning permissions should be aligned with the permits to be issued by the Environment Agency.
10. An assessment of light pollution as part of the site operations should be carried out, and if there are likely to be significant impacts associated with light pollution from the sites that cannot be mitigated or controlled, the Applicant should be requested to consider the opportunity to offer to fit blackout blinds to those homes most likely to be affected.
11. Further clarification or new information on the occurrence and magnitude of

- equipment likely to be contaminated with radioactive waste and how such waste would be managed on the site and disposed of should be sought.
12. Should planning permission be granted, it should be a pre requisite that no activity can start until the onsite and offsite waste treatment capacity is defined.
 13. Further clarification should be sought that any specific risks due to using the MoD site for accessing the Roseacre Wood site have been addressed before any planning permission is granted.
 14. A full assessment of the impacts of additional traffic associated with the proposals on road safety should be carried out and appropriate traffic management options considered to address the public concerns, particularly in respect of the Roseacre Wood site.
 15. Should planning permission be granted, provision should be made with the Applicant to maintain road safety, particularly on the access routes to Roseacre Wood site and road safety and any related incidents on the access to both the sites should be monitored.
 16. In the event planning permissions are granted, any breach of planning conditions should be reported to the Director of Public Health so that necessary steps can be taken in protecting and improving the health of local communities from issues arising due to the alleged or identified breaches of planning control.

Indicative framework for long term monitoring of environmental and health Conditions.

1. Context

It is understood that a range of data will be collected by the operator and reported to the regulatory authorities, particularly the EA. What this will constitute is not available to LCC's public health department until the environment permit, planning condition and environmental operating standards are agreed. This document is written with that gap in knowledge. Following the Applicant's surrender of the permit to the EA (who must be satisfied that environmental conditions are acceptable and will remain so before accepting the surrender), current practice suggests there will not be a requirement for long term monitoring of the environment in and around the restored sites of former wells. Establishing a shale gas monitoring unit in Lancashire as an independent source of reliable information will help with the understanding of any environment and health impacts and the communication of risks to the local communities. It will also support the development of future policy and practice of shale gas extraction.

2. Aim

To establish an independent, reliable, single source of local information on shale gas exploration in Lancashire.

2.1 Objectives

- To develop a framework to establish a baseline and ongoing monitoring of environmental and health conditions
- To support risk communication and reassurance to local communities on the safety and impacts of shale gas activities in Lancashire.

- The governance and management of the shale gas observatory should be determined in consultation with various stakeholders including the local communities, the industry, and the regulatory agencies.

3. The framework for data collection

It is expected that most of the data will be collected under the existing regulatory regime. Hence, the focus should be collating the data in one place with independent verification, analysis and communication of risks to the public in a transparent, reliable and proportionate manner.

Both qualitative and quantitative methods of data collections should be used. It is anticipated that the data collection will start prior to any activities beginning if the applications are approved. It will mainly focus on the geographical area affected by the two planning applications. This is currently understood to be approximately a 2 kilometres radius from the proposed location of the well pads.

The time period for long term monitoring should be at least 30 years post abandonment or until such time there is national guidance on long term monitoring. The suggested 30 year time period is based on the long term monitoring of landfill gas migration.

3.1 Data collection and analysis (an indicative list)

- Profiling of drill cuttings, fracturing fluids to identify substances hazardous to human health including NORM.
- Information on decontamination of equipment.
- Characterisation of the extent of fracture propagation and the permeability of layers above and beyond the faults
- Characterisation of combustion gases at the flare, particularly the levels of hydrocarbons, radon, methane, volatile organic compounds and any other substances deemed hazardous to human health
- Levels of fugitive emissions at well pads, on potential pathways and at receptor households.
- Ground water monitoring of methane.
- Measuring long term well integrity.
- Particulate Matter at source and confirmation of the modelling findings for receptors in the ES
- Levels of noise at source and receptors
- Information on any existing private water supplies that aren't covered by abstraction license within 2 km zone.
- Sampling of ground/food chain.
- Information on local climate within the 2 km zone to identify potential hotspots.
- Safety profile of transport routes and modelling to minimise road traffic accidents
- Safety profile of waste management sites.
- Household survey of human health and wellbeing, and sampling of environmental conditions within the 2km zone. The sampling to be based on modelling from source data.
- Survey of any other sensitive receptors in the vicinity of the two sites.
- Analysis of routinely collected data on health and health care utilisation.
- Analysis of occupational health surveillance data collected by the operator.

LCC Emergency Planning: No objection. The application does not impinge on any REPPIR site but is within the thermal hazard range of a major hazard gas pipeline.

LCC Highway Services (Lighting): No objection. The design generally complies with required standards with the exception of the predicted sky glow which marginally exceeds the permitted standard, but it is not considered that this would cause any issues to the surrounding area or to the highway and its users

LCC Specialist Advisory Services:

Landscaping: Focusing on a 2.0km radius from the centre of the application site, the elements of the development which have the most potential for creating significant landscape and visual impacts are drilling, hydraulic fracturing and flow testing operations which involve the use of a drilling rig (up to 53m high), fracturing rig, well services rig and flare stacks.

It is recommended that additional photomontages for viewpoints 3, 5 9 and 14 to a prescribed methodology are submitted as the submitted images to do reflect the true scale of the proposed development, with the rig appearing approximately 3x smaller than it will in reality.

The site falls within the County Council's Coastal Plain landscape character type and The Fylde landscape character area, which are characterised by rural farmland, hedgerows, shelter belts and field ponds, slightly undulating topography, long views across the landscape and a strong sense of openness. The application site has a strong rural farmland character which is enhanced by the intactness of key features such as hedgerows, shelter belts and field ponds. The gently undulating topography and the low levels of tree cover afford long views over the rural landscape and create a strong sense of openness. There are some significant landscape detractors which affect the landscape character including electricity pylons, large barns, wind turbines and a plethora of communication masts which are a dominant feature in views to the east of the site. The application site clearly lies within an area where tall vertical structures have become a key feature of the local landscape character.

A detailed assessment of the potential impacts and significance on the landscape and receptors, taking account of the development site and area landscape characteristics has been undertaken with the following summarised observations:

- Moderate to major significance on views from Roseacre Road, Old Orchard Farm and Public Rights of Way 5-13-FP3, 4 and 5 and on local landscape amenity
- Minor to moderate significance on views from Public Rights of Way 5-13-FP1 and 2
- Minor significance on views from Wharles and landscape fabric and cumulative effects with Preston New Road.
- Negligible to minor significance on views from Roseacre, Seaswick House, Roseacre Lane, Church Road and Moorside and on the Coastal Plain Landscape Character Type and Fylde Landscape Character Area.
- Negligible significance on the landscape value of the site and wider landscape.

The assessment of the proposal has also taken account of the effects of time, with regard to the duration of the landscape effects, and has also taken account of mitigation proposals which will reduce the impact of low level site structures.

The proposed development would have some temporary but reversible localised landscape and visual effects of moderate-major significance. However, these are not considered to significantly affect the overall character of the Coastal Plain Landscape Character Type or The Fylde Landscape Character Area. In addition, the likely effects of the development proposals on the landscape's value and fabric would not be significant and, there would be no significant cumulative effects. For these reasons, the overall temporary effects of the proposals are deemed to be acceptable in landscape terms.

The applicant's options for mitigating the most significant localised effects are limited due to the height of the drill well (potentially 53m), characteristics of the receiving landscape and the 3 year operations period which does not leave enough 'growing time' for planting to have any significant impact. So, whilst there is much about the proposals which could be deemed acceptable in landscape terms, especially in the context of the wider landscape, the applicant needs to address the likely significant localised effects to ensure that overall, this form of temporary industrial development is successfully assimilated into the rural landscape. The most appropriate way of achieving this would be through implementation of the additional mitigation measures outlined above.

It is concluded that significant localised landscape and visual effects are unavoidable although there is scope to further mitigate the likely effects by reducing the height of the drilling rig to a maximum of 35m; finish the drilling and fracturing rigs in a more suitable colour than red/white as proposed and to finish the various cabins and other temporary buildings in a more appropriate colour than blue as proposed.

Ecology: No objection. The development has the potential for impacts on biodiversity, including European protected species (great crested newts, bats) and their habitat, species protected by domestic legislation (nesting birds), wintering birds (qualifying features of European designated sites) and Habitats and Species of Principal Importance in England (Section 41 NERC Act 2006) (woodland, hedgerows, ponds, several protected species and additionally brown hare, common toad).

In order that the proposals constitute sustainable development for the purposes of the NPPF, mitigation and compensation for impacts on biodiversity will need to be secured as part of any planning approval.

The applicant was requested to submit results of eDNA surveys for great crested newts (water bodies 10, 11, 12) together with proposals that clearly demonstrate either avoidance of impacts on great crested newts and their habitat or that the proposals would be licensable. The applicant provided the results which confirmed the presence of great crested newts in water body 11 and that mitigation would be a combination of licenced and non-licenced avoidance measures. The applicant should identify parts of the proposals that would be managed using Reasonable Avoidance Measures and for those measures that require a licence further information should be submitted to demonstrate that licensing tests would be addressed.

It is recommended that planning conditions and/or Section 106 agreements address the following:

- Mitigation measures for wintering birds.
- Approved mitigation measures for great crested newts.
- Prior to the commencement of works on site, a Biodiversity Mitigation Strategy shall be submitted for approval in writing and subsequent implementation in full and maintenance thereafter. The scheme shall include, but not be limited to, details of measures for the avoidance/mitigation of impacts on protected and priority species (amphibians, bats, nesting and wintering birds, badgers, reptiles, water vole, brown hare) and their habitat during construction and operation of the development. The strategy should accord with Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) and should include details of the establishment, aftercare and management of habitats to be retained and enhanced, or created, as part of these proposals.
- Habitat compensation proposals.

Archaeology: The Archaeology and Cultural Heritage chapter of the ES has been undertaken in line with the requirements of the County Archaeology Service (LCAS). LCAS agrees with the assessment that the site has a low potential to contain previously unknown archaeological finds or features.

The proposed mitigation measures are considered to be appropriate. LCAS recommend therefore that should the application be approved a condition is attached that development should not take place until the implementation of a programme of archaeological work is secured.

Representations (Appendix 2)

The application, Environmental Statement and supporting documentation to the application have been advertised in the local press, site notices posted at various points on and around the site and neighbouring properties considered to be most affected individually notified by letter. Further information submitted by the applicant was advertised in the press. Copies of all the documents were made available for inspection on the County Council's web site and hard copies were made available at the County Council's offices, the offices of Fylde Borough Council, Kirkham Library; St Anne's Library; Lytham Library; and Ansdell Library.

Representations have been received from a number of groups and individuals. The following is a list of the main issues raised; a summary of the representations is set out in Appendix 2.

Friends of the Earth (FOE): Object to the proposed development for the following summarised reasons:

FOE submitted a further objection to the proposal with regard to the precautionary principle and the Water Framework Directive; inconsistency within national and local planning policy, inconsistency with government policy; evidence of adverse environmental impacts and inadequate consideration of adverse socio-economic and public health impacts.

Roseacre Awareness Group (RAG): Object to the proposal with regard to need for the development, climate change impacts, unsuitability of a countryside location and adverse impacts regarding health, socio-economics, traffic, landscape, noise, air quality, water resource, waste management, ecological, safety and seismicity. A petition of 52 signatories objecting to the proposed development was also received from RAG.

Objections: Up to the end of December 2014 a total of 8924 representations objecting to the proposal had been received; 1242 of the objections were from within Fylde and this is 2% of the adult population (1.6% of total population) and 80 were from within a 2km radius of the site. 5495 of the representations were received from outside Lancashire. Of these 822 were individual letters; 4212 were template objections submitted by Friends of the Earth; 3890 template objections, many of which were collected and submitted by 'Frack Free Lancashire'. Representations have continued to be received mostly in a variety of template forms, the final number of which will be reported when the application is presented for determination.

The reasons for objecting to the proposal are summarised in Appendix 2 under the following headings:

- Need for the Development
- Climate Change
- Energy Alternatives
- Environmental Impact
- Exploration or Production
- Regulation
- Safety
- Geology / Seismicity
- Air Pollution
- Noise Pollution
- Light Pollution
- Soil and Groundwater Contamination
- Waste Disposal
- Water Resource Sustainability
- Landscape Impact
- Ecology
- Economy
- Traffic
- Health and Wellbeing
- Community
- Property
- Damage and Compensation
- Abandonment
- Applicant / Application
- Government
- Lancashire County Council / Decision making

Support

The North and Western Chamber of Commerce: support the proposals in view of the economic opportunities the industry would bring to Lancashire.

The Chamber of Commerce East Lancashire: support the proposals in view of the economic opportunities the industry would bring to Lancashire.

Up to the end of December 2014 a total of 173 representations supporting the proposal both in principle and in respect of the specific benefits that the proposal would generate in the locale had been received. Representations in support have continued to be received the final number of which will be reported when the application is presented for determination.

The reasons for supporting the proposal are summarised in Appendix 2 under the following headings:

- Energy Security – need, supply and pricing
- Economic Benefits
- Minimal Environmental Risks
- Robust Regulatory Framework

Advice

Planning permission is sought for the construction and operation of a site for drilling up to four exploration wells, hydraulic fracturing of the wells, testing for hydrocarbons, abandonment of the wells and restoration, including provision of an access road and access onto the highway, security fencing, lighting and other uses ancillary to the exploration activities, including the construction of a pipeline and a connection to the gas grid network and associated infrastructure to land to the west of Roseacre Road, Roseacre. A supporting application for the installation of a monitoring array of 80 boreholes for seismic and water quality within the surrounding area has also been submitted (ref LCC/2014/0102).

The applications are supported by a Planning Statement (PS), Supporting Documents, an Environmental Statement (ES) and a Non Technical Summary (NTS). The PS includes a Sustainability Appraisal and the Supporting Documents include a Flood Risk Assessment, Utilities Statement and a Statement of Community Involvement. Further information was submitted in response to consultee responses and comments made by other bodies, groups and individuals.

Section 38 (6) of the Planning and Compulsory Purchase Act 2004 requires planning applications to be determined in accordance with the Development Plan, unless material considerations indicate otherwise. In considering the issues that arise from the proposed development, it is necessary to take into consideration the relevant policies of the Development Plan and the planning history of the site and all other material planning considerations. Government policy is a material consideration that should be given appropriate weight in the decision making process.

Government policy supports the exploration, testing (appraisal) and production of economic onshore hydrocarbon reserves. This application relates to the first two phases; exploration and testing (appraisal). The site would then be restored unless the appraisal stage indicated that exploitation would be viable. If that were to be the case, further planning permission for an exploitation phase would be required.

Policy

General Government Policy on Energy resources

One of the primary roles of National Government is to manage and regulate the supply of energy resources to ensure that the UK has access to secure, clean affordable energy supplies whilst also aiming to meet international obligations on climate change including reduction in green house gas emissions. A number of pieces of legislation and policy statements have been made by recent Governments in relation to energy including the following:

In 2007 the Government published a White Paper on energy (Energy – Meeting the Challenge) which set out the Government's domestic and international strategy for responding to the two main challenges of meeting targets for cutting green house gases to meet climate change objectives and to ensure the availability of secure, clean and affordable energy as imports replace declining North Sea production. The White Paper sought to respond to these challenges in a way that was consistent with energy policy goals including cutting CO₂ emissions, maintaining reliability of energy supplies, promoting competitive markets and ensuring that every home is adequately and affordably heated,

The Climate Change Act Of 2008 also makes it a duty of the Secretary of State to ensure that levels of the main green house gases in 2050 emitted by UK households, industry, transport and the energy generation sector are at least 80% lower than 1990 levels.

In 2009, the Government published 'The UK Low Carbon Transition Plan' which is a national strategy for climate and energy including how energy generation will be gradually transformed to a system based on renewables in order to meet climate change objectives including those obligations in the Climate Change Act. The document identifies that there will be a continuing need for energy generation from fossil fuel sources including gas as part of this transformation provided that such generation is associated with carbon capture technologies in order to meet climate change objectives.

More recently (2011), the Government has also published a National Policy Statement for Energy against which proposals for energy infrastructure brought forward under the 2008 Planning Act will be assessed. Although, this application is for exploration for hydrocarbons and not for nationally significant energy infrastructure, there are a number of themes within the policy document that are relevant with regards to the present Government's views on the likely future need for gas as a fuel for energy generation. These general themes are as follows:-

- The need to meet legally binding targets to cut green house emissions by at least 80% by 2050 compared to 1990 levels which will require major changes in the way that energy is generated and used by individuals, industry and the public sector.
- The Government considers that it is critical that the UK continues to have secure and reliable supplies of energy resources to be achieved by ensuring the existence of reliable supply chains (for example fuel for power stations) to meet demand as it arises.

- A diverse mix of technologies and fuels including the need to source fuels from a wide range of locations.
- The need to address issues raised by increased imports of oil and gas as North Sea reserves decline in an environment where energy demand is rising and supply is increasingly politicised.
- The requirement to make substantial and timely investment in new infrastructure over the next two decades including in new fossil fuel generating capacity during the transition to a low carbon economy.

In December 2012, the Government also published a Gas Generation Strategy. The report noted that a third of UK energy demand is met by gas and that as coal use declines for use in power generation, gas will have an important role to play in filling the gap alongside renewable and nuclear generation thereby helping to reduce carbon emissions. The Government's forecast is that gas use in 2030 will be at similar levels to 2012 and that gas will still be needed for many years into the future.

The Strategy noted that the strong role of gas in energy generation has been supported by a secure supply of fuel and that the global outlook for gas supply is good which has been recently enhanced by developments in unconventional gas extraction. The Strategy notes that an important component of Government energy security policy is to ensure that the UK is not over dependant on any individual fuel source and that over reliance on gas, or any single energy resource, could put the UK at more risk if there were any disruption to supply. Such risks are likely to become greater for gas as the UK become dependent upon imports as domestic production declines. The strategy notes the developments in unconventional (shale) gas in the US, highlights the favourable geology in some parts of the UK and provides a commitment to provide various policy and fiscal incentives to encourage exploration for shale gas in the UK as a possible means to provide additional security of supply for gas.

To summarise, Government energy policy is therefore that there will be a continuing need for gas particularly for energy generation and that gas will have an important role to play in terms of providing security of supply and enabling a transition to low carbon means of generation. The Government has identified the security issues that may arise from increasing amounts of gas having to be imported from outside the UK and therefore has sought to encourage the exploration of domestic shale gas resources in order to establish the degree to which they could enhance diversity and security of supply.

National Planning Policy

National Planning Policy Framework (NPPF): The NPPF provides a broad framework for dealing with planning applications for mineral development including for energy resources.

The NPPF states that '*minerals are essential to support sustainable economic growth and our quality of life. It is therefore important that there is a sufficient supply of material to provide the infrastructure, buildings, energy and goods that the country needs.*' The NPPF therefore requires that in determining planning applications, that great weight is given to the benefits of mineral extraction, including to the economy but that proposals should also be considered against a range of criteria including

impacts on human health, impacts of noise at nearby properties and effects on the natural and historic environment.

When determining planning applications for on shore oil and gas development, including unconventional hydrocarbons, the NPPF also requires mineral planning authorities to clearly distinguish between the three phases of development (exploration, appraisal and production). The current application is for an exploration site and therefore the application should be considered on that basis.

There are a number of other sections of the NPPF that are relevant to this application in terms of general planning issues including:-

Paragraphs 11-14	Requirement for Sustainable Development
Paragraph 17	Core Planning Principles
Paragraphs 56-66	Requirement for Good Design
Paragraphs 87-90	Inappropriate Development in the Green Belt
Paragraph 100	Flood Risk
Paragraph 103	Requirement for Flood Risk Sequential Test
Paragraph 109	Conserving and Enhancing the Natural Environment
Paragraph 118-125	Conserve and Enhance Biodiversity

National Planning Policy Guidance (NPPG)

The National Planning Practice Guidance includes policy on hydrocarbon extraction including onshore oil and gas. The guidance is intended to be read alongside the NPPF and other planning guidance. The guidance is intended to cover unconventional hydrocarbons (such as shale gas). The guidance states that unconventional hydrocarbons are emerging as a form of energy supply and that there is a pressing need undertake exploratory drilling to assess whether or not there are sufficient recoverable reserves to allow full scale production on an economically viable scale. The guidance also includes information on the phases of hydrocarbon exploration, the planning application process and the issues raised by such developments including those that are specific to unconventional gas reserves.

In summary, National Planning Policy and Guidance in relation to this application is that proposals which meet the definition of sustainable development and which comply with the policies of the development plan should be approved without delay. In determining individual applications, the economic benefits of mineral extraction are important considerations but must be balanced against local environmental impacts. In terms of unconventional gas proposals, the Government wishes to understand the likely contribution that such resources might make to gas supply. As with any hydrocarbon resources, the information gathered by techniques such as seismic surveys has limitations and exploration wells must be drilled to allow an accurate assessment of the size and recoverability of the resource. The Government wishes to encourage the drilling of such exploration wells where they are environmentally acceptable as a means to more accurately establish the size of UK shale gas resources including the contribution they may make towards energy self sufficiency.

Local Development Plan Policy

The Development Plan for the site is made up of the Joint Lancashire Minerals and Waste Development Framework Core Strategy (LMWDF), the Joint Lancashire Minerals and Waste Local Plan – Site Allocation and Development Management Policies – Part One (LMWLP) and the Fylde Borough Local Plan.

Joint Lancashire Minerals and Waste Development Framework Core Strategy Development Plan documents (LMWDF)

Policy CS1 - Safeguarding Lancashire's Mineral Resources – this policy requires that minerals will only be extracted where they meet a proven need for materials with those particular specifications.

Policy CS5 - Achieving Sustainable Minerals Production – the policy outlines a number of criteria against which proposals will be considered to ensure that natural resources (water, air, soil and biodiversity), the historic and visual importance of landscapes, flooding and the amenity, health and well being of the population are protected from harm and appropriately enhanced.

Joint Lancashire Minerals and Waste Local Plan – Site Allocation and Development Management Policies – Part One (LMWLP)

Policy NPPF 1 - Presumption in favour of sustainable development = the policy reiterates the position in the NPPF that planning applications which accord with the policies in the local plan will be approved without delay and that where there are no relevant policies, the County Council will grant planning permission unless material considerations, including policy in the NPPF, indicate otherwise.

Policy DM2 - Development Management – the policy states that proposals for minerals operations will be supported where it can be demonstrated that all material social, economic or environmental impacts that would cause demonstrable harm can be eliminated or reduced to acceptable levels.

The policy also states that proposals will be supported where it can be demonstrated to the satisfaction of the mineral planning authority that the proposals, where appropriate, will make a positive contribution towards the local and wider economy, historic environment, biodiversity and landscape character, residential amenity, reduction in carbon emissions and reduction in length and number of journeys made.

The County Council is also preparing a 'Supplementary Planning Document' (SPD) on oil and gas exploration, production and distribution. The purpose of the SPD is to provide interpretation of how the existing policies in the Minerals and Waste Core Strategy and Local Plan are intended to operate, to give guidance on the application process and to provide information on some of the characteristics of the hydrocarbon industry. The draft was published for consultation on 5th January 2015.

Fylde Borough Local Plan

The Fylde Borough Local Plan contains a number of policies for the general control of development in the Fylde area and was adopted in 2005. The Borough Council

are producing a replacement Local Plan. However this is at an early stage of preparation and therefore carries limited weight at present. Due to the age of the existing local plan, it may be that some policies of the existing local plan carry limited weight, particularly where they are not consistent with the NPPF. However the policies referred to in the report are considered to still retain weight and are consistent with the NPPF.

At a strategic level, the site is defined as a countryside area in the Local Plan and is therefore subject to Policy SP2. Policy SP2 states that development in such areas will not be permitted except where proposals are essentially required for the purposes of agriculture, horticulture or forestry or other use appropriate to a rural area. An exploration site for hydrocarbons is an industrial development which does not fall within the above categories.

However, minerals can only be worked where they are found. Although the Bowland Shale occurs beneath most of the Fylde area and therefore there may some flexibility as to where an exploration site can be located, much of the area outside the existing settlements within Fylde Borough is designated as countryside. Due to the need to retain a separation between exploration sites and settlements, exploration in countryside locations is therefore almost inevitable. For these reasons, the development is considered acceptable in terms of Policy SP2.

There are also a number of other local plan policies dealing with environmental impacts which will be discussed in other sections of this report. These policies are:-

Policy EP11	Building Design and Landscape Character
Policy EP12	Conservation of Trees and Woodland
Policy EP23	Pollution of Surface Water
Policy EP24	Pollution of Ground Water
Policy EP26	Air Pollution
Policy EP27	Noise Pollution
Policy EP28	Light Pollution

Assessment

The application and supporting information has been assessed against the national guidance, the national policies and those relevant policies of the local development plan under the following sections relative to those set out in the ES. In view of the nature and complexity of some of the issues raised, where appropriate these have been set out in supporting appendices including the nature of the proposal relative to the subject matter, the proposed mitigation if required, a summary of representations received and an assessment of such. A summary of the issues with reference to the respective appendices are reported as follows.

Scheme alternatives

Schedule 4, Part 1 (2) of the EIA Regulations requires the ES to provide “*an outline of the main alternatives studied by the applicant or appellant and an indication of the main reasons for the choice made, taking into account the environmental effects*”.

Unlike other types of mineral development where there are very narrowly defined

locations for development, exploration sites could potentially be located at a variety of sites within the applicant's exploration licence area. The applicant has undertaken a systematic process to select the preferred sites for this stage of exploration.

The purpose of the exploration proposals is to establish the potential commercial shale gas reserves in Lancashire and provide a clearer understanding of the total amount of gas in place and the volume of commercially recoverable gas. The exploration of gas is supported by the Government and particularly DECCs UK Gas Generation Strategy in respect of shale gas.

The applicant is proposing 4 wells at each of the proposed sites (Roseacre Wood and Preston New Road) which would enable different strata to be targeted from one site. The sites have been selected based on geological, environmental, community, land ownership and other technical factors in a staged manner.

The first stage involved a detailed understanding of the geological conditions following the 3D geophysical survey that was carried out. This identified areas of relatively shallow flat laying shale which directed the choice of site to avoid hydraulically fracturing near regional faults and which together with the employment of a 'traffic lights system' of monitoring would reduce the risk of inducing a felt seismic event.

The second stage involved the identification of Tier 1 environmental constraints, namely:

- Existing and proposed European and national designations (for example Special Protection).
- Areas, Sites of Special Scientific Interest).
- Nationally designated heritage assets including: listed buildings, Scheduled Monuments.
- Registered Parks and Gardens, Registered Battlefields and World Heritage Sites.
- Groundwater Source Protection Zone 1.
- Flood Risk – avoiding flood risk zone 3b.

The second stage involved the identification of Tier 2 environmental constraints, namely:

Connections:

- Highway routes and access - A review of the existing road network and access arrangements was undertaken to identify locations where it would be suitable to use an existing access or create a new access to an exploration site.
- Utilities - Areas were identified where there is potential to connect to existing utilities networks (principally potable water supply and gas).

Environmental Constraints:

- Cultural heritage - All heritage assets identified via the historic environmental record were mapped and reviewed.

- Landscape character - Landscape character areas were mapped and considered in regard to the location of exploration well sites and the County's Landscape Strategy.
- Visual impact - A broad zone was used to establish the area in which the exploration well sites may be visible.
- Protected species - Data was collected from site walkovers, surveys and existing ecological records were reviewed.
- Non-designated sites/valuable habitat - Non-designated sites and valuable habitats were defined and reviewed for each site.
- Agricultural land quality - Information on agricultural land classifications (i.e. 1, 2, 3a and 3b) was reviewed.
- Proximity to housing and other sensitive uses - Residential properties and other sensitive uses were considered and the distance from these uses was taken into account.
- Light pollution - The potential for light pollution was considered for each zone taking into account the topography of the site, existing barriers and sensitive receptors.
- Noise - A more detailed consideration of noise was undertaken for each zone, taking into account existing noise levels, potential noise barriers and distance from residential properties and sensitive receptors.
- Air quality - The potential for air quality impacts was considered taking into account air quality management designations and sensitive receptors.
- Water resources, flood risk and drainage - Proximity to watercourses, wetlands and ponds, and the potential for future development of groundwater resources was considered. Flood risk issues and drainage requirements were also considered.

Planning Constraints

- Local planning policy - The Development Plan allocations and planning designations were identified.

Land Ownership Issues

- Potential to secure a lease from the landowner - The likelihood of using the land for the purpose of an exploratory well was determined based on discussions between Cuadrilla and the land owners.

The existing sites that are within the control of the applicant and for which planning permission has previously been granted at Grange Hill, Preese Hall, Annas Road and Becconsall were also considered. These were dismissed due to them not having the most suitable geological characteristics (Grange Road), abandonment (Preese Hall, Annas Road) or not falling within the 3D geophysical survey (Becconsall).

The assessment of all the above constraints has lead to the proposed site being chosen.

Inevitably, notwithstanding the site may be considered to be the preferred site by the applicant it would still generate potential impacts, most particularly on the nearest residential properties. It has been suggested that a site could have been located in a more industrial location particularly with the opportunity to directionally drill at depth and which would not have generated the same type of impacts. However, such

locations may not be as attractive in terms of targeting the geological horizons and if the impacts of the proposed development can be found or made acceptable then it could be argued that the preferred site could be found acceptable.

The application must of course be considered on its merits and the following is an assessment of the need for the development and the potential impacts and proposed mitigation.

Need for the Development

The Government has made it clear that there is a need to reduce carbon emissions and to ensure energy security and that while renewable energy must form an increasing part of the national energy picture, oil and gas remain key elements of the energy system for years to come. The Government is committed to maximising indigenous resources, subject to safety and environmental considerations. It is considered that in principle the proposal accords with the approach set in national guidance by investing in energy infrastructure to establish whether indigenous oil and gas reserves are available and worth exploiting.

The NPPF, for the purposes of oil and gas exploration notes that '*Minerals are essential to support sustainable economic growth and our quality of life*' and that '*...minerals are a finite natural resource, and can only be worked where they are found...*' (NPPF paragraph 142). Paragraph 144 requires that in determining planning applications local planning authorities '*give great weight to the benefits of mineral extraction, including to the economy*', though this must be balanced against the weight given to environmental impacts of a development.

Paragraph 124 PPG: Minerals advises that nationally, energy should come from a variety of sources, including oil and gas, and mineral planning authorities should take account of government policy including that relating to oil and gas.

Paragraph 147 of the NPPF states that minerals planning authorities should "*when planning for on-shore oil and gas development ... address constraints on production and processing within areas that are licensed for oil and gas exploration or production.*" This makes it clear that any consideration of constraints should be limited to sites which are covered by a Petroleum Exploration and Development Licence (PEDL). As operators can only explore within the area they hold a PEDL for, it is considered reasonable to limit consideration of alternative sites to a single PEDL area, particularly as a key constraint for oil/gas exploration would be holding the PEDL licence.

At the local level, there are no specific policies relating to oil and gas. Policy CS1 of the Joint Lancashire Minerals and Waste Development Framework Core Strategy Development Plan documents (LMWDF) seeks to safeguard Lancashire's mineral resources and requires that minerals are only extracted where they meet a proven need for materials with those particular specifications. Policy CS5 - Achieving Sustainable Minerals Production outlines a number of criteria against which proposals will be considered to ensure that natural resources (water, air, soil and biodiversity), the historic and visual importance of landscapes, flooding and the amenity, health and well being of the population are protected from harm and appropriately enhanced.

Policy NPPF 1 of the Joint Lancashire Minerals and Waste Local Plan – Site Allocation and Development Management Policies – Part One (LMWLP) reiterates the position in the NPPF that planning applications which accord with the policies in the local plan will be approved without delay and that where there are no relevant policies, the County Council will grant planning permission unless material considerations, including policy in the NPPF, indicate otherwise. Policy DM2 states that proposals for minerals operations will be supported where it can be demonstrated that all material social, economic or environmental impacts that would cause demonstrable harm can be eliminated or reduced to acceptable levels.

The application site is within PEDL 165 and EXL 269 licence boundaries. The area covered by the PEDL encompasses the major settlements of Preston, Fleetwood, Blackpool, Lytham, Leyland, Chorley and Southport between which the area is generally rural with scattered, small settlements and, therefore, any oil/gas site tapping into this reserve is likely to be within the countryside.

It is considered that in principle the proposal accords with the approach set in local policy that mineral operations will be supported where it can be demonstrated that all material social, economic or environmental impacts that would cause demonstrable harm can be eliminated or reduced to acceptable levels. The following is an assessment of whether the applicant has demonstrated such.

Air Quality (Appendix 3)

The project will generate some emissions to air. But providing the operational practices are adhered to and regulated by the Environment Agency, the emissions would not cause unacceptable impacts.

Having undertaken a detailed assessment, the Agency is satisfied that the emissions from the flare would be insignificant at locations closest to the site. In terms of public health impact of the flare emissions, the Agency's audit checks, modelling and sensitivity analysis confirms there will be no exceedance of standards established for human protection.

Based on the information contained within the application, Public Health England has no significant concerns in relation to the potential emissions from the site adversely impacting the health of the local population, providing the applicant takes all appropriate measures to prevent or control pollution, in accordance with the relevant sector technical guidance or industry best practice.

Comprehensive monitoring of the practices and the site, overseen and regulated by the Environment Agency, will ensure that risks are managed effectively.

Archaeology and Cultural Heritage (Appendix 4)

As part of the EIA an assessment has been undertaken of the effects of the project on the archaeology of the area, the above or below ground remains left by previous generations including pre history, Roman, early medieval, medieval, post medieval and later. The assessment concludes there would be significant effects on archaeology and cultural heritage assets resulting from the construction, operation and decommissioning of the proposed exploration compound, the construction of the associated access route and the installation of the seismic monitoring array.

To mitigate the impact of the development works the most appropriate way to implement a scheme of investigation would be to carry a strip, map and record exercise during the excavation of the topsoil if the monitoring archaeologist identifies any features requiring further investigation

Subject to the imposition of a condition requiring the implementation of a programme of archaeological work is secured prior to commencement of development it is considered the development would not have an unacceptable impact on archaeology, would not have an unacceptable cumulative impact in conjunction with the proposed Roseacre Wood site and would comply with policy EP21 of the Fylde Local Plan.

Greenhouse Gas Emissions (Appendix 5)

The project will generate some greenhouse gas emissions. But providing the operational practices are adhered to and regulated by the Environment Agency, the emissions would not cause unacceptable impacts.

The Environment Agency draft permit requires that during drilling of the exploratory boreholes, fugitive emissions of natural gas are to be prevented by increasing the hydrostatic pressure of fluids so as to prevent gas release. The well will also be equipped with physical control equipment which enables the borehole to be shut at the surface to prevent escape of gas emissions. Gas monitoring equipment will be in constant use at the surface. The draft permit does not allow the venting of natural gas unless it is necessary for safety reasons. Comprehensive monitoring of the practices and the site, overseen and regulated by the Environment Agency, will ensure that any risks are managed effectively.

The major source of greenhouse gas emissions from the proposal is however CO₂ from the combustion of natural gas in the flare. The operator has justified the use of a flare rather than using the gas on site by demonstrating to the Environment Agency that the costs of using the gas would be disproportionate for the 90 day periods. It is also not reasonably practicable to connect the flow of extracted natural gas to the gas grid during the initial flow tests. This is because the flow rates are unknown and the quality of the gas produced may not be compatible with gas grid requirements without further processing. In addition, in order to establish whether there is sufficient flow of gas to move to extended flow testing, there needs to be an uninterrupted flow. Using the gas to meet energy requirements on site would necessitate interrupting the gas flow, preventing the collection of the required data for analysis.

Total CO₂ emissions in Lancashire (as set out in the Lancashire Climate Change Strategy, 2009) were estimated at 12.7 million tonnes. Maximum emissions from the project over its 5.5 years are estimated at 124,369 tonnes carbon dioxide equivalent (tCO₂e). This averages to 22,613 tCO₂e per year, which is 0.18% of the county's annual emissions as set out in the Strategy. The project's emissions are just over 3% of the Borough's annual emissions. The emissions are short term.

Community and Socioeconomics (Appendix 6)

The applicant has undertaken an assessment of the community and socio-economic effects of the proposal. The assessment identifies that the proposal would have a number of community and socio-economic effects consisting of:

- Temporary loss of local amenity value through site activities, traffic and influx of population area.
- Employment generation, with direct employment for initial exploration wells predominantly drawn from beyond the local area, but with indirect and induced effects from local spending and the influx of population on Site (local supporting industry, hotels and subsistence for example);
- Increased spending in the agriculture sector from increased landowner income;
- Opportunity costs from loss of agricultural land;
- Community disturbance from any protest activities, or Site works.
- Effects of increased local spending from the community benefit payment from the applicant via the Community Foundation for Lancashire to local communities (although the applicant acknowledges that such payments are not a material consideration in deciding whether to grant planning permission and are not presented as such, but are of the view that they would be a positive effect flowing from the development).

An assessment of the potential community and socio-economic impacts has been carried out. The proposal is for a temporary project but it has the potential to have impacts that may impact on community, social and economic factors particularly relating to the temporary loss of local amenity value through site activities, traffic and influx of population area; community disturbance from any protest activities; impacts on tourism and agricultural production; many of these potential impacts (and more) are referred to in representations opposing the proposal. However, there would also be opportunities for employment generation, with direct employment for initial exploration wells predominantly drawn from beyond the local area, but with indirect and induced effects from local spending and the influx of population on site such as local supporting industry, hotels and subsistence; increased spending in the agriculture sector from increased landowner income although these are difficult to quantify; and whilst it is not a material consideration for planning purposes, the opportunity for community benefit payments.

Subject to the adherence to regulatory requirements it is considered that the community and socio economic impacts could be kept to a minimum. In the event there were to be disturbance leading to damage, the applicant has committed to investigating complaints and has demonstrated insurance would be in place if damage is proven to be attributable to their operations. It is not possible to quantify what impacts a proposal of this nature would have on either property values or the market, but these are not material planning considerations.

Stay Lancashire has publically countered the view that the site would adversely affect tourism and is of the view that the hospitality industry would benefit. There are no statistics that support either view.

In terms of community cohesion, recent experience has shown that drill sites can attract public attention and a degree of protest and environmental extremist activities may also occur. The Lancashire Constabulary have been consulted on the proposals and have not objected. It is right to assume that public order would be maintained by the police although there would inevitably be costs associated with such as has been evidenced by other sites elsewhere in the country.

It is concluded that whilst there would be some localised impact on residents in the community at the nearest properties, the project would not have a significant effect on wider communities or socio-economic factors, particularly in groups with protected characteristics. There would not be an impact on agricultural land or practices and there would be some economic benefits during the exploration stage to the local economy. It is therefore considered that the proposal would not have an unacceptable impact on communities or socio-economic impacts and that to the contrary there would be some community and socio economic benefits. On balance therefore, it is concluded that the proposal would not be in conflict with the policies of the NPPF or the development plan policies.

Ecology (Appendix 7)

The applicant has undertaken an assessment of the ecology of the area and identified the potential impacts and proposed mitigation where necessary. The ecological receptors, of nature conservation value, identified within the zone of influence of the main site as part of a Phase 1 Habitat Survey included; hedgerows, bats, breeding birds, nesting birds wintering birds, brown hare and great crested newts. The following were identified as having the potential to be significant at the local scale:

- Loss of habitat.
- Disturbance due to the loss of bat foraging habitat from the activities and equipment present at the well pad.
- Loss terrestrial habitat for great crested newts and potential direct effects on them.
- Disturbance and loss of habitat from brown hare.
- Potential disturbance and displacement of migratory species of birds in the vicinity of the array points.

A range of mitigation measures and compensation measures would be adopted to ensure that the Project would not result in a significant effect on ecological features. These measures include the following:

- Replace hedgerow, trees and habitats,
- Measures to reduce the magnitude of lighting impacts on feeding bats
- Locate seismometer array points away from land unused by overwintering birds.
- Clearance of vegetation to occur outside of bird breeding season or after confirmation that there are no breeding birds using the vegetation.
- Implement noise attenuation measures to minimise disturbance to sensitive species of wildlife.

It is accepted that imposition of conditions and a legal agreement controlling the implementation of the proposed mitigation measures would ensure that there would

be no unacceptable impact upon biodiversity as a result of the proposal. However, the information requested with regard to protected species to demonstrate that the licensing tests would be addressed has not been submitted and therefore the application could not be granted until information is provided that confirms the measures to address the protection of great crested newts.

Hydrogeology and Ground Gas (Appendix 8)

The applicant has undertaken an assessment of the potential impacts relevant to hydrogeology and ground gas. The assessment looks at the potential effects of the project as part of the well pad activities and materials in transit, the well construction and integrity and features created by the hydraulic fracturing on the quality of the water environment, both ground water and surface water and the possible creation of subsurface pathways to sensitive features that could result in pollution.

The geology beneath the site is described and the interpretation by the applicant has been assessed by the EA. The geology is such that the Manchester Marls forms a seal between the ground surface and shale rock within which is trapped the natural gas. The Manchester Marls act as an impermeable barrier and prevent the movement of water and gas up towards the surface of the ground from deeper layers of rock. The Sherwood Sandstone aquifer, a porous rock containing water lies above the Manchester Marls. The EA has confirmed the poor quality of the aquifer because of its salinity and it is therefore not used for drinking water.

The assessment sets out how the well pads and the wells have been designed to prevent leaks or spills from entering the wider environment (the soil, groundwater, surface water or the atmosphere) and cause pollution. The well design is assessed by the HSE and the EA in accordance with their respective regulatory requirements and industry guidance. The EA also assesses the proposed drilling fluid and the fracture fluid and requires it to be non-hazardous.

Prior to and during works, groundwater water and surface water would be monitored. The monitoring would be agreed with the EA. The EA would require baseline monitoring of groundwater, air quality and surface water for approval before the start of operations.

When the works are finished, the wells would be plugged and abandoned in accordance with the regulatory requirements of the HSE and the EA and industry guidance. The plugging and abandonment of the well including the monitoring of the ground water quality and gas concentrations are matters for the HSE, the EA and the DECC.

The assessment concludes that the probability of source pathway receptor linkage associated with the contaminant release during well pad construction and access is low; that the contaminant release due to defects in the pad membrane is low; that the contaminant release due to overflow discharge from the well pad drainage systems low; that liquid spray off due to high pressure equipment failure is low; that the spill of contents of vehicles in transit on the public highway is low; that the loss of well integrity due to poor well construction is very low; that the loss of well integrity caused by hydraulic fracturing is very low; that the loss of well integrity is very low.

As mentioned, the Manchester Marls forms a seal between the ground surface and shale that traps the natural gas within the rock. The Manchester Marls act as a barrier and prevent the movement of water and gas up towards the surface of the ground from deeper layers of rock. The Sherwood Sandstone is a porous rock and contains water. It is considered by the Environment Agency to be a poor quality aquifer because of its salinity and is therefore not used for drinking water.

The well pads and the wells have been designed in accordance with the HSE and EA regulatory requirements and industry guidance. The Environment Agency also assesses the proposed drilling fluid and the fracture fluid requires it to be non-hazardous. Prior to and during works, groundwater water and surface water will be monitored. The monitoring will be agreed with the EA. The EA will require baseline monitoring of groundwater, air quality and surface water for approval before the start of operations. When the works are finished, they will be decommissioned in accordance with the regulatory requirements of the EA and the HSE and industry guidance. The plugging and abandonment of the well including the monitoring of the ground water quality and gas concentrations are matters for the HSE and the DECC.

An assessment of subsurface geology by the EA has considered the potential for retained pollutants in the shale rock to migrate upwards into contact with any groundwater bearing formations. This outcome has been assessed as very low and with no plausible pathway. A groundwater activity permit is required from the EA because of the theoretical possibility that fluid and gas could migrate from the target formation into the Millstone Grit. The EA has assessed the possibility of fluid migration as very low. This is because of the absence of a pressure gradient driving the fluid once the fracturing pressure is turned off. Moreover, close monitoring of fractures (using the micro seismic array and in accordance with the Fracture Plan that must be approved by DECC and the Agency) will prevent any fractures moving into the Millstone Grit from the target formation, thus preventing the movement of fluid.

There are possible impacts associated with the well pad construction and activities. The site construction involves laying an impermeable membrane over the whole compound area to prevent accidental slippage and rainwater from entering the underlying soils, groundwater and nearby water courses. The platform is bounded by a ditch, for the purpose of pollution control. Only clean surface water will drain into a water course (outside drilling, hydraulic fracturing and initial flow test stages) and the Environment Agency has advised that the arrangements are acceptable subject to conditions.

There are potential impacts associated with the well design and construction and proposal to manage these impacts. It is proposed that the well would be drilled, constructed and tested in accordance with regulatory requirements and industry standards. The well design would comprise a two barrier cement sealed design. Details of the well design would be reviewed by the Independent Well Examiner. Additionally, the Environment Agency considers the proposed well construction would form a barrier to prevent the escape of fluids. The EA is satisfied that well integrity is assured through compliance with the well examination regime and regulation by the Health and Safety Executive, and further through conformance to Oil & Gas UK and UK Onshore Operators' Group good practice guidelines for well design and construction. Hydraulic fracturing plans and a seismic monitoring programme would be submitted to DECC and the EA for approval prior to hydraulic

fracturing operation commencing; operation of a traffic light system for monitoring of induced seismicity is also designed to mitigate the risk from induced seismicity, including any potential for damage to well integrity. The potential for fractures that are propagated by hydraulic fracturing to extend beyond the target formation has been assessed to be very low and the growth of fractures resulting from each fracturing stage would be assessed with the aid of the seismic monitoring array.

The EA has assessed the proposed fracture fluid as non-hazardous. It is also satisfied that the chemical similarity between the fluid and the water in the Millstone Grit is sufficiently high that any indirect discharge would be insignificant. Finally, the EA believes that if any fluid reaches the Millstone Grit it would not move far from the point of entry because of the confined nature of the rock. If needed low toxicity oil based muds would only be used below the Manchester Marl formations and with the approval of the EA.

Prior to and during works, groundwater water and surface water would be monitored (see application LCC/2014/0102). The monitoring would be agreed with the EA. The draft permit includes pre-operational requirements to provide baseline monitoring of groundwater, air quality and surface water for approval before the start of operations. The draft permit also includes a requirement to provide for a monitoring plan for at least 4 weeks prior to gas flaring. The EA has specified monitoring of groundwater and surface water in the draft permit and this would be carried out until the permit is surrendered.

When the works are finished, they would be decommissioned in accordance with the regulatory requirements of the EA and the HSE and industry guidance. The plugging and abandonment of the well including the monitoring of the ground water quality and gas concentrations are matters for the HSE, the DECC and the EA and their respective regulatory regimes. In particular, the plugging and abandonment of the borehole is regulated by the HSE under the Offshore Installations and Wells (Design and Construction etc.) Regulations 1996. These Regulations contain provisions relating to well integrity and abandonment as well as the selection of materials. The Regulations apply to all wells drilled under landward licences, the key objectives of which are to prevent the escape of fluids from the well which might result in pollution of freshwater or ground contamination. Under the Regulations, well abandonment techniques must prevent the transfer of fluids created by pressure gradients between different zones. Such transfer is achieved by means of the original borehole casing and the cementing and plugging operations that are undertaken as part of well abandonment.

Paragraph 122 of the NPPF requires that planning authorities should not seek to control processes or emissions where these are subject to approval under separate pollution control regimes and that LPA's should assume that these regimes will operate effectively. Nonetheless, paragraph 112 of PPG Minerals, notes that before granting permission the local planning authority should be satisfied that the issues dealt with under other regimes can be adequately addressed by taking advice from the relevant regulatory body. The County Council has consulted with the EA and HSE, neither of which has objected.

The EA is minded to grant the applicant the necessary environmental permits needed to carry out their proposed operations. The draft permits set out the conditions needed to protect groundwater, surface water and air quality. If permits

are issued, the applicant will have to comply with the proposed conditions that are designed to ensure that operations do not cause harm to people or the environment. The EA has assessed the proposed activities that could involve the discharge of pollutants into groundwater (a ‘groundwater activity’) and the nature of these pollutants. The EA is satisfied, subject to conditions, that there is minimal risk of direct discharge of pollutants into groundwater. The EA is also satisfied that the indirect entry of non-hazardous pollutants will be limited so as not to cause pollution.

Hydrogeological issues and the protection of surface and ground water have been assessed by the applicant and the risks associated with such were considered to be low or very low.

Advice provided to the County Council from the University of Glasgow states the scenarios of pollution of shallow groundwater and surface waters due to fracking operations, as suggested in some representations, are not credible. They also say the suggestion the proposal is unsafe because there are faults in the vicinity is unfounded.

The EA and HSE have been consulted and have advised on the regulatory regimes that would be employed to manage the risks and that they are satisfied that such risks could be managed in a way that would not cause any unacceptable impact. It is considered that the site can be contained and surface waters managed in a way as to prevent pollution to adjoin land or nearby watercourses.

The County Council should assume that these regimes will operate effectively and can be satisfied that the issues dealt with under other regimes can be adequately addressed. Boreholes for ground water monitoring are the subject of planning application LCC/2014/0102. Subject to conditions controlling the management of surface water it is considered that the proposal could be acceptably controlled by other regulatory regimes and would not have any unacceptable impacts on hydrology or ground or surface water and would comply with national guidance and policies and the policies of the development plan.

Seismicity (Appendix 9)

A full assessment of the likely effects of induced seismicity associated with the proposed hydraulic fracturing operations including the likely effects on surface deflections (subsidence) from gas extraction has been carried out. It recognises seismic events could occur as a result of stress changes on a plane of weakness (a fault) caused by the growth of engineered fractures and the transmission of fluid pressure into a critically stressed fault. The assessment has been carefully considered against the findings of the Royal Society, in light of national guidance and with regard to specialist advice that has been sought from DECC and the County Council's own appointed seismologists and in view of the views and recommendations of the Director of Public Health. The views expressed by groups and individuals have also been carefully considered. The full assessment of such is set out in Appendix 9.

The Royal Society concludes that health, safety and environmental risks associated with hydraulic fracturing as a means to extract shale gas can be managed effectively in the UK as long as operational best practices are implemented and enforced through regulation. DECC will control fracking in a way, through a traffic light system

that prevents fracturing generating more than $0.5M_L$ which means induced seismicity will not be felt at all, or only by a few under especially favourable conditions. Whilst perceived fears are understandable, they cannot be supported by independent review and guidance. It is safe to assume that BGS or other appropriate bodies will carry out national surveys to characterise stresses and identify faults in UK shales and operators will carry out site-specific surveys to characterise and identify local stresses and faults. It is proposed that seismicity will be monitored before, during and after hydraulic fracturing (see application LCC/2014/0097). Monitoring has already been carried out in the Becconsall area. A traffic light monitoring systems would be implemented and data fed back to well injection operations so that action can be taken to mitigate any induced seismicity and which would be overseen by DECC and whom the county council can be satisfied will operate within its own regulatory framework.

With regard to possible subsidence DECC has reported [Review and Recommendations for Induced Seismic Mitigation (April 2012)] that there are no documented cases of fracturing operations causing subsidence or tremors large enough to cause damage at the surface and that unlike coal mining, shale gas production does not remove large quantities of rock from underground, which can cause subsidence. The report notes that subsidence can happen when rock is compressed and collapses in on itself, but that shale rock is not easily compressed, so subsidence is unlikely and that rock samples would be tested before any commercial production is approved. The conclusions of the applicant and the previous conclusions of DECC are accepted. It is considered that the proposed exploration and appraisal of shale gas would not lead to any subsidence at surface and should there be an opportunity for any further stage of exploration that could lead to commercial exploitation, that would require the benefit of planning permission and would be the subject of greater scrutiny by DECC.

With regard to the representations received it is not likely that seismic activity would lead to injury to humans or wildlife or destabilise the geology in a way that would generate earthquakes that would place the Heysham power station or the proposed underground gas storage project at Preesall at risk. The County Councils has not seen any verified evidence of damage to property as a consequence of the seismic events at Preese Hall or that the surface strata was undermined in any way or present a risk of subsidence to moss land or nearby properties. There is no evidence to support that fact induced seismicity would led to pollution of surface or ground water or that the process could be safely carried out. A 3D survey has been carried out to give a clear understanding of the geological conditions and faulting in the area and the sites, depth and direction of drilling and horizons proposed to be fracked have been chosen and designed in a way to minimise seismic movement and which, if undertaken in accordance with a traffic light system would prevent the migration of fluids. There are no mine workings in the Fylde.

Whilst the concerns are understandable it is concluded that they cannot be supported and that the County Council can assume and be satisfied that the development would be carried out to meet the requirements of DECC.

Land Use (Appendix 10)

As part of the EIA an assessment has been undertaken of the impacts of the proposal on the land use. The agricultural land affected (2.6ha) has been assessed as good or moderate in terms of its agricultural land quality. A soil survey has been carried out and data on farming practices collated. The site forms part of a 275ha farm holding of which 2.6 is proposed to be used for the development – approximately 0.9%. The land is grassland grazed by milking cattle, produces hay crops for sale, dairy replacements and beef are reared and used for winter grazing by sheep. Approximately 0.02ha is classed as good quality (Class 3a) with approximately 2.58ha moderate quality (Class 3b).

The assessment concludes the impact on the loss of agricultural land is not significant.

An assessment of the ES has been carried out and it is concluded that the impact of the proposal in terms of land use planning would not be significant. The loss of agricultural land would be for a temporary period and provided that appropriate mitigation measures are imposed with regard to soil compaction and conditions controlling the storage of soils and the reinstatement of the land, the proposal would be acceptable. The proposal would not be contrary to the policies of the NPPF or the policies of the development plan.

Landscape and Visual Amenity (Appendix 11)

The applicant has undertaken an assessment of the landscape and visual amenity of the site and area within a 5km radius. As part of the EIA an assessment has been undertaken of the impacts of the proposal on the landscape and visual effects. It concludes there would be no significant landscape effects although there would be very localised direct change due to the development temporarily altering a very small proportion of the local character area during construction of the well pad but no effect during other phases. The visual findings conclude there would be significant adverse visual effects arising during the drilling, hydraulic fracturing and flow testing phases. Eleven of the principal viewpoints would experience significant adverse visual effects. Nine of these are public rights of way receptors, one with a recreational viewpoint along with two residential receptors (a group of five residences have been assessed as one receptor at Stanley Farm since all would experience the same effect. No significant adverse visual effects were judged to occur on any receptor more than 900m from the site during any phase of the project.

Mitigation measures are proposed in the form of 4m bunds around the well pad, landscaping around the well pad to help filter views, allowing hedgerows to grow taller, minimisation of light spill, gap filling in existing hedgerows.

The ES concludes there would be no cumulative effects from other developments proposed or committed that would have a significant impact on visual amenity. The land is of good to moderate agricultural quality and it is concluded that there would be no significant effects on farming practices.

An assessment of the ES has been carried out and advice provided by the County Council specialist advisor on landscape. The assessment finds that given the undulating and open nature of the landscape, the development would have some

significant landscape impacts but only for a limited period and in the main restricted to locations near to the site, in particular properties at Old Orchard Farm and Stanley Farm. The development would not affect any conservation areas, listed buildings or protected trees. It would not require the removal of any significant existing landscape features and therefore any landscape change would not be of a permanent nature. The development is therefore considered acceptable in terms of landscape impacts in the long term. However, it is considered that any planning permission should be subject to conditions relating to the colour of the drilling rigs and other equipment, the design and location of the perimeter landscaping mounds, the colour and design of fencing, lighting design and control and details of the restoration and aftercare of the site to include the replanting of any hedgerows that are removed and restoration.

It is therefore concluded that in the short term the proposal would generate significant localised landscape and visual impacts and which would be unavoidable due to the nature and duration of the proposal. However, whilst the duration is over an extended period of time, it would still be temporary. Mitigation measures are proposed and there is scope to further mitigate the likely effects by reducing the height of the drilling rig to a maximum of 35m; finish the drilling and fracturing rigs in a more suitable colour than red/white as proposed and to finish the various cabins and other temporary buildings in a more appropriate colour than blue as proposed. Subject to such conditions it is considered that the proposal would not be contrary to Policy D2 of the Lancashire Minerals and Waste Local Plan and whilst it could be seen as contrary to Policy EP11 of the Fylde Local Plan, the proposed development, due to its nature for a temporary period it could not be designed in a way to meet the requirements of this policy.

Lighting (Appendix 12)

As part of the EIA an assessment has been undertaken of the effects of the potential night time light obtrusion from the project in view of the site being in a rural location away from built up areas and where there is little existing night time lighting. The assessment has used national policy and light obtrusion guidance including the Institute of Lighting Professionals (ILP) Guidance Note for the Reduction of Obtrusive Light. An assessment of the impacts has been carried out against the policies of the NPPF, the policies of the development plan and with regard to the views of the county councils specialist lighting advisor, the Director of Public Health and in view of representations received (Appendix 2).

The County Council's lighting advisor has raised no objection to the proposals and has advised that the lighting design generally complies with the required standards, with the exception of predicted sky glow, which marginally exceeds permitted standards. He does not anticipate any issues to the surrounding area, highway or users on grounds of safety.

The Director of Public Health has recommended that an assessment of light pollution as part of the site operations should be carried out, and if there are likely to be significant impacts associated with light pollution from the sites that cannot be mitigated or controlled, the applicant should be requested to consider the opportunity to offer to fit blackout blinds to those homes most likely to be affected.

In terms of landscape impact, lighting has properly been assessed; it concludes there would be some light pollution at night. This would be for a temporary period but

would be significant particularly when seen from the nearest residential properties. Notwithstanding it would be for an extended period of time, with the mitigation measures proposed, and which could be controlled by condition, on balance, it is considered that lighting could be made acceptable and that the impacts associated with such would not be so great to affect amenity on a permanent basis or lead to unacceptable effects on nature conservation to constitute a sustainable reason for refusal. It would not be appropriate to require blackout blinds to be fit to those properties most likely to be affected. Subject to the mitigation measures proposed, and which could be controlled by condition, it is considered on balance that the proposed lighting for a temporary period would be acceptable for the purposes of the NPPF Policy DM2 of the LMWLP and Policy EP28 of the Fylde Local Plan.

Noise (Appendix 13)

Paragraph 109 of the NPPF states that the planning system should contribute to and enhance the natural and local environment by *inter alia* preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability.

Paragraph 123 of the NPPF states that *planning policies and decisions should aim to:*

- *avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;*
- *mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;*
- *recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and*
- *Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.*

Assessment of 'significant adverse impacts' is directed to the DEFRA publication *Explanatory Note to the Noise Policy Statement for England*.

In the accompanying practice guidance for the NPPF the management of the noise associated with particular development types is considered in a number of separate documents. For minerals development there is National Planning Practice Guidance: Minerals (PPG).

In relation to noise the PPG states that applicants *should carry out a noise impact assessment, which should identify all sources of noise and, for each source, take account of the noise emission, its characteristics, the proposed operating locations, procedures, schedules and duration of work for the life of the operation, and its likely impact on the surrounding neighbourhood.*

Proposals for the control or mitigation of noise emissions should:

- consider the main characteristics of the production process and its environs, including the location of noise-sensitive properties and sensitive environmental sites;
- assess the existing acoustic environment around the site of the proposed operations, including background noise levels at nearby noise-sensitive properties;
- estimate the likely future noise from the development and its impact on the neighbourhood of the proposed operations;
- identify proposals to minimise, mitigate or remove noise emissions at source;
- monitor the resulting noise to check compliance with any proposed or imposed conditions.

The PPG continues by adding that *Mineral planning authorities should take account of the prevailing acoustic environment and in doing so consider whether or not noise from the proposed operations would:*

- give rise to a significant adverse effect;
- give rise to an adverse effect; and
- enable a good standard of amenity to be achieved.

In line with the Explanatory Note of the Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure would be above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation.

The PPG recommends appropriate noise standards and advises that *Mineral planning authorities should aim to establish a noise limit, through a planning condition, at noise-sensitive property that does not exceed the background noise level ($L_{A90,1h}$) by more than 10dB(A) during normal working hours (0700-1900). Where it will be difficult not to exceed the background level by more than 10dB(A) without imposing unreasonable burdens on the mineral operator, the limit set should be as near that level as practicable. In any event, the total noise from the operations should not exceed 55dB(A) LAeq, 1h (free field). For operations during the evening (1900-2200) the noise limits should not exceed the background noise level ($L_{A90,1h}$) by more than 10dB(A) and should not exceed 55dB(A) LAeq, 1h (free field). For any operations during the period 22.00 – 07.00 noise limits should be set to reduce to a minimum any adverse impacts, without imposing unreasonable burdens on the mineral operator. In any event the noise limit should not exceed 42dB(A) LAeq, 1h (free field) at a noise sensitive property.*

Where the site noise has a significant tonal element, it may be appropriate to set specific limits to control this aspect. Peak or impulsive noise, which may include some reversing bleepers, may also require separate limits that are independent of background noise (e.g. Lmax in specific octave or third-octave frequency bands – and that should not be allowed to occur regularly at night.)

For particularly noisy short term events such as soil stripping and road construction the PPG advises:

Increased temporary daytime noise limits of up to 70dB(A) LAeq 1h (free field) for periods of up to eight weeks in a year at specified noise-sensitive properties should be considered to facilitate essential site preparation and restoration work and

construction of baffle mounds where it is clear that this will bring longer-term environmental benefits to the site or its environs.

Where work is likely to take longer than eight weeks, a lower limit over a longer period should be considered. In some wholly exceptional cases, where there is no viable alternative, a higher limit for a very limited period may be appropriate in order to attain the environmental benefits. Within this framework, the 70 dB(A) LAeq 1h (free field) limit referred to above should be regarded as the normal maximum.

Policy DM2 of the Joint Lancashire Minerals and Waste Local Plan (JLMWLP) states that development for minerals operations will be supported where it can be demonstrated that all material social, economic or environmental impacts that would cause demonstrable harm can be eliminated or reduced to acceptable levels. In assessing proposals account will be taken of the proposal's setting, baseline environmental conditions and neighbouring land uses, together with the extent to which its impacts can be controlled in accordance with current best practice and recognised standards.

Policy EP27 of the Fylde Borough Local Plan states that development which would unnecessarily and unacceptably result in harm by way of noise pollution will not be permitted. Where appropriate, planning permission will be granted subject to conditions to minimise or prevent noise pollution. This policy is considered not to be in conflict with the NPPF.

The Environmental Statement contains a noise assessment including details of existing background noise levels at noise sensitive receptors and details of predicted noise levels from proposed operations including traffic, drilling and hydraulic fracturing. The assessment outlines the available British Standards and guidance in relation to noise measurement and recommended acceptable noise levels. From this the applicant employed noise levels based on recommendations and guidance set out in BS5228-1:2009 – *Code of practice for noise and vibration control on construction and open sites*, which the applicant considers is the most appropriate by virtue of being representative of the nature of the proposed development.

Drilling would take place for 24 hours per day. The first drilling phase would last for five months. Three other separate drilling phases would then follow. Each of the three phases would last for three months. Between each drilling phase would be a hydraulic fracturing stage that would last for two months. Hydraulic fracturing would not take place at night time, and would last for three hours per day. Cumulatively there would be 14 months of 24 hour drilling.

The closest residential properties to the site are located at Roseacre village to the north of the site and at Old Orchard Farm which is approximately 280m to the south. Roseacre Farm is to the north of the site with further residential properties beyond.

Background noise levels at Old Orchard Farm have been recorded as low as 26.7dB L_{A90} at night (LCC's own measurements) and 39.4 dB L_{A90} during the day (applicant's measurements). Noise from operations is predicted to raise background noise levels by approximately 13.3 dB at night and 14.6 dB by day.

Background noise levels at Roseacre Farm have been recorded as low as 28 dB L_{A90} at night (LCC's own measurements) and 33 dB L_{A90} during the day (applicant's measurements).

The applicant has advised that different stages of the proposed development would generate different noise levels, and noise levels for all stages of the project have been assessed. The applicant has concluded that the only stage with the potential to result in a significant noise effect would be where hydraulic fracturing occurs during night time (2300-0700) where noise limits are at their most stringent. The applicant proposes to mitigate this by only operating the pumps used (only for up to 3 hours at a time during hydraulic fracturing) during weekday daytime and Saturday mornings.

Vibration impacts have been ruled out by the applicant because of the nature of the project, method of construction for the well pad, arrays and pipeline connection for the extended flow testing.

The assessment concludes that there would be no significant adverse impacts on sensitive receptors and consequently no further mitigation is required. Nevertheless, a number of possible noise reduction measures have since been proposed by the applicant (and were consulted upon) and the applicant has stated that recommended noise limits in the PPG could be achieved.

Proposed mitigation measures for drilling include:

- Installing enclosures to mud pumps.
- Fitting noise absorbent materials to the housing containing shale shakers and generators.
- Identify items of pipework or equipment that can be fitted with rubber bushings to reduce vibration and impact noise.

Proposed mitigation measures for hydraulic fracturing include:

- Confine fracturing pumping operations to Monday to Friday 0700 to 1900 and Saturdays 0700 to 1300 only with no fracturing on Sundays or Bank Holidays.
- Installation of an acoustically designed, up to 5m high hoarding around the fracturing pumps.

Additionally, real time noise monitoring could be installed throughout the development.

The applicant's background noise readings and predicted noise levels are considered to be sufficiently robust and have been verified by independent noise measurements undertaken by consultants on behalf of LCC with the exception that background noise readings were found to be slightly lower than those set out in the ES. Furthermore, it is concluded that it is unlikely there are any significant tonal or impulsive aspects to the noise from the drilling rig or from the hydraulic fracturing phase of the project.

The difference between existing low background noise levels and predicted noise levels is of concern. Fundamentally, *PPG- Minerals* states that *Mineral planning authorities should take account of the prevailing acoustic environment and in doing so consider whether or not noise from the proposed operations would give rise to a significant adverse effect and whether it would enable a good standard of amenity to be achieved.*

PPG-Minerals seeks to ensure that noise is minimised as far as practicable and it should be demonstrated that noise would be no more than 10dB above background during daytime and evening working at noise sensitive receptors (subject to a maximum of 55dB) and that for any operations during the period 22.00 – 07.00 noise would be reduced to a minimum, without imposing unreasonable burdens on their operations subject to a ceiling noise limit not exceeding 42dB(A) LAeq,1h (free field) at a noise sensitive property.

Fylde Borough Council's Environmental Health Team has commented that residents may experience an increase in noise with the proposed development and ideally criteria should be set such that "as a result of the activity at the site no dwelling shall experience sound levels that are more than 5dB above current background levels between 07.00 – 23.00 and no increase in background level between 23.00 and 07.00".

Clearly there is a balance to be struck between not imposing unreasonable burden on developers and ensuring that there would be no impact or an acceptable impact on local residents and the environment. The applicant has indicated that a range of noise attenuation measures could be employed to reduce noise levels but that further attenuation would result in unreasonable burden. What constitutes unreasonable burden has not been explained.

Notwithstanding assurances by the applicant that *PPG –Minerals* maximum noise levels could be achieved for both day and night periods, it is considered that there has not been clear demonstration that noise impacts would be reduced to an acceptable level given the low background levels in the area. It is concluded that noise from the proposed operations would be above the significant observed adverse effect level (SOAEL) as defined in the *Noise Policy Statement for England*. This is the level above which significant adverse effects on health and quality of life occur.

It is therefore concluded that the proposed development would be contrary to Policy DM2 of the JLMWLP and Policy EP27 of the Fylde Borough Local Plan as it has not been satisfactorily demonstrated that noise impacts would be reduced to acceptable levels and would therefore unnecessarily and unacceptably result in harm to the amenity of neighbouring properties by way of noise pollution.

Resources and Waste (Appendix 14)

The applicant has undertaken an assessment of the management of waste, including inert, non-hazardous and hazardous waste, and including waste water. The wastes described would be solid, liquid and gas and both oil and gas are defined as minerals. The waste produced would be:

- Non-hazardous and inert waste.
- The accumulation of injected hydraulic fracturing fluid which would remain in the underground target formation and has become waste.
- Above ground hazardous including the temporary deposit and accumulation of hazardous waste in storage containers as the wells are successively drilled. The hazardous waste would include flow back water and drill cuttings coated with residual Low Toxicity Oil Based Muds ("LTOBM").
- The incineration by flaring of hazardous waste, namely natural gas above 10 tonnes per day, as an activity listed in schedule 1 of the Environmental Permitting (England and Wales) Regulations 2010.

The management of waste is set out in a proposed waste management plan and subject to environmental permits that would be regulated by the EA and needed by the applicant to carry out their proposed operations. The permits would set out the conditions needed to manage waste and naturally occurring radioactive material (NORM). If permits are issued, Cuadrilla would have to comply with the proposed conditions that are designed to ensure that operations do not cause harm to people or the environment.

The assessment concludes that all types of waste would not result in a significant effect; that there is sufficient capacity to treat flow back fluid even though at peak times it could use up to 68% of identified treatment capacity but which would have a significant effect. Consequently re use of flow back fluid is proposed to reduce this effect. Fracturing at the site would be staggered with Roseacre Wood to avoid increasing weekly waste water production rates to minimise cumulative effects. In the event on site storage and treatment capacity is exceeded, operations would be suspended.

General measures would be employed to reduce the quantity of waste generated, increase the re-use, recycling and recovery of materials and improve waste management.

An assessment of the proposals has been carried out. With regard to inert, non-hazardous and hazardous waste associated with the construction, drilling, hydraulic fracturing, initial and extended flow testing and decommissioning it is considered that subject to compliance with the necessary permits issued by the EA the quantities generated would not result in a significant effect.

The treatment of the quantity of waste water generated by the project would result in a significant effect and so mitigation to reduce this effect is proposed to include recycling of flow back water and staggering of operations. In particular there would be a requirement, wherever possible, to re-use the flow back fluid once the gas has been separated. This would reduce the amount of waste which needs to be disposed

at an offsite facility. About 10-40% of the injected fluid is predicted to return to the surface.

The applicant proposes to leave some fracture fluid deep underground. The EA is of the view that leaving some of the retained fluid in situ is the 'Best Available Technique'. The EA has assessed the components of the fluid to be used in fracking process and is satisfied that it is non-hazardous. They are also satisfied that the fluid that would be retained underground would be non-hazardous and that over time the retained fluid would become indistinguishable from the water already present in the target formation.

Naturally occurring radioactive material (NORM) is present in many geological formations including oil and gas bearing strata such as shale formations. The flow-back fluid that returns to the surface following hydraulic fracturing as well as the sediments and scales in gas or water process vessels, is likely to contain sufficient NORM that it will be classed as radioactive waste. The level of radioactivity is considered to be extremely low. The EA has assessed the impact and proposals for NORM disposal and is satisfied that the applicant has demonstrated that it can have suitable arrangements in place with licenced waste disposal companies for its treatment.

Drill cuttings can be contaminated with hazardous waste. All hazardous waste must be stored in solid steel containers which are subject to inspections. The EA has advised it is satisfied with the proposed arrangements.

With regard to the representations received, it is considered that waste can be acceptably contained and that there are available facilities with capacity to accommodate the waste to which safe purpose designed transport would deliver it. The permitting process would restrict the available storage on site and the continued production of such in the event off site facilities were unavailable. The site can be contained in a way to prevent discharge or over spill off site and provide secure storage facilities. The permitting process would apply the necessary controls on waste quality standards. There would be no risk of migration of fracking fluids that could result in cross contamination of water resources and leaving fluids in the ground would not result in contamination in their own right. The waste is not toxic and would not be stored close to residential properties or schools and the site would be secure preventing unauthorised access.

Paragraph 122 of the NPPF requires that planning authorities should not seek to control processes or emissions where these are subject to approval under separate pollution control regimes and that LPAs should assume that these regimes will operate effectively. Nonetheless, paragraph 112 of PPG Minerals, notes that before granting permission the local planning authority should be satisfied that the issues dealt with under other regimes can be adequately addressed by taking advice from the relevant regulatory body'. The County Council has consulted with the EA and which has not objected.

The EA says it is ' minded to grant' the environmental permits needed to carry out the proposed operations. The draft permits set out the conditions needed to manage waste and NORM. If permits are issued, the applicant would have to follow the proposed conditions that are designed to ensure that operations do not cause harm to people or the environment.

The EA is satisfied that the draft permit and associated conditions will require that extractive wastes are managed in a way that minimises harm to human health and the impact on the environment. The operator has demonstrated this through a waste management plan that accompanies the permit application. The EA is satisfied that the proposals are in line with the waste hierarchy.

It is considered that the proposal could be acceptably controlled by other regulatory regimes and would not have any unacceptable impacts and would comply with national guidance and policies and the policies of the development plan.

Transport (Appendix 15)

The applicant has undertaken an assessment of the potential effect of the proposal on the transport networks serving the site and surrounding area. The potential effects from transport and traffic have been assessed as driver and pedestrian delay, pedestrian amenity, severance, accidents and safety, dust and dirt. The assessment concludes that the proposed increase in traffic would only be over a number of peak periods and only for a few days at a time. Consequently the applicant's assessment concludes that even during peak periods, such an increase would not lead to a significant transport effect. To reduce the impact of transport a number of traffic plan measures are proposed including traffic routing, site management to minimise impact on highway users, driver training, pre and post monitoring surveys, employing complaint procedures.

The Roseacre Site is served by a network of minor and unclassified roads. The applicant has examined a number of different options to access the site and has concluded that the proposed route utilising the MoD land is the most suitable, the other options being rejected due to issues such as the numbers of residential properties, narrow roads, accident history and presence of schools and general unsuitability for HGV traffic.

In order to ease traffic movements on Dagger Lane, five passing places are proposed to provide localised widening to between 5.5 and 6.5m thereby allowing two HGV's to pass. In all cases the widening can be achieved using highway verge and it would not be necessary to remove roadside hedgerow.

The peak traffic flows would occur as a result of combined traffic associated with activities at more than one well. The total traffic numbers in the ES are based on such conditions. The peak traffic generated would be around 50 two way HGV movements per day which would occur for around one week on eight occasions over the life of the project.

LCC Developer Support (Highways) objected to the proposal as initially submitted in view of the increase in traffic, particularly HGV movements that would be severe resulting in a material impact on existing road users, particularly vulnerable road users and overall highway safety of which the potential impact is considered severe. This conclusion is reflective of the objections expressed by Fylde Borough Council, parish councils, opposition groups and individuals.

As a consequence of concerns (including the MoD) regarding the proposed traffic management plan the applicant chose to submit an alternative proposal for HGV

access to the site and further information to demonstrate the suitability of such. The alternative is to use a one-way route to and from the site for HGVs utilising the access as proposed (including the MOD land for those time periods proposed) for directing vehicles out of the site but bringing vehicles in via Woodplumpton and Broughton from the A6 the applicant's view is that this would significantly reduce the probability of two HGVs meeting on sections of the highway with a constrained width. It would also halve any increase in exploration site related HGV traffic flows along the proposed route.

The applicant is of the view that the departure of HGVs from the site could be more easily controlled and co-ordinated by site management than the corresponding arrivals. It is therefore proposed to use the permitted route described in the draft amended TMP as a one-way route for outbound HGVs from the site.

The County Council's overall assessment concludes that notwithstanding the temporary nature of the proposed works and the mitigation and management measures proposed, the proposal as submitted would be severe in view of the increase in traffic (particularly HGV movements) during restricted maximum daily flows and maximum hourly flows. Notwithstanding the applicant's commitment to a maximum of 50 HGVs per day, these would still be at a level that would give rise to a significant cause for concern when location and routing to access the site along the route proposed (including with passing spaces) would still result in conflict. This would compromise the surrounding network and environment used by existing familiar and unfamiliar users.

There would also be a material impact on existing road users, particularly vulnerable road users and overall highway safety of which the potential is also considered to be severe, a view reflective of those in opposition.

There is an extensive network of PROW on the local network in the vicinity of the site and on the proposed inbound and outbound access routes. Movement of vulnerable road users on this part of the network can be expected to be higher in the summer months. There is limited footway provision on this local network.

The very narrow nature of the lanes on the routes in the local vicinity of the site would suggest that there will be a material impact on vulnerable road users (both familiar and unfamiliar) as a result of the additional traffic and in particular the impact due to a significant increase in the numbers of HGV movements expected

With consideration for all the information that has been presented to date in support of the application it is considered that the impact of the increase in traffic, particularly HGV movements would be severe. There would be a material impact on existing road users, particularly vulnerable road users and overall highway safety of which the potential is considered severe and therefore unable to support this application. The alternative has not been advertised as further information but it is anticipated that further representations objecting to such a change would be received. Irrespective an assessment of the revised TMP has been carried out by LCC Highways and it is concluded that the increase in traffic, particularly HGV movements would be severe, there would be a material impact on existing road users, particularly vulnerable road users and overall highway safety of which the potential is considered severe.

It is further concluded by LCC Highways that for **all** the information that has been presented to date by the applicant in support of the application that the impact of the increase in traffic, particularly HGV movements would be severe which would result in a material impact on existing road users, particularly vulnerable road users and overall highway safety of which the potential is considered severe. Consequently it is considered that the application cannot be supported.

In these circumstances, it is considered that the development would give rise to unacceptable impacts on existing road users that would be contrary to Policy DM2 of the Lancashire Minerals and Waste Local Plan.

Water Resource (Appendix 16)

The applicant has undertaken an assessment of the impact of the proposal on water supplies and surface water runoff or drainage and the consequent impact on flood risk. The construction of the well pad would include the installation of an impermeable plastic membrane to be laid to prevent infiltration from the well pad through the underlying soils and water bodies. Ditches would be constructed around the perimeter of the well pad to collect storm water. The void space in the granular fill, ditches and the 50mm "air freeboard" would provide a storage volume to attenuate drainage flows from the site. During drilling and hydraulic fracturing operations a valve would prevent storm water from leaving the site. During these periods storm water would be removed by tanker to a licenced wastewater treatment works. At other times when the water quality in the ditch system meets the requirements of EA the site would drain freely to the local field drain immediately to the east of the site.

The water requirements for the Project would be provided by a pipe connection to an adjacent United Utilities (UU) water main. UU have confirmed that this supply would not affect their current customers (including residential properties). The use of mains water negates the need to transport water to the site by tanker to reduce transport impacts. Estimated daily water use during hydraulic fracturing activities has been reduced from 765³m per day to 600³m per day by reducing the proposed number of hydraulic fracturing stages and reusing flow back water to make up part of the fracturing fluid for the subsequent fracturing stages. Flowback fluid would be subject to physical treatment using ultra violet disinfection to control bacterial growth. If possible collected storm water would also be used to make up part of the fracturing fluid volume.

The assessment concludes that subject to such measures the proposed development would not have a significant effect on surface water runoff, drainage or water supplies.

An assessment of the potential impacts of the proposal on water supplies and surface water runoff or drainage and the consequent impact on flood risk has been carried out with reference to the views of the EA and UU and with regard to representations received. It is concluded that the proposal would have no adverse effect on potable water supply and would not be an unacceptable use of potable water. Flow back water would be reused resulting in lower quantities of potable water being required. Water will be supplied direct to the site thereby reducing the number of HGVs travelling to and from the site. The site would be contained and managed to ensure the protection of surface and ground water and nearby water courses. The

site is in a Flood Zone 1 which is defined as having a low probability of flooding. The EA has reviewed the Flood Risk Assessment submitted with the application and is satisfied that the development would not be at risk of flooding or increased flood risk off-site. The development is therefore considered to comply with the national guidance and policies and the policies of the development plan.

Public Health (Appendix 17)

The County Council's Director of Public Health has provided specific advice to inform the planning process and provide public health advice to protect and improve the health of local residents living near the proposed shale gas exploration sites of Roseacre Wood (planning application numbers LCC/2014/0101 and 0102) and Preston New Road (planning application numbers LCC/2014/0096 and 0097). The advice was published as a Health Impact Assessment (HIA) in November 2014.

The Health Impact Assessment makes 45 recommendations to a broad range of agencies, suggesting actions before, during and after any permissions or permits are granted. Appendix J contains 16 recommendations to specifically inform the determination of this application (together with the Preston New Road applications).

Given the advice is specific to this application, an assessment has been undertaken in relation to each of the 16 recommendations in Appendix J of the HIA. All of the recommendations in Appendix J have been addressed as part of this determination.

Recommendation 1 states: 'Consider the need for further noise assessment, particularly on the proposed Roseacre Wood site and if necessary, require additional mitigation measures to reduce noise associated with the development of the sites and more particularly the drilling and hydraulic fracturing phases of the development and which could be controlled by conditions attached to any planning permission'.

The predicted night time noise levels at the nearest properties (Orchard Hall Farm) are at the national night time standard of 42dB. The elevation of 13.3dB above background levels at night time at the nearest property, for such a sustained period, would be perceived as noticeable and disruptive. It is likely this would have significant adverse effects on the health and quality of life of the nearby residents

Recommendation 4 states: 'Seek agreement with the Applicant to establish an independent comprehensive baseline and on-going long term monitoring of environmental and health conditions prior to any activity on the sites'.

The applicant has questioned the appropriateness of providing for such long term monitoring through the planning system, and has cited national guidance and case law as justification for this position. Nevertheless, while there is a question around the appropriateness of using a planning condition or section 106 agreement to provide for such monitoring, the County Council would have pursued a Unilateral Undertaking with the applicant to provide for such in the event of a recommendation to grant permission.

Many representations received by the County Council refer to research conducted in North America and overseas that indicate shale gas extraction is linked to adverse health impacts.

While much research exists, and is growing in volume each year, it is difficult to gain an objective view of the veracity of the research. Anti-fracking campaigners frequently point to studies that indicate increased health risks (eg elevated risks of cancer or birth defects) as a result of shale gas activity in North America. Conversely, pro-fracking campaigners point to numerous methodological flaws in the research. It is also difficult to translate the findings of research from North America into the UK environment. Operating and regulatory practices are very different.

In June 2014, Public Health England (PHE) published a review into the potential health impacts of shale gas extraction. The review drew on significant scientific evidence in peer reviewed or published reports up to January 2014. Much of the research cited in representations to the County Council was reviewed by PHE.

PHE say there have been very few epidemiological studies or health risk assessments published in the peer reviewed literature. Epidemiology is the branch of medical science that investigates all the factors that determine the presence or absence of diseases and disorders. It aims to assess the cause of a disease, and seeks to look beyond associations which might be a result of chance, bias or confounding effects.

PHE highlight significant methodological flaws in the research that has been cited to the County Council.

Moreover, one study frequently cited by objectors (McKenzie, 2014) has been publically criticised by the Chief Medical Officer and Executive Director of the Colorado Department of Public Health and Environment in the USA as follows "*we disagree with many of the specific associations with the occurrence of birth defects noted within the study. Therefore, a reader of the study could easily be misled to become overly concerned.*"

PHE state that direct application of the North American research to the UK situation is impossible because of the wide differences between the two countries. It is clear from experience in the US that emissions vary widely depending on the phase of development, operational practices, the geology, local topography and meteorology, and the types of activities and equipment on-site. PHE state that such variability makes direct application to the UK situation impossible. There are also different regulatory practices in the UK.

At present there is limited environmental and health surveillance data within the published literature in relation to existing shale gas extraction operations. There have been very few epidemiological studies (as opposed to statistical associations) and those that have been carried out generally lack robust exposure assessments according to PHE.

Representations

The development has generated a significant number of representations the majority of which object to the proposal although there are a smaller number offering support for the proposal. The reasons for objecting are summarised in Appendix 2.

Up to the end of December 2014 a total of 8924 representations objecting to the proposal had been received; 1242 of the objections were from within Fylde and this

is 2% of the adult population (1.6% of total population) and 80 were from within a 2km radius of the site. 5495 of the representations were received from outside Lancashire. Many of the representations object to the principle of exploring for and placing future reliance on the use of hydrocarbons as a means of providing an energy resource and that investment and consequent employment opportunities would be better directed into renewable and more sustainable energy resources. There is further objection to the proposed methodology for the exploration of shale gas and the unacceptable impacts associated with such along with the localised impacts of the proposed development itself on the area, environment and communities. More representations both opposing and in support of the proposal have been received since this report has been finalised and an updated figure will be reported to the Committee at the meeting.

Some of the objections maintain that planning permission should not be granted in view of the alleged poor track record of the applicant when carrying out operations at other sites within its control.

The issues raised in representations have been addressed relative to the 'topic' areas that they have been summarised into and which are many. There is an assumption that the number of representations received assist in demonstrating the level of opposition and consequently the proposal should be refused. However, it is the issues raised rather than the number of representations received and it is considered that these have properly been addressed a part of the assessment of the application.

With regard to the applicant's previous operations and compliance with planning permissions, a planning application goes with the land rather than with the applicant and it is right to assume that the applicant would comply with conditions attached to any planning permission.

Overview of cumulative and in combination effects

The applicant has undertaken an assessment of the cumulative effects associated with the individual elements of the technical topic areas covered in the ES along with an assessment of the cumulative effects of the proposed development at Preston New Road. They have also undertaken a review of current adopted land use plans and emerging local plans to identify and significant planned new development proposals in the vicinity of the site or along the key access routes to the site. The review has confirmed that there are no large development proposals for development in the vicinity of the site or nearby settlements so consequently there is limited scope for cumulative effects with other developments. There are other development proposals within 10km of the site although it is concluded that they are not likely to alter the scale of the effects of the proposal or create any new or additional effects. The applicant's current proposals at Grange Hill to pressure test an existing well are minor and should planning permission be granted, they would not contribute to any effect.

The conclusion drawn is that there would be no cumulative effects associated with the two sites operating in tandem and that the separation distance is sufficient such that:

- Air quality, heritage, hydrogeological, seismic, water resources noise, visual and general disturbance impacts will not result in a cumulative effect.

Likewise, the sites themselves are also separated enough from other development sites that these potential cumulative effects can be avoided.

- There is sufficient separation between the two sites so that their operations will not have a combined effect on the same settlements. Vehicles would use a different junction from the M55 and different local roads to access the Preston New Road site compared to those accessing the Roseacre Wood site.
- The different activities that would be carried out at the two sites would be synchronised so that, for example, when hydraulic fracturing is occurring at one site a different activity, such as drilling, is occurring at the other site. This would further reduce the risk of any cumulative effects from occurring.
- The rate and quantity of flowback fluid generated from both this site and Preston New Road could be managed using the mitigation measures proposed.

Some of the impacts from the Project result in effects on more than one of the EIA topics including:

- Air quality impacts on human beings and ecological receptors (nationally and internationally designated sites);
- Visual impacts on the setting of heritage sites and assets (e.g. Listed Buildings and Registered Parks and Gardens);
- Noise impacts on residential and ecological receptors; and
- Lighting impacts on residential and ecological receptors.

Due to the distance between the Sites, the dispersed nature of residential properties, topography and landscape features no in-combination effects are predicted.

The applicant concludes that the EIA process has identified the foreseeable impacts arising from the Project, and assessed whether or not they are likely to result in significant effects. Where significant effects have been predicted measures to avoid or mitigate these effects, so that where possible they are no longer significant, have been identified. Additional mitigation measures to further reduce the magnitude of potential impacts have also been identified within the assessment. As a consequence of taking these measures the applicant considers that the only residual significant effects (following the identification of mitigation measures) are the:

- Temporary visual effects from the use of the taller pieces of equipment (e.g. the drilling rig and workover rig used during hydraulic fracturing);
- Temporary sky glow and building luminance effects from night time exploration activities; and
- The short term use of the available waste treatment capacity, for flowback fluid, within 100 miles the proposed sites.

It is considered that there would be no unacceptable cumulative effects associated with the development of the Roseacre Wood site or with the proposed Preston New Road site.

Conclusion

In principle the proposed development for exploration and appraisal for shale gas accords with national guidance and policy to investigate the possibility to provide an alternative energy source.

Whilst it is recognised that a number of groups and individuals oppose the continued reliance on hydrocarbons as a primary energy resource and more particularly the principle and nature of shale gas exploration and appraisal in view of the potential harm and irreversible damage and ground contamination it could potentially cause, it is considered that these concerns cannot be supported and they would not constitute a sustainable reason for refusing the proposal.

An assessment of the proposal has been carried out and it is considered that whilst the development could have some impacts on air quality; archaeology and cultural heritage; greenhouse gas emissions; community and socio-economics; ecology; hydrogeology and ground gas; induced seismicity (including subsidence); land use; landscape and visual amenity; lighting; resources and waste; water resources or public health (excluding noise); such impacts would be low or could be mitigated and controlled by condition.

However, in the location proposed, over a two year development phase, the proposal would generate localised disturbance most particularly to the nearest residential property at Old Orchard Farm and which would be mostly associated with noise as part of the drilling and fracking operations.

Noise associated with fracking would result in a significant increase over background noise levels (14.6dB) for between 30 and 40 days within four two month periods albeit for a three hour period each day.

There would also be noise associated with drilling operation on a 24/7 basis for an initial period of 5 months and then over three further three month periods that would create most noise disturbance. The applicant has advised that the predicted levels of night time noise would be reduced to the national guideline maximum limit and which they have confirmed would be the best reduction that can be achieved without onerous burdens.

However, notwithstanding that the national guideline maximum limit (averaged over one hour) may be able to be achieved this would still lead to a significant increase in noise levels according to LCC's measurements (13.3 dB at Old Orchard Farm) over and above existing background noise levels during the night; together with increases in noise during the day above background according to the applicant's measurements (14.6dB at Old Orchard Farm) as a result of fracking.

Considerable concern has been expressed to such increases by residents, parish councils, interest groups, the Borough Council and the County Council's Director of Public Health. It is considered that such increase over background levels at night for such periods over an extended period of 24 months would have a significant adverse effect on the health and quality of life and lead to an unacceptable loss of residential amenity to those residents at the nearest residential property at Old Orchard Farm and potentially other nearby properties contrary to the national guidance and development plan policies.

Notwithstanding this conclusion, it is important to recognise that the planning application must be considered on its merits and in accordance with planning law. It is also important to accept that notwithstanding the criticism directed at the regulatory processes within which developments of this nature would be carried out there are other regulatory regimes (DECC, the HSE and the EA) that the County Council as planning authority must assume would operate in ways to control the developments within their remit and that the County Council must be satisfied that they would do such. In this case DECC, the HSE and the EA have advised that the development could only be carried out within their regulatory regimes and subject to their controls would be acceptable. In this respect the County Council can assume and be satisfied that this would be the case.

A planning authority's reliance on other (non planning) regulatory bodies to provide the appropriate controls and conditions in relation to their statutory responsibilities was recently addressed in case law (December 2014) relating to a drilling site in West Sussex {R [on the application of Frack Free Balcombe Residents Association] v West Sussex County Council [2014] EWHC 4108 (Admin)}. Paragraph 102 of the judgment is particularly relevant to this issue:

"the existence of the statutory regimes applied by the HSE, the EA and the DECC shows that there are other mechanisms for dealing with the very proper concerns which the Claimant's members have about the effects on the environment. The Claimant and its members' concerns are in truth not with the planning committee's approach of relying on the other statutory regimes, but rather with the statutory bodies whose assessments and application of standards they disagree with. That does not provide a ground of legal challenge to the decision of the planning committee."

In light of this judgment as well as NPPF guidance (para 122) it is not necessary or appropriate to impose planning conditions or require an applicant to enter into a S.106 legal agreement with respect to matters, such as longer term monitoring, that are clearly within, and properly, the remit of other regulatory regimes and bodies.

It is therefore concluded that the principle of exploration and appraisal for shale gas would be acceptable and that in the proposed location impacts on air quality; archaeology and cultural heritage; greenhouse gas emissions; community and socio economics; ecology; hydrogeology and ground gas; induced seismicity and subsidence; land use; landscape and visual amenity; lighting; resources and waste; water resources or public health (except for noise) would be low or could be mitigated and controlled by condition to make them acceptable.

However, it is considered that the proposed development in this location would lead to a significant increase in night time background noise levels and consequently it is likely that this would have significant adverse effects on the health and quality of life and lead to an unacceptable loss of residential amenity to those residents at Old Orchard Farm and potentially beyond. Such effects and loss would be contrary to the National Planning Policy Guidance on noise, Policy DM2 of the Joint Lancashire Minerals and Waste Local Plan – Site Allocation and Development Management Policies – Part One (LMWLP) and Policy EP27 of the Fylde Borough Local Plan. Consequently and for this reason it is considered that on balance the proposal would be unacceptable and should be refused.

Further, the site is located in a very rural location served by a highway network of unclassified roads. Notwithstanding the proposed amendments to the TMP and the proposed amended routing to create a one way system, an assessment concludes that the increase in traffic, particularly HGV movements, would be severe, there would be a material impact on existing road users, particularly vulnerable road users and overall highway safety of which the potential is considered severe.

It is concluded that for **all** the information that has been presented to date by the applicant in support of the application that the impact of the increase in traffic, particularly HGV movements would be severe and which would result in a material impact on existing road users, particularly vulnerable road users and overall highway safety of which the potential is considered severe. Consequently it is considered that the application cannot be supported.

In these circumstances, it is considered that the development would give rise to unacceptable impacts on existing road users that would be contrary to Policy DM2 of the Lancashire Minerals and Waste Local Plan.

Equality Impact Assessment (Appendix 18)

As part of the decision-making process, under the Equality Act, public bodies must have due regard to the need to eliminate unlawful discrimination, harassment, victimisation and any other conduct prohibited by the Act; advance equality of opportunity between people who share a protected characteristic and people who do not share it; and foster good relations between people who share a protected characteristic and people who do not share it.

An Equality Impact Report is required in relation to this development to show how consideration of equality issues has influenced the decision-making process. This concluded that the development would not adversely affect those with 'protected characteristics'.

An assessment has been undertaken for the purposes of judging that the county council has met its own requirements under the duty. The assessment has concluded that impact of the proposal can be mitigated so that they will not have a significant impact on groups with protected characteristics.

Human Rights

The proposal raises issues relating to the protection of amenity and property under Article 1 of the 1st Protocol of the Human Rights Act 1998.

The Human Rights Act requires the County Council to take into account the rights of the public under the European Convention on Human Rights and prevents the Council from acting in a manner which is incompatible with those rights. Article 8 of the Convention provides that there shall be respect for an individual's private life and home save for that interference which is in accordance with the law and necessary in a democratic society in the interests of (inter alia) public safety and the economic wellbeing of the country. Article 1 of protocol 1 provides that an individual's peaceful enjoyment of their property shall not be interfered with save as is necessary in the public interest.

For an interference with these rights to be justifiable the interference (and the means employed) needs to be proportionate to the aims sought to be realised. The main body of this report identifies the extent to which there is any identifiable interference with these rights. The planning considerations identified are also relevant in deciding whether any interference is proportionate. Case law indicates that certain development does interfere with an individual's rights under Human Rights legislation. This application has been considered in the light of statute and case law and the interference would be considered to be disproportionate if the proposal was to proceed because of certain impacts.

The County Council has a duty to secure the proposed location and design of exploration and appraisal activities to protect the amenities of residents in the area as set out in the policies of the development plan. The proposal would conflict with certain policies of the development plan designed to achieve these aims and the interference in the rights of the applicant is therefore considered to be justified in order to protect the amenities of the residents to the nearest residential properties. It is considered that the public interest can only be safeguarded by the refusal of permission and that the refusal of the application would not be disproportionate in that the proposed increase in night time background noise levels would have significant adverse effects on the health and quality of life and lead to an unacceptable loss of residential amenity to those residents at the nearest residential property at Old Orchard Farm and the increase in traffic, particularly HGV movements, would result in an unacceptable impact on existing road users, particularly vulnerable road users and a reduction in overall highway that would be severe.

Article 6 is the determination of an individual's civil rights and obligations. Article 6 provides that in the determination of these rights, an individual is entitled to a fair and public hearing within a reasonable time by an independent and impartial tribunal. Article 6 has been subject to a great deal of case law. It has been decided that for planning matters the decision making process as a whole, which includes the right of review by the High Court, complied with Article 6.

Recommendation

That after first taking into consideration the environmental information and further information, as defined in the Town and Country Planning (Environmental Impact Assessment) Regulations 2011 submitted in connection with the application, planning permission be refused for the following reasons:

1. The proposed development would be contrary to Policy DM2 of the JLMWLP and Policy EP27 of the Fylde Borough Local Plan as it has not been satisfactorily demonstrated that noise impacts would be reduced to acceptable levels and would therefore unnecessarily and unacceptably result in harm to the amenity of neighbouring properties by way of noise pollution.
2. The proposed development would be contrary to Policy DM2 of the Joint Lancashire Minerals and Waste Local Plan – Site Allocation and Development Management Policies in that it would generate an increase in traffic, particularly HGV movements, that would result in an unacceptable impact on

the rural highway network and on existing road users, particularly vulnerable road users and a reduction in overall highway safety that would be severe.

Local Government (Access to Information) Act 1985
List of Background Papers

Paper	Date	Contact/Directorate/Ext
LCC/2014/0101	16/06/2014	Stuart Perigo/Environment/531948
LCC/2014/0102	16/06/2014	
LCC/2014/0096	02/06/2014	
LCC/2014/0097	02/06/2014	

Reason for Inclusion in Part II, if appropriate

N/A

Appendix 1

Proposed Works

Proposal

The proposed development is for the exploration and analysis of shale gas reservoirs within the Bowland Shale formation in the Fylde district of Lancashire. The shale gas (also called methane gas or natural gas) is known to be distributed within the shale rock. The total area of the surface works is 6.54ha. In addition lateral drilling and hydraulic fracturing would be undertaken underground with horizontal wells extending up to a distance of 2km from the centre of the well pad.

A well pad would be constructed and wells would be drilled into the shale rock. A process called hydraulic fracturing would then be used to help the gas flow out of the rock by pumping water and other materials into the shale to dislodge the gas. The gas then flows back to the surface within the flow back fluid. During Initial Flow Testing (IFT) the gas would be burnt off at flare stacks and during Extended Flow Testing (EFT) the gas would flow into the gas network through new pipelines and connections to the gas grid.

The proposed development would explore the potential flow rate of the gas in order to establish whether the gas can be extracted and if it would be economically viable to do so. Following exploratory activities the site would be abandoned and restored unless the site is found to be economically viable, in which case a planning application would be submitted for production works before the site is decommissioned.

The description of the proposed works below has been divided into Surface Construction Works and Underground Exploratory Activities.

Surface Construction Works

The surface works construction phase would involve the creation a temporary well pad, drilling cellars, monitoring boreholes, drainage system, access track, an access route, pipelines and gas grid connections, ancillary facilities and boundary works. During this construction phase the seismic arrays and groundwater quality monitoring wells proposed in planning application LCC/2014/097 would also be installed.

The surface site area would be divided into 6 zones. The well pad zone would contain 4 other zones – drilling/well zone, sand silo zone, flare zone and EFT equipment zone, and would be surrounded by, and adjoined to, the sixth zone the boundary pipeline zone. Each zone would have maximum heights of equipment, with the tallest structures, up to a maximum height of 53m, located in the centre of the site, reducing down to the smallest structures, with a maximum height of 5m, on the periphery.

A description of each zone is given below:

Well Pad Zone A 1.34ha stone well pad area would be constructed with the well/drilling cellar, sand silo, well pad, flare and EPT equipment zones all located within it. The well pad would also contain well pad drainage and an earth bund.

Well Pad - Construction of the well pad area would involve digging out soil to create a flat working surface area. An impermeable plastic membrane and geotextile layer with protective felt inter-layers would be laid on the flat surface to create a waterproof barrier between the well pad and the soil below. On top of the plastic membrane a 300mm (minimum) layer of clean compacted aggregate would be placed to create a firm working surface for machinery used in the exploration process. The stone well pad would have a level of 17.70m AOD. Any structures/ activities located on it, outside of the other zones, would have a maximum height of 10m and are described in the Well Pad Zone ancillary structures description below. The construction works for the well pad zone would involve general earth working equipment.

Well Pad Drainage - Around the edge of the well pad, an open drainage ditch would be constructed to collect surface water run-off and attenuation. The drainage ditch would be lined with an impermeable plastic membrane to create a waterproof barrier. A pollution interceptor would be used to separate oil and fuel from drainage water. Subject to meeting Environment Agency water quality standards the collected water would either be discharged into the adjacent farm drain or would be removed off site by tanker via the pipe perimeter drain. An isolation value would be closed during exploratory operations to ensure no potentially polluting materials enter the farm drain or other adjacent surface water ditches.

Groundwater Monitoring Wells – Three pairs of groundwater monitoring wells would be installed around the perimeter of the well pad to a maximum depth of approximately 30m, using a small drilling rig.

Well Pad Bunds - Soil excavated to construct the well pad and the drainage ditch would be used to construct earth banks (bunds) to help provide visual and noise screening. The earth banks would be seeded with grass and wildflowers. These landscape bunds would have a height of 17.75m AOD and prior to planting would be laid with an impermeable plastic membrane and a 1mm thick fully welded smooth HDPE membrane.

Drilling/Well Zone A well/drilling cellar zone would be located within the central area of the well pad area. The zone would extend 97m x 30m with a maximum equipment height, above the well pad, of 53m (65.5m AOD). At the centre of the well pad within the well/drilling zone, 4 holes called drilling cellars would be constructed using a piling rig or shallow drilling rig, with each measuring 2.7m by 3m deep. A distance of between 5 and 25m would be left between each drilling cellar. The cellar would have a concrete floor and walls. One exploration well would be drilled from each cellar, creating 4 exploration wells in total.

During drilling and initial and extended flow testing (IFT/EFT) phases a drilling rig with a mast height of between 30 and 53m (65.5m AOD) would be located in this zone along with mud pumps.. Within the well pad area adjacent to the drilling zone, cementing equipment, mud facilities including mud mixing, mud processing, mud pumps and generators and fuel storage, wireline logging equipment, casings and

tubular would be located. During hydraulic fracturing activities and testing, a service rig (up to 36m high), a coiled tubing unit (up to 36m high), a coiled tubing support tower, up to 6 hydraulic fracturing pumps, a manifold unit, a blender unit and a high volume separator would be located in this zone and the sand silo zone. The separator unit and flowback tanks would be located in the general well pad area. Cranes would be used to assemble the drilling rig and other equipment as required.

Sand Silo Zone A sand silo zone would be located in the central section of the well pad zone, on the eastern side of the drilling/well zone. The sand silo zone would extend 110m x 15m with a maximum equipment height, above the well pad, of 15m (27.5m AOD). During hydraulic fracturing activities and testing the zone (along with the drilling zone) would contain sand silos, hydraulic fracturing pumps, the manifold unit, generators and fuel storage, iron storage and a monitoring cabin/data van.

Flare Zone A flare zone would be located towards the south western corner of the well pad zone. The flare zone would extend 20m x 10m with a maximum equipment height, above the well pad, of 10m (22.5m AOD). Two enclosed flare stacks up to 10m high and 3m in diameter would be located in the flare zone and would be used during Initial Flow Testing.

EFT Equipment Zone An Extended Flow Testing (EFT) zone would be located in the south eastern corner of the well pad zone, overlapping with the southern end of the sand silo zone. The EFT zone would be approximately 25m x 25m area. A maximum equipment height, above the well pad would be 5m (17.5m AOD). The EFT zone would be bounded by a security fence.

Well Pad Zone ancillary development The remaining area of the well pad excluding the drilling/well, sand silo, flare and EPT zones would have ancillary development located within it, including storage facilities, site offices, welfare facilities, utilities, lighting and a drainage ditch. The maximum height of the ancillary structures would be 10m (22.5 AOD).

Storage Facilities – During drilling and flow testing a separator unit and flowback tanks would be located on the well pad between the well/drilling cellar zone and the flare zone towards the south western boundary of the well pad near to the flare zone. Mud mixing, mud pumps and generators and fuel storage would be located on the north western area of the site. During hydraulic fracturing and testing, the separator unit and flowback tanks would remain and on the eastern boundary water tanks would be located.

The following containment options for material/substance storage is proposed on the well pad containment system– single skinned steel tanks for fresh water; purpose designed tanks, skips and containers for the mud system (drilling fluids, additives, cuttings, displacement/spacer fluid and suspension additives); on pad containment for cement powder, fire fighting foam/water, well servicing and suspension fluid/additives and hydraulic oil and maintenance lubricants; single skinned tank for foul effluent; fuel tanks with integral secondary containment for diesel; integral containment and drip tray for hydraulic oil and maintenance lubricants; separate double skinned tank for waste oil. Hydraulic fracturing fluid would not be stored in mixed form. Hydraulic fracturing fluid additives would be stored in the chemical

storage area with secondary containment and drip trays. Flowback fluid would be stored in steel single skinned tanks.

Offices and Welfare Facilities - Modules (i.e. single storey height shipping containers) for office, welfare and onsite accommodation would be located on the north and west site boundaries throughout the drilling, hydraulic fracturing, testing and decommissioning phases of the project.

Stores and Workshops – During drilling and testing phases, single storey 40 foot shipping containers would be used for storage of equipment and workshops, and would be located on the southern area of the well pad zone in between the flare zone and the EFT zone.

HGV Turning Area, Car Parking and Security – An area for HGV turning and car parking and a security cabin would be located on the well pad at the eastern corner and north eastern boundary of the site. Visitor parking and toilet would be provided at northern boundary adjacent to the site car parking. CCTV would be located at strategic points of the site.

Utilities – A connection to the mains water supply would be installed to provide water for site staff welfare, drilling and hydraulic fracturing activities. A 150mm diameter pipe would be connected to a United Utilities mains located adjacent to the development site in Roseacre Road. An on-site diesel powered generator would provide electricity and small power for mains electricity and telecommunications within the site offices and welfare facilities. Domestic foul sewerage from site welfare facilities would be stored on site and tankered periodically to nearby wastewater facilities

Lighting – Lighting proposed within the whole well pad including the named zones would include low intensity security lighting and task lighting which would enable works to be carried out in hours of darkness. During construction of the well pad, access track and gas pipeline, security lighting would be located around the contractors site cabins, comprising low power over door bulkhead luminaries using. If required a temporary works lighting unit utilising 4No. 400W lamp floodlights would be used during working hours. During drilling and hydraulic fracturing, the site lighting would be dependent upon the type of drilling rig, the position, orientation and type of lights and luminaries mounted on the rig and other equipment. The likely lighting would be site lighting comprising 4 mobile lighting towers with 4No. 400W floodlights; drilling rig lighting comprising of 9No. 500W floodlights and 14No. 2 x 35W fluorescent luminaries and tank lighting comprising of 2No. 2 x 18W luminaries. The installation and construction of extended flow testing would be during normal working hours. Operating lighting around the well pad would use medium power, less or equal to 400W floodlights.

Boundary zone / Pipeline Zone - Boundary and pipeline works would be located around the well pad zone and would also extend to the east of the well pad towards Roseacre Road. The boundary zone would include fencing, landscaping, bunds, the EFT pipeline and a National Grid compound.

Fencing – Around the well pad would be three types of perimeter security fencing, outer, perimeter and inner to maintain a secure site during construction and exploration activities. Around the perimeter of the earth bunds, an inner 2.4m high fence would be located. A 4m high welded mesh perimeter fence would then be located followed by screen planting and a 1.2m high outer fence.

Well Pad Access track – A 428m access track from Roseacre Road to the development site will be constructed and would have an area of approximately 0.5ha. There are two alternative proposed access routes to the development site, the Wharles route and the DHFCS Inskip route. The DHFCS access route would cover an area of approximately 2.19ha.

For the Wharles route the proposed site access is off Roseacre Road. The site entrance would be via the existing junction with a farm track that leads to Roseacre Wood. The existing junction would be widened and improved through the partial removal and lowering of an existing hedgerow. The entrance would be wide enough to allow two heavy goods vehicles (HGVs) to pass each other in order to enter and exit the site. This would avoid HGVs waiting at the site entrance and potentially blocking Roseacre Road. Surfacing for HGV usage would be applied to the access track.

For the DHFCS Inskip route the existing Roseacre Wood farm junction would not be improved. Instead a new junction would be made from Roseacre Road through to the farm track which would enable site vehicles to cross straight over Roseacre Road onto the new access track. The junction works would require the removal of part of the existing hedgerow and some lowering of other sections. The entrance would be wide enough to allow two heavy goods vehicles (HGVs) to pass each other in order to enter and exit the site. Surfacing for HGV usage would be applied to the access track.

Other highway improvements are proposed as part of the access route works including 5 passing places along Dagger Road and 4 passing places along Roseacre Road for the Wharles access route. For the DHFCS Inskip route, widening and improvement of the gated access at Roseacre Road and improvement of the gated access at Inskip Road are proposed.

EFT Pipeline/ National Grid compound – A buried gas pipeline (depth 1.2m and 6inch diameter) will be laid. The pipeline will run eastwards from the well pad for 55m and connect to the gas grid pipeline. At the connection point, a National Grid compound would be located within a secured stoned area.

Underground Exploratory Activities

The underground exploratory activities would include the drilling of vertical and horizontal exploration wells, hydraulic fracturing of the shale rock and initial flow testing and extended flow testing of the natural gas released.

Drilling of Exploration Wells

An exploration well would be drilled from the base of each of the 4 drilling cellars. Drilling equipment would include plant and equipment specific to the drilling unit used, which would include a mast with an erected height of between 30 to 53m high. Cranes would be used to assemble the drilling rig and other equipment. Additional equipment would include drilling mud log equipment, well cementing equipment, wireline logging equipment, drilling materials and fluids and casings and tubular.

The first vertical well (Well 1) would be drilled to a maximum depth of approximately 3.5km below ground level and would provide geological information regarding the depth, thickness and characteristics of each layer of rock (strata) including the shale. The data provided would then be used to select the depth and orientation for the next stage of horizontal drilling. The lower section of the vertical well (Well 1) may be plugged with cement to a selected depth for initiating the horizontal well (Well1).

A horizontal well for Well 1 would then be drilled laterally at a depth of between 1.5-3.5km and could extend up to 2km horizontally from the drilling cellar. This drilling process would be repeated for Wells 2 -4. Vertical wells would be drilled for each of the remaining wells and the horizontal drilling depth for each well would be determined by the data obtained from drilling Well 1.

Three types of well has been designed – a vertical section of Well 1; the horizontal section of Well 1; and the subsequent combined vertical and horizontal wells for Wells 2, 3 and 4. During drilling operations, low intensity security lighting and focused task lighting at the base of the drilling rig would allow works to be undertaken during hours of darkness. Drilling operations would be undertaken 24hours a day, 7 days a week.

The drilling process involves drilling mud engineering, casing running and cementing, data acquisition (via coring and wireline logging) and directional drilling.

Mud Engineering - For each well a drilling fluid (also known as drilling mud) would be used to help facilitate the removal of rock fragments (drill cuttings); to prevent the release of fluids or gas during drilling by managing the hydrostatic pressure within the well; to stabilise the borehole and the drilled cuttings; to cool the drill bit; to lubricate the drill string and to minimise the loss of drill cuttings to permeable formations. A water based mud is proposed to be used when drilling through shallow formations and the permeable Sherwood Sandstone formation. A low toxicity oil based emulsion mud (LTOBM) is proposed to be used when borehole stability is problematic or where maximum lubrication is required. LTOBM would only be used after casing and cementing of all potentially sensitive groundwater receptors.

Casing running and cementing - Each exploration well would be lined with steel tubing (called casing) and would be cemented in place. The well casings would form physical multiple barriers between the well and the surrounding rock with the aim of preventing well contents (gases and liquids) from entering the surrounding rock. The casing would also help prevent the well being blocked which could restrict the flow of natural gas. The concrete layer would separate the well casing from the adjacent

rock and the next well casing. Additional layers would be provided where sections of the wells are near the surface in order to provide greater protection between the wellbore and adjacent rock.

The steel casings have different diameters and applicable depths from ground level and would include shallow conductors (1067-762mm diameter, extend to 60m), deep conductors (473-508mm diameter, extend to 300m), surface casing (340mm diameter, extend to 1,200m), intermediate casing (245mm diameter, extend to 2,000m), drilling liner and tie back (178-245mm diameter, extend to 2,300-3,200m) and production liner (144mm diameter, depth to be determined).

Casings and liners would generally be cemented in place to seal off various subsurface formations through which they extend, with exceptions made to allow for pressure monitoring. Un-cemented sections would only be present in sections where they would always be at least one further layer of casting between a well and adjacent rock. For each well, a high-pressure wellhead would be installed onto the surface casing. To provide secondary well control when drilling the remainder of each well, a blow out preventer (BOP) would be installed onto the wellhead.

Data acquisition (via coring and wireline logging) and directional drilling would follow the completion of the casing running and cementing.

Hydraulic Fracturing

Hydraulic fracturing would require the provision of: - a coiled tubing rig (up to a maximum height of 36m); a service rig (up to a maximum height of 36m) to install and remove the tubing up to 36m in height; 2 enclosed gas flares each 10m high, a flowback separator with line heater and associated equipment; enclosed steel flow-back tanks and steel water storage tanks. The equipment would remain on site during Initial Flow Testing. The coiled tubing and service rig would be used to occasionally service the wells. Well servicing which would take approximately a week per well.

The hydraulic fracturing process would involve the following stages – testing of the wellhead, well casing perforation, mini fracturing, hydraulic fracturing and flowback fluid and testing.

Wellhead testing - A 'Frac Tree' would be installed on each wellhead, to provide a seal and prevent the release of gas and liquids to the surface. The Frac Trees would include primary and secondary valves capable of withstanding maximum hydraulic fracture pressure.

Well casing perforation - To control where fractures are created, the well casing would be perforated at target locations. The perforations would be pre-set in the well casing by installing frac sleeves during well construction. The sleeves would be mechanically opened prior to fracking. If the sleeves fail to open, an abrasive jetting technique or a small shaped explosive charge would be used. If jetting is used, coiled tubing would be placed into the well and jetting fluid (water, sand, and friction reducer) would be injected through the tube under pressure. After jetting perforation, the jetting fluid could be recovered. The sand would settle in the surface collection

tanks and the recovered jetting fluid could be reused. Sand would be damaged and not reusable.

Mini fracturing - Pilot hydraulic fracturing would take place involving the pumping of small volumes of fracturing fluid, without a proppant, into a well. A mini-fracture to evaluate the injection pressure required to generate fractures in the rock would be undertaken. The process would also be used to calibrate the micro-seismic monitoring network. Additional mini fracture tests would take place during hydraulic fracturing.

Hydraulic fracturing - Hydraulic Fracturing would take place on Well 1 first and then for each of the subsequent wells. The process involves pumping fracturing fluid under high pressure down the well and into the shale rock. The fluid would open up millimetre sized cracks or gaps with the aim of releasing the natural gas trapped within the shale. The fracturing fluid would be composed of mains water and silica sand (approximately 99.95%) and polyacrylamide (approximately 0.05%).

Silica sand would be used as a proppant to hold open the cracks in the shale after the hydraulic pressure is released. Polyacrylamide would be used as a friction reducer to minimise the pressure losses incurred due to friction between the water and well casings. Polyacrylamide is non-toxic and classified as non-hazardous to groundwater by the Environment Agency. Dilute hydrochloric acid (compromising 10% acid and 90% water) may be pumped into the wells before the fracking fluid to dissolve any well drilling mud or cuttings.

Hydraulic fracturing would be carried out in stages along the well with between 30 to 45 stages expected per well, which would be undertaken at intervals of 30 to 50m per stage. The initial stage would be at the end of the horizontal well at the furthest distance from the well pad. Successive fracturing stages would take place, with operations working backwards along the well length towards the vertical section. Pressure would be applied at target intervals and the amount of sand proppant would be adjusted to optimise the fracturing process. Each fracturing stage would last for 3 hours.

Flowback fluid and testing - Once a hydraulic fracturing stage has been completed, pressure at the surface would be reduced and a portion of the injected fracturing fluid would be allowed to return to the surface as flowback fluid. The flowback fluid would pass into a choke manifold unit which would maintain full pressure during the flowback fluid process and prevent excessively high flowback velocities.

The flowback fluid would be a mixture of injected hydraulic fracturing fluids, sand, water from the shale rock, dissolved minerals and any released hydrocarbons. Naturally occurring radioactive materials (NORM), soluble NORM in shale, may also return in the flowback fluid. If LTOBM has been used as part of the drilling process, the flowback fluid may also contain small amounts of LTOBM. Testing of the flowback fluid would ensure the appropriate waste classification for the flowback fluid and subsequent waste management. Gas flow rates would also be measured and recorded with samples taken for analysis of the hydrocarbons.

The flowback fluid would be deposited in an enclosed 4 phase separation system at the surface which would separate solids, water, condensate and gases to be separated for optimal waste recovery and management. Any solids such as sand and NORM (in its solid form) would be removed and the remaining fluid's quality would be tested. Flowback fluid materials would be stored temporarily on site in enclosed tanks prior to removal off site.

The flowback fluid may be used with new mains water, sand and polyacrylamide to fracture the next section of well. The recycling of the flowback fluid would reduce the quantity of mains water being used and the quantity of flowback fluid to be removed for treatment and disposal offsite. If the flowback fluid contains any bacteria, the bacteria would be killed using UV treatment. Unused flowback fluid would be transported off site by tanker and taken to an Environment Agency permitted treatment centre for treatment and disposal. Rainwater collected in the drainage ditches may also be used as part of the fracturing fluid.

Once hydraulic fracturing has been completed on a Well 1, the process would be continued on Wells 2, 3 and 4. On completion of hydraulic fracturing for individual wells, Initial Flow Testing would commence.

Initial Flow Testing

After hydraulic fracturing has been completed for a well and the flowback of hydraulic fluid has commenced, natural gas would flow into the well. Eventually more gas would flow from the well than flowback fluid and at that point Initial Flow Testing would begin.

Each well would have Initial Flow Testing for up to 90 days, depending on the amount of gas flowing. The gas would be burned off at two flare stacks, which would be approximately 10m tall and 3m in diameter. The flare stacks would be fully enclosed within a flare shield. The shield would help to retain the flare in a confined area and would minimise the level of noise generated, light spillage and visual impact.

Extended Flow Testing

If sufficient gas is measured during Initial Flow Testing, the exploratory activities would move into Extended Flow Testing. For each well this could last between 18 and 24 months. Gas produced would not be burned in the flare stacks but instead would flow through a new connection into the gas grid. This process would require the installation of equipment within the boundary of the well pad to filter and prepare the gas.

The gas would be filtered to separate sand, liquid and gas. The gas would then be dried to remove any remaining water and would pass through a carbon filter to remove any impurities. Following testing of the hydrocarbon levels, propane may be added to increase the calorific value of the gas. Data would be gathered regarding the flow rates and well pressure. A regulator would be installed to limit pressure to 75bar prior to injection into the gas grid. Declining rates of gas flow would be measured along with an assessment of the amount of flowback fluid produced.

The gas would flow through a buried gas pipeline to connect with the gas grid at a new connection point to the east of the well pad.

Abandonment Activities

Decommissioning - On completion of the exploratory activities the site would be decommissioned by plugging and abandonment. The drilling cellars would be removed and the wells would be cut off at least 2m below ground level and sealed with concrete. A service rig would be used to plug and abandon the wells.

Plant, equipment and temporary buildings would be removed off site. The stone and plastic membranes used to construct the well pad would be removed along with the access track, fencing and lighting. The ditches would be emptied and all utilities disconnected. Extended flow testing equipment would be removed and any connections to the gas grid would be removed to the connection point and capped in line with National Grid requirements. It is estimated that the decommissioning activities would take 3 months to complete.

Restoration – The site would be restored to its former use as agricultural land in accordance with an agreed Restoration Plan. Subsoil and topsoil from the two earth banks would be treated with herbicides and would be redistributed across the site including the infilling of the drainage ditch. The site would then be grassed over and returned to agricultural land use. Fences, gates and field drains would be reinstated. The restoration activities are estimated to take 3 months, with an additional 3 month contingency provided to take account of any seasonal constraints which could affect the timing of the works. Ongoing monitoring of the caverns would be carried out for a further as yet unspecified period.

Long term gas production – if the exploratory activities demonstrate that the flow of natural gas from this area of the Bowland Shale would support long term shale gas production from the application site, then a new planning application and Environmental Statement may be produced and submitted for planning approval. A planning application could be submitted prior to abandonment and restoration of the proposed development.

Waste Treatment

Welfare Facilities - Domestic foul drainage from site welfare facilities would be routed into temporary storage facilities on site and then periodically tankered to nearby wastewater treatment works.

Waste Streams – Waste streams would be present from all phases of the development, well pad construction, drilling, hydraulic fracturing, initial flow testing, extended flow testing, decommissioning and restoration. Some of the waste streams would be stored on site pending removal for treatment and/or disposal offsite by a licensed waste management contractor. The following waste recovery and disposal options are proposed.

Excavation materials would be reused on site, with vegetation waste composted or residual waste to landfill. Concrete would be subject to waste recovery off site and/or

disposal at landfill. Packaging/food etc waste would be subject to recycling or landfill disposal. Oils and lubricants would go for treatment at a hazardous waste facility.

Drilling waste materials would be a variety of non hazardous and hazardous waste. Non hazardous waste including polymer based water drilling muds and drill cutting, cement waste from well casings and spacer fluid would be recycled or treated at a specialist waste facility for recovery or disposal. LTOBM waste would be classified as non waste and the muds reconditions for reuse. Drill cutting LTOBM and any contaminated materials (e.g. oil, diesel, waste oil, lubricants) would be hazardous and treated at a hazardous waste facility. General waste (paper, timber, scrap metal, food) would be recycled or disposed of at landfill. Foul and industrial wastewater (rain captured on well pad during drilling) would go to wastewater treatment works.

Hydraulic fracturing, IFT and EFT waste materials would be a variety of non hazardous and hazardous waste. Flowback fluid, solid scale and materials/equipment contaminated by NORM, would be analysed to ensure appropriate waste classification and adequate handling and disposal. Radioactive waste with non hazardous composition would be stored on site in enclosed tanks and removed to a treatment centre permitted by the Environment Agency with a licence to receive NORM. Jetting fluids sand used in the perforation process would not be reused and would be for disposal. Flowback fluid may also be reused on site in the hydraulic fracturing process. Hazardous waste including oils would be recycled or treated at a specialist waste facility for recovery or disposal. Any non hazardous sand would be recycled as secondary aggregate. General waste would be recycled or disposed of at landfill. Foul and industrial wastewater would go to wastewater treatment works. Surplus natural gas would be flared on site.

Decommissioning waste materials would include hazardous and non hazardous waste. Clean aggregate and the well pad membrane liner and felt liner and inert concrete would be non hazardous and could be reused offsite. Contaminated aggregate and the contaminated well pad impermeable membrane would go to a hazardous waste treatment centre for waste recovery or disposal.

Traffic

There are a number of potential access routes to this site. The applicant has examined a number of different options to access the site and has concluded that Route 3 is the most suitable. The site would be accessed from the A583 to the south close to Clifton village. Traffic would then to use Clifton Lane, Station Road, a short section of Treales Road, Dagger Road, Salwick Road, Inskip Road and Roseacre Road to reach the site, a distance of approximately 9km from the A583. All of these roads are unclassified roads. Passing places are proposed along Dagger Road and Roseacre Road. Access to the development site from Roseacre Road would be along the existing farm track leading to Roseacre Wood and would require some improvements to the road junction. An alternative option to the proposed route would be to avoid Wharles village and travel through the DHFCS Inskip site. Improvements would need to be made to the existing gated accesses at Inskip Road and at Roseacre Road. A new junction would be created on the western side of Roseacre Road to enable access straight across from the Inskip site.

The traffic movements associated with the development would vary over the duration of the project depending upon the activities being undertaken. During stage 1 (construction of the site), which would last approximately 2 months, there would be an average of 22 two way HGV movements per day (maximum of 48). During stage 2 (mobilisation of rig, drilling of first borehole and demobilisation of rig) lasting five months, there would be an average of 14 two way HGV movements (maximum of 50). For drilling of the subsequent three wells, the duration of the movements would be over a shorter period of three months but would equate to around 17 two way HGV movements per day. For hydraulic fracturing, (taking one to two months for each well) the average two way HGV movements would be around 10 per day. For the initial flow testing, (around three months), it is anticipated that the average two way movements would be around 5 per day. The extended flow testing would generate minimal HGV movements whilst the decommissioning and restoration of the site over approximately 2 months would generate an average of 22 two way HGV movements.

The peak traffic flows will occur as a result of combined traffic associated with activities at more than one well. The total traffic numbers in the ES are based on such conditions. The peak traffic generated would be around 50 two way HGV movements per day which would occur for around one week on eight occasions over the life of the project.

Job creation

19 new full-time jobs would be created.

Timeframe

The development works (exploration and restoration) would have a proposed duration of 6 years from the start of construction works on site to the completion of the restoration activities. If the site moves into full production the decommissioning period would not take place.

Exploratory activities would take place concurrently for each of the 4 wells. The indicative sequence for the development is as follows:

1. Install surface seismometer and buried seismometer arrays (LCC/2014/097)
2. Install groundwater quality monitoring wells (LCC/2014/097)
3. Construct well pad and access track and commence gas pipeline
4. Drill Well 1
5. Hydraulic fracture Well 1 and Drill Well 2
6. Initial Flow Testing (IFT) Well 1, Hydraulic Fracture Well 2, Drill Well 3
7. Extended Flow Testing (EFT) Well 1, IFT Well 2, Hydraulic fracture Well 3, Drill Well 4
8. EFT Wells 1&2, IFT Well 3, Hydraulic Fracture Well 4
9. EFT Wells 1,2 &3, IFT Well 4
10. EFT Wells 1-4
11. Plug and abandon all wells – unless application for full production submitted
12. Restoration of site

Site mobilisation and construction of the well pad would take 2 months. Equipment mobilisation period for the drilling of each well would typically last for two weeks. Once commenced, drilling operations must take place 24hours a day, 7 days per week. The first well would take around 5 months to complete to enable geological data to be analysed as the well is drilled. The other 3 wells are expected to take 3 months each to complete.

Each fracturing stage of hydraulic fracturing is expected to last 3 hours with approximately 30 to 45 stages per well. For each well the approximate time period for hydraulic fracturing would be 2 months. The duration of hydraulic fracturing would be dependent on the total number of hydraulic fracturing stages undertaken for each well. Hydraulic fracturing pumping equipment would operate between 07:00 and 19:00hrs Monday to Friday and between 07:00 and 13:00hrs on Saturdays. Operatives would be on site 24hours a day, 7 days a week for operational and monitoring purposes.

Initial Flow Testing would take place for a period of 90days per well with the gas flow flared. Extended Flow Testing would take between 18 and 24 months per well to complete. Decommissioning and restoration of the site is expected to take between 7 and 9 months depending on weather conditions. A two month contingency would cover any delays.

An indicative timeline for the works activities is summarised below

Year 1	Site mobilisation, installation of seismic arrays, groundwater monitoring Commence pipeline construction Well 1 – Drilling, Hydraulic Fracturing, Initial Flow Testing Well 2 – Drilling
Year 2	Well 1 – Initial Flow Testing, Extended Flow Testing Well 2 – Drilling, Hydraulic Fracturing, Initial Flow Testing Well 3 – Drilling, Hydraulic Fracturing
Year 3	Well 1 – Extended Flow Testing Well 2 – Extended Flow Testing Well 3 – Extended Flow Testing Well 4 –Initial Flow Testing, Extended Flow Testing
Year 4	Well 1 – Extended Flow Testing Well 2 – Extended Flow Testing Well 3 – Extended Flow Testing Well 4 –Extended Flow Testing
Year 5	Well 3 – Extended Flow Testing Well 4 –Extended Flow Testing Plug and abandon wells
Year 6	Site restoration completed

Appendix 2

Representations:

Objections

Friends of the Earth (FOE):

FOE submitted a further objection to the proposal with regard to the precautionary principle and the Water Framework Directive; inconsistency within national and local planning policy, inconsistency with government policy; evidence of adverse environmental impacts and inadequate consideration of adverse socio-economic and public health impacts.

The grounds for objection are summarised as follows.

Precautionary Principle

- The development should not go ahead unless it can be proven that there will be no groundwater contamination over the short and long term.
- The development is an unconventional activity where the full impacts are unknown and where the risks can be clearly identified.
- Fracking poses a higher risk of well failure (and leaks) due to injection of wells and drilling wells horizontally as well as vertically.
- Fracking at Preese Hall resulted in harmful consequences.
- The current regulatory framework for the shale gas industry is inadequate, flawed or ineffectively applied and enforced.
- Regulators appear to have failed to assess the risks and determine the standards necessary to enable the development to go ahead, e.g. water recycling standards.

Groundwater, Flooding and Water Resource

- Potential groundwater contamination as a result of mechanical failure of equipment, well integrity issues, membrane defects, well degradation, geological faults, and increased run off leaving the site.
- Watercourses could be conduits transferring contamination to other areas.
- Where there is a risk of significant adverse impact on surface water quality then the development is only acceptable in terms of the Water Development Framework in the circumstances set out in the River Basin Management Plan for the North West.
- Risk of flooding to an area 700m to west of the site and 300m to the east across Roseacre Road is within Flood Zone 3.
- The EIA does not consider impacts on water circulation from polluted water and the unsustainable use of water, given the large amounts of water required
- Risks to the availability of water supplies and water pressure problems for nearby residents.

Climate Change

- The assessment of the potential for greenhouse gas (GHG) emissions is incorrect, with regard to impact of leakage, global warming potential (GWP) of methane and scales of emissions.
- The EIA findings that the impact on climate change is 'n/a' does not enable the local planning authority to make an informed decision.
- The mitigation measures proposed for possible sources of fugitive methane emissions are basic and may be ineffective based on US research.
- The figure used in the application for GWP is inaccurate and asks for clarity regarding the carbon footprint calculations.
- The comparison of the sites GHG emissions to the UK carbon budget is wholly inappropriate. Cuadrilla does not appear to know how much GHG will be emitted and therefore the precautionary principle should apply.
- Utilising shale gas resources is contrary to Policy DM2, to reduce carbon emissions and is contrary to the Lancashire Climate Change.
- Planning decisions must take account of the need to reduce GHG emissions and this application will increase the emissions.

Energy

- Need for the mineral resource has not been demonstrated.
- Local planning authorities should consider all energy sources and as per the European Renewable Directive 2009, including renewable energy sources.
- Impact of shale gas on UK security of energy supply is highly contested.
- Shale gas recovery is incompatible with the UK meeting the climate change target and could lock the UK into fossil fuel use for decades.
- Exploitation of unconventional gas and oil are a dangerous distraction to investing in energy efficiency and renewable energy.

Waste

- Insufficient information on how overflow water and wastewater discharges, and pollutants, will affect the local environment and protected sites.
- Management of contaminated wastewater is wholly inadequate. There is a lack of treatment centres, resulting in potential capacity issues, especially if flow back rates are higher than estimated. This is not an adequate solution.
- Contrary to Planning Policy (Statement 10) as the application produces huge quantities of waste.
- It is unclear what waste quality standards would be applied by the applicant to ensure that concentration of pollutants in the wastewater did not accumulate beyond safe levels as a result of re-use for fracking and how risks to the environment and health and safety would be mitigated.
- Further investigation is required before the Council can lawfully grant an application to drill.
- Legacy of underground waste which will be present is denied, not a temporary development as it will create permanent contaminated wastewater.
- Risks from flow back fluid and waste water.

- Risks of storage of waste to protected ecological areas.

Chemical Composition

- No detail has been given on the drilling and hydraulic fracturing chemicals, including the additives in the friction reducer.
- Polymers may leach or decompose into toxic monomers.
- The classification of polyarylamide as non hazardous is disputed.
- The classification of oil based muds as non toxic is disputed.
- The classification of flow back fluid as radioactive waste with non-hazardous composition is disputed.
- The chemical content of jetting fluid is unclear.
- Will surfactant, gelling agent, defoamers, corrosion inhibitors, weighting agents and additional biocides not be needed?
- A list of actual products to be used and in what quantities, with a Material Safety Data Sheet for each chemical should be available for public viewing.
- Total quantities of friction reducer are significant and the use of hydrochloric acid as a contingency is a concern.
- Environmental permit information should be part of the planning application. The list of potential additives includes 14 that are presumed hazardous.
- The use of toxic chemicals is contrary to the aim of the North West River Basin Management Plan which aims to reduce the release of toxic pollutants.

Air quality

- People including children will be exposed to pollutants from traffic.
- The planning authority should check the baseline air quality and assess whether the development will significantly add to air quality issues and whether significant people will be affected.
- The air quality assessment does not identify vulnerable groups e.g. Inskip pre-school, a nursery in Elswick and residents of Wharles who will experience notable changes in traffic. Residents of Roseacre, Wharles and Elswick could be receptors of emissions. Impacts on Kirkham and Wesham not considered.
- Emissions from generators, engines and site equipment for drilling have been scoped out of the air quality assessment despite the potential for emissions.
- All possible sources of emissions should be included with cumulative impacts assessed, including increased NO₂ levels.
- There will be air quality impacts and mitigation is required, with reference to the Air Quality Directive.

Traffic

- Concern at number of vehicle movements, particularly HGVs on rural single land carriageways (including Inskip Road and Roseacre Road) which have cycle and pedestrian usage.
- Contrary to Policy DM2, due to unacceptable adverse transport impacts from length and number of transport journeys.

- Generation of approximately 23,610 two way vehicle movements of which 11,670 HGV movements, over the lifetime of the project will emit greenhouse gas emissions and air pollution.
- Rural network impacts due to requiring new or widened junctions and access.
- Peak vehicle movements are to be spread throughout the day, but at Balcombe and Barton Moss there was a convoy of vehicles.
- The assessment of cumulative effects of operations at Roseacre Wood and in combination with Preston New Road does not account for operational delay.
- Traffic generated could breach statutory thresholds for noise and air quality.
- HGVs travelling on rural roads with hazardous chemicals or wastewater.

Ecology

- Potential adverse impacts on the migratory path for wintering birds utilising the Morecambe Bay and Ribble Estuary Ramsar/ SPA sites.
- Agricultural drainage ditches surrounding the site discharge north-westwards to the Wyre Estuary via Lords Brook.
- Impacts on internationally designated sites, Morecambe Bay SPA and Ramsar, Wyre Estuary SSSI, Newton Marsh SSSI.
- Medlar Ditch and Wesham Marsh Biological Heritage Sites have not been considered in relation to site operations and potential disturbance.
- The development would result in the loss of 0.06ha of Roseacre Wood, UK BAP habitat lowland deciduous woodland. New woodland planting will not compensate for the loss of mature woodland with habitat value.
- Impacts on protected and notable species including bats, otters, brown hare, great crested newts and nesting birds.
- Impacts on SPA qualifying bird species, wintering and breeding birds.
- Impacts on the functional link with the Ribble and Alt Estuaries SPA/Ramsar, require that a full Habitat Regulation Assessment must be carried out.
- Impacts of the flare (noise, heat, emissions) and 24hour lighting on wildlife.
- There will be 14 instances of significant impacts including disturbance and loss of habitat for bats, brown hare, nesting birds and great crested newts, with limited mitigation measures proposed. Conditions are inadequate as the applicant will disregard them as per experience at Becconsall site.

Seismicity

- The ES contains too little information for the Council to understand and evaluate the risks around induced seismicity from drilling and fracking.
- The Fylde is highly faulted geologically and there are a number of faults in the vicinity of the site including one which will be encountered by drilling.
- Potential effects on induced seismicity during the hydraulic fracturing stage of the project, associated with ground motion hazard, well integrity, liquefaction, slope instability, and cumulative effects of settlement and fluid migration. The scale of impact is disputed; it is not insignificant / negligible.
- The relevant authorities lack a full understanding of the geology of the local area and the causes of the tremors from fracking last undertaken in the area.

Socio economic

- The analysis of socio-economic impacts is probably unlawful because it takes account of economic impacts which are not related to environmental consequences of drilling and fracking.
- Strongly disagree that shale gas will make a positive contribution to economic growth at a local and national scale.
- There is no explanation of local expenditure and its calculation.
- Job creation effects are highly limited. There will be low job creation with no guarantee of jobs for local people given the specialist nature of the jobs.
- Strongly disagree that there will be no significant effects for wider economic effects as potential adverse effects have been disregarded. Economic costs of the development will be detrimental to the local economy.
- There is no assessment of impacts to residents in the immediate vicinity and impacts on tourism and agriculture.
- No assessment of impacts of community infrastructure (schools/village halls) within 2-3km of the site.
- Several years of disruption to the local community with 14 months of drilling 24hours a day, 8 months of hydraulic fracturing and 12 months of flaring with dust, light and noise emissions.
- Unprecedented levels of public opposition / concern about the impacts.
- Previous sites yet to be restored, a concerning precedent to communities.

Public Health

- The ES does not review the evidence of known and unknown adverse public health impacts of unconventional gas. The industry is evolving quicker than the research into health impacts.
- Occupational health not addressed despite US evidence of harmful effects to workers from air quality, waste, wastewater, fracking fluid.
- Fracking fluid information is vague and there are no details of chemicals in the drilling fluids.
- The community profile does not include vulnerable communities in the immediate vicinity of the site.
- Relevant data on demographics and deprivation in Blackpool is excluded.
- Impacts on physical activity have not been considered. HGVs carrying drilling and fracking chemicals and hazardous wastewater may deter cyclists and pedestrians using local roads.
- Air quality assessment should include fixed point sources of air emissions (e.g. generators).
- Cuadrilla has overstated safety claims, through misleading advertising, exaggeration and subjective claims.
- US evidence of negative health impacts of shale gas development.
- US evidence of heart and neural defects in newborns within 10mile radius of maternal residence to shale gas developments.
- Dangerous levels of human exposure to benzene.
- Exposure to silica as a health hazard to workers.

- Breast Cancer UK expressed strong concerns about the potential adverse Health effects from exposure to harmful chemicals as a result of fracking.
- Germany environment agency has stated that there is a lack of information to assess risks and how they can be controlled.
- Operator has a poor track record in running operations properly.

Consultation

- Very low participation in consultation tools and techniques, compared to high numbers of people submitting representations. Public exhibition events managed to separate stakeholders, elected members from residents.
- The LPA need to take account of the legitimacy of high local and national interest and opposition, due to the international importance of the area for wildlife, national importance for food production and tourism and the precedent of the decision regarding shale gas development in the UK.
- Levels of risk to area have been mi-advertised and characterised.

Planning Policy

- Not conform to LWMLP Policies CS5 and DM2 regarding sustainable minerals development and development management.
- Not conform with FBBLP Policies SP2, EP10, EP15, EP16, EP17, EP22, EP23, EP24, EP26 regarding countryside development, habitats, protected sites, SSSIs, BHS, agricultural land, water resources, groundwater and air pollution.
- Application must be judged on all relevant national and local planning policy, especially climate change, waste, transport and unacceptable adverse environmental impacts.
- Not sustainable development – as leave legacy for future generations of mining waste, climate change emissions, risk of groundwater contamination.
- Significant problems with the assessment of impacts in the ES including waste, waste mitigation, seismicity, chemicals, health and air quality.
- Adverse impacts of application cannot be mitigated through conditions in terms of climate change emissions, wastewater production, lighting or noise because of the scale of the activity proposed.
- Production scale shale gas disguised as exploration and appraisal, given 4 wells, continuous nature of the drilling and hydraulic fracturing proposed, total period of the development, extended flow test over 2 years, installation of pipes connecting to the national transmission network, the installation of equipment to treat and regulate gas on-site, and the proposal to pump gas during EFT into the grid.
- Not temporary as implications are permanent – creation of contaminated waste that remains in situ.
- No margin for rigorous testing, monitoring or evaluation between stages.

Roseacre Awareness Group (RAG):

Representations received on behalf Roseacre Awareness Group object to the proposal on the following grounds:

Need for development

- Shale gas is not economically viable. Would need thousands of wells and hundreds of well pad to produce a small percentage of UK energy.
- Economic benefits exaggerated only benefit the company and government.
- Application is not temporary, could take 6 years, and the connection to the gas grid and associated works is to effectively produce gas.
- Once at full production, all impacts will be tenfold and LCC need to consider this when determining the application.

Climate Change

- Investment in shale gas diverts resources from cost effective, less damaging renewable energy solutions – tidal, wind and solar.
- Contrary to Lancashire Climate Change Policy and Climate Change Act as use of fossil fuels not meet low carbon objectives. Shale gas methane emissions are more detrimental than from coal.

Countryside Location

- Contrary to Policy SP2 Development in the countryside, site is totally suitable for industrial development with potential for serious long-lasting and damaging impacts to the landscape and character of the area.
- Applicant has not considered alternative locations apart from own sites. Could operate from an SP1 location using horizontal drilling technology.

Health and Socio- Economic Impacts

- Not addressed harm to residents living near to fracking sites, do not want to be guinea pigs to fracking industry. No reference to US health findings.
- Impacts on residents at Roseacre, Wharles and Stanley Mews residents need to be considered, including stress and anxiety.
- No consideration of impacts on rural character, community cohesion and community infrastructure - primary school, church, Women's Institute, recreational fields, footpaths, bridleways, pubs, tearooms, farm shop, caravan parks, livery yards and social events.
- Development will split the communities of Roseacre and Wharles in half.
- No consideration of impacts on visitors to the community for sporting and leisure activities e.g. ramblers, birds potters.
- Impacts of daily drilling, fracking, flaring, HGVs and hazardous waste will make it an undesirable area to live and visit.
- House prices will be affected and people will not be able to sell.

- Adverse impacts on agriculture from harmful effects of noise, air, water and light pollution on livestock as reported in the US. Reputation for food production and supplies to supermarkets could be destroyed.
- Contrary to Policy DM2 as economic and environmental impacts cause demonstrable harm.
- A local caravan site has already lost business this year.
- Huge number of objections with Lancashire and UK opposition.
- Consultation process has been flawed.

Traffic

- Significant danger/conflicts from increased volume and size of vehicles.
- Additional 49,000 vehicle movements in a quiet rural area.
- Existing countryside unsuitable for significant increase in traffic volumes.
- No assessment of impacts on vehicles passing hundreds of residences in Medlar, Wesham, Kirkham, Newton, Clifton, Salwick and Wharles.
- Narrow country lanes have blind bends, limited visibility, and no footpaths and are used by farm vehicles, cars, motorbikes, caravans, cyclists, horse riders and pedestrians. Too narrow for HGVs and impossible for safe vehicle passing.
- Potential road safety issues at Clifton children's playing field; Hand & Dagger pub Salwick and Treales Primary School.
- LCC will need to repair the roads as maintenance requirements will increase
- Roads can be hazardous from mud from farm vehicles/livestock so will become more hazardous with site vehicles.
- Roads can be subject to flooding from heavy rain, the development will reduce drainage making the situation worse.
- Impacts of HGV vibrations on old buildings have not been taken into account.
- Proposed mitigation measures of altering roads, verges, hedgerows and installing passing places will damage the rural character and deter use of roads for recreation and tourism with knock on economic effects.
- Inskip route option will not stop traffic going through Wharles village.
- Inskip route will involve crossing Roseacre Road for entry and exit posing a danger to users of Roseacre Road.
- Additional traffic will increase air and noise pollution with health impacts.
- No detail on how emergency services would access the site.

Landscape

- The site infrastructure including the 53m high rig will be a major blight on the landscape and damage the rural character and affect tourism.
- The site will be visible from several houses, to road users and from local natural landmarks e.g. Beacon Fell, Longridge Fells, Carr Hill.
- Contrary to Policy EP16 as EP28 as light pollution will cause harm to both local residents and wildlife and will distract passing road users.
- The light pollution will transform an idyllic countryside area into an industrial zone with loss of social amenity. Detrimental to tourism and property prices.

Noise

- Contrary to SP2, SP9 and EP27 due to harm from drilling noise pollution. It will seriously affect residents living close to the site, affecting quality of life resulting in health issues. Noise levels cannot be mitigated.
- Elswick site operations are not representative of a live fracking site.
- No consideration of cumulative effects of onsite machinery (generators, separators, compressors) with noise from drilling, fracking, flaring and HGVs
- Noise assessment should have used BS4142 and not BS5228, to be relevant to a quiet rural area and not a construction site.
- Actual increase in noise level should be no more than 5db, proposal higher.
- No adequate baseline surveys or assessment of sensitive local receptors (Stanley Farm mews) No information to demonstrate that residential amenity will not be significantly affected.

Air Quality

- Information is inadequate to assess real impacts of development and whether standards of the Air Quality Directive will be met.
- Assessment should recognise that the area is rural and not urban, with existing higher air quality as a baseline.
- Potential impacts on Roseacre Hall and Stanley Farm and Old Orchard Farm
- Emissions from site and traffic will affect resident's health and wellbeing including children and elderly residents. Evidence from the US, Breast Cancer UK and the media of health impacts.

Water Resources

- Information is inaccurate and ambiguous making assessment difficult.
- When compared to Preese Hall data, the information seems inaccurate.
- Development will need more water than supplied by United Utilities so further supplies will be required by tanker, with impacts on local community.
- Existing water pressure issues, water supply to residents may be restricted.
- If goes to full production, where will additional water come from?

Waste Management

- Surface water drainage into Nigget Brook could contaminate Thistleton Brook which flows into River Wyre and Morecambe Bay.
- Accidental spillages from the site or vehicles could impact on water and land. with impacts on local wells used by livestock and groundwater contamination
- Storm impacts have not been taken into account, with risk of flooding.
- Insufficient evidence that fracking fluid will not leak into local water sources through existing faults. Flow back fluid estimates do not cover worst scenario.
- Wastewater treatment sites do not have capacity to treat all the flow back fluid, including radioactive waste resulting in storage concerns.
- Concern regarding content and quantity of chemicals in fracking fluid.

- Huge amounts of waste will be produced and could lead to significant traffic removing hazardous and toxic waste products.
- Applicant not demonstrated how they would reuse/recycle/treat flowback fluid.

Ecology

- Potential impacts on protected species, some of which have not been surveyed or surveys have limitations and missing data. Need a full habitats survey.
- No information on impacts on Holmes Wood, Carr Wood, Nigget Wood and Medlar Brook and impacts on Roseacre Wood, a possible ancient woodland.
- Ecological organisations have not been consulted and Lancashire Wildlife Trust has raised numerous objections.
- Contrary to Policies DM2, EP15, EP19 and NPPF.
- Hedgerows should be protected and not removed to install passing places.

Safety

- Contrary to policy EMP5 as local people at risk of accidents from the industrial site and fracking activities including well blow out.
- US fracking sites have had serious accidents - chemicals and pollution. Other countries and states have banned or imposed moratoriums on fracking.
- Contrary to NPPF paragraph 15 as cannot ensure industry is safe and sustainable.
- Industry leaves serious legacy issues, all wells leak over time and a significant percentage fail. LCC will have to pay for the cleanup.
- Current regulations are inadequate with no independent body to oversee and monitor operations. HSE and EA have not dealt with a high volume fracking site so query ability to evaluate, monitor and manage the industry.
- Applicants' competence and trustworthiness is questioned as previously breached planning permissions and not safely abandoned any wells to date.
- Application documents have ambiguities, inaccuracies and inconsistencies.

Seismology

- Fylde is heavily faulted, so extremely risky for applicant to frack through local faults especially given earthquake at Preese Hall.
- Other countries have banned fracking in highly faulted areas. Significant earthquakes in US and Poland associated with fracking activities.
- Seismic monitoring will only detect an event happening so may be too late to stop fluids leaking into faults. 3D surveys are inadequate as faults are complex and unpredictable.
- Contrary to Policy and the precautionary principle should apply. Faults could leak fracking fluid and methane into the groundwater and atmosphere and pollute aquifers and drinking water supplies.

Up to the end of December 2014 a total of 8924 representations objecting to the proposal had been received. Of these 822 were individual letters; 4212 were template objections submitted by Friends of the Earth; 3890 template objections,

many of which were collected and submitted by 'Frack Free Lancashire'. Representations have continued to be received mostly in a variety of template forms, the final number of which will be reported when the application is presented for determination.

The reasons for objecting to the proposal are summarised under the following headings:

Need for Development

- Fracking not needed in Lancashire.
- Extraction is for profit for a minority.
- Amount of gas to be produced is overestimated.
- No guarantees of any gas being found.
- No guarantee it will result in cheaper gas prices.
- Risks are too great for a short term energy fix.
- Fracking under Lancashire would take until 2030 to produce a meaningful volume of gas by which time emissions commitments would mean the gas cannot be extracted or burnt, so no national interest is served.
- Need thousands of wells for commercial production so no real benefit from this development?

Climate Change

- Extraction of shale gas will further add to the burning of fossil fuels and exacerbate climate change.
- Immoral to pollute the environment by increased use of carbon-based fuels.
- More fossil fuels are not the answer. Need to reduce carbon emissions.
- International Energy Agency warn that most of gas should stay in ground to avoid catastrophic climate change
- Shale production will have a negative effect on meeting UK targets relating to greenhouse gas emissions Climate Change Act 2008.
- Contrary to NPPF Para 93 reductions in greenhouse gas emissions.
- LCC has a responsibility to help reduce emissions.

Alternatives for energy production

- Central government failed to plan ahead for nuclear energy.
- Need to produce cleaner nuclear energy.
- Reliance on fossil fuels will stifle innovation for clean sources of energy.
- Should use natural renewable sources of energy from sun, wind, water.
- Should invest in wind farms given the powerful winds from the Irish Sea.
- Should harness tidal water from Morecambe Bay.
- LCC should promote renewable energy in line with the Renewables Directive.
- Contrary to Policy CL2 to stop money being invested in renewable energy.
- Need to support solar farms.
- Do not need to rely on fossil fuels, Germany runs on 90% renewable energy.
- Renewable energy has potential for greater economic success.

- Should invest in renewable energy.
- Should be removing our dependence on gas - use wood and other materials.
- Safer ways to extract gas and oil without contaminating land.
- There is enough North Sea oil and gas to cover our transition to renewables.
- Should insist on fitting wind turbines/solar panels to every new building.
- Should encourage highly renewable self sustaining / insulated housing.
- Need to be energy saving.

Environmental Impact

- Fracking will destroy the planet and people's lives.
- Local and global level implications to natural environment.
- Should not allow companies to exploit the environment at our expense.
- Fracking is seriously destructive and polluting and will leave the environment in a degraded and contaminated state; it is the dirtiest energy source.
- Widespread pollution is inevitable in the immediate and long term.
- Need to preserve not destroy planet for future generations.
- Potential harm to the environment.
- Should not be allowed in Lancashire or anywhere else.
- Full environmental effects are unknown and need further research.
- Other countries banned fracking.
- Growing evidence that shale gas extractions pose serious risks to human health and the environment, precautionary principle should be applied to protect residents from unavoidable impacts of shale gas development.
- Why is fracking being considered here next to towns – Blackpool, Preston, Lancaster and Southport?
- No other country will frack so close to populated areas.
- Fracking is an irresponsible / reckless idea.
- Risks outweigh the benefits.
- Fracking is a boom and bust industry.
- Only people seeking monetary gain are in favour.
- Contrary to NPPF as not sustainable development due to the need to keep drilling new wells as production rates steeply decline.

Exploration or Production Stage

- Application is for a production facility not exploration.
- By creating a well pad, the development will scale up to enable full production.
- Construction of a pipeline and connection to a gas grid network constitutes development and production.
- Exploratory boreholes by definition are not temporary.
- The application should be withdrawn and resubmitted as a pilot development pad which will be scaled up to full development.
- Francis Egan at the Winter Gardens Shale Gas conference said becoming a supplier was a long term investment /relationship for 20-50 years, so definitely not a temporary development.
- Contrary to SP2, if production is viable, production permission will be sought so not a temporary development. If approved it will set a precedent.

- Why two new sites are needed in addition to the existing 3 test sites?
- Why are these sites needed when the applicant has access to other sites with the geology to carry out initial flow testing?
- Existing Cuadrilla sites for temporary works have become permanent sites with permanent impacts due to recurrent time extensions.
- Like Annas Road, the development will not be undertaken in the proposed timescale so cannot be considered as temporary works.

Regulatory Framework

- Need specific regulations / legislation.
- Need strict enforcement/ fracking industry inspectorate.
- Need to inform regulators and industry about what is important and to ensure risks are as low as reasonably practicable.
- Lack of regulation for on-shore gas extraction.
- Regulation by the industry itself has not been tested, will be ineffective and wrong. Need independent monitoring.
- No amount of regulation is enough.
- No amount of regulation can prevent human error or equipment failure.
- Government inspectors cannot inspect what they don't know about.
- DECC, Environment Agency and Health & Safety Executive are not in a position to protect us, due to staff cutbacks, lack of expertise, disorganisation, apathy and relying on each other to ensure that no disasters happen.
- Environment Agency has no experience of other wells.
- Contrary to Policy EMP5 for Cuadrilla to police their own Health & Safety.
- What measures are in place to continue monitoring and rectifying any damage in the event the company goes into liquidation?
- Cuadrilla have breached planning permissions in Lancashire (and Balcombe) demonstrating a dangerous gap in regulatory enforcement.
- Cuadrilla does not have a good reputation for following regulations and keeping its promises. The applicant needs to demonstrate competence before new sites are approved.
- Cuadrilla failed to recognise the significance of earthquake damage from Preese Hall site and was reprimanded for not reporting it for 6 months.
- Applicants definition of timelines for initial flow and extended flow testing conflict with DECC guidance.

Safety Risks

- How can fracking be safe in the UK and not in other countries?
- If no risks why have other countries banned fracking?
- Unproven safety record of onshore sites.
- Safety concerns, unconventional gas are a high risk activity
- Overwhelming evidence that the process is not safe.
- Shortage of energy does not justify the risks.
- Pollution risks from human error and lack of care on site.
- Fracking technology is not a safe, unproven technology, risks cannot adequately be determined.

- Onshore accidents could be tempting lives and untold damage.
- Potential for major accidents (and comparison made to Abbeystead).
- Risk of explosion.
- Reports state that all wells fail eventually, either immediately or later on.
- Capping and plugging does not prevent failure of cement bonds, steel cages or well casings.
- Well failure will lead to a toxic legacy for current and future generations.
- Frightening risk if fracking occurs within a few miles of potential natural gas storage development.
- Huge potential for disaster from any impacts to local nuclear sites.
- Contrary to Policy EMP5 as the development is a hazardous installation.
- Not all risks are adequately addressed in the Environmental Risk Assessment, e.g. noise from drilling rig; visible plumes, vandalism and the assessment conclusion is disputed.
- Have CAA been consulted regarding risk to aircraft from vents or flare gas?
- Cuadrilla's Annas Road site and Preese Hall had well failures.
- Cuadrilla pulled out of Preese Hall due to stricter monitoring, this demonstrates the previous application did not adhere to Policy EMP5.
- Cuadrilla is not fracking at current sites due to technical failures which should be fully investigated before approving new sites.
- Does Cuadrilla have an emergency plan in place?
- What are LCC's Emergency Planning team's views?
- There is no specialist emergency response vehicle capable of dealing with an incident in the local vicinity; the nearest one is in Morecambe.
- Roseacre, Wharles, Salwick, Clifton, Elswick, Singleton, Greenhalgh, Wesham and Kirkham to name a few, are all at risk from onsite operations.

Geology / Seismicity

- Previous earthquake at Elswick / Fylde area.
- Fracking site caused an earthquake.
- Experienced shockwaves from Grange Road (Singleton) - terrified.
- Do not want tremors again.
- The earthquake in 2011 has been downplayed as no greater magnitude than a heavy lorry driving past your home but it was sufficient to damage property (cracked plaster) and has unnerved residents.
- Contrary to Policy DM2. Experienced previous tremor which was frightening and house shook. Concerned about future drilling.
- Contrary to Policy DM2 due to earth tremor/earthquake risk.
- Academics say that Lancashire's faulted geology is unsuitable for fracking and it will lead to induced seismic activity and risks to communities.
- Interfering with Lancashire's complex geology will be hazardous. The development will irrevocably damage our structures and lubricated and slipped rocks will increase earthquake risks.
- Fracking will destabilise fault lines.
- There are large faults in the region near Roseacre and Elswick.
- Risk of earth tremors, earthquakes and sinkholes.
- Inadequate baseline monitoring of background seismic activity.

- Need a condition for independent baseline monitoring of seismic activity before the works start.
- Traffic light system is only a warning system and cannot stop seismic activity once it's started. Not reassured by monitoring by Cuadrilla or Arup.
- Only 8 of the surface arrays will monitor induced seismic events as part of the traffic light monitoring system.
- Impact on BNFL nuclear plant from earthquake.
- Impact on Blackpool Tower, tremors could cause it to collapse.
- Impact on gas pipeline at Inskip from earthquake.
- Area already has moving sand with subsidence risk to local properties.
- Comparisons with US are invalid as the geology and percentage populations are different.

Air Pollution

- Proposal is contrary to Policy EP26 due to flaring and air quality impacts.
- Unacceptable levels of greenhouse gas emissions / toxic air pollution from flaring and health impacts to residents including children.
- Impact of flaring, burning gas between 30days to 2 years.
- Flared methane emissions.
- Methane flaring will lead to over 250 pollutants.
- Green completion should be used instead of flaring.
- Lethal emissions of methane and radon gas will damage the environment.
- Fracking will unleash radon, methane, toxic gases, particulate matter and carcinogenic toxins into the atmosphere with associated health risks to people, wildlife and the land.
- Possibility of pollution and methane escape.
- No evidence that no gas will escape once drilling has been completed.
- Not acceptable for Roseacre to receive polluted air from flared gas.
- Inskip School is directly across from Roseacre Wood and will receive toxic fumes affecting the schoolchildren.
- Ozone and emissions from traffic/ tankers. Where is LCC's green policy?
- Application does not provide enough baseline data for monitoring impacts and the outcomes of the Environmental Risk Assessment is disputed.
- Comments from the Public Health England review need to be considered.
- There are no safe limits for PM2.5 small particulate matter.
- No consideration of dust at passing places - Wharles and Dagger Lane.
- Need a condition for independent baseline monitoring of air and ground gas including methane before the works start.
- Approach for air quality monitoring will not mitigate local community concerns.

Noise Pollution

- Contrary to FBLP Policy EP27 as constant noise will be detrimental to health.
- There will be noise pollution.
- Noise assessment results and analysis is disputed.
- The noise assessment should have used BS4142 (nuisance on local receptors) instead of BS5228 for construction sites.

- Receptors at Stanley Mews have not been considered.
- The noise levels will severely and adversely affect people's right of a quiet enjoyment of their homes.
- Area around Roseacre Wood is extremely quiet; development will be loud and intrusive in the rural area.
- Predicted noise levels may be ok in an urban area with ambient noise but will be loud and intrusive in a rural area.
- Moved to area to enjoy the peace and quiet, but this will be disrupted by HGV passing in front of house.
- Peace and quiet will be shattered by noise from fracking, day and night.
- Not acceptable to have drilling 24 hours a day, 7 days a week, 365 days a year, it will destroy the peaceful fabric of the villages and affect people's physical and mental health.
- Concerned about fracking noise from 7am to 7pm during the week and from 7am at weekends for 365 days of the year.
- Noise from HGV, heavy drilling and fracking will destroy communities.
- Impact of constant noise to migraine sufferer, significantly affect quality of life.
- Intrusive noise - will be able to hear from Inskip and Elswick.
- Will affect pets and horses, including livery yards in Elswick and Wharles.
- Cuadrilla exceeded set noise levels at Balcombe.

Light Pollution

- Contrary to Policy EP28 as it will not minimise harm relating to loss of local character, amenity or reduction in highway safety.
- Impact of light pollution and disturbance from floodlighting every night, 7 days a week, 365 days a year. Blight to the countryside.
- Little light pollution now so development will significantly affect local residents.
- The site will look like a football pitch with floodlighting in contrast to the beautiful rolling countryside.
- Visual impact of gas flaring and site lighting, in the setting of a rural locality, the light pollution will be greater than any agricultural development and will have an adverse effect on the community and tourism.
- Floodlights will ruin the night sky. The sky glow level is too high so nighttime operation should not be permitted.
- Will be visible from Roseacre and Inskip. Not acceptable.
- Concern regarding impact of lighting on road safety with regard to threshold increment (loss of visibility) and veiling luminance (disability glare).
- Detrimental impact on wildlife including resident bird population.

Soil and Groundwater Contamination

- Contrary to Policy EP24, from loss of well integrity from leaking wells toxic legacy for current and future generations.
- Contrary to Policy EP24, as proven damage to the groundwater and our water supply from fracking and leaking wells.
- Contrary to Policy EP15 if contaminated water enters watercourses and affects livestock, crops and wildlife. Rivers will become toxic soups.

- No guarantees that fracking chemicals and previously latent chemicals, radioactive materials, noxious/toxic/carcinogenic gases will not find their way through fractured shale or other pathway to water aquifers, groundwater and land and seriously pollute water, land, people, livestock, agricultural land and wildlife for years to come.
- Water pollution.
- Object unless 100% certain that in 10, 50 or 100 years time the toxins produced will not contaminate the groundwater.
- Contamination of nearby Thistleton Brook could pollute local water sources used by local farmers and the Wyre Estuary.
- Roseacre site is close to an aquifer and serious risk of groundwater contamination.
- Contamination/pollution from fracking process to aquifers.
- Cannot be guaranteed that there will be no contamination of the Sherwood Sandstone layer, principal aquifer.
- No right to poison the water table, affecting children's future.
- Risk of uncontrolled contamination/poisoning of groundwater.
- The Water Framework Directive requires that a development should not go ahead unless it is proven that there is no risk to groundwater.
- No thought has been given to how the fluids will migrate over time into the water supply as the well casing fails.
- Huge risk from broken wells leaking into the land and water supplies.
- Hazard from toxic spillage at the exploration/drilling heads.
- Wells will leak; flowback liquid will have 90times the permitted nuclear content and over 1400 times the permitted lead content.
- Contamination of Thistleton Brook could result in pollution of local water courses used by local farmers for their livestock.
- Soil pollution.
- The loss of land is permanent; a hole that cannot be effectively sealed is a permanent conduit for gas, flowback fluid and contamination. It may take years for the contamination to reach the surface.
- Soil cannot be cleaned; radium 226 has a half life of 1600 years.
- 48 million gallons of flowback liquid will be left in the ground at Roseacre site.
- Risk of chemicals into food chain/water supply is too high.
- Why inject 2.8M hydrochloric acid into the ground?
- Risk of contamination from, hydrochloric acid and polyacrylamide.
- Need full disclosure about the dangerous chemicals in fracking.
- No information on whether fracking fluid includes a chemical tracer.
- Radioactive materials will be released.
- Chemicals used in the process are harmful.
- No proper evidence that their proposals will not cause pollution.
- Need a condition for independent baseline monitoring of groundwater and ground gas before the works start.

Waste Disposal

- Creation of toxic wastewater.
- Each well will produce 2.5million gallons of flow back.

- Lack of information and research on how the massive amounts of waste water will be disposed of and treated.
- Inadequate measures are in place to treat and dispose of vast quantities of waste water. No adequate disposal solution has been presented
- There is no adequate treatment facilities that have insufficient capacity for huge volumes of hazardous and wastewater waste.
- Insufficient information in the Waste Management Plan regarding drill cuttings storage and disposal and dust implications.
- What will happen to flowback water and its treatment?
- No guarantee of safe disposal of chemical waste and drilling muds.
- Manchester Ship Canal cannot take anymore waste.
- Cuadrilla have dumped two million/thousands of gallons of radioactive/ contaminated waste water into Manchester Ship Canal (from Barton Moss) and were allowed to get away with it. The EA cannot guarantee that this will not happen again.

Water Resource Sustainability

- Contrary to CL1, vast quantities of water out of the hydrological cycle forever.
- Unsustainable use of water.
- Not enough water available for this use, where will it come from?
- Public drinking water must be preserved at all costs.
- Vast amounts of water should not be utilized / wasted for gas drilling, especially given water shortages in recent years.
- Recent droughts have resulted in water shortages and severely affected pressure and fracking will make the impact worse.
- United Utilities may not have adequate resources to protect drinking water.

Development in the Countryside / Landscape Impacts

- Need 30,000 wells to extract the gas.
- If goes into full production, farmland and rural spaces will be lost to hundreds of pads, gas processing sites, pipelines, compressor stations and new roads.
- Industrialisation of the rural environment and Lancashire countryside.
- Others sites on brownfield land should have been considered.
- Contrary to NPPF paragraph 112 and Policy CS4, as applicant has not demonstrated that the development could not be undertaken elsewhere due to any viable alternatives.
- Contrary to Policy DM2 as the development does not take account of the deviation from the baseline environmental conditions of a quiet rural area.
- Contrary to Policies SP2, SP5 and SP9 as it is not appropriate in a rural area and will prejudice the rural and undeveloped character and appearance of the countryside and impact rural communities.
- The proposal will destroy /change the beautiful Lancashire/Fylde countryside.
- Totally unsuitable in the heart of rural Fylde.
- Destruction of the rural habitat. The countryside should be preserved and cherished now and for future generations.
- Need to preserve the idyll rural landscape and rural heritage.

- Contrary to objectives to limit development in open countryside to that appropriate to a rural area, due to physical size, drilling rig height, fracking structure and security fencing.
- The development will visually split the two villages of Roseacre and Wharles.
- Need to examine sites for evidence of early settlements before it is lost.
- Environmental damage from construction and operation.
- The development will be an eyesore in pleasant fields.
- The size and scale of the development will be far greater than any agricultural development and will have an adverse effect.
- Visual nightmare with 53m high rig and site the size of a floodlit football pitch.
- Contrary to Fylde Borough Council's objective 1.50, no.2 - visually intrusive due to 53m high rig, the scale and size and distraction to motorists.
- A 53m high rig, comparable to Nelson's Column, grotesque in a country field.
- How is a 53m high rig and ugly noisy intrusive monstrosity allowed when planning refused for smaller structures/buildings in the area?
- How can wind farms and turbines be rejected as eyesores whilst this hideous drilling may be allowed?
- Impact of 4m high security fence.

Ecology / Wildlife

- Contrary to Policies EP15 and EP16 as the proposal will affect a European Site and SSSI site.
- Poses an adverse threat to wildlife and wildlife sites and watercourses including, including Ribble Estuary and Morecambe Bay RAMSAR sites, SSSI, Wyre Estuary SSSI, Marton Mere SSSI, Medlar Meadows, Medlar Woods and Medlar Ditch BHS sites, River Wyre, Thistleton Brook and Wyre Estuary Country Park.
- Object to access road at Roseacre Wood, the oldest wood in the parish. To remove trees from this wood would be environmental vandalism.
- Hedgerows will be ripped out to widen roads and canopy of TPO trees at Ladies Row could be affected by passing HGVs.
- Negative impacts on protected species including bats, brown hare, barn owls, great crested newts and birds.
- Adverse effect on wildlife throughout the day on local ecology / biodiversity.
- Fracking - huge adverse effect / harmful impact on wildlife, flora and fauna.
- Impacts from noise, lighting, air pollution (toxic fumes), surface water pollution into field drainage ditches onto wildlife including bird wildlife sites and habitats, resident bird populations, wintering wildfowl, barn owls, pink footed geese and ducks.
- Impact on pink footed geese and other bird species at Holmes Wood.
- RSPB do not support fracking.
- Impacts on fishing lakes and local pits with a variety of fish.
- Ecological surveys are incomplete and without them the Biodiversity Mitigation Strategy will be based on incomplete information.

Economy

- Boom and bust industry.
- Creation of thousands of jobs is utter nonsense.
- Potential benefits from full production not justify the development.
- Limited job creation, with only jobs for outside specialists, so no local benefit.
- Impact on tourism economy and subsequent unemployment.
- Adverse effect on Blackpool tourism despite some business support.
- Ribby Hall Holiday village would be vulnerable if Fylde is a gas field.
- Proposal is already affecting bookings to a local caravan site. If approved, the noise and light pollution, traffic and fracking underneath will result in lost trade and the site will close with impacts to local shops, pubs and restaurants.
- Contrary to Policy SP5 due to a negative impact on the leisure industry. Existing visitors (walkers, horse riders and cyclists) visit local shops, cafes and pubs and use livery yards, stables, campsites and B&Bs. Trade will decline as these pastimes will become dangerous and no-one will want to visit an area blighted by fracking nuisances and traffic.
- Resurgence for Lancashire food and tourism will be adversely affected.
- Put agricultural economic sector at risk.
- Industrialisation of land which could be used for food production.
- Prime farming land should be used for safe food production.
- Destruction of the fertile farmland / valuable farmland for dairy and arable use.
- Fylde has largest number of small farms per hectare in the whole of England.
- Primary area for dairy farming/grazing with cheese makers in the area, the development could jeopardise this industry and jobs.
- Food manufacturers and processors will not buy for fear of contamination of agricultural land putting agricultural sector at risk.
- Toxic fumes cause harm to farm animals.
- Need to maintain the farming heritage started hundreds of years ago.
- Any spillage on the land will render useless, resulting in a permanent loss.
- Adverse impacts on stables in the parish as people will keep horses elsewhere, with a significant impact to local businesses.
- The land around Roseacre Hall Farm and New Hall Farm is used for a shoot and should not be considered suitable for the well pad location.
- Impact of protestors on business and area.

Traffic

- Contrary to Policy SP7 as 200 vehicle journeys a day cannot be safely served proposed means of transport. It will be dangerous. Existing roads are not designed to cope with such traffic.
- Traffic will increase by 100% and will ruin the countryside.
- Significant increase in HGV traffic using roads that were not built for that use.
- One HGV every 3-4 minutes for 12 hours per day with associated air pollution.
- Contrary to Policies SP7 and SP9 as 6 axle HGVs will not be able to turn into Roseacre Wood without the whole vehicle on the wrong side of the road.
- Contrary to Policies SP7 and SP9, as HGVs on village roads / narrow country lanes will impact negatively on daily lives and residents amenity.

- Contrary to Policy SP7 as the development cannot safely be served by the proposed means of access and local road network.
- The roads will not safely serve Cuadrilla's operational needs with regard to size, quantity and nature of vehicles.
- Unacceptable/ Inappropriate use of small narrow rural bumpy lanes around villages of Roseacre, Wharles, Elswick and Treales by HGVs.
- Twisting roads in Roseacre, Wharles and Treales are already used by large and small agricultural vehicles, buses, school buses, delivery vehicles and commuter traffic to Springfields at Salwick and walkers, cyclists, horse riders.
- HGV use of Wharles narrow winding road would be detrimental to Wharles residents through noise, fumes and road disruption.
- The second preferred route along Inskip Road, through the busy centre of Cafforth village, along Catforth Road and over the narrow and inadequate canal bridge at Swillbrook is totally unacceptable and ridiculous.
- Unsuitable for Lorries to use narrow rural (B) roads as the access route to the site, especially Dagger Road and Roseacre Road, HGVs will not be able to pass safely and will endanger other road users.
- No sight lines for oncoming traffic on Dagger Road making it particularly dangerous. A HGV could not overtake a cyclist or horse rider.
- In Bucks Wood, Station Road has a significant hazard from poor sight lines when elevated, with a steep fall-off into the canal below.
- New Rail Bridge at Salwick is only 5.5m wide with steel barriers, so potential for accidents if a tanker meets a car and caravan going to a caravan site.
- HGV traffic from Clifton to Wharles will result in increased traffic along Inskip Road to Treales, which will impact the school and Salwick commuters.
- Clifton village is a 20mph zone, will suffer road vibration from heavy Lorries.
- Contrary to SP7. Elswick village will have up to 50 HGVs thundering through the village each day, with noise and air pollution and posing danger to children as there are no safe road crossings in the village.
- Traffic management plan controlling flow of traffic through Wharles will severely impact on our local amenity.
- Appalled that Treales will be turned into a glorified layby.
- DHFCS Inskip route would greatly reduce traffic and noise problems.
- There is no guarantee of use of DHFCS Inskip and residents have previously been warned about site dangers so is it a feasible option for site traffic.
- Object to the use of the A585 to junction 3 of the M55 for 75% of all HGV movements as it is seriously overloaded and has to take traffic from new housing at Wesham, Kirkham, Wrea Green and Warton, with serious existing problems from access, noise and pollution.
- Increased traffic on M55, A585 and A583. 'A' roads are extremely busy and dangerous roads already.
- Contrary to NPPF as there will be conflict between HGVs and other road users including pedestrians and cyclists.
- Contrary to Policies SP5 and SP9 as the local roads are used by hundreds of cyclists, horse riders, runners and pedestrians including children who will be at serious risk of injury and will lose an important social amenity.
- HGV traffic will make villages and country lanes a no-go area for cyclists, horse riders, runners, walkers, dog walkers and vulnerable road users.

- Risks to children travelling on school buses to local schools, from site accidents, road accidents and disruption from travel delays.
- Concerned for safety of children given increased traffic.
- Concern for walking on roads where there are no paths making it dangerous to walk between villages.
- Lack of pavements/narrow pavements will lead to intimidation of pedestrians.
- Danger of being pushed into dykes.
- Road safety risks from collision, skidding, failure to manage manoeuvres, weather and intimidation to other road users have not been addressed.
- Roads are not wide enough for 2 HGV's.
- Passing places on single track roads will not solve the problem and could cause accidents and deaths.
- Fatalities in recent years on country lanes will be increased by HGV traffic.
- It will cause disruption on narrow local roads, especially in summer months when the roads are used by visitors and tourists.
- Horse riders will not be able to ride down quiet lanes around Wharles as HGVs will be using them for 12 hours a day.
- Will cause major problems from confrontations between HGV and road users when unable to manoeuvre.
- Existing roads already have poor road surfaces with potholes and fractures which will be made worse by HGV usage, creating more danger for all.
- Vibrations and verge degradation has not been addressed.
- Cuadrilla traffic figures are incorrect, volumes are understated.
- Cuadrilla traffic assessment done in winter months so does not reflect higher traffic usage in summer including cyclists and horse riders.
- Lots of people use these roads already, major holdups in summer months.
- Who will monitor and enforce that the HGVs use a certain route?
- Traffic management system will cause great inconvenience.
- Improvements to road infrastructure through new roads and/or widening are not an acceptable solution, as following works (for profit) they will be abandoned for the ratepayer to maintain.
- Dangers of transporting toxic waste on roads where families live/travel
- Risk of spillage of hazardous material from HGVs in accidents on narrow road and/or with other motorists.
- Potential hazard from toxic spillage from use of narrow roads.
- Cyclists will be affected by spillages from vehicles leaving the site if inadequate washing down of vehicles.
- Application is contrary to Lancashire Local Transport Plan aims and goals.
- The sites should be located with access directly onto a main road.

Health and Well being

- Irresponsible to consider fracking in the UK until prospective studies have been completed and the cumulative health impacts of fracking have been determined, need proof of no adverse health impacts.
- Proven adverse impact on human health, leading to other countries banning it

- Contrary to NPPF which states that local authorities should ensure that mineral development does not have unacceptable adverse impacts on human health.
- Contrary to Policy EMP5 due to the potential for 120 fracking sites in the Fylde meaning many people will fall into high risk category for health impacts.
- The applicant has failed to acknowledge the sensitive residential receptors located less than 400m from the centre of the well pad.
- We do not want to be human guinea pigs. Unacceptable to risks to health.
- Health impacts to family from living in the vicinity of the site.
- People have a human right to remain safe, if allowed it's a violation.
- Fracking is very scary/ terrifying. People are fearful.
- Toxic fumes will cause illness to people.
- Concerned about health impacts especially to children and people with existing health issues e.g. asthma.
- Frightened by possible health risks to children. What damage will be done to children's health growing up with fracking; legacy for future generations?
- The development will affect health and happiness of children.
- Adverse impacts on children at Inskip, Catforth, Woodplumpton and Roseacre schools and nurseries from emissions, noise and pollution. How can the Government and LCC allow this to happen?
- American reports have linked air pollution/gas flaring, contamination and groundwater contamination from shale gas developments with health impacts in individuals within a radius of 10 miles.
- Lancet, British Medical Journal and the Medical Journal of Australia have linked the proximity of shale gas sites with increased health risks.
- Contrary to Policy EMP5 as US studies show an increase in cancer caused by chemicals produced during the fracking process.
- Reported health risks from living in the vicinity of fracking sites include neurological conditions, cancer, lung cancer, heart disease, respiratory problems asthma, stillbirths, low birth weights dermalogical conditions (skin rashes) and weight loss,
- Constant noise impacts on people's physical and mental health.
- Cumulative health impacts have not been addressed.
- Risk of exposure to carcinogenic gases (benzene) neurotoxins (toluene) and central nervous system impacts (xylene) and other chemicals including ethylbenzene, heptanes, octane and diethylbenzene.
- Impacts of reduced physical activity e.g. walking, cycling due to traffic. Impacts will affect general health.
- Health impacts will cause a strain on the NHS.
- Who will compensate us for health and well being impacts?
- Impact on leisure pursuits, fracking will remove the enjoyment of a rural life, impacting on cycling and walking activities.
- Contrary to NPPF paragraph 171 as impacts on the Lancashire Cycle Way through the use of Roseacre Road and other roads and lanes in the parish and constitutes a barrier to improving health and wellbeing.
- Residents are worried that if the application is approved, the works will slip like at Preese Hall and the development and disruption will be long term and result in significant health impacts on the community.

- Contrary to NPPF paragraph 144 and Policy SP5 as traffic management mitigations will disperse activity and prejudice village vitality.
- Quality of life will be undermined by threat or reality of earthquakes, contaminants, unsafe drinking water, health impacts, excessive traffic and property damage.

Community

- Contrary to NPPF core planning principles to support the intrinsic character and beauty of the countryside and thriving rural communities.
- Rapid industrialisation of small isolated rural communities.
- Negative impact on a rural community, damage will be immense.
- Fylde residents have not chosen to live in a fracking area, but are having it thrust upon them.
- Need to listen to local people not big business.
- Why frack here and not in London?
- Roseacre, Wharles and Treales are one community not three separate units.
- Development will industrialise Roseacre and Wharles.
- The site is too close to Roseacre and Wharles.
- Significant impact on the rural character of the area with the site situated between two hamlets which form a single community. The development will divide the community in half.
- Close proximity to 18 residential properties and 3 working dairy farms, nearest property is only 200m away.
- Development will cause major disruption and decrease quality of life.
- Contrary to Policy SP9 as it would adversely affect the amenity of nearby residents in terms of fumes, toxic spillage, noise, vibration and landscape character. Outcome for our villages should not be understated.
- Size and scale of the development will impact on the local community.
- Traffic will impact on daily life.
- Contrary to Policy SP9 due to loss of social amenity and social disruption, not able to sit in garden, enjoy BBQs, walk up the road to visit friends, walk the dog, leave windows open on a warm day, listen to birdsong, due to air and noise pollution and HGVs.
- People choose to live in a peaceful beautiful rural community for own and children's benefits.
- Area is popular with visitors, walkers, horse riders, cycle clubs and tourists so unsuitable for this development.
- Charity events held in the area could be at risk, e.g. sponsored sports.
- Development will undermine the work of the Villages in Bloom participants to make the villages a wonderful place to live.
- Significant impacts on rights of way, including noise, emissions, visual impact.
- Why should rights of way be taken away for private profit?
- Development facilitating community tensions.
- The application has caused inequality between the landowners agreeing to works on their land and the community opposing the development.
- Applicant's security team has monitored villagers, impinging our civil liberties.
- People will leave the area.

- If less people live in parish due to movement out and no people moving in, it could result in the loss of local primary schools and will destroy the currently strong and vibrant community that provides health and wellbeing.
- Horrified at impacts of fracking in other communities in America and Australia where it has been allowed.
- In Australia, fracking is not allowed in close proximity to residents.
- Stress on local services and infrastructure.
- Increased building of rental units.
- Cramped space from influx of trucks and equipment.
- Impact from protests

Property

- Moved to house to enjoy surrounding countryside.
- Moved here to be away from built up areas.
- Purchased house for quiet natural beauty which will be lost with excess transport and drilling noise.
- People have a right to good pleasant surroundings and a quality environment.
- Not happy to have a well site on my doorstep for the next 30 years.
- Against our human rights to destroy peace and quiet and our way of life.
- Privacy of residents will be destroyed.
- Fracking under home without consent is contrary to human rights.
- A list of landowners under whose land they intend to drill has not been provided so no permission has been given, this is a legal requirement as the trespass law has not yet been revised.
- House will be uninsurable. Will LCC compensate?
- Insurance companies are refusing to cover for fracking damage.
- Inskip village has running sand underneath making subsistence an issue, fracking will make this worse, creating high insurance premiums.
- People putting homes up for sale to escape the consequences of fracking.
- Disgraceful that the effect on private property values is not a ground to object.
- House equity was to support us in old age, but devaluation will stop this.
- Home will become worthless.
- Houses are becoming unsalable now. Will LCC compensate if unable to sell?
- A number of properties within 2km of the site do not have any foundations.
- More drilling will cause structural instability to many homes.
- Who will compensate us for property damage?
- What indemnity will LCC be given if damage occurs to my property from seismic activity?
- No hope of compensation.

Damage and Compensation

- No assurance that Cuadrilla will accept liability for any damage to properties and the environment. The local authority and the community will have to pay for any damage caused by Cuadrilla.
- Will local authorities be left to clean up the mess when the company has fled and filed for bankruptcy?

- Applications are from subsidiary companies and should be scrutinised by a forensic accountant. No reassurance that the applicant has the financial means to meet their obligations to reimburse residents or the council in the event of an accident.

Abandonment

- No evidence that Cuadrilla have expertise, experience or knowledge of abandonment / restoration works given the wrong timescales applied to previous applications. Need to restore a single well at Preese Hall first.
- No reference in the ES regarding hazards and risk mitigation when lifting and removing the impermeable membrane off site.
- No guarantee that the countryside will be returned to its former state when fracking ceases.
- The site can never be restored to the same condition.
- Contrary to Policy EP24, as wells will just be capped and left forever and 60% fail eventually.
- Who will be responsible for the abandoned wells?
- Lack of maintenance and responsibility for abandoned wells.

Applicant / Application

- Cuadrilla is greedy.
- Cuadrilla previous attempts at fracking failed, this application is madness.
- Cuadrilla have breached previous planning permissions here and at Balcombe
- £100,000 per community is equivalent to £53.00 per household, a small compensation for ruining our lives.
- Trying to bribe with monetary gifts and sponsorship.
- Councillors have been offered money to look at their land.
- Business community in Blackpool has succumbed to a charm offensive.
- Cuadrilla has not provided information when requested by local residents.
- Cuadrilla has not consulted residents of Inskip.
- Cuadrilla has not consulted residents of Catforth about the second preferred transport route.
- Application will have to be split or rejected as PEDL165 has expired and it only permits 1 well to be drilled.
- Cuadrilla community brochure was banned by the Advertising Standards Agency for misleading and unsubstantiated information. Can Cuadrilla tell the truth and be honest at the planning stage?
- The planning application documents including the ES are unreliable as they are full of inaccuracies, incorrect data, discrepancies in calculations and methodology and no constraints plan or mitigation of some impacts.
- No assessment undertaken of cumulative impacts for Roseacre and Little Plumpton

Government

- Government has not provided full information about the shale gas industry to the public.
- Permission should be rejected until fracking is properly debated in Parliament and by the British public in the run up to the 2015 General Election.
- Unacceptable to impose fracking on us by changes to planning and mineral rights laws and publishing reports with redactions, not the actions of a democratic or responsible government.
- Immoral and a corruption of a democratic government to increase use of carbon based fuels.
- Government fiercely oppose shale regulations.
- Government latest fad.
- Financial gain for ministers from mistreatment of the land.
- Do not bow to the wishes of central government.
- Do not accept government bribes.
- Why does Cuadrilla's Lord Browne have so much influence?
- Would David Cameron be so supportive if this was on his doorstep?
- Drill at Downing Street where there is plenty of gas.
- Government not bothered about the north of England and what happens here.
- What right has the government got to subject us to toxic pollution causing ill health and shortening of life expectancy?

Lancashire County Council / Decision making / Policy

- Are LCC for local people or money, profit and big business?
- Is LCC willing to put the lives and health of Lancashire residents at risk for a paltry financial gain?
- Any councillor who votes in favour of this bears the responsibility of the devastation to the local resident's lives and loss of value to the area.
- LCC Councillors should put the health and safety of Lancashire people above everything else.
- Will hold LCC individuals responsible for any health issues or deaths remotely connected to fracking if they allow it to take place in Lancashire.
- Once grant this application, it will set a precedent and lead to more intensive gas drilling in rural Lancashire for many years.
- If approved could lead to over 100 sites across the Fylde, need to carefully consider all implications.
- Any decision on Roseacre should be held until works at Preese Hall have been completed. Cuadrilla have shown complete disregard to the planning system and authority through the need for time extensions for restoration.
- Councillors should be aware that the Elswick -1 site has major differences in size and scale to this application so no comparisons should be made in the decision making process.
- Committee members should not be seduced by the notion of 'exploring' for gas when the works are production and the industry is unsustainable. They cannot allow Lancastrians to be guinea pigs in a cruel experiment.
- Will the planning board include people that actually live here?

- Fylde and Wyre Borough Councils and local people are against fracking.
- Decision should accord with NPPF. The proposal is contrary to NPPF Paragraphs 30,32,36,61,93,97,109,120,123,144,162,171,
- The proposal is contrary to Policies EC5, E5, GD1, EP10, EP11, EP12, EP15, EP16, EP17, EP18, EP22, EP23, EP24, EP26, EP27, EP28, CS4, CS9, DM2, SP2, SP5, SP7, SP9, EMP5
- The application is contrary to the JLMWDF Core Strategy as the activity will not be best practice.

Support

North and Western Chamber of Commerce

- Support shale gas development subject to conclusive evidence that the proposals are unsafe and will cause irreparable damage to the local environment.
- Welcome investment in Lancashire which could create thousands of jobs in the local economy directly through the supply chain and spread beyond that, through inward investment and spin off technologies.
- Help create well paid jobs in Lancashire and help rebalance the local economy and generate wealth.
- The National Transmission System for gas has spare capacity and runs through the county which has excellent road, rail, and air and port infrastructure.
- UCLAN and Lancaster University have considerable energy expertise across a range of disciplines which could benefit from the shale gas development.
- Lancashire is already a leading centre for the nuclear industry and advanced technology and manufacturing and with shale gas opportunities could regain its role as a national economic powerhouse, with Lancashire a centre of expertise for shale gas operations.
- Huge opportunity for Lancashire to use to generate economic growth.
- Following a review of Government, Royal Society, Royal Academy of Engineering, International Energy Agency, Energy and Climate Change Select Committee and Public Health England findings, concluded that if properly and effectively regulated, fracking is no more dangerous than any other form of energy extraction.
- Shale gas extraction would be at low risk to the environment and public health
- Confident that shale gas extraction will be properly regulated and take place safely and responsibly.
- Shale gas in Lancashire would strengthen the UK's energy supply as well as providing a bridge fuel towards a low-carbon future.
- Shale gas in Lancashire would establish Lancashire at the heart of a successful UK and European industry.
- Lancashire's Strategic Economic Plan, prepared by Lancashire Enterprise Partnership (LEP) and endorsed by Lancashire County Council, acknowledged that shale gas sector may play an important economic role in Lancashire within the timeframe of the Growth Deal and the locating of an elite institution in Lancashire for shale gas would be important in establishing the sector both locally and nationally.

Chamber of Commerce East Lancashire

- Important to the local and national economies and for international competitiveness to have energy supply, security, price and supply chain opportunities
- Assurance of energy supply will be a strategic consideration to would-be inward investors.
- Shale gas fills the gap between decommissioning coal and nuclear plants and the ideal of a no-carbon solution
- Shale gas will be a significant buffer against volatile imports
- Lancashire's manufacturing sector could gain from careful use of shale gas resources
- Lancashire's wellbeing and prosperity can benefit

Up to the end of December 2014 a total of 173 representations had been received supporting the proposals both in principle and in respect of the specific impacts that the proposals will generate in the locale. Representations have continued to be received in support of the proposal, the final number of which will be reported when the application is presented for determination.

The reasons for supporting the proposal have been summarised under the following headings:

Energy Security – need, supply and pricing

- UK needs to secure energy reserves as global energy demands increase and reserves decrease.
- Need to reduce reliance on expensive imported gas and associated impacts of supply disruption (due to political unrest) and fluctuating gas prices.
- Need to have a predictable, sustainable source of energy to ensure our energy supply and to stabilise prices.
- Shale gas is critical for future energy strategy.
- Bowland could supply the UK with gas for 23-169 years.
- US shale gas has reduced energy prices.
- If priced correctly shale gas would force competition in the energy market.
- Everybody wants cheaper energy; gas is the cheapest source of energy.
- Shale gas will be potentially vast resource of clean sustainable energy for the UK which could help deliver climate change commitments by substituting for coal in electricity production and thereby reducing emissions of CO₂.
- Need to explore all future energy sources, renewable, nuclear and huge store of natural energy from shale.
- Shale could bridge the gap until we build up renewable and/or nuclear capacity to deliver the quantities we need.
- UK cannot be sustained on renewable energy such as wind or solar power.
- A wind farm requires 200 times as much land as a fracking well site for the same energy output and residents are anti wind farms.
- Prefer to have shale gas than nuclear energy.

Economic benefits

- Need to determine whether or not the gas is in commercial quantities.
- Shale gas development will bring economic growth, wealth, prosperity and jobs to the UK, Northwest and Lancashire economies.
- It's vital to the country's prosperity to exploit our natural reserves and to benefit future generations.
- Energy from a local source will be good for the local economy and could attract high gas consuming businesses to relocate in the region.
- SME business failure may be avoided by stabilising energy costs and by providing new business opportunities as part of the supply chain - energy services, components, education/training, hospitality, property.
- Federation of Small Businesses support the proposal as an economic driver for the region, creating jobs and wealth and securing future energy needs. Rising energy costs are a concern so shale gas could help tackle that.
- Shale gas exploration will provide increased potential for local business growth and revenues and provide employment for local people.
- Shale gas could be a catalyst bringing in inward investment and regenerating Lancashire and Blackpool.
- This opportunity should be welcomed and not lost to other counties and countries. Shale gas could transform Lancashire like North Sea oil/gas has done for Aberdeen.
- Fylde Borough Council and Lancashire County Council will benefit from tax revenues, which could help pay for public services and infrastructure.
- Investigation works have already provided significant business to the accommodation sector in and around Blackpool with knock on impacts.
- This is an opportunity to change the region from high unemployment and no industry, to an innovative area that supports new industry and is a leader of new technology within the energy sector.
- Without shale gas, what is the economic future for Lancashire and Blackpool, Blackpool has high levels of deprivation, child poverty, poor health, benefits dependency and youth unemployment.
- Fylde coast has an over dependence on declining agriculture and tourism sectors with a transient, seasonal, low paid, unskilled, migrant workforce.
- Shale gas provides economic diversity through new industrial activity, generating skilled permanent jobs and youth employment opportunities, directly or indirectly through the supply chain including engineers, apprentices.
- If shale gas development is not allowed in Lancashire, but develops elsewhere, Lancashire will miss out on revenue and employment generated by supply chain businesses.
- New jobs essential for Fylde coast.
- The energy industry creates jobs and prosperity on a grand scale.
- Job prospects for future generations will help stop them having to move away.
- Every aspect of the community will benefit, including people struggling to pay gas bills through cheaper gas prices.

Minimal Environmental Risks

- Environmental impact of shale gas is less than any other energy source, mineral and coal extraction has a far larger impact on our environment.
- Shale operations are sustainable, non-polluting and can be undertaken with minimal risk to the environment.
- Shale gas development has been safely undertaken in America for 10 years.
- The process of rock fracturing and its waste products have been intensely investigated and proven to be totally safe.
- Reports by the Royal Society, the Royal Academy of Engineers and other academics have concluded that shale gas is safe.
- Out of approximately 8,500 wells in the UK none are leaking. Repairs can be made by squeezing methods. There have been internal leaks in well called well barrier leaks but these are not integrity issues.
- The exploration site will not have a measurable difference on impacts to designated ecological sites. They will be at no greater risk than from general risks from other industry and infrastructure.
- Cuadrilla's breach of planning permission at Balcombe was due to a slight noise excess of 6dB which is not dangerous and immediate action was taken.
- Flaring will be done in a fully enclosed, high efficiency, low light and noise burners which will have minimum impact, and will be temporary in nature. Once pipework is installed, green completions with no flaring will be used. The Elswick gas well is not flared and virtually invisible.
- The drainage, required by the Environment Agency, from the chemical and waterproof well pad is of rainwater and will contain any spills. Runoff is disposed of under licence from the EA after testing that it is not polluted.
- Comments that the geology of Lancashire is not suitable for fracking have been provided by a professor who retired 18 years ago and is now living in France running a B&B. Evidence in the US and UK is to the contrary.
- The Traffic Light System for seismic monitoring has been devised after much research by expert geologists and the British Geological Society and with the agreement of DECC.
- Shale will not generate large earthquakes as it is a soft rock. After over 1 million shale frack jobs, only 3 have resulted in detectable earthquakes. Cuadrilla's well was one of the unlucky ones. None have caused proven damage.
- Many claim that fracking causes serious quakes in the USA. However these are not fracking, but waste water injection, which is banned in the UK.
- Reports linking fracking and health impacts are not published medical papers and the results are dismissed by local health authorities. These studies cite chemicals that are not permitted anywhere in the EU. The fluid storage methods used in the US are also not permitted here. Open pits can split or flood and volatile materials and gas can escape. That's why they are banned in the EU/UK. Even if the studies were valid, they would not be relevant to the UK.
- The predicted well spacing in Lancashire in full production would be 1 x 4 acre pad every 5km. horizontal drilling and 24 wells per pad mean very little visual impact. The pictures produced by RAFF are not representative.

- Treatment of waste is covered by the EA by licence and they are minded to approve the plans. A local company has a cleaning technique that will ensure this will happen. Much of the flowback fluid may be reused.
- The water required even for a fully developed industry is a tiny fraction of one percent of the water produced in the UK. Farming and industry are much bigger users. It's all covered by agreements with Water UK and in a drought water would not be supplied. This is not an issue for the drillers. They don't have to frack a well as soon as it's drilled. They can drill another one and wait till the rains all start again. This is a non-issue.
- Sites are fairly remote, once infrastructure is in and the rigs etc have gone there will be no visual issues so why should they affect property values.
- The Infrastructure bill, currently being debated in Parliament, will require a fund to cover any damage or problems that occur if the company goes bust so locals do not have to pay.
- Long term impacts for the area are minor, buried pipes and some fenced off areas in a wood, will help heat thousands of homes with UK produced gas and provide feedstock for chemical and pharmaceutical companies. These are major industries in the UK that are being squeezed by high energy costs.
- Security of energy, economic benefits and job creation far outweigh any supposed environmental risks, minimum disruption or inconvenience.
- Environmental costs will be imperceptible and of no significance to health and wellbeing of communities in and around the proposed developments.
- Lancashire experiences natural geological processes/earth tremors; shale gas will not significantly increase the incidence.
- The possibility of any localised pollution is the same as any other industrial or agricultural business.
- The development footprint of a producing gas well is minimal.
- Drilling rigs will be no more visually intrusive than large electric pylons and site lighting will be no more visually intrusive than airport approach lights.
- The noise of drilling will be low compared with noise of jet aircraft at Warton.
- Vehicle movements are less than to quarries/waste disposal sites and vehicle sizes are no greater than large farm equipment used by local farmers.
- Routing of traffic will be controlled by planning conditions and the use of byways for cycling will not be impaired.
- Environmental concerns raised by professional protesters have been overstated / inaccurate, to scaremonger local communities to oppose.
- Opposition viewpoint over-emotional, ill informed and nimbyism. Adverse factors identified by objectors have no scientific credibility.
- Silent majority support the proposal, cannot let activists jeopardise new jobs.

Robust Regulatory framework

- Exploitation of shale gas in Lancashire is safe and will avoid environmental impacts if environmental protection measures are implemented to best practice standard and monitored and controlled by regulatory bodies.
- Regulations, enforced by Lancashire County Council, the Environment Agency, the Health & Safety Executive and DECC/Government will ensure that the process is safe and safeguards protect the environment.

- The Environment Agency is convinced that shale gas activities can be carried out safely and will monitor the development in the short and long term.
- The UK has 60 years of regulating onshore and offshore oil and gas industries
- The UK has some of the toughest and most stringent health and safety, environmental and drilling regulations and the gas industry prioritises safety, environmental protection and competence.
- Scientists/engineers located in Lancashire are confident with the process, regulations and limited risks to the environment.
- Public scrutiny and implementation of regulations will ensure the safe and responsible extraction of shale gas.
- Cuadrilla is open and informative about their development and is aware of its responsibilities with regard to safety, environmental management and working with local communities.
- At Annas Road site, Cuadrilla kept residents well informed, noise was minimal (similar to light aircraft /farm vehicles), increased traffic was negligible and there was no noticeable smells or gases.
- Small generation plant at Singleton has been running reliably for over 20 years off shale gas without people being aware of its existence.

Appendix 3

Air Quality

Proposal

The applicant has assessed air quality impacts in Chapter 6 and Appendix E of the Environment Statement. It does this by predicting the likely changes in pollutant concentrations as a consequence of the project. These are then compared to air quality objectives and limit values for these pollutants to determine whether the predicted changes are significant.

The area in which the site is situated is rural and not densely populated. There are no existing significant sources of emissions to the atmosphere. Likewise, there are no areas within the vicinity of the site where there is an existing problem with air quality or pollution.

The project has five main activities that will result in emissions to the atmosphere, these are:

- Emissions from construction activities;
- Emissions from the vehicles associated with the use of the site;
- Emissions from the flaring of gas during flow testing;
- Emissions from equipment associated with the operation of the Site (e.g. generators); and
- Possible fugitive emissions (i.e. unexpected or uncontrolled emissions)

The main source of atmospheric pollutants from the project is the gases that are emitted when gas is burnt in the flare during flow testing. The assessment in the ES quantifies the amount of nitrogen dioxide, benzene and radon that could be emitted from the flare and how it would be dispersed using weather data for the prevailing wind directions.

The predicted air quality emissions from the project have been compared to Air Quality Objectives and Limit Values for the different pollutants likely to be emitted by the project activities (Section 6.7 of the ES). These objectives and limit values are based on minimizing health effects as a result of acute or chronic exposure to potentially sensitive individuals.

Dust

The risk to nearby receptors has been assessed by the applicant. This assessment has concluded that there is a negligible to low risk of dust being created by the project and it will not result in a significant effect. This is because there is sufficient distance between the site and potentially sensitive receptors. Furthermore, the scale and duration of the project activities (construction of the access track and well pad and decommissioning) will not be carried out over a long period of time (less than 2 months for each activity).

Emissions from generators

The applicant has provided details of equipment that will be used at the site, i.e. pumps, fracturing water transfer pumps, generators, blender units and service rigs. The equipment will be used during the drill phases for the duration of the drilling. During the hydraulic fracturing the engines will be run for only a few hours at a time. Given the size of the generators and engines and the relatively short period of operation, these sources have been scoped out of the assessment by the applicant. A table summarising the generators used on site is provided in Appendix F of the ES.

Further information was requested from the applicant to justify the decision to remove the generators from the scope of the assessment. This has been provided and provides sufficient information to justify the applicant's conclusion.

Emissions from road traffic.

To assess the impacts from road traffic an initial screening exercise was undertaken by the applicant that examined the likely changes in vehicle numbers on the road and compares these with criteria from the national guidance 'Design Manual for Roads and Bridges' (DMRB) to determine whether a more detailed assessment was required. The criteria are not exceeded so no significant air quality impacts are likely, according to the applicant's assessment.

Again, further information was requested to justify this decision and this has been provided and provides sufficient information to justify the applicant's conclusion.

Emissions from the Flare

The Air Quality chapter of the ES (Chapter 6) includes a forecast and assessment of the potential quantity and effects of NORM in the form of gas (specifically radon) that may be present in the gas that is burnt in the flare stacks. These predictions have been compared to an annual dose limit of 300 microSv/yr for a single source. The predicted emissions from the combustion of gas in the flares is 0.3 microSv/yr. This is one thousand times lower than the International Commission on Radiological Protection (ICRP) limit. Therefore, the applicant concludes, the levels of NORM emitted to the atmosphere by the project do not present a significant risk to health.

The flares that will be used to burn gas generated during initial flow testing are the main source of emissions to air associated with the project. The concentrations and distribution of pollutants (specifically NO₂ and benzene) have been modelled by the applicant so that the effect on air quality, and indirectly health, can be predicted at potentially sensitive receptor locations around the site (residential properties). The ES air quality assessment concludes that the levels of NO₂ and benzene are well within the regulatory limits and therefore do not present significant risk to health.

The air quality effects from the project have been assessed for dust, NO₂, PM10, PM2.5, benzene and NORM. The assessment by the applicant for all of these parameters has concluded that the emissions from the project will not be significant.

Because of the low risks, the applicant says the only mitigation measures required are standard dust control measures that are used during construction of the access track, well pad and the installation of the connection to the national transmission

system. According to the ES, these will be sufficient to manage the risk of the project generating dust that could adversely affect vegetation or nearby properties.

Summary of consultee comments and representations

Lancashire County Council Director of Public Health: The County Council's Director of Public Health has provided specific advice to inform the planning process and provide public health advice to protect and improve the health of local residents living near the proposed shale gas exploration sites of Preston New Road (planning application numbers LCC/2014/0096 and 0097) and Roseacre Wood (planning application numbers LCC/2014/0101 and 0102). The advice was published as a Health Impact Assessment (HIA) in November 2014. This is covered in more detail in Appendix 17.

The Health Impact Assessment makes 45 recommendations to a broad range of agencies, suggesting actions before, during and after any permissions or permits are granted. Appendix J contains 16 specific recommendations to inform this planning process.

Three of the 16 recommendations in Appendix J relate specifically to air quality as follows:

3. *Undertake an independent verification of the assessment of air quality, transport, waste management and induced seismicity prior to determining the planning applications.*
6. *Consider the need to seek further clarification from the Applicant that the cumulative impacts of the operations from the flare, generators, vehicles and drilling will not exceed the national air quality objective thresholds, particularly for PM 24 hour mean levels*
7. *As part of either the planning or permitting process, the Applicant should be required to submit regular data on the ambient air quality on site measuring all the common air pollutants relevant to the activity and report them regularly. PM10 and PM2.5 should be reported separately.*

Public Health England (PHE): has sought a number of clarifications regarding the planning application in two separate consultation responses. In turn, the clarifications and questions contained in both PHE responses have been satisfactorily addressed as a result of further information or clarification provided by the applicant.

In many cases, the applicant has clarified how and where the PHE comments are addressed in the Environment Statement submitted with the planning application, or has submitted additional information. This further information has been the subject of further consultation. Several of the clarifications requested by PHE are also controlled by the Environment Agency through the permit process.

PHE conclude that although onshore oil and gas extraction and related activities have the potential to cause pollution to air, land and water, the currently available

evidence indicates that the potential risks to public health from exposure to the emissions associated with such extraction are low if the operations are properly run and regulated.

Overall, based solely on the information contained within the application provided, PHE has no significant concerns in relation to the potential emissions from the site adversely impacting the health of the local population from this proposed activity, providing that the applicant takes all appropriate measures to prevent or control pollution, in accordance with the relevant sector technical guidance or industry best practice.

PHE agrees with the proposals to undertake baseline monitoring of ground waters, surface waters and local air quality to better assess the impact on the environment from any development. However, it says the details of the baseline monitoring prior to operations need to be provided to ensure it will allow assessment of the impact of operations on the local environment.

PHE say the levels of radon are very small and there are no grounds for concern about the potential radiological impact of radon arising from the proposed activities. Similarly, on naturally occurring radioactive material (NORM) PHE confirm the dose is significantly below PHE's recommended level and is not a concern.

Fylde Borough Council: objects to the proposal. The Borough Council believes operations would be in relatively close proximity to residential properties and the noise and general disturbance from 24 hour drilling operations and associated activity would be significant. The Borough Council says the proposal is contrary to the provisions of Policy DM2 of the Minerals and Waste Local Plan and Policies EP26, EP27 and EP28 of the Fylde Borough Local Plan which are considered to be in conformity with the provisions of the National Planning Policy Framework.

In terms of air quality, the Borough Council states the increase in road traffic is unlikely to approach the "action" level of $40\mu\text{g}/\text{m}^3$ but the area will see a rise in air pollution albeit not very significant but due to low current levels there will be a significant percentage increase. It is the Borough Council's intention to relocate one of the NOx tubes that is used to monitor road traffic pollution in another area to this location.

In addition, the Borough Council requests that the applicant shall ensure that there is continuous monitoring of air quality as a result of increase road traffic to demonstrate that air quality guidelines are being met.

Dust – the site has been categorised as "medium" with reference to likelihood of dust creation and dispersal. Due to the sensitivity of the environment and the residents the Borough Council advises that the site is categorised as "large".

Medlar-with-Wesham Parish Council and Kirkham Town Council: Object to the proposal as submitted and requests that it be refused planning permission for the following air quality related reason: Air pollution from gas emissions. Flaring can lead to over 250 pollutants including methane.

Roseacre, Wharles and Treales Parish Council: Objects to the proposal on the following air quality related grounds:

- Air quality monitoring regime is not acceptable. Need baseline data and real time publicly available data on a range of pollutants and the combined impact of flaring, fugitive emissions and equipment and transport emissions.
- Dust assessment is inadequate and does not take account of construction and daily utilisation of passing places through Wharles and Dagger Lane.
- HGV traffic volumes will have an unacceptable adverse impact on the community through air and noise pollution and general nuisance.

Friends of the Earth: Have made two representations. On air quality, the following issues are raised:

- People including children will be exposed to pollutants from traffic.
- The planning authority should check the baseline air quality and assess whether the development will significantly add to air quality issues and whether significant people will be affected.
- The air quality assessment does not identify vulnerable groups e.g. Inskip pre-school, a nursery in Elswick and residents of Wharles who will experience notable changes in traffic. Residents of Roseacre, Wharles and Elswick could be receptors of emissions. Impacts on Kirkham and Wesham not considered.
- Emissions from generators, engines and site equipment for drilling have been scoped out of the air quality assessment despite the potential for emissions.
- All possible sources of emissions should be included with cumulative impacts assessed, including increased NO₂ levels.
- There will be air quality impacts and mitigation is required, with reference to the Air Quality Directive.

Other representations

The following is a summary of the issues raised in representations that relate to air quality:

- Proposal will result in unacceptable levels of greenhouse gas emissions / toxic air pollution from flaring and health impacts to residents
- Proposal is contrary to Policy EP26 due to flaring and air quality impacts
- Flared methane emissions from fracked gas are worse than from coal
- It is estimated that up to 7.9% of methane from shale gas escapes to atmosphere from venting and leaks over the lifetime of a well.
- In the USA, the methane emissions from shale developments were up to 1000 times higher than initially reported.
- Flaring of methane 24hrs a day is not clean energy
- Methane flaring will lead to over 250 pollutants

- The proposal is contrary to Article 4 of the mining waste directive which requires that the best available technique for the management of waste should be used e.g. green completion.
- In the US, the Environmental Protection Agency (EPA) requires use of green completion technology from 2015 for hydraulically fractured wells instead of flaring to reduce air pollution.
- The description of the proposed flare is unclear
- Flare plume dispersal modelling should be a priority
- Flaring within 230m of a residential property is not acceptable
- Fracking will unleash radon, methane, toxic gases, particulate matter and carcinogenic toxins into the atmosphere with associated health risks to people, wildlife and the land
- Radioactive products will be released into environment, and will affect drinking water and food production.
- Radon should be treated as a hazardous waste
- Potential impact from air pollution to Westby reservoir and watercourses
- Possibility of pollution and methane escape
- Fumes from the flare will concentrate toxic air pollution, which will be detrimental to local residents, including those at the caravan park.
- Air pollution will impact people and particularly those with existing illnesses, breathing disorders and low immune systems.
- Impact of flaring, burning gas between 30days to 2 years
- Not acceptable for Roseacre to receive polluted air from flared gas
- Inskip school is directly across from Roseacre Wood and will receive toxic fumes affecting the schoolchildren
- Gas flaring is hazardous and will cause fires in homes
- Impact of 100 lorries per day will release carbon monoxide and carbon dioxide
- Waste fluid left in open air pits to evaporate will release harmful VOC's (volatile organic compounds) into the atmosphere
- The development will increase nitrogen dioxide levels and increase health risks to local residents
- If boreholes are not sealed properly there will be fugitive gas emissions.
- Is Cuadrilla being made to fit special filters to machines, diggings, chimneys, diesel generators etc?
- Need air quality monitoring for Great Plumpton given the prevailing wind and likely negative impacts
- Residents sought rural environment for clean air and now at risk of adverse effects
- Negative impact from air pollution on enjoyment of property, garden and living in Great Plumpton
- Emissions should be monitored with limits and fines for exceeding
- There will be an unacceptable level of dust generated
- Ozone and emissions from traffic

Policy

As part of the National Planning Policy Framework, planning practice guidance on various topics has been published. In relation to air quality, the guidance refers to the significance of air quality assessments to determine the impacts of proposed

developments in the area and describes the role of local plans with regard to air quality. Paragraph 5 sets our considerations on whether or not air quality is relevant to a planning decision, stating this will depend on the proposed development and its location. Paragraph 9 sets out a flow chart to be followed in the development management process.

Policy DM2 of the JLMWLP states that development for minerals operations will be supported where it can be demonstrated that all material social, economic or environmental impacts that would cause demonstrable harm can be eliminated or reduced to acceptable levels. In assessing proposals account will be taken of the proposal's setting, baseline environmental conditions and neighbouring land uses, together with the extent to which its impacts can be controlled in accordance with current best practice and recognised standards.

Assessment

Overview of air quality impact.

Lancashire County Council Scientific Services (LCCSS) carried out a review of the air quality chapter (including radon) of the Environmental Statement.

The review concluded that the documents provide sufficient detail to show that the applicant has carried out the assessment in a satisfactory manner and that the conclusions drawn from the assessment are valid.

The review found that the documents for both sites identified the following emissions from the activities before, during and after operations: fugitive dust, nitrogen oxides and particulate matter, volatile organic compounds (VOCs) and odours.

The review suggested there are other potential pollutants not mentioned in the assessment which may adversely affect air quality. These include sulphur dioxide, hydrogen chloride and other potentially carcinogenic VOCs. It was suggested that the assessment should explicitly consider these chemicals, but if the consideration concludes these chemicals are of little or no concern this should be confirmed. Further information has been provided by the applicant in relation to these points:

Sulphur Dioxide & Hydrogen Chloride

Results of testing of gas from Cuadrilla's Preese Hall well did not detect any sulphurous compounds or chlorine compounds in the gas. It is therefore assessed as very unlikely that there will be any significant concentrations of sulphur dioxide or hydrogen chloride in the gas produced at the proposed site. The applicant concludes that the contribution of sulphur dioxide is insignificant. The Environment Agency draft permit documentation supports this view.

Monitoring of the gas quality will be undertaken once the site is operational. This will mitigate the risk of any unexpected pollutant emissions going undetected. In addition, the EA draft permit (which incorporates the Waste Management Plan) provides for ambient sulphur dioxide monitoring.

Potentially Carcinogenic VOCs

The air quality assessment has identified the most significant VOCs (volatile organic compounds) as benzene and benzo[A]pyrene (BaP) (selected to represent carcinogenic VOCs). The main pollutants of concern which are included in the air quality objectives are benzene and BaP (Benzo[a]pyrene). The benzene results are included within the ES, section 6.7.5.

BaP: Due to limited amounts of information on polycyclic aromatic hydrocarbons (PAHs) being available in the UK, for the assessment at Preston New Road a precautionary approach has been taken by the applicant by making assumptions based on data from Alberta, Canada. The information has been used to determine the emissions of BaP that could potentially result in a breach of the UK objective for BaP (0.25ng/m³ annual mean).

Analysis undertaken by M.Strosher et al looking at the composition of flare gas from natural gas extraction sites in Canada is the report which has been used for the assumptions made for the Preston New Road site, which in discussion with the Environment Agency is considered the best source of information regarding BaP content of shale gas.

The applicant has made a worst case assumption for the Preston New Road site in the ES (chapter 6) that assumes that C6 hydrocarbons constitute 0.1% of the total emissions. The Alberta report indicates that BaP is around 1/1000th of the amount of Benzene. Using this as the worst case assumption, the potential contribution from the Preston New Road site can be calculated. Based on this approach the highest predicted annual mean concentration is 0.0224 ng/m³ which is well below the UK objective (0.25ng/m³). In summary, the findings in the ES and the further information submitted by the applicant conclude that the risk of any impacts of VOCs emissions from the flare on local receptors would be not significant. In addition, the EA draft permit (which incorporates the Waste Management Plan) requires ambient monitoring of VOCs and BTEX (benzene, toluene, ethylbenzene, and xylenes) and indirect monitoring of the flare of VOCs among other chemicals.

Emissions from construction activities

The risk to nearby receptors has been assessed by the applicant. This assessment has concluded that there is a negligible to low risk of dust being created by the project and it will not result in a significant effect. This is because there is sufficient distance between the site and potentially sensitive receptors. Furthermore, the scale and duration of the project activities (construction of the access track and well pad and decommissioning) will not be carried out over a long period of time (less than 2 months for each activity).

Emissions from the vehicles associated with the use of the site;

Environmental Protection UK (EPUK) provides guidance (Development Control: Planning for Air Quality, 2010) to help establish when an air quality assessment is likely to be considered necessary because a proposal might cause a significant change in air quality. Environmental Protection UK is a national charity that provides advice on air quality and their effects on people and communities.

For emissions from vehicles, the following guidance is provided.

- *Proposals that will give rise to a significant change in either traffic volumes, typically a change in annual average daily traffic (AADT) or peak traffic flows of greater than ±5% or ±10%, depending on local circumstances (a change of ±5% will be appropriate for traffic flows within an AQMA), or in vehicle speed (typically of more than ±10 kph), or both, usually on a road with more than 10,000 AADT (5,000 if 'narrow and congested');*
- *Proposals that would significantly alter the traffic composition on local roads, for instance, increase the number of HGVs by say 200 movements or more per day, due to the development of a bus station or an HGV park (professional judgement will be required, taking account of the total vehicle flow as well as the change);*

The applicant has used this guidance to assess the significance of vehicle emissions on air quality. A significant effect would occur if the number of HGVs was to increase by 200 or more per day, or the overall traffic flow was to increase by more than 1,000 vehicles per day.

Construction: Vehicle traffic movements during the construction phase reach a worst case maximum of 34 average annual daily traffic (AADT) movements (12 cars or vans and 22 HGVs). Following the EPUK guidance (which states the number of vehicles required in order to trigger the need for a detailed assessment - an increase in HGVs by 200 or an increase in total AADT by 1000) it is clear the number of vehicles is well below the thresholds which would require a detailed assessment. It is therefore concluded that the air quality impacts of exhaust emission from vehicles in the construction phase is not significant.

Drilling: Vehicle traffic movements during the drilling phases reach a worst case maximum of 45 AADT (32 cars or vans and 13 HGVs). Following the EPUK guidance which states the number of vehicles required in order to trigger the need for a detailed assessment (an increase in HGVs by 200 or an increase in total AADT by 1000) it is clear the number of vehicles is below the thresholds which would require a detailed assessment. It is therefore concluded that the air quality impacts of exhaust emission from vehicles in this phase is not significant.

Initial flow testing: The maximum impacts on air quality will take place during the initial flow testing stage (from the flare). Traffic flows in this phase are well below the level which would require a detailed assessment. The impact from vehicle movements during this phase is therefore considered not significant. This would also apply if greater than anticipated flowback rates were encountered because the maximum number of daily vehicle movements is significantly less than the 200 HGVs or 1000 vehicle movements per day threshold.

Extended flow testing: No significant air quality impacts are expected as a result of the construction phase for extended flow testing. Limited vehicle movements will occur during this phase of activity, these movements will have a negligible effect on air quality and therefore are not significant.

Decommissioning and restoration: Extended Flow Testing Infrastructure; limited vehicle movements will occur during this phase of activity so there are no significant effects on air quality. Exploration well, pad and access track; decommissioning the well pad and access track will require the same number of vehicle movements as during construction so the air quality impacts of exhaust emission from vehicles is again not significant.

Emissions from the flaring of gas during flow testing:

The main source of atmospheric pollutants from the project is the gases that are emitted when gas is burnt in the flare during flow testing.

Environment Agency assessment

The Environment Agency has undertaken its own detailed assessments of the emissions to air that will arise from the flow testing operations (i.e. from the flare) and the potential impact of these emissions on human health and ecological receptors.

Detailed air dispersion modelling has been carried out by the Agency. This considered the potential impacts of the main pollutants that could be emitted from the combustion of natural gas based on its expected composition:

- Oxides of nitrogen / nitrogen dioxide
- Benzene (a volatile organic compound)
- PAH emissions (a reference to benzo-a-pyrene)

Particulate emissions have been covered by a qualitative assessment as the Agency would not expect particulate (PM10) to result from gaseous emissions.

Sulphur dioxide (SO₂) was not included in the Agency's assessment because the applicant provided information based on other gas extraction locally that no hydrogen sulphide (H₂S) has been identified during monitoring of the drilling muds or gas.

Having undertaken a detailed assessment, the Agency is satisfied that the emissions from the flare would be insignificant at locations closest to the site.

In terms of public health impact of the flare emissions, the Agency's audit checks, modelling and sensitivity analysis confirms there will be no exceedance of standards established for human protection. Indeed, the modelling assumed the flares would be operating for 24 hours, 365 days per year per well. The actual proposal is for the flares to operate for no more than 90 days per well.

Public Health England assessment

PHE conclude that although onshore oil and gas extraction and related activities have the potential to cause pollution to air, land and water, the currently available evidence indicates that the potential risks to public health from exposure to the emissions associated with such extraction are low if the operations are properly run and regulated.

Based solely on the information contained within the application provided, PHE has no significant concerns in relation to the potential emissions from the site adversely impacting the health of the local population from this proposed activity, providing that the applicant takes all appropriate measures to prevent or control pollution, in accordance with the relevant sector technical guidance or industry best practice.

PHE agrees with the proposals to undertake baseline monitoring of ground waters, surface waters and local air quality to better assess the impact on the environment from any development.

Emissions from equipment associated with the operation of the site (e.g. generators)

In the Environment Statement (ES), the applicant provided details of equipment that will be used at the site, i.e. pumps fracturing water transfer pumps, generators, blender units and service rigs. The equipment will be used during the drill phases for the duration of the drilling. During the hydraulic fracturing the engines will be run for only a few hours at a time. Given the size of the generators and engines and the relatively short period of operation, these sources were scoped out of the assessment by the applicant. A table summarising the generators used on site is provided in Appendix F of the Environment Statement.

However, the County Council requested the applicant to undertake a further assessment to demonstrate (and justify) the exclusion of the generators from the air quality assessment in the ES. This assessment was undertaken and the information provided by the applicant was subject to a further round of public consultation.

The further assessment included detailed dispersion modelling to assess the impacts from the generators and the vehicle movements to/from the site. A number of worst case assumptions have been made in the modelling to ensure a conservative approach has been taken. The modelling shows that no significant effects are likely to result.

Further corroboration of the conclusion that no significant effect is likely from PM10s is demonstrated by the generators being below the threshold of local authority regulation. Fylde Borough Council has confirmed this is the case. This is a result of the Environmental Permitting (England and Wales) (Amendment) Regulations 2014/255. The amendment removes the need for the aggregation of diesel generators with a rated thermal input of less than 3 megawatts:

The modelling shows the PM10 24 hour mean level (50 ug/m³) is not breached on any day of the year. The national standard (24 hour mean, 50 ug/m³) allows for 35 breaches per year (90.4 percentile).

Possible fugitive emissions (i.e. unexpected or uncontrolled emissions)

The Environment Agency draft permit requires that during drilling of the exploratory boreholes, fugitive emissions of natural gas are to be prevented by increasing the hydrostatic pressure of fluids so as to prevent gas release. The well will also be equipped with physical control equipment which enables the borehole to be shut at the surface to prevent escape of gas emissions. Gas monitoring equipment will be in

constant use at the surface. The draft permit does not allow the venting of natural gas unless it is necessary for reasons of safety in an emergency.

Fugitive emissions of methane could potentially arise from the wellbore and mud circulation system. The applicant has provided a specific risk assessment for this scenario, which includes monitoring and proposes emergency control measures. The operator will carry out testing of all surface pipework to check for leaks prior to starting the operations and will be carrying out monitoring using Flame Ionization Detection monitoring equipment during the operations as part of the Environmental Management and Monitoring Plan required by the draft permit.

The operations will be benchmarked against baseline levels and should elevated levels of methane be detected, the well will be shut and the cause of the damages investigated and remedied. Operation will only resume once the Agency is satisfied that the issue has been resolved.

The Agency is satisfied that these measures minimise the risk of fugitive emissions and, together with condition 3.1 of the draft permit, provide acceptable controls.

Particulate matter (PM10) emissions

The County Council's Director of Public Health has made two recommendations that relate specifically to emissions of particulate matter (PM10). These are recommendations 6 and 7 from appendix J of the Health Impact Assessment. An assessment has therefore been carried out in relation to PM10s.

PM10 from generators and vehicles:

An assessment of PM10 (particulate matter of 10 microns diameter or less) from generators and vehicles has been undertaken and presented for both the Preston New Road and the Roseacre Wood proposed exploration sites as part of a further information request to the applicant. Detailed dispersion modelling has been used to assess the impacts from the generators and the vehicle movements to/from the site. A number of worst case assumptions have been made in the modelling to ensure a conservative approach has been taken. The modelling shows that no significant effects are likely to result.

Further corroboration of the conclusion that no significant effect is likely from PM10s is demonstrated by the generators being below the threshold of local authority regulation. Fylde Borough Council has confirmed this is the case. This is a result of the Environmental Permitting (England and Wales) (Amendment) Regulations 2014/255. The amendment removes the need for the aggregation of diesel generators with a rated thermal input of less than 3 megawatts:

In order to calculate the total cumulative impacts from generators and traffic the scheme related concentrations are added together. The findings from this cumulative assessment of PM10 for the Roseacre Wood and Preston New Road site during operations are that the results indicate no receptor is likely to experience a change of greater than, or equal to 1% of the annual mean objective (40 $\mu\text{g}/\text{m}^3$). As such no significant effects are likely to result from cumulative impacts. The total concentrations are also well below the air quality objectives for PM10. In other

words, the assessment shows the PM10 24 hour mean level (50 ug/m³) is not breached on any day of the year. The national standard (24 hour mean) allows for 35 breaches per year (90.4 percentile).

PM10 from Flaring

The generation of PM10 emissions from the flare has been scoped-out of the assessment due to the gas composition and high efficiency of combustion. This has been agreed with the Environment Agency and is described in the draft permit:

"Particulates have been covered by a qualitative assessment as we would not expect PM10 to result from gaseous emissions. It formed part of the air quality assessment submitted by the applicant and is included in the habitats section for completeness".

Indeed the Agency has further clarified its position in relation to particulates from flaring of natural gas in that when there is full and efficient combustion (based on temperature and retention time) the emissions are not likely to contain particulate matter.

An enclosed flare, which is a requirement for these activities, allows more control of the process, and the temperature can be continuously monitored along with the retention time to ensure the combustion process is complete.

The gas flow to the flare and the gas composition are also measured.

In this case the applicant will produce an Environmental Management and Monitoring Plan before they are operational which will need to be approved by the EA; this plan will contain details of appropriate control measures they will put in place should efficient combustion not be achieved.

PM10 from Drilling

No PM10 emissions from drilling would be expected as the material drilled would be wet. Also any dust-creating processes on site would be mitigated by following the site Environmental Operating Standard (see ES:4.13.1 & Appendix E).

Air Quality Monitoring

The Environment Agency draft permit requires, through the Waste Management Plan (section 9.6, version 7 of the WMP), monitoring of 13 ambient air quality parameters including PM2.5 and PM10. This will be done prior to operations commencing to establish a baseline, during operations and after operations have ceased. Four sampling positions will remain constant at the perimeter of the site. The parameters are: methane, carbon monoxide, hydrogen sulphide, nitrogen dioxide, nitrogen monoxide, sulphur dioxide, ozone, total petroleum hydrocarbons, VOCs, BTEX, PM2.5 and PM10, dust. Results will be published monthly and submitted to the Agency for check and verification.

Monitoring of particulates will be undertaken throughout the operational period of the site using Frisbee-type dust gauges with directional adhesive strips (for nuisance dust) plus pumped gravimetric sampling for PM10 and PM2.5 will be located at four locations in close proximity to key receptors.. The sampling period for gravimetric monitoring for PM10 and PM2.5 will be 24 hours.

In addition, the Environment Agency requires point source emission monitoring from the flare for oxides of nitrogen, carbon monoxide, total volatile organic compounds, and methane (using emission modelling calculations) as part of the draft permit.

In summary, no significant effects are expected daily or annually from PM10s for any phase of the project, or in combination of phases. Moreover, the Environment Agency draft permit (section 9.6, version 7 of the WMP) provides for ambient PM10 and PM2.5 monitoring over 24 hour periods.

Conclusion

The project will generate some emissions to air. But providing the operational practices are adhered to and regulated by the Environment Agency, the emissions would not cause unacceptable impacts.

Having undertaken a detailed assessment, the Agency is satisfied that the emissions from the flare would be insignificant at locations closest to the site. In terms of public health impact of the flare emissions, the Agency's audit checks, modelling and sensitivity analysis confirms there will be no exceedance of standards established for human protection.

Based on the information contained within the application, Public Health England has no significant concerns in relation to the potential emissions from the site adversely impacting the health of the local population, providing the applicant takes all appropriate measures to prevent or control pollution, in accordance with the relevant sector technical guidance or industry best practice

Comprehensive monitoring of the practices and the site, overseen and regulated by the Environment Agency, will ensure that risks are managed effectively.

The proposal would not have unacceptable impacts and would comply with national guidance and policies, together with the policies of the development plan.

Appendix 4

Archaeology and Cultural Heritage

Proposal

As part of the EIA an assessment has been undertaken of the effects of the project on the archaeology of the area, the above or below ground remains left by previous generations including pre history, Romano-British, early medieval, medieval, post medieval and later. The assessment considers the likely significant effects on archaeology and cultural heritage assets resulting from the construction, operation and decommissioning of the proposed exploration compound, the construction of the associated access route and the installation of the seismic monitoring array.

The assessment has been carried out in accordance with national guidance documents in the absence of any statutory requirements to use any particular methodology for the assessment of impacts on heritage assets. A number of different historical records have been used to inform the assessment including data held by the County Council and English Heritage. A walk over survey has also been carried out. There are no World Heritage Sites, Scheduled Monuments, Registered Parks and Gardens, Registered Battlefields, listed buildings or Conservation Areas within 1km of the site. The assessment has confirmed there are no records of archaeological finds within the planning application boundary for any of the proposed surface works.

The EIA has identified that the only activities associated with the project that have the potential to result in a significant effect on archaeology are the construction of the well pad, access track and connection to the national transmission system as a result of top and sub soil removal as part of the construction of the site which might encounter archaeology which without specific mitigation could be lost with the opportunity of recording it. To mitigate this it is proposed to record any evidence of the track and field systems during excavation works. It is concluded that this would not result in significant effect on heritage or archaeological features.

The site is not in close proximity to above ground heritage assets such as listed buildings to avoid any indirect visual impacts on their setting.

The development of the suite would involve vehicles travelling to and from the site along a prescribed route. This route passes within 20m of a listed building (Pointer House, Wharles). The assessment concludes that the impact of traffic on this property during the development and operational phases would be no more than minor due to the temporary nature of movements.

A new section of access road is proposed to be constructed through DHFCS Inskip which would also result in the disturbance of top and subsoils with the potential to disturb archaeological remains. However, these are likely to comprise artefact scatters of low heritage value. Nonetheless the impact is similarly considered to be significant.

An interconnection from the site to the national grid is proposed in the event extended flow testing of gas is carried out and which would be laid in an excavated

trench to then be covered and the surface restored. There are no known heritage assets on the proposed alignment. Nevertheless the excavation of trench to accommodate the interconnection could have a significant effect in disturbing unknown archaeology.

In terms of cumulative impacts, the assessment concludes that the Roseacre Wood site is considered sufficiently distant from the Preston New Road site such that their combined impacts on heritage features will not result in a greater combined effect than individually.

To mitigate the impact of the development works it is concluded that the most appropriate way to implement a scheme of investigation would be to carry a strip, map and record exercise during the excavation of the topsoil if the monitoring archaeologist identifies any features requiring further investigation

Summary of Consultee comments and Representations

The County Councils Archaeology Service (LCAS) has confirmed the Archaeology and Cultural Heritage chapter of the ES has been undertaken in line with the requirements of the Service which agrees with the assessment that the site has a low potential to contain previously unknown archaeological finds or features. The proposed mitigation measures are considered to be appropriate. LCAS recommend that should planning permission be granted it should be subject to a condition preventing the commencement of development until the implementation of a programme of archaeological work is secured.

No issues relating to archaeology have been raised in representations.

Policy

Policy EP21 of the Fylde Local Plan requires developers to provide an archaeological assessment or if necessary a field evaluation where there is an identified archaeological interest and to make adequate provision for recording remains if their preservation in situ cannot be justified.

Assessment of Impacts

The proposed development of the site, access roads and trench would not have any impact on World Heritage Sites, Scheduled Monuments, Registered Parks and Gardens, Registered Battlefields, listed buildings or Conservation Areas. The construction of the site, access road and trench for the interconnecting pipeline would have significant effects on unknown archaeology; however these effects could be mitigated by carrying out a strip, map and record exercise during the excavation of the topsoil if the monitoring archaeologist identifies any features requiring further investigation and which would be addressed by condition.

Conclusion

Subject to the imposition of a condition requiring the implementation of a programme of archaeological work is secured prior to commencement of development it is

considered the development would not have an unacceptable impact on archaeology and would comply with policy EP21 of the Fylde Local Plan.

Appendix 5

Greenhouse Gas Emissions

Proposal

Chapter 8 of the applicant's Environment Statement assesses, calculates and describes the potential greenhouse gas emissions (GHG) from the proposal. It does this by taking data about the project (e.g. quantity of gas burnt in the flares and vehicle movements) and applies factors that allow the GHG emissions from the project to be calculated.

The applicant states there is no methodology to determine the significance of the emissions associated with the project. However, although the significance cannot be assessed the applicant's assessment compares the greenhouse gas emissions from the project to UK national GHG emissions for 2012.

The assessment has used data provided by Cuadrilla from previous projects on the amount of fuel or energy used. Where this data was not available other sources of information have been used. Where this is the case, ranges have been applied were possible. In addition, more than one source of emission factors has been applied to provide a range of results. This makes allowance for uncertainties associated with the project.

The greatest source (73%) of the project GHG emissions come from burning the gas in the flare. The total project GHG emissions could be between 118,418 (lower range) to 124,397 (higher range) tCOe (tonnes carbon dioxide equivalent).

Policy

The Climate Change Act, 2008

The Climate Change Act (2008) establishes a framework for the UK to achieve its long term goals of reducing greenhouse gas emissions (GHG) emissions by at least 80% from 1990 levels by 2050 and to ensure that steps are taken towards adapting to the impact of climate change.

An interim target of 34% reduction from 1990 by 2020 has also been agreed. Some of the key measures provided by the CCA include:

- Decarbonising the grid supply, such as renewable source of energy;
- Cleaner transport modes such as electric and hybrid vehicles;
- Energy efficiency measures in the built environment; and
- Behavioural changes.

The Carbon Plan, 2011

The Carbon Plan sets out the Government's plans for achieving the GHG emissions reductions committed to in the Climate Change Act and the first four carbon budgets. The strategy for energy as set out in the Carbon Plan includes:

- Reduce emissions from electricity generation through increasing the use of gas instead of coal, and more generation from renewable sources;

- Support the deployment of major low carbon technologies through providing financial incentives; and
- Support the development of less mature renewable technologies such as marine and offshore technologies.

National planning policy

National Planning Practice Guidance (PPG) states that planning plays a key role in helping shape places to secure radical reductions in greenhouse gas emissions, minimising vulnerability and providing resilience to the impacts of climate change, and supporting the delivery of renewable and low carbon energy and associated infrastructure

Paragraph 98 of the PPG states:

When determining planning applications, local planning authorities should:

- *not require applicants for energy development to demonstrate the overall need for renewable or low carbon energy and also recognise that even small-scale projects provide a valuable contribution to cutting greenhouse gas emissions; and*
- *approve the application if its impacts are (or can be made) acceptable. Once suitable areas for renewable and low carbon energy have been identified in plans, local planning authorities should also expect subsequent applications for commercial scale projects outside these areas to demonstrate that the proposed location meets the criteria used in identifying suitable areas.*

Lancashire Climate Change Strategy, 2009

The Lancashire Climate Change Strategy sets out the county's long-term objective to achieve a 'low carbon and well adapted Lancashire by 2020'.

The strategy contains an objective to actively promote decentralised energy production and medium and large scale renewable energy generation. The strategy recognises the challenge is to ensure that the replacement energy supply for fossil fuels will be low carbon.

Joint Lancashire Minerals and Waste Local Plan

Policy DM2 of the JLMWLP states that development for minerals operations will be supported where it can be demonstrated that all material social, economic or environmental impacts that would cause demonstrable harm can be eliminated or reduced to acceptable levels. In assessing proposals account will be taken of the proposal's setting, baseline environmental conditions and neighbouring land uses, together with the extent to which its impacts can be controlled in accordance with current best practice and recognised standards.

Consultees and representations

Medlar-with-Wesham Parish Council and Kirkham Town Council: Object to the proposal. Air pollution from gas emissions. Flaring can lead to over 250 pollutants including methane.

Roseacre, Wharles and Treales Parish Council: Objects to the proposal: On greenhouse gas emissions:

- Contrary to Policy EP26 and CS5 as the flare will emit 15,000 tonnes of methane and there is no mitigation for the health hazards of particulate matter
- Contrary to NPPF as it will not support a low carbon future.

Friends of the Earth: have made two representations. The following views relate directly to greenhouse gas emissions:

- The assessment of the potential for greenhouse gas (GHG) emissions is incorrect, with regard to impact of leakage, global warming potential (GWP) of methane and scales of emissions.
- The EIA findings that the impact on climate change is n/a does not enable the local planning authority to make an informed decision.
- The mitigation measures proposed for possible sources of fugitive methane emissions are basic and may be ineffective based on US research.
- The figure used in the application for GWP is inaccurate and asks for clarity regarding the carbon footprint calculations.
- The comparison of the sites GHG emissions to the UK carbon budget is wholly inappropriate. Cuadrilla does not appear to know how much GHG will be emitted and therefore the precautionary principle should apply.
- Utilising shale gas resources is contrary to Policy DM2, to reduce carbon emissions and is contrary to the Lancashire Climate Change
- Planning decisions must take account of the need to reduce GHG emissions and this application will increase the emissions.
- the applicant has failed to properly consider climate change
- the applicant has not considered methane emissions from drilling
- fugitive methane emissions is a key issue because of its high global warming potential
- an incorrect conversion factor has been used for methane in respect of its potential to contribute to global warming, meaning the contribution of the proposal to greenhouse gas emissions would be nearly 3.5 times that stated by the applicant.
- Comparing the proposal's greenhouse gas emissions to the UK's emissions is inappropriate. The comparison should be more local.
- The County Council, as mineral planning authority, has a duty to reduce and mitigate the impact of climate change.
- The report by the previous government Chief Scientist into the 'Potential Greenhouse Gas Emissions Associated with Shale Gas Extraction and Use' is contested.

Roseacre Awareness Group (RAG): Objections related to climate change:

- Investment in shale gas diverts resources from cost effective, less damaging renewable energy solutions – tidal, wind and solar.
- Contrary to Lancashire Climate Change Policy and Climate Change Act as use of fossil fuels not meet low carbon objectives. Shale gas methane emissions are more detrimental than from coal.

Wildfowl & Wetlands Trust (WWT): Objection includes a greenhouse gas concern on the basis that fossil fuel contributing to climate change, a serious long term threat to the natural environment and to economic and social wellbeing.

RSPB: Objection includes a greenhouse gas concern on the basis that hydraulic fracturing which could lead to long-term damage to nature at the local level, leading to significant financial costs for local communities and taxpayer as well as contributing to climate change, which is the most serious long-term threat to the natural environment.

Other representations

The following is a summary of the points raised in representations that mention greenhouse gas emissions and climate change:

- Extraction of shale gas will further add to the burning of fossil fuels and exacerbate climate change
- Immoral to pollute the environment by increased use of carbon-based fuels
- Shale production will have a negative effect on meeting UK targets relating to global heat, carbon emissions and greenhouse gas emissions, from Kyoto agreement and Climate Change Act 2008
- Contrary to NPPF Para 93 reductions in greenhouse gas emissions
- LCC has a responsibility to help reduce emissions
- LCC Moral duty to ensure fossil fuels not exploited
- Need to leave fossil fuels in the ground
- International Energy Agency warn that most of gas should stay in ground to avoid catastrophic climate change
- The use and burning of fossil fuels impacts on climate change
- Burning shale gas is as bad as burning coal.
- Can't continue to use up natural resources

Assessment

Many of the representations made against this application refer to the wider national impact on greenhouse gas emissions as a result of the use of gas. Many representations make an assumption that the shale gas industry will scale-up substantially and will damage the UK's efforts to tackle climate change.

However, this application is for four experimental boreholes. Any proposal to move into gas production will be the subject of a new planning application. The impacts of this application must therefore be assessed against the greenhouse gas emissions from the project for four exploratory wells only.

Nevertheless, given the level of representations on this issue (greenhouse gas emissions associated with the wider shale gas sector) it is appropriate that the issues are explored briefly.

Emissions from the shale gas sector

The House of Commons Energy and Climate Change Committee reported on the 'The Impact of Shale Gas on Energy Markets' in 2013. The Committee concluded that the US shale gas revolution has seen significant reduction in the country's greenhouse gas emissions because of a large switch from coal to gas. And a report by DECC's Chief Scientific Advisor in 2013 concludes that shale gas's overall carbon footprint was comparable to gas extracted from conventional sources, lower than that of liquid natural gas and, when used for generating electricity, significantly lower than that of coal if the correct controls are used.

However, this study is contested by Friends of the Earth who cite several other pieces of research to show that methane leakage is significant and adds considerably to the carbon footprint of shale gas. (Friends of the Earth further argue there is a risk that shale gas will be used as well as coal rather than in its place. And it may divert investment from alternatives such as renewables, weakening the case for reducing the UK's reliance on fossil fuels).

In turn, the research into methane emissions cited by Friends of the Earth has been challenged. The House of Commons Energy and Climate Change Committee (2013) refer to research by the Massachusetts Institute of Technology which suggests the claims of substantial methane emissions have been exaggerated. Other more recent research has also been criticised because of methodological flaws (e.g. very small aerial sample size and the confounding effects of a coal mining area on methane emissions in the study). Methane emissions undoubtedly occur. But there are differing views on the degree and impact of emissions.

Given the lack of conclusive evidence either way, the carbon footprint of shale gas remains a source of disagreement, which was recognised by the House of Commons Energy and Climate Change Committee.

The Committee therefore recommended that "*DECC should also monitor the methane emissions of those companies that are currently exploring for shale gas. It should be possible, by way of regulation, to ensure that fugitive emissions are prevented by outlawing venting*".

The Environment Agency draft permit regulates fugitive emissions of methane. Venting is not permitted except in safety emergencies. Condition 3.2 of the draft permit applies controls. Flowback fluid will be transferred through the separator and to the storage tanks via enclosed pipework. And as described in section 9.9 of the Waste Management Plan (which is part of the draft permit) pipework and connections will be tested for integrity prior to use and will be monitored during operations. Importantly, methane monitoring will take place before, during and after operations.

Global warming potential of methane

Global-warming potential (GWP) is a relative measure of how much heat a greenhouse gas traps in the atmosphere. It compares the amount of heat trapped by a certain mass of the gas in question to the amount of heat trapped by a similar mass of carbon dioxide.

Friends of the Earth (FOE) say that the figure used by the applicant in the ES for the global warming potential of methane is inaccurate. It is this figure which plays an important part in estimating the carbon footprint of the project, including its greenhouse gas emissions.

The applicant has used a figure of 25 over a 100 year timeframe, citing the UN Intergovernmental Panel on Climate Change (IPCC) fourth assessment report that uses this figure. FOE argues that the figure of 34 should be used from the recent IPCC fifth assessment report. They also argue that the GWP of methane over a 20 year period (as well as a 100 year period) should have been used.

The applicant says GWP figures were selected to provide consistency with DEFRA conversion factors which are currently based on the IPCC's 2nd assessment report. DEFRA's aim is to provide a consistent comparison with the UK Greenhouse Gas Inventory and Kyoto Protocol. The GWP of 25, over a 100-year period, maintains this consistency of comparison and incorporates a safety margin in the estimation of effects.

DECC's Chief Scientist says methane has a global warming potential 25 times greater than CO₂, based on a 100-yeartime horizon in his September 2013 report (citing the IPCC fourth report).

The UK Greenhouse Gas Inventory, 1990 to 2012: Annual Report for Submission under the Framework Convention on Climate Change (published April 2014 by DECC) uses a greenhouse gas potential figure of 21 over 100 years for methane (Table 1.1).

In light of the conversion factors commonly used by others agencies in the UK, the applicant's use of a figure of 25 is not unreasonable.

Emissions from this project

The applicant's ES estimates the greatest source of the project GHG emissions come from burning the gas in the flare (73%). The total project GHG emissions could

be between 118,418 (lower range) to 124,397 (higher range) tCOe (tonnes carbon dioxide equivalent).

Both direct and indirect GHG emissions have been assessed. Direct emissions are GHGs emitted directly by activities associated with the project, such as the combustion of fossil fuels by on-site generators or through the flares. Indirect emissions consist of GHGs emitted outside of the direct influence of the project (either further up or down the supply chain). For example, GHG emissions associated with the production, extraction, refining and transport of diesel used to power generators and trucks (referred to in this assessment as well-to-tank), or the treatment of flowback fluid are defined as indirect emissions. A more detailed summary of emission sources associated with the project, and whether or not they are direct or indirect, is included in Table 8.2 of the ES.

The average volume of direct emissions is 114,009 tCO₂e. The average volume of indirect emissions is 7,401 tCO₂e.

The project's carbon footprint is 118,419 to 124,369 tCOe. This is made up of approximately 94% direct emissions and 6% indirect emissions. 73% of the project carbon footprint can be attributed to flaring.

Emissions from drilling

The issue of potential methane emissions from the drilling phase has been raised by Friends of the Earth. The Environment Agency draft permit requires that during drilling of the exploratory boreholes, fugitive emissions of natural gas are to be prevented by increasing the hydrostatic pressure of fluids so as to prevent gas release. The well will also be equipped with physical control equipment which enables the borehole to be shut at the surface to prevent escape of gas emissions. Gas monitoring equipment will be in constant use at the surface. The draft permit does not allow the venting of natural gas unless it-is-necessary for reasons.

Fugitive emissions of methane could potentially arise from the wellbore and mud circulation system. The applicant has provided a specific risk assessment for this scenario, which includes monitoring and proposes emergency control measures. The operator will carry out testing of all surface pipework to check for leaks prior to starting the operations and will be carrying out monitoring using Flame Ionization Detection monitoring equipment during the operations as part of the Environmental Management and Monitoring Plan required by the draft permit.

The operations will be benchmarked against baseline levels and should elevated levels of methane be detected, the well will be shut and the cause of the damages investigated and remedied. Operation will only resume once the Agency is satisfied that the issue has been resolved.

The Agency is satisfied that these measures minimise the risk of fugitive emissions and, together with condition 3.1 of the draft permit, provide acceptable controls.

Emissions from the flare

The principal greenhouse gas emitted is carbon dioxide (CO₂), but the flare could also emit small amounts of methane (CH₄) arising from the combustion process. The

Environment Agency expect combustion efficiency of at least 98%, therefore there is potential for a small amount of un-burnt methane to be emitted from the flare (fully efficient combustion converts CH₄ to CO₂ and water vapour). CH₄ has a global warming potential many times that of CO₂.

The major source of greenhouse gas emissions from the installation is however CO₂ from the combustion of natural gas. The best available technique for greenhouse gas emissions is to maximise energy recovery and efficiency but on this occasion the Agency is satisfied that flaring the gas is the best available option.

The operator has justified the use of a flare rather than using the gas on site by demonstrating to the Agency that the costs of using the gas would be disproportionate for the 90 day periods. It is also not reasonably practicable to connect the flow of extracted natural gas to the gas grid during the initial flow tests. This is because the flow rates are unknown and the quality of the gas produced may not be compatible with gas grid requirements without further processing.

In addition, in order to establish whether there is sufficient flow of gas to move to extended flow testing, there needs to be an uninterrupted flow. Using the gas to meet energy requirements on site would necessitate interrupting the gas flow, preventing the collection of the required data for analysis.

The incineration of hazardous waste is not subject to the Greenhouse Gas Emissions Trading Scheme Regulations 2012; therefore it is a requirement of the Industrial Emissions Directive to investigate how emissions of greenhouse gases emitted from this activity might be prevented or minimised.

The only factor influencing the GWP of the installation is the efficient operation of the combustion unit. The operator will ensure the combustion of natural gas is carried out to the maximum efficiency; by monitoring the combustion temperature and air flow. Requirements to this effect are in the draft permit.

Comparative analysis

In attempt to determine whether the projects greenhouse gas emissions are significant, the applicant has compared the emissions expected from this project to the UK's greenhouse gas emissions in 2012. This concludes that the project is equivalent to 0.002% of the current UK Carbon Budget set by the government and as such the project's contribution to national GHG emissions is negligible.

There is no standard methodology to determine the significance of the emissions associated with the project. The applicant has therefore chosen to compare the project's emissions with the UK's emissions for 2012. Comparing the emissions of 4 exploratory boreholes with those of the UK as a whole is not the most appropriate comparison, and Friends of the Earth also make this point.

A more appropriate comparison would be against local emission data, for example those contained in the Lancashire Climate Change Strategy published in 2009. Total CO₂ emissions in Lancashire (as set out in the strategy) were estimated at 12.7 million tonnes. Maximum emissions from the project over its 5.5 years are estimated at 124,369 tonnes carbon dioxide equivalent (tCO₂e). This averages to 22,613

tCO₂e per year, which is 0.18% of the county's annual emissions as set out in the Strategy. The project's emissions are just over 3% of the Borough's annual emissions. The emissions are short term.

By way of further comparison, livestock is a significant source of methane emissions. Agriculture is the highest contributing sector to total methane emissions for the UK, representing 46% of total methane emissions. The Fylde contains about 14% of the cattle and pigs in Lancashire, which is higher than average. If 46% of all methane emissions in the Fylde are from livestock (as in the UK) then it would not be inappropriate to suggest that agriculture in the Fylde is a significant source of greenhouse gas emissions in the Borough. Landfill gas sites can also be a significant source of methane emissions.

In light of these comparisons, together with the proposed regulation and operational practices to limit methane emissions, it is concluded that the greenhouse gas emissions would not cause an unacceptable impact.

Conclusion

The project will generate some greenhouse gas emissions. But providing the operational practices are adhered to and regulated by the Environment Agency, the emissions would not cause unacceptable impacts.

The Environment Agency draft permit requires that during drilling of the exploratory boreholes, fugitive emissions of natural gas are to be prevented by increasing the hydrostatic pressure of fluids so as to prevent gas release. The well will also be equipped with physical control equipment which enables the borehole to be shut at the surface to prevent escape of gas emissions. Gas monitoring equipment will be in constant use at the surface. The draft permit does not allow the venting of natural gas unless it-is-necessary for reasons. Comprehensive monitoring of the practices and the site, overseen and regulated by the Environment Agency, will ensure that any risks are managed effectively.

The major source of greenhouse gas emissions from the proposal is however CO₂ from the combustion of natural gas in the flare. The operator has justified the use of a flare rather than using the gas on site by demonstrating to the Environment Agency that the costs of using the gas would be disproportionate for the 90 day periods. It is also not reasonably practicable to connect the flow of extracted natural gas to the gas grid during the initial flow tests. This is because the flow rates are unknown and the quality of the gas produced may not be compatible with gas grid requirements without further processing. In addition, in order to establish whether there is sufficient flow of gas to move to extended flow testing, there needs to be an uninterrupted flow. Using the gas to meet energy requirements on site would necessitate interrupting the gas flow, preventing the collection of the required data for analysis.

Total CO₂ emissions in Lancashire (as set out in the Lancashire Climate Change Strategy, 2009) were estimated at 12.7 million tonnes. Maximum emissions from the project over its 5.5 years are estimated at 124,369 tonnes carbon dioxide equivalent (tCO₂e). This averages to 22,613 tCO₂e per year, which is 0.18% of the county's

annual emissions as set out in the Strategy. The project's emissions are just over 3% of the Borough's annual emissions. The emissions are short term.

The proposals would not be inconsistent with national planning policy or the policies of the development plan.

Appendix 6

Community and socio economics

Proposal

The applicant has undertaken an assessment of the community and socio-economic effects of the proposal and in particular on:

- Population;
- Wealth and deprivation;
- Industrial structure;
- Community infrastructure;
- Housing;
- Education and skills;
- Crime and public safety;
- Public rights of ways;
- Employment (socio-economic factor);
- The wider economy (socio-economic factor);
- Public access (community factor); and
- Crime and public safety (community factor).

The assessment identifies that the proposal would have a number of community and socio-economic effects consisting of:

- Temporary loss of local amenity value through site activities, traffic and influx of population area.
- Employment generation, with direct employment for initial exploration wells predominantly drawn from beyond the local area, but with indirect and induced effects from local spending and the influx of population on Site (local supporting industry, hotels and subsistence for example93);
- Increased spending in the agriculture sector from increased landowner income;
- Opportunity costs from loss of in use agricultural land;
- Community disturbance from any protest activities, or Site works.
- Effects of increased local spending from the community benefit payment from the applicant via the Community Foundation for Lancashire to local communities (although the applicant acknowledges that such payments are not a material consideration in deciding whether to grant planning permission and are not presented as such, but arte of the view that they would be a positive effect flowing from the development).

The area of the proposed works is situated in the east of the Fylde borough, mainly rural in character with various different types of farming activity, including intensive market gardening and extensive arable and dairy farming. The site is surrounded by open farm land and a number of small businesses within 1km of the site including a garden centre, catteries and a caravan park. The area is relatively affluent and is in a low population density area. It is considered that the growing population will necessitate employment opportunities into the future, particularly in the context of

increasing levels of employment benefit claimants. The major existing and potential employment land areas in the borough are located away from the site. The ward has limited provision of community infrastructure due to the small size of the population and the agricultural nature of the area. The local area does not contain any of the existing or potential housing supply identified in the Five Year Housing Supply Statement. Although the proposal is a temporary exploration project lasting six years the applicant considers it has the potential to have the following beneficial effects:

- Direct, indirect and induced job creation in the local Lancashire area;
- Opportunities for local businesses to provide services to the project (e.g. construction of the well pad and access track; transportation of materials and equipment and site welfare facilities);
- Expenditure in local hotels and restaurants by people working on the project but do not live locally; and
- Community benefit payments for each well that is hydraulically fractured. (It is acknowledged that such payments are not a material consideration in deciding whether to grant planning permission and are not presented as such, but they would be a positive effect flowing from the development which is properly to be assessed when considering the socio-economic effects).

The applicant's recent experience has shown that drill sites can attract public attention and a degree of protest. The risk of criminal activity is thought to be minimal, although should this occur, it is assumed that public order and people management will be maintained by the local police. The assessment concludes that the proposal would not have any significant adverse effects on community and socio-economic effects.

Policy

National Planning Policy Framework (NPPF)

Paragraphs 11-14 Requirement for Sustainable Development
Paragraph 17 Core Planning Principles
Paragraph 144 Environment and local communities

Joint Lancashire Minerals and Waste Local Plan – Site Allocation and Development Management Policies – Part One (LMWLP)

Policy NPPF 1 Presumption in favour of sustainable development
Policy DM2 Development Management

Fylde Borough Local Plan

Policy SP2 Development in Countryside Areas

Consultees and representations

There are no specific consultees on community and socio economic issues.

Roseacre, Wharles and Treales Parish Council: Objects to the proposal for a number of reasons including the following in respect of community and socio economic issues:

- Local planning authority should support a thriving rural community, but this development will have an adverse impact on local communities.
- Local community is fearful for the future with adverse impacts on health and wellbeing, community cohesion and quality of life.
- Decline in house sales, if unable to sell cannot move on to next life stage.

Medlar-with-Wesham Parish Council and Kirkham Town Council: objects to the proposal for a number of reasons including the following in respect of community and socio economic issues:

- Detimental impact on property values and insurance premiums.
- Concern regarding future site expansion for production following exploratory phase. An increase in well heads will lead to further noise, traffic and pollution.

Friends of the Earth: Object to the proposal for a number of reasons and which include objections relating to impacts on community and socio economics and which are summarised as follows:

- The analysis of socio-economic impacts is probably unlawful because it takes account of economic impacts which are not related to environmental consequences of drilling and fracking.
- Strongly disagree that shale gas will make a positive contribution to economic growth at a local and national scale.
- There is no explanation of local expenditure and its calculation.
- Job creation effects are highly limited. There will be low job creation with no guarantee of jobs for local people given the specialist nature of the jobs
- Strongly disagree that there will be no significant effects for wider economic effects as potential adverse effects have been disregarded. Economic costs of the development will be detimental to the local economy.
- There is no assessment of impacts to residents in the immediate vicinity and impacts on tourism and agriculture.
- Several years of disruption to the local community with 14 months of drilling 24hours a day, 8 months of hydraulic fracturing and 12 months of flaring with dust, light and noise emissions.
- Unprecedented levels of public opposition / concern about the impacts.
- Inaccuracies in the site description and proximity to residences with failure to mention Foxwood Chase and Carr Bridge Residential Caravan Park.
- No consideration of impacts on schools, caravan parks, kennels, catteries, farm nurseries and national cycle infrastructure located 1-2km from the site.
- Fracking could adversely affect house prices.
- No consideration of impacts on Blackpool and tourism.
- US evidence linking fracking to harmful effects on livestock and farming.
- No mitigation measures for impacts on agriculture, tourism, loss of amenity for local residents.

Representations objecting to the proposal include reasons which could be considered to relate to community and socio economic issues and which have been summarised as follows:

- No economic benefit. The number of jobs to be created are exaggerated
- Only jobs for outside specialists, so no local benefit.
- More job opportunities in renewable green energy, which are also sustainable.
- DECC report that job creation in fracking will be approximately 24,300 yet 400,000 could be created in clean energy. Fracking is not sustainable, whereas sun, wind and tidal resources will not run out.
- Shale gas creates bad press which has a negative impact on the Northwest economy particularly if the industry were to escalate in scale.
- Impact on coastal settlements from potential loss of jobs in tourism/farming
- Tourism in Blackpool, Lytham St Annes and the Fylde could be seriously affected /harmed, with reduced visitors and trade due to industrialisation, toxic rivers, dead wildlife, gasfield landscape and HGV traffic.
- Cannot sacrifice food growing, need to keep prime farming land safe for food production, for local economy and to avoid world food shortages.
- Impact on local dog boarding kennel from dog owner's perception of risks.
- The damage to communities will be irreparable and not good for wellbeing.
- Massive impact on rural community from the 24hr operation will be like living on a heavy industrial site.
- Rapid industrialisation of small isolated rural communities leading to industrial and population growth will put stress on services and infrastructure.
- An influx of gas workers and families could lead to over building and an increase in rental values. Baseline data is needed to compare the effect.
- The application is incorrect with regard to number of residences/people in close proximity to the site that will be unavoidably impacted by the development. There are 10 not 1 residences at Staining Wood Farm.
- Need a 2km buffer zone from residential areas for unconventional gas well pads (like in Australia). It's irresponsible to locate an unsafe development near to (densely) populated areas including Staining Wood/Foxwood Chase which is within 300m of the site.
- Contrary to Policy EMP5 as residences at risk from hazardous installation.
- An unsafe development should not be located near to villages and schools.
- People will leave the area, take children out of schools and it will be ruined
- The development site is too close to large urban communities.
- Need to consider the impact on residents of drilling and fracking for 24/7 for 2-3years, and if viable for 10-15yrs with 20-30wells on the site.
- Concern about hydraulic fracturing for 12hrs a day 7-7pm is far too long and will disturb too many people. No restriction on how many 2-3hr durations during a 12hr day.
- Any disaster will affect the local community for generations. People in local area do not want this forced on them.
- Impact from protests and cost of policing them.
- Proposal is contrary to NPPF Paragraph 144 on grounds of unacceptable adverse impact on the environment and local communities.
- Home insurance premiums may increase, or insurance refused due to risks of subsidence.

- If house is undermined who will be responsible? Will the applicant pay/ be made to pay for repairs to damaged property?
- Residents have paid a premium to live in a rural area and planning applications have already had a detrimental impact on housing and land value
- House valuations in area will depreciate further if proposal is approved and this will lock people into possible negative equity.
- Will applicant pay for compensation for loss in house value?
- Who wants to buy a house with 24hr drilling on the doorstep?
- Need a fund to compensate residents for damage caused by any earthquakes during works and for several years after abandonment.
- Local residents and people of Lancashire should receive significant financial benefits over and above taxation/employment.
- No assurance that Cuadrilla will accept liability for any damage to properties and the environment. The local authority and the community will have to pay for any damage caused by Cuadrilla
- Will applicant be accountable for damage to the environment, housing, roads, and health? Who will foot the bill?

Representations have been received in support of the proposal in respect of socio economic benefits from the North and Western Chamber of Commerce on the basis investment in Lancashire could create thousands of well paid jobs in the local economy directly through the supply chain and spread beyond that, through inward investment and spin off technologies rebalancing the local economy and generate wealth; shale gas in Lancashire would establish Lancashire at the heart of a successful UK and European industry; Lancashire's Strategic Economic Plan, prepared by Lancashire Enterprise Partnership (LEP) and endorsed by Lancashire County Council, acknowledged that shale gas sector may play an important economic role in Lancashire within the timeframe of the Growth Deal and the locating of an elite institution in Lancashire for shale gas would be important in establishing the sector both locally and nationally.

The Chamber of Commerce East Lancashire maintains the proposal is important to the local and national economies and for international competitiveness to have energy supply, security, price and supply chain opportunities and that Lancashire's wellbeing and prosperity can benefit.

Stay Lancashire has publically countered the view that the site would adversely affect tourism and is of the view that the hospitality industry would benefit. There are no statistics that support either view.

Representations have been received supporting the proposal both in principle and in respect of the specific benefits that the proposal would generate in the locale. Representations in support have continued to be received the final number of which will be reported when the application is presented for determination.

The reasons for supporting the proposal in respect of socio economic effects have been summarised as follows:

- Need to determined whether or not the gas is in commercial quantities

- Shale gas development will bring economic growth, wealth and prosperity to the UK, Northwest and Lancashire economies and to local communities
- It's vital to the country's prosperity to exploit our natural reserves and to benefit future generations
- Energy from a local source will be good for the local economy and could attract high gas consuming businesses to relocate in the region.
- SME business failure may be avoided by stabilising energy costs and by providing new business opportunities as part of the supply chain - energy services, components, education/training, hospitality, property
- Shale gas exploration will provide increased potential for local business growth and revenues and provide employment for local people
- Shale gas could be a catalyst bringing in inward investment and regenerating Lancashire and Blackpool
- This opportunity should be welcomed and not lost to other counties and countries. Shale gas could transform Lancashire like North Sea oil/gas has done for Aberdeen and how shale gas has done for small towns in the US.
- Fylde Borough Council and Lancashire County Council will benefit from tax revenues, which could help pay for public services and infrastructure
- Investigation works have already provided significant business to the accommodation sector in and around Blackpool with knock on impacts
- This is an opportunity to change the region from high unemployment and no industry, to an innovative area that supports new industry and is a leader of new technology within the energy sector.
- Without shale gas, what is the economic future for Lancashire and Blackpool, Blackpool has high levels of deprivation, child poverty, poor health, benefits dependency and youth unemployment
- Fylde coast has an over dependence on declining agriculture and tourism sectors with a transient, seasonal, low paid, unskilled, migrant workforce.
- Shale gas provides economic diversity through new industrial activity, generating skilled permanent jobs and youth employment opportunities, directly or indirectly through the supply chain including engineers, apprentices
- Reports suggest that a shale gas industry could be responsible for a supply chain spend of over £300 billion and support 60,000-74,000 jobs.
- If shale gas development is not allowed in Lancashire, but develops elsewhere, Lancashire will miss out on revenue and employment generated by supply chain businesses
- New jobs essential for the prosperity of the UK and the Northwest area
- Job prospects for future generations will help stop them having to move away and will improve the local skills base
- UCLAN and Blackpool & the Fylde College can train local people in skills to ensure jobs can go to local people
- Every aspect of the community will benefit, including people struggling to pay gas bills through cheaper gas prices

Assessment

An assessment of the potential community and socio economic impacts has been carried out. This is a temporary project but it has the potential to have impacts that may impact on community, social and economic factors particularly relating to the

temporary loss of local amenity value through site activities, traffic and influx of population area; community disturbance from any protest activities; impacts on tourism and agricultural production. However, there would also be opportunities for employment generation, with direct employment for initial exploration wells predominantly drawn from beyond the local area, but with indirect and induced effects from local spending and the influx of population on site such as local supporting industry, hotels and subsistence; increased spending in the agriculture sector from increased landowner income although these are difficult to quantify; and whilst it is not a material consideration for planning purposes, the opportunity for community benefit payments.

Many of the representations received strongly refute the findings of the assessment on community and socio economic impacts, most particularly the employment benefits the industry would bring to the area and highlight the negative impacts it would have on agriculture, tourism, property values, community cohesion and the industrialisation of rural areas both as part of the current proposals and any future proposals. It is maintained existing businesses would be impacted including the established market garden economy and tourism and that investment in renewables would lead to more sustainable investment and long term environmental and economic benefits. The concerns are understandable but are not necessarily expressed with foundation. Equally, whilst it is acknowledged that some local economic benefits could be generated by the proposal, it is difficult to quantify the scale of such and whether they would counter the impacts.

The proposal is for exploration and appraisal, a temporary operation, albeit for a development period of two years. Throughout that period there would be both disturbance and a potential negative impact on the nearest residents at Orchard Wood Farm and properties along the proposed route from the A583 although it is questionable what impact it would have on wider communities, if any at all. There would be some economic benefits in the use of local services and industry and where specialist services are drawn in from elsewhere; they would generate income in the local economy in some form. The use of such a small area of agricultural land would not have a negative effect on agriculture nor, subject to the regulatory regimes that would be in place, would there be any detriment to agricultural land or practices elsewhere in the locale. Whilst fracking would be carried out over a much wider underground area, as projected to the surface, it has the potential to affect properties most particularly in terms of vibration and which is considered in the seismicity section. However, again, subject to the adherence to regulatory requirements such impacts could be kept to a minimum. In the event there were to be disturbance leading to damage, the applicant has committed to investigating complaints and has demonstrated insurance would be in place if damage is proven to be attributable to their operations. It is not possible to quantify what impacts a proposal of this nature would have on either property values or the market, but these are not material planning considerations.

Stay Lancashire has publically countered the view that the site would adversely affect tourism and is of the view that the hospitality industry would benefit. There are no statistics that support either view.

In terms of community cohesion, recent experience has shown that drill sites can attract public attention and a degree of protest and environmental extremist activities

may also occur. The Lancashire Constabulary have been consulted on the proposals and have not objected. It is right to assume that public order would be maintained by the police although there would inevitably be costs associated with such as has been evidenced by other sites elsewhere in the country.

Conclusion

It is concluded that whilst there would be some localised impact on residents in the community at the nearest properties, the project would not have a significant effect on wider communities or socio economic factors, particularly in groups with protected characteristics. There would not be an impact on agricultural land or practices and there would be some economic benefits during the exploration stage to the local economy. It is therefore considered that the proposal would not have an unacceptable impact on communities or the economy and would not be in conflict with the policies of the NPPF or the development plan policies.

Appendix 7

Ecology

Proposal

The Environment Statement assesses the potential for the project to effect sensitive habitats and species of wildlife value. It does this by firstly establishing which habitats and species of value are present within the zone of influence of the Project. An assessment is then undertaken to determine whether there are any pathways of impact upon the valued habitats and species. The assessment has established which habitats and species of value are present in the zone of influence of the proposal and then considered whether there are any pathways of impact on the valued habitats and species. The assessment identifies that the majority of habitat located within and surrounding the Exploration Site at Roseacre Wood comprises improved grassland heavily grazed by dairy cattle and is of low ecological value.

The nearest wooded area, Roseacre Wood is located approximately 250m to the north east of the Exploration Site. The wood was identified as being heavily disturbed and managed largely for the purpose of rearing waterfowl and was considered of low ecological importance. Holmes Wood located 350m to the south west is also of relatively limited ecological value due to rearing game.

The ecological receptors, of nature conservation value, identified within the zone of influence of the main site as part of a Phase 1 Habitat Survey included; hedgerows, bats, breeding birds, nesting birds wintering birds, brown hare and great crested newts. The following were identified as having the potential to be significant at the local scale.

- Loss of habitat.
- Disturbance due to the loss of bat foraging habitat from the activities and equipment present at the well pad.
- Loss terrestrial habitat for great crested newts and potential direct effects on them
- Disturbance and loss of habitat from brown hare.
- Potential disturbance and displacement of migratory species of birds in the vicinity of the array points.

A range of mitigation measures and compensation measures are proposed to be adopted to ensure that the Project would not result in a significant effect on ecological features. These measures include the following:

- Replace hedgerow, trees and habitats,
- Measures to reduce the magnitude of lighting impacts on feeding bats
- Locate seismometer array points away from land unused by overwintering birds.
- Clearance of vegetation to occur outside of bird breeding season or after confirmation that there are no breeding birds using the vegetation.

- Implement noise attenuation measures to minimise disturbance to sensitive species of wildlife.

Policy

EU Habitats Directive

National Planning Policy Framework (NPPF)

Paragraphs 109-112	Conserving and Enhancing the Natural Environment
Paragraphs 118-125	Conserve and Enhance Biodiversity

National Planning Policy Guidance (NPPG)

Natural Environment	Protect biodiversity
Noise	Manage noise impacts

Joint Lancashire Minerals and Waste Development Framework Core Strategy Development Plan documents (LMWDF)

Policy CS1	Safeguarding Lancashire's Mineral Resources
Policy CS5	Achieving Sustainable Minerals Production

Joint Lancashire Minerals and Waste Local Plan – Site Allocation and Development Management Policies – Part One (LMWLP)

Policy NPPF 1	Presumption in favour of sustainable development
Policy DM2	Development Management

Fylde Borough Local Plan

Policy EP12	Conservation of Trees and Woodland
Policy EP15	European Nature Conservation Sites
Policy EP16	National Nature Reserves
Policy EP17	Biological Heritage Sites
Policy EP23	Pollution of Surface Water
Policy EP24	Pollution of Ground Water
Policy EP26	Air Pollution
Policy EP27	Noise Pollution
Policy EP28	Light Pollution

Summary of Consultee comments and Representations

Roseacre, Wharles and Treales Parish Council: Object to the proposal for a number of reasons including the following issues relating to ecology:

- Protected species within area not included in ecology surveys.
- Some impacts cannot be mitigated against for example Barn Owls.
- Insufficient information to make necessary evaluation and recommendations for mitigation
- Other surveys taken place outside recommended times of year.
- No consideration of wintering birds in the ES statement.
- A full Habitats Regulations Assessment needs to be undertaken to understand the impacts on the European protected sites.

Royal Society for the Protection of Birds (RSPB): Express concern about the lack of data and it would be difficult to conclude that there would definitely not be an impact on the three SPAs (Ribble & Alt Estuaries, Martin Mere and Morecambe Bay) through impacts on functionally-linked land due to this lack of data. Winter bird surveys for the area would elucidate the issue.

The RSPB believe that "the regulatory regime for fracking is not fit for purpose, that such a new and untested technology in the UK should be approached with far more caution and that the case has not been made for encouraging a large scale fracking industry within our legally binding climate change limits."

Natural England: No objection- An initial objection was made due to the need for further information to be supplied to the planning authority to check the likelihood for significant effects in accordance with the Habitats Regulations. Further information was required to address impacts on air quality, Special Protection Area (SPA) birds, land use and cumulative effects.

Following the receipt of additional information from the applicant, Natural England concluded that the specific issues they had raised had been addressed and therefore withdrew their objection.

Lancashire County Council Ecology: Initially advised, the proposals have the potential for impacts on biodiversity, including European protected species (great crested newts, bats) and their habitat, species protected by domestic legislation (nesting birds), wintering birds (qualifying features of European designated sites), and Habitats and Species of Principal Importance in England (section 41 NERC Act 2006) (woodland, hedgerows, ponds; several protected species, and additionally brown hare, common toad).

In order that the proposals constitute sustainable development for the purposes of the NPPF, mitigation and compensation for impacts on biodiversity will need to be secured as part of any planning approval.

Prior to determination the applicant should be required to submit the results of eDNA surveys for great crested newts (water bodies 10, 11, 12), together with proposals that clearly demonstrate either avoidance of impacts on great crested newts and their habitat or that the proposals would be licensable.

Planning conditions and/or Section 106 agreements are recommended to address the following matters:

Mitigation measures for wintering birds (as set out in the report '*Environmental Statement. Shadow Habitats Regulations Assessment – Screening*' (ARUP, October 2014), and as approved by Natural England, will be implemented in full;

The approved mitigation proposals for great crested newts will be implemented in full (either as part of a licensed scheme, or non-licensed avoidance measures).

A Biodiversity Mitigation Strategy is required to address impacts upon protected and priority species (amphibians, bats, nesting and wintering birds, badgers, reptiles, water vole, brown hare) and their habitat during construction and operation of the development.

The Strategy should also demonstrate that Species Listed under Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) will not be spread. The Strategy should include details of the establishment, aftercare and management of habitats to be retained and enhanced, or created, as part of these proposals to demonstrate that impacts on habitats will be fully compensated.

Habitat compensation proposals (creation, enhancement and management) fall outside the redline boundary, and it will therefore need to be ensured that appropriate mechanisms are in place to secure compensation.

The applicant submitted further information to address these points including an indicative mitigation strategy and further information in the form of the missing survey results. However, the information requested with regard to Great Crested Newts to demonstrate that the licensing tests would be addressed has not been submitted, and this would need to be satisfied beforehand in the event of a decision to grant permission.

Lancashire Wildlife Trust: The ES does not take into account fungi or lichens, the bird surveys were carried out over one season only and may not represent a true reflection of the impact of the development over time. Concern that the ES and site survey does not include road side verges, wildlife corridors etc in accordance with British Standards Institute Code of Practice Biodiversity Code of Practice for planning and development. Concern is raised over the competence of the author of the ES. The application does not meet the aims of the NPPF in particular paragraphs 17, 109 and 165 of the NPPF. Concern is expressed at the lack of bio security measures to manage the risk of spreading pathogens and non native invasive species. An appropriate landscape/ ecological management plan has not been submitted and there is the need for a legal agreement to safeguard such arrangements. A construction environmental Management Plan (CEMP) is required. The site has the potential to provide net gains in a number of areas of biodiversity. There is general concern about the regulatory framework associated with Fracking.

Woodland Trust: The application site includes a section of woodland called Roseacre Wood, although the site does not appear on Natural England's Ancient Woodland inventory it does appear on maps dating back to 1847. Due to the

significant chance that the site is ancient woodland the Woodland Trust objects to this proposal.

Council for the Protection of Rural England: Lancashire County Council should approve the application only if a number of significant conditions are imposed to prevent adverse impacts on the countryside landscapes, habitats, wildlife and local communities in the area of impact by shale gas operations

Friends of the Earth: Object to the proposal for a number of reasons including the following issues relating to ecology:

- Potential adverse impacts on the migratory path for wintering birds utilising the Morecambe Bay and Ribble Estuary Ramsar/ SPA sites.
- Agricultural drainage ditches surrounding the site discharge north-westwards to the Wyre Estuary via Lords Brook.
- Impacts on internationally designated sites, Morecambe Bay SPA and Ramsar, Wyre Estuary SSSI, Newton Marsh SSSI.
- Medlar Ditch and Wesham Marsh Biological Heritage Sites have not been considered in relation to site operations and potential disturbance.
- The development would result in the loss of 0.06ha of Roseacre Wood, UK BAP habitat lowland deciduous woodland. New woodland planting will not compensate for the loss of mature woodland with habitat value.
- Impacts on protected and notable species including bats, otters, brown hare, great crested newts and nesting birds.
- Impacts on SPA qualifying bird species, wintering and breeding birds.
- Impacts on the functional link with the Ribble and Alt Estuaries SPA/Ramsar, require that a full Habitat Regulation Assessment must be carried out.
- Impacts of the flare (noise, heat, emissions) and 24hour lighting on wildlife. There will be 14 instances of significant impacts including disturbance and loss of habitat for bats, brown hare, nesting birds and great crested newts, with limited mitigation measures proposed. Conditions are inadequate as the applicant will disregard them as per experience at Becconsall site

Roseacre Awareness Group (RAG): Object to the proposal for a number of reasons including the following issues relating to ecology:

- Potential impacts on protected species, some of which have not been surveyed or surveys have limitations and missing data. Need a full habitats survey.
- No information on impacts on Holmes Wood, Carr Wood, Nigget Wood and Medlar Brook and impacts on Roseacre Wood, a possible ancient woodland
- Ecological organisations have not been consulted and Lancashire Wildlife Trust has raised numerous objections.
- Contrary to Policies DM2, EP15, EP19 and NPPF
- Hedgerows should be protected and not removed to install passing places

Other representations

The following is a summary of the representations received that relate to ecology:

- Contrary to Policies EP15 and EP16 as the proposal will affect a European Site and SSSI site.
- Poses an adverse threat to wildlife and wildlife sites and watercourses including, including Ribble Estuary and Morecambe Bay RAMSAR sites, SSSI, Wyre Estuary SSSI, Marton Mere SSSI, Medlar Meadows, Medlar Woods and Medlar Ditch BHS sites, River Wyre, Thistleton Brook and Wyre Estuary Country Park.
- Object to access road at Roseacre Wood, the oldest wood in the parish. To remove trees from this wood would be environmental vandalism.
- Hedgerows will be ripped out to widen roads and canopy of TPO trees at Ladies Row could be affected by passing HGVs.
- Negative impacts on protected species including bats, brown hare, barn owls, great crested newts and birds.
- Adverse effect on wildlife throughout the day on local ecology / biodiversity.
- Fracking - huge adverse effect / harmful impact on wildlife, flora and fauna.
- Impacts from noise, lighting, air pollution (toxic fumes), surface water pollution into field drainage ditches onto wildlife including bird wildlife sites and habitats, resident bird populations, wintering wildfowl, barn owls, pink footed geese and ducks.
- Impact on pink footed geese and other bird species at Holmes Wood.
- RSPB do not support fracking.
- Impacts on fishing lakes and local pits with a variety of fish.
- Ecological surveys are incomplete and without them the Biodiversity Mitigation Strategy will be based on incomplete information.

Assessment

Initially, the County Council's Ecologist raised a number of concerns about the need for more surveys for great crested newts together with proposals that clearly demonstrate either avoidance of impacts on great crested newts and their habitat or that the proposals would be licensable. Further, there would be the need for a Biodiversity Mitigation Strategy to address the impact of the construction and operation of the site on protected and priority species.

The applicant submitted an indicative mitigation strategy and further information in the form of the missing survey results for the additional ponds which confirmed the presence of great crested newts in a further pond and states that the mitigation would be a combination of licensed and non licensed avoidance measures. However, the information requested to demonstrate that the licensing tests would be addressed has not been submitted. This would need to be addressed before the grant of planning permission.

Natural England submitted an initial objection due to the need for further information to be supplied to the planning authority to check the likelihood for significant effects in accordance with the Habitats Regulations. Additional information submitted by the applicant included a Shadow Habitat Regulations Assessment-Screening and the

inclusion of built in mitigation measures. On that basis Natural England confirmed "that a significant effect on the Ribble and Alt Estuary Special Protection Area (SPA)/ Ramsar, and Morecambe Bay SPA/ Ramsar can be excluded, either alone or in combination with other plans or projects". Natural England concluded that the specific issues they had raised had been addressed and therefore withdrew their objection.

Wintering Birds

As mentioned above the applicant submitted a Shadow Habitat Regulation Assessment (HRA) and Natural England agreed with its conclusions and that the built in mitigation would be adequate to enable a conclusion of no likely significant effect to be reached. The County Council are similarly of the opinion that sufficient information, and built in mitigation, has now been submitted to demonstrate no likely significant effect.

Barn Owls

Friends of the Earth have raised a number of concerns and state that barn owls and nesting birds are European protected species. However, they are not, but they are protected by domestic legislation. It is further considered that there is no evidence to suggest the habitat in this area provides high quality foraging habitat for barn owls. It is considered that there is no predicted loss of barn owl foraging habitat.

Breeding Birds

Concern has been expressed that the cumulative impacts on breeding birds have not been properly assessed. The array sites are small discrete structures and whilst there may be many of them, collectively they do not result in the loss of a significant amount of breeding bird habitat. During operation, infrequent visits to monitoring stations during the bird nesting season would not be expected to result in an offence. It is further considered that the biodiversity strategy would enhance habitats for a range of breeding birds.

Bats

Other concerns include the impact of the proposal on bats. There are no significant issues that need to be addressed pre-determination, but mitigation during construction and replacement habitat/ habitat creation should be secured as part of any permission. Whilst there are no roosts at the main site the loss of hedgerow and woodland edge (foraging habitat); light pollution of foraging and commuting habitat and heat from the flare stack may alter insect abundance and distribution. Hedgerow creation and enhancement, replacement woodland planting, lighting mitigation, and monitoring of bat activity during operation of the site has been put forward as part of the Biodiversity Mitigation Strategy (BMS) but which needs to be secured through a planning condition. With regard to the array sites 8 of these are near trees but are microsited to maintain 15m to trees. Therefore, trees need to be adequately protected from damage during array installation.

Excess noise and vibration during installation of arrays is relatively time-limited. However, risks could be further minimised through securing precautionary measures, such as pre-installation survey of trees at those 8 array sites (to confirm absence of bats in advance), a watching brief during installation, or installation of those particular arrays at a time when bats are less likely to be present. Such mitigation could be dealt with as part of a legal agreement requiring a Biodiversity Mitigation Strategy to be implemented.

Roseacre Wood

Concerns have been raised about the impact of the development on part of Roseacre Wood which is an Ancient Woodland. Natural England has confirmed that Roseacre Wood is not on the ancient woodland inventory.

The Lancashire Wildlife Trust has raised a number of concerns and questions.

A concern has been raised that the applicant did not assess lower plants (e.g. fungi). The initial assessment and subsequent surveys did not assess the habitat as significant and did not trigger the need for lower plant surveys. The site is largely characterised as improved agricultural grassland.

The Trust is concerned that requirements of polices 17, 109 and 165 of the NPPF NPPF, require there to be an enhancement of biodiversity instead of a net loss of biodiversity. The applicant says the mitigation measures presented within the ES would be included within the BMS. The detailed commitments to habitat creation and management to be included in the BMS would be developed with reference to the views of the County Council.

The Trust is concerned, about the lack of bio security measures to manage the risk of spreading pathogens and non native invasive species. The applicant has advised that these measures would be addressed in the BMS.

The Trust is concerned that an appropriate landscape and/or ecological management plan has not been submitted and approved. The BMS and Environmental Operating Standard would ensure that all habitat creation and management activities would be implemented, monitored and maintained.

Conclusion

The ecological receptors, of nature conservation value, identified within the zone of influence of the main site as part of a Phase 1 Habitat Survey included; hedgerows, bats, breeding birds, nesting birds wintering birds, brown hare and great crested newts. The following were identified as having the potential to be significant at the local scale.

- Loss of habitat.
- Disturbance due to the loss of bat foraging habitat from the activities and equipment present at the well pad.
- Loss terrestrial habitat for great crested newts and potential direct effects on them

- Disturbance and loss of habitat from brown hare.
- Potential disturbance and displacement of migratory species of birds in the vicinity of the array points.

A range of mitigation measures and compensation measures would be adopted to ensure that the Project would not result in a significant effect on ecological features. These measures include the following:

- Replace hedgerow, trees and habitats,
- Measures to reduce the magnitude of lighting impacts on feeding bats
- Locate seismometer array points away from land used by overwintering birds.
- Clearance of vegetation to occur outside of bird breeding season or after confirmation that there are no breeding birds using the vegetation.
- Implement noise attenuation measures to minimise disturbance to sensitive species of wildlife.

It is accepted that imposition of conditions and a legal agreement controlling the implementation of the proposed mitigation measures would ensure that there would be no unacceptable impact upon biodiversity as a result of the proposal. However, the information requested with regard to protected species to demonstrate that the licensing tests would be addressed has not been submitted and therefore the application could not be granted until information is provided that confirms the measures to address the protection of great crested newts.

The information submitted so far means the proposal is not fully consistent with the policies of the development plan in relation to great crested newts.

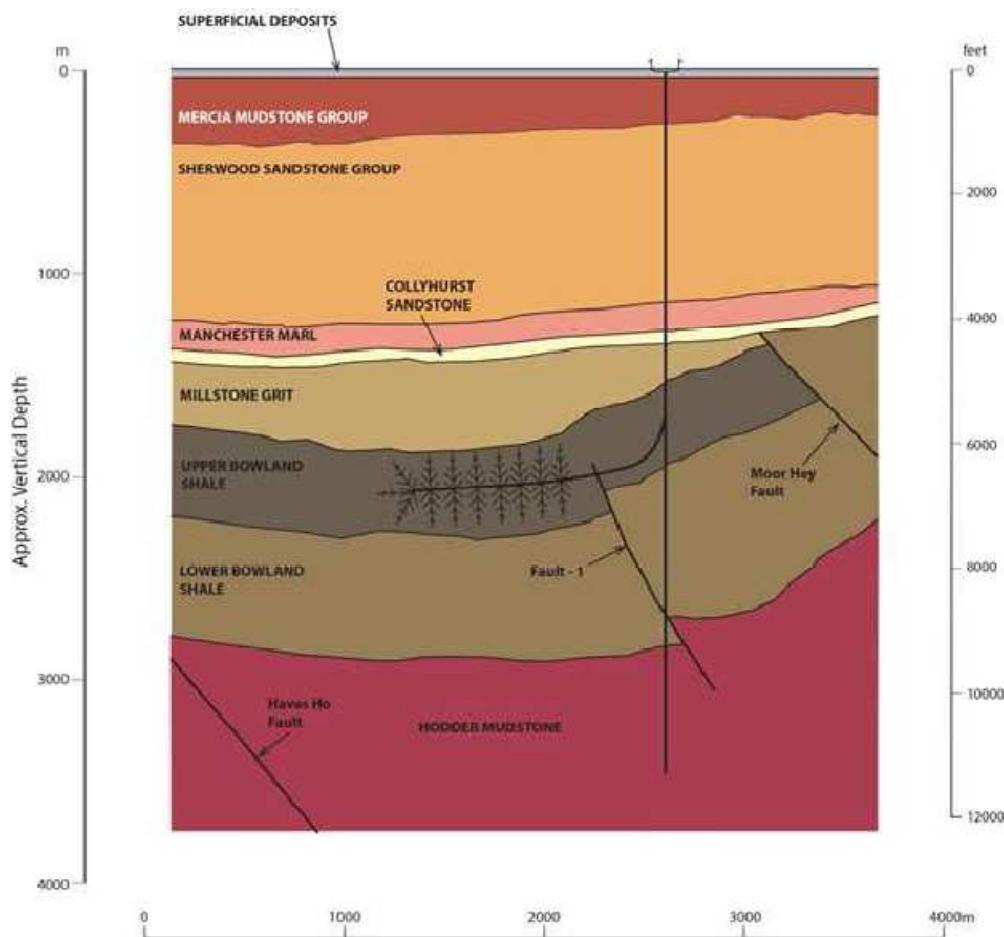
Appendix 8

Hydro Geology and Ground gas

Proposal Outline

The applicant has undertaken an assessment of the potential impacts relevant to hydrogeology and ground gas. The assessment looks at the potential effects of the project as part of the well pad activities and materials in transit, the well construction and integrity and features created by the hydraulic fracturing on the quality of the water environment, both ground water and surface water and the possible creation of subsurface pathways to sensitive features that could result in pollution.

The geology beneath the site is described and the interpretation by the applicant has been assessed by the EA. The geology is such that the Manchester Marls forms a seal between the ground surface and shale rock within which is trapped the natural gas within the rock. The Manchester Marls act as an impermeable barrier and prevent the movement of water and gas up towards the surface of the ground from deeper layers of rock. The Sherwood Sandstone aquifer, a porous rock containing water lies above the Manchester Marls. The EA has confirmed the poor quality of the aquifer because of its salinity and it is therefore not used for drinking water. The following diagram is a typical cross section of the local geology.



The assessment sets out how the well pads and the wells have been designed to prevent leaks or spills from entering the wider environment (the soil, groundwater, surface water or the atmosphere) and cause pollution. The well design is assessed by the HSE and the EA in accordance with their respective regulatory requirements and industry guidance.

The EA also assesses the proposed drilling fluid and the fracture fluid and requires it to be non-hazardous.

Prior to and during works, groundwater water and surface water would be monitored. The monitoring would be agreed with the EA. The EA will require baseline monitoring of groundwater, air quality and surface water for approval before the start of operations.

When the works are finished, the wells would be pugged and abandoned in accordance with the regulatory requirements of the HSE and the EA and industry guidance. The plugging and abandonment of the well including the monitoring of the ground water quality and gas concentrations are matters for the HSE, the EA and the DECC.

The applicant's assessment concludes that the probability of source pathway receptor linkage associated with the contaminant release during well pad construction and access is low; that the contaminant release due to defects in the pad membrane is low; that the contaminant release due to overflow discharge from the well pad drainage systems low; that liquid spray off due to high pressure equipment failure is low; that the spill of contents of vehicles in transit on the public highway is low; that the loss of well integrity due to poor well construction is very low; that the loss of well integrity caused by hydraulic fracturing is very low; that the loss of well integrity

Policy

National Planning Policy Framework (NPPF) Para 122

National Planning Policy Guidance (NPPG) Water supply, wastewater, water quality

Joint Lancashire Minerals and Waste Local Plan – Site Allocation and Development Management Policies – Part One (LMWLP):

Policy DM2 Development Management

Joint Lancashire Minerals and Waste Supplementary Planning Guidance:

SPD Oil and gas exploration, production and distribution (draft)

Fylde Borough Local Plan:

Policy EP23	Pollution	of	Surface	Water
Policy EP24	Pollution of Ground Water			

Consultee comments and representations

Department of Energy and Climate Change: Has confirmed the details of the petroleum licence for the surface site and the maximum extent for underground drilling. The licences give exclusive rights within their area for exploration, boring for

and getting petroleum, but do not waive any other legal requirement applicable to these activities, including requirements for planning permission.

DECC requires the operator to produce Environmental Risk Assessments, taking account of guidance published to the industry by them in April 2014, which flows from the recommendations of the Royal Academy of Engineering and the Royal Society, in their report on the hazards of hydraulic fracturing for shale gas published in June 2012.

Drilling of wells requires Secretary of State consent under the terms of the licence and DECC will undertake a number of checks regarding well targeting and operator funds and insurance before giving consent. With regard to drilling practice, DECC has clarified that drilling through a fault does not entail any seismic hazard.

DECC also requires for hydraulic fracturing, the implementation of measures to mitigate seismic risk including the submission to DECC of a detailed Hydraulic Fracturing Programme (HFP) for each well to be hydraulically fractured. DECC will monitor the conduct of fracturing operations in accordance with the HFP. DECC is of the view that in principle hydraulic fracturing through a fault should be avoided. The applicant has stated that they plan to avoid all detectable faults (whether local or regional), which is the correct approach. The applicant's 3D data will be scrutinised through the review of the HFPs to ensure that the full extent of the stimulated rock volume preserves a safe distance from any detectable fault. The fracturing fluids will therefore never enter a fault and will not be transmitted along it.

DECC consider the traffic light system for shutting down operations to be adequate as the association between hydraulic fracturing and seismic activity remains a developing area of knowledge. Careful monitoring of seismic activity in real time is likely to detect precursor events, providing scope to halt operations, reduce stresses and avoid more substantial tremor. DECC would explore the implications of any red light event promptly with a view to deciding whether operations can be resumed without undue risk of disturbance to local residents and if so what operations are acceptable and whether any further precautions are appropriate.

Proposals to flare gas during the initial testing phase will require the consent from the Secretary of State under the Energy Act 1976 and any venting is subject to DECC consent. Any venting should be reduced to a minimum. DECC's standard online drilling consent allows 96 hours of testing. To test for a longer period, the applicant will need to apply to DECC for a paper-based Extended Well Consent. DECC will expect the operator to minimise flaring during the period of any Extended Well Consent.

Abandonment of any well requires the Secretary of State's consent under the terms of the licence. DECC will check for completeness of well data before giving consent.

Environment Agency (EA): No objection in principle and recommends the following:

- A scheme to dispose of surface water between the drill pad and Carr Bridge Brook to be submitted to ensure the proposed development does not increase the risk of pollution to Carr Bridge Brook.

- Routine monitoring of on-site surface water quality and maintenance, and inspection of surface water drains, valves and interceptors to ensure correct and efficient operation.
- Surface water run-off retained on site during operations to be tankered away for off-site disposal and to not be discharged to the watercourse.
- To consider whether the Control of Pollution (Oil Storage) (England) Regulations 2001 apply. If not any facilities, above ground, for the storage of oils, fuels or chemicals to be sited on impervious bases and surrounded by impervious bund walls.

With regard to flood risk the EA confirmed that the proposed development is located in Flood Zone 1 which is defined as having a low probability of flooding in the National Planning Practice Guidance. The Agency has reviewed the Flood Risk Assessment submitted with the application and is satisfied that the development would not be at risk of flooding or increased flood risk off-site.

With regard to radon release during the flaring of gas, the Environment Agency confirmed that radon is exempt from their permitting by the Natural Gas Exemption Order 2002 and from regulation under the Environmental Permitting Regulations 2010. This is on the basis of its low risk, widespread use and that it was not amenable to regulation. Discharges of radon in natural gas, being flared or vented at gas sites is not subject to regulation under radioactive substances regulation (RSR).

Health and Safety Executive (HSE): No objection; the proposed operations will be conducted in accordance with recognised regulations standards and good industry practice. From a well's operations perspective there are no issues or concerns with the proposals

HSE has provided clarification of relevant regulations applicable to onshore well; how it regulates shale gas activity; what information it requires and working with the Environment Agency. HSEs regulatory framework ensures that information is provided at key stages in the lifecycle of a well and allows HSE inspectors to assess whether risks are being adequately controlled and if not to take the appropriate regulatory action.

The Health and Safety at Work Act 1974 (HSWA) requires those who create health and safety risks to workers or the public as part of their undertaking have a duty to manage and control the risks so far as is reasonably practicable. This is supplemented with more specific regulations particular to the extraction of gas and oil through wells, which includes shale gas operations.

The Borehole Sites and Operations Regulations 1995 (BSOR) applies to all onshore oil and gas wells. These Regulations require notifications to be sent to HSE about the design, construction and operation of wells, and the development of a health and safety plan which sets out how risks are managed on site.

To comply with BSOR the well operator must submit a notification to HSE at least 21 days before work commences. The notification includes information on the design of the well, the equipment to be used to construct it, the programme of work, the location, depth and direction of the borehole, the relationship to other wells and

mines, the geology of the drilling site and identified risks and their proposed management. The HSE will assess the well design before construction starts and will identify any issues which will have an impact on well integrity. Any issues will be addressed by the operator and safety features will be incorporated into the design. Further notifications are required if there are any material changes to the information previously supplied.

The Offshore Installations and Wells (Design and Construction) Regulations 1996 (DCR) includes specific requirements for all wells, whether onshore or offshore, and include well integrity provisions which apply throughout the life of shale gas or oil wells. They also require the well operator to send a weekly report to HSE during the construction of the well so that inspectors can check that work is progressing as described in the notification. .

To comply with DCR the operator must report to HSE every week during construction and during work to abandon the well, to provide HSE with assurance that the operator is constructing and operating the well as described in the notification. The weekly report details well integrity tests, the depth and diameter of the borehole, the depth and diameter of the well casing and details of the drill fluid density. The drill fluid density allows the inspector to gauge the pressure in the well and identify any stability issues.

If the operator is not complying with the notification, the HSE can take appropriate regulatory action. HSE uses a risk based interventions on particular sites and operators and to ensure well integrity. The HSE has a team of expert well engineers who cover hydrocarbon wells onshore and offshore. In considering well integrity a lifecycle approach is used including notifications, weekly well reports, operator meetings and on-site inspections being used to manage the risks appropriately.

The operator must also appoint an independent well examiner in a quality control role who will ensure that the well is designed, constructed, operated and abandoned in accordance with industry and company standards and that regulatory requirements are met. Specialist well engineers help develop best practice standards for the onshore industry with the United Kingdom Onshore Operators Group (UKOOG). All members of UKOOG have to comply with the latest standards published in February 2013.

A well operator must also report to HSE any occurrences covered by RIDDOR – Reporting of Injuries, Diseases and Dangerous Occurrences Regulations. These could include a blowout (i.e. an uncontrolled flow of well fluids); the unplanned use of blowout prevention equipment; the unexpected detection of hydrogen sulphide (H₂S) which is an explosive gas; failure to maintain minimum separation distance between wells and mechanical failure of any safety-critical element of a well. HSE can investigate any well incidents that would have an effect on well integrity and ensure the operator improves their operations.

Since 2012, the HSE and the Environment Agency have an agreement covering joint regulation of shale gas operations. HSE and EA inspectors will meet all new and first-time operators of shale gas wells to advise them of their duties under the

regulations and to jointly visit all shale gas sites during the exploratory gas phase of shale gas development.

In response to comments raised by Friends of the Earth in their representation to the proposed development, HSE have clarified the following

- HSE have continued to monitor Preese Hall site during abandonment activity and that there has been no unplanned release of fluids from the well.
- HSE will continue to monitor abandonment activity on all onshore and offshore wells to ensure all work is completed to industry standards and the risk of release of fluids from wells post abandonment is as low as reasonably practicable.
- With regard to risk of leaks from gas wells and the risk of exposure to benzene, the DCR sets out the requirement that there should be no unplanned release of fluids from the well so far as is reasonably practicable. The HSE will review well notification information to ensure that the operator is managing the risks in such a way that the well is designed, constructed and abandoned safely.
- BSOR Regulation 10 requires the well operator to provide all persons engaged in borehole operations with appropriate health surveillance.
- The HSE is aware of the warning issued by NIOSH regarding exposure to silica. The HSE will look at how the well operator manages exposure to silica. It is expected that sealed units will deliver sand to site and mix it into fracturing fluid so that the exposure risk is minimised.
- HSE do not consider that the regulations are inadequate, flawed or ineffectively applied and enforced. The UK health and safety regulations are robust and the regulatory regime governing oil and gas operations is world leading.
- HSE receives well notification information 21 days before work starts. Until the notification is received HSE cannot make a full appraisal of the design of the well and the programme of work and give assurance that the well operator is managing the health and safety risks appropriately including the risk of an unplanned release of fluids.

Public Health England (PHE): Initially recommended that the Local Planning Authority (LPA) request and consider further information regarding sensitive receptors, atmospheric pollution, risks to surface waters and groundwater, environmental monitoring, radon, NORM, resources and waste, dust, noise, light and odour, accidents and incidents.

The applicant provided further information to address the issues raised by PHE. PHE has subsequently advised that the planning authority should confirm (in respect of hydrogeology):

- The operator is happy to provide details on the baseline monitoring protocol in response to a planning condition.
- They are satisfied with details of monitoring locations, what is being monitored for, and the schedule for monitoring frequencies.

- They are satisfied with the proposed definition of significant variation for other determinants, regarding air emissions and surface water and ground water potential contaminants.
- They are satisfied with the applicant's proposal for drill cuttings coated with low toxicity oil based muds to not be covered.

LCC Director of Public Health: Has undertaken a Health Impact Assessment (HIA) on the two drill sites and identified that the key risks to health and wellbeing of the population from the two proposed sites are a lack of public trust and confidence in the regulatory process and the industry, stress and anxiety from uncertainty about the industry that could lead to poor mental wellbeing; potential noise related health effects due to continuous drilling for at least five months for the initial borehole on each site and for three months for each of the subsequent three boreholes per site (14 months of continuous drilling), and potential health risks due to the presence of mining wastes generated as part of the drilling and hydraulic fracturing process being retained on site if adequate off site treatment facilities are not found.

With particular regard to hydrogeology

- To develop a framework to establish a baseline and on-going monitoring of environmental and health conditions.
- Characterisation of the extent of fracture propagation and the permeability of layers above and beyond the faults
- Characterisation of combustion gases at the flare, particularly the levels of hydrocarbons, radon, methane, volatile organic compounds and any other substances deemed hazardous to human health
- Levels of fugitive emissions at well pads, on potential pathways and at receptor households.
- Ground water monitoring of methane.
- Measuring long term well integrity.
- Information on any existing private water supplies that aren't covered by abstraction license within 2 km zone.

Elswick Parish Council: The Parish Council does not object but has the following comments:

- In favour of the preferred traffic route which enables Elswick, a densely populated area to remain outside the routing of the tankers, ensuring the safety of over 200 children living in the village.
- A small group of residents have expressed concerns regarding the visual impact and character of landscape and the risk of methane/water contamination and environmental impacts.

Great Eccleston Parish Council: No observations

Medlar-with-Wesham Parish Council and Kirkham Town Council: The Council's object to the proposal as submitted and request that it be refused planning permission for the following reason (among other reasons) that relates to hydrogeology: Potential well failure and the huge potential for land contamination, particularly to aquifers and agricultural land.

Newton-with-Clifton Parish Council: Objects to the proposal. No specific comments on hydrogeology and ground gas:

Roseacre, Wharles and Treales Parish Council: Objects to the proposal on a number of grounds including the following ground related to hydrogeology and ground gas: Risk of imperfectly sealed wells leaking into groundwater.

Friends of the Earth have raised a number of objections to the proposal including the following summarised reasons in respect of hydrogeology as part of their response to the application as initially submitted and in response to the further information:

- It is unclear what waste quality standards would be applied by the applicant to ensure that concentration of pollutants in the wastewater did not accumulate beyond safe levels as a result of re-use for fracking and how risks to the environment and health and safety would be mitigated as a result of well failure.
- Legacy of underground waste which will be present is denied, not a temporary development as it will create permanent contaminated wastewater
- Risks from flow back fluid and waste water
- Risks of storage of waste to protected ecological areas and the developer has not clarified what happens when the storage capacity of the site is exceeded.
- Concerned that the site has insufficient capacity to contain storm water without overflowing and presenting risk to adjoining land.

Representations objecting to the proposal have made reference to the unacceptable impacts on hydrogeology which are summarised as follows:

- The applicant has underplayed the impact because they have omitted important faults from their maps and that have also understated the hazard from the faults that they have considered by overlooking the possibility that fracking fluid may leak into these faults.
- Concerns have been expressed that the presence of major faults in the area means that the proposal will inevitably pollute the surrounding region as a result of flow along the faults.
- In addition concerns have also been expressed about well integrity, chemicals that are used in fracking fluid, and the need for long term monitoring.
- The Earth will become a barren toxic wasteland after fracking, breaking up and filling the ground with chemicals must have environmental consequences.
- Risk of short term well failure and loss of well integrity in the long term are widely reported, resulting in a toxic legacy for current and future generations
- Issues from corrosion of well casings, cement deterioration, faulty drilling.
- Fracking fluid contains carcinogens, toxins, radioactive and hazardous materials which will contaminate land and water sources affecting food production and drinking water.
- Risk of contamination from carcinogenic chemicals.
- Risk of contamination from *Caesium-137, Americium-241, Beryllium, Hydrochloric acid, lead, arsenic, cadmium, glutaraldehyde, biocide quaternary ammonium chloride, ammonium persulfate, choline Chloride, isopropanol,*

petroleum distillate, polyacrylamide, guar gum, citric acid, lauryl sulphate, sodium hydroxide, copolymer of acrylamide, sodium acrylate, chloride, bromine, methane.

- 50% of chemicals will remain in the ground.
- Don't want a chemical legacy for our children to have to deal with.
- Need full disclosure of chemicals in fracking fluids and risks from them.
- Contamination/pollution from fracking process, gases and fracking fluid to aquifers, ground water sources, local rivers, streams, springs and reservoirs in the short and long term which could endanger drinking water supply to people and grazing animals with associated health risks.
- Over a thousand documented cases in the US of groundwater pollution.
- Drinking water is more important resource than gas. Risk of contaminating water supply is too big a risk.
- Need more work to establish the safety of the process in relation to ground water contamination.
- Need baseline and continuous groundwater monitoring with work suspended if contamination / adverse effects are found.
- Monitoring wells for groundwater quality and gas concentrations should be mandatory.
- Even if tightly regulated an unforeseen accidental discharge could contaminate groundwater and the damage cannot be rectified.
- Millions of litres of polluted / toxic water will be left to drift underground, approximately 30miles around each well with long term damage.
- Faults can act as conduits and enable fracking fluids to migrate to water sources.
- The Water Framework Directive requires that a development should not go ahead unless it is proven that there is no risk to groundwater.
- Contrary to FBLP Policy EP24 as water quality will be affected by leaking wells.
- Who pays for decontamination of our water supplies? Are councils not cash strapped?
- Need a law for every contamination, company directors get 10 year jail sentence.
- Water from taps could ignite.
- UK geology – too many local faults will allow leakage. Faults still moving. In previous drilling using unproven technology an undetected fault moved and failed the borehole. Too risky.
- Link between fracking and previously geologically stable areas in Ohio, USA.
- Fracking could destabilise the entire bedrock beneath the Fylde, upon which sits several mine workings and unstable ground conditions – running sand.

Assessment of Impacts

An assessment of subsurface geology by the EA has considered the potential for retained pollutants in the shale rock to migrate upwards into contact with any groundwater bearing formations. This outcome has been assessed as very low risk and with no plausible pathway. The rock formation directly above the target formation, known as the Millstone Grit (at depths of ~1300m to ~1550m below ground level), has been assessed as a groundwater unit. A groundwater activity

permit is therefore required because of the theoretical possibility that fluid could migrate from the target formation into the Millstone Grit.

The EA has assessed the possibility of fluid migration as very low risk. This is because of the absence of a pressure gradient driving the fluid once the fracturing pressure is turned off. Moreover, close monitoring of fractures (using the micro seismic array and in accordance with the Fracture Plan that must be approved by DECC and the Agency) will prevent any fractures moving into the Millstone Grit from the target formation, thus preventing the movement of fluid.

Concerns have been raised by third parties that there are groundwater / surface water pollution risks and that that '*The hydrogeology of the area immediately east of the site shows that regional faults are transmissive.*'

In considering these concerns the County Council has taken advice from the Environment Agency and from Professor Younger and Dr Westaway at the University of Glasgow. This concludes:

- (i) Where faults cut low-permeability strata such as shale there is a marked tendency for the fault plane to be lined with a fine-grained clay-rich material known as "fault gouge", which typically renders these portions of the fault planes effectively impermeable (*Younger, P.L., 2007, University of Glasgow. Groundwater in the environment: an introduction. Blackwell, Oxford.*. In contrast, where the same fault cuts a permeable rock such as sandstone and the displacement has not smeared clay-rich gouge from an over- or under-lying mudstone into the fault zone, then the fault plane may well be occupied by relatively permeable breccia; minor fractures either side of the fault plane in a sandstone might also be relatively clean and open. However, because of the formation of fault gouge where the same faults pass down into mudstones, there is no a priori reason to suppose that these faults are permeable throughout their depths: where they cut mudstones they are overwhelmingly likely to be of low permeability.
- (ii) Even where a fault is not so lined with gouge as to render it impermeable, it is subject to the present crustal stress regime, which tends to favour faults being more permeable where they are aligned fairly closely to the current maximum compressive stress azimuth, but tends to make them far less permeable if they are otherwise oriented (*Ref: Ellis, J., Mannino, I., Johnston, J., Felix, M.E.J., Younger, P.L. and Vaughan, A.P.M. 2014. Shiremoor. Geothermal Heat Project: reducing uncertainty around fault geometry and permeability using Move™ for structural model building and stress analysis. European Geosciences Union General Assembly 2014, Vienna, 27th April–2nd May 2014. EGU2014-15069.* Note that this does not override the basic permeability control provided by fault gouge.
- (iii) Crucially, even where a fault is continuously permeable over a large vertical interval (which is unlikely in sequences, like those in the region under consideration, that contain thick mudstones) groundwater flow can only occur if there is a sustained driving head from one area to another. There is no evidence of any such upward-oriented hydraulic gradient in this region, and the extremely short-lived pulses of increased head close to the

boreholes during fracking operations are insufficient to overcome the head in overlying strata. Where conventional oil and gas reservoirs occur, natural upward hydraulic gradients may exist, but oil and gas only accumulate where permeable pathways upwards are insufficient to allow dissipation of fluid pressure over geological time. It is inherent in the very definition of unconventional gas that such over-pressure does not occur; hence the need for reservoir stimulation and depressurisation of the target horizon in order to get gas to move into boreholes. These points were addressed in the Joint Royal Academies' report (*Ref: Shale gas extraction in the UK: a review of hydraulic fracturing. Royal Society and Royal Academy of Engineering*)

There are possible impacts associated with the well pad construction and activities. The site construction involves laying an impermeable member over the whole compound area to prevent accidental slippage and rainwater from entering the underlying soils, groundwater and nearby water courses. The platform is bounded by a ditch, for the purpose of pollution control. Surface water will drain into a water course and the Environment Agency has advised that the arrangements are acceptable subject to several conditions

There are potential impacts associated with the well design and construction and proposal to manage these impacts. It is proposed that the well would be drilled, constructed and tested in accordance with regulatory requirements and industry standards. The well design would comprise a two barrier cement sealed design. Details of the well design would be reviewed by the Independent Well Examiner. Additionally, the Environment Agency considers the proposed well construction would form a barrier to prevent the escape of fluids. The EA is satisfied that well integrity is assured through compliance with the well examination regime and regulation by the Health and Safety Executive, and further through conformance to Oil & Gas UK and UK Onshore Operators' Group good practice guidelines for well design and construction. Hydraulic fracturing plans and a seismic monitoring programme would be submitted to DECC and the EA for approval prior to hydraulic fracturing operation commencing; operation of a traffic light system for monitoring of induced seismicity is also designed to mitigate the risk from induced seismicity, including any potential for damage to well integrity. The potential for fractures that are propagated by hydraulic fracturing to extend beyond the target formation has been assessed to be very low and the growth of fractures resulting from each fracturing stage would be assessed with the aid of the seismic monitoring array.

The EA has assessed the proposed fracture fluid as non-hazardous. It is also satisfied that the chemical similarity between the fluid and the water in the Millstone Grit is sufficiently high that any indirect discharge would be insignificant. Finally, the EA believes that if any fluid reaches the Millstone Grit it would not move far from the point of entry because of the confined nature of the rock. If needed low toxicity oil based muds would only be used below the Manchester Marl formations and with the approval of the EA.

Prior to and during works, groundwater water and surface water would be monitored (see application LCC/2014/0102). The monitoring would be agreed with the EA. The EA's draft permit includes pre-operational requirements to provide baseline monitoring of groundwater, air quality and surface water for approval before the start of operations. The draft permit also includes a requirement to provide for a

monitoring plan for at least 4 weeks prior to gas flaring. The EA has specified monitoring of groundwater and surface water in the draft permit and this would be carried out until the permit is surrendered.

When the works are finished, they would be decommissioned in accordance with the regulatory requirements of the EA and the HSE and industry guidance. The plugging and abandonment of the well including the monitoring of the ground water quality and gas concentrations are matters for the HSE, the DECC and the EA and their respective regulatory regimes. In particular, the plugging and abandonment of the borehole is regulated by the HSE under the Offshore Installations and Wells (Design and Construction etc.) Regulations 1996. These Regulations contain provisions relating to well integrity and abandonment as well as the selection of materials. The Regulations apply to all wells drilled under landward licences, the key objectives of which are to prevent the escape of fluids from the well which might result in pollution of freshwater or ground contamination. Under the Regulations, well abandonment techniques must prevent the transfer of fluids created by pressure gradients between different zones. Such transfer is achieved by means of the original borehole casing and the cementing and plugging operations that are undertaken as part of well abandonment.

Paragraph 122 of the NPPF requires that planning authorities should not seek to control processes or emissions were these are subject to approval under separate pollution control regimes and that LPA's should assume that these regimes will operate effectively. Nonetheless, paragraph 112 of PPG Minerals, notes that before granting permission the local planning authority should be satisfied that the issues dealt with under other regimes can be adequately addressed by taking advise from the relevant regulatory body'. The County Council has consulted with the EA and HSE, neither of which has objected.

The EA is minded to grant the applicant the necessary environmental permits needed to carry out their proposed operations. The draft permits set out the conditions needed to protect groundwater, surface water and air quality. If the permits are issued, the applicant will have to comply with the conditions that are designed to ensure that operations do not cause harm to people or the environment. The EA has assessed the proposed activities that could involve the discharge of pollutants into groundwater (a 'groundwater activity') and the nature of these pollutants. The EA is satisfied, subject to conditions, that there is minimal risk of direct discharge of pollutants into groundwater. The EA is also satisfied that the indirect entry of non-hazardous pollutants will be limited so as not to cause pollution.

Conclusions

Hydrogeological issues and the protection of surface and ground water have been assessed by the applicant and the risks associated with such were considered to be low or very low.

Advice provided to the County Council from Professor Younger and Dr Westaway at the University of Glasgow states the scenarios of pollution of shallow groundwater and surface waters due to fracking operations, as suggested in some representations, are not credible. They also say the suggestion the proposal is unsafe because there are faults in the vicinity is unfounded.

The Environment Agency (EA) and the Health and Safety Executive (HSE) have been consulted and have advised on the regulatory regimes that would be employed to manage the risks and that they are satisfied that such risks could be managed in a way that would not cause any unacceptable impact.

It is considered that the site can be contained and surface waters managed in a way as to prevent pollution to adjoin land or nearby watercourses.

The County Council should assume that these regimes will operate effectively and can be satisfied that the issues dealt with under other regimes can be adequately addressed.

Boreholes for ground water monitoring are the subject of planning application LCC/2014/0102. Subject to conditions controlling the management of surface water it is considered that the proposal could be acceptably controlled by other regulatory regimes and would not have any unacceptable impacts

It is therefore considered that the proposal would not have an unacceptable impact and would not be in conflict with the policies of the NPPF or the development plan policies.

Appendix 9

Induced Seismicity

Proposal

A full assessment of the likely effects of induced seismicity associated with the proposed hydraulic fracturing operations including the likely effects on surface deflections (subsidence) from gas extraction has been carried out. Seismic events could occur as a result of stress changes on a plane of weakness (a fault) caused by the growth of engineered fractures and the transmission of fluid pressure into a critically stressed fault.

The potential extent of underground engineering activities have been identified and projected to the surface and which represents a quadrant extending some 2km from the well site. The key development issues associated with induced seismicity include:

- The potential effects of ground motion, including felt vibrations, damage to structures, infrastructure and other elements of the built environment.
- The risk of ground motion hazard causing equipment damage, in particular the integrity of the borehole and casing.
- The growth of engineered fractures and the potential for the migration of hydraulic fracturing fluids and gases out of the fracturing zone; and
- The methods to monitor and limit the magnitude of seismic activity.

Induced seismicity is seismic events usually of a very low magnitude. An extensive review of geological information of the area from a diverse range of sources has been undertaken as part of a baseline data collection process. These include geological information, stress data, background seismicity, and identification of seismic receptors to inform a predicted future baseline. An assessment of operational effects has been carried out the methodology for which includes:

- Review and select criteria for assessment of ground borne vibration.
- Assessment of the potential hazard of induced seismic events during drilling, hydraulic fracturing, flow testing and extended flow testing.
- Quantify the effects from induced seismic events specific to the mechanisms associated with shale gas.
- Develop a risk based mitigation plan.

The assessment has been based on a source, pathway, and receptor framework. In order to quantify the significant effects, the risk and subsequently the significance of the effect have been estimated. To reduce the effects of induced seismicity, mitigation measures are proposed to reduce the risk of felt magnitude seismic events occurring, rather than preventing very low magnitude seismic events occurring all together.

There is no existing ground investigation information for the site. An understanding of the geology has been derived from the desk top study and review of source information and from the 3D geophysical survey carried out in the area to provide an

interpretation of the below ground stratigraphy of the site. This sought to demonstrate the geological make up of the ground being a combination of middle sands overlying boulder clay, Sherwood sandstone, Manchester marls, Collyhurst Sandstone, Millstone grit, upper and lower Bowland shales, Hodder mudstone and Clitheroe Limestone. The site is located within the Bowland Basin predominately active in the Carboniferous period 300 – 360 million years ago. Within the basins are a series of regional extensional faults the largest of which is the Woodsfold Fault which outcrops at the surface approximately 3k east of the site and dips approximately west beneath the site and some 650m below the shale gas target geological horizon. It has been assumed as a worst case scenario that all faults within the area of the well site are critically stressed although this is not always the case. Using a worst case scenario means that the mechanism of transmitting an increase in fluid pressure to a fault plane and hence induced seismicity is considered to be feasible for all faults that are critically orientated. A study of such would be carried out as part of the initial well drilling and used to prepare the fracking plan to be submitted to DECC for approval prior to any fracking being carried out.

In terms of natural seismicity the UK is not a particularly active seismic region but is considered to have a low to moderate rate of seismicity. Within the UK, West Lancashire is interpreted to be a relatively low seismicity region. BGS records a magnitude of $3.7M_L$ a $4.7M_L$ every 10 years and $5.6M_L$ every 100 years. Currently the BGS earthquake catalogue does not contain information on events less than $2.0M_L$ although it is expected that over 2000 events at $0.5M_L$ occur every year in the UK. $0.5M_L$ is the red light threshold in the Governments traffic light system mitigation measure. Consequently the applicant considers that the events associated with Preese Hall well site at 2.3 and $1.5M_L$ were within the range of magnitudes commonly felt across the UK and which are not unusual in occurring every year in significant numbers.

To assist in monitoring back ground seismicity an array of 4 monitors were installed at the Beckonsall site, some 15km south of Blackpool and recorded background seismicity over a 6 month period. The monitoring recorded two natural seismic events which were also recorded by BGS, one near Ludlow ($2.8M_L$) and one near Wigan ($1.6M_L$) demonstrating natural seismicity near the Fylde. .

The results from modelling with all the data compiled indicate that the maximum likely magnitude of induced seismic events associated with fracking would exceed the levels of Preese Hall if no mitigation measures were employed and injection volumes used at the time were to be used again.

It is not proposed to inject similar volumes as part of the proposed operations and therefore the anticipated events would be significantly lower. An assessment of the impacts on the following receptors has been made:

- Wells – including the site exploration well and other wells.
- Infrastructure – including roads, railway, bridges, utilities, pipelines.
- Special buildings – including listed buildings, schools, hospitals, churches, monuments, stately homes, listening stations.
- Residential buildings.
- Industrial/commercial buildings.

Hydraulic fracturing will cause induced seismicity. An assessment of ground motion hazard and other seismic related effects such as liquefaction, slope stability and subsidence has been carried out. The assessment on ground motion concludes that no damage to structures is anticipated and there would not be significant effect at levels up to $1.5M_L$ although seismic events may be perceptible to some people in sensitive environments. The effects on well integrity at this level is considered to be not significant as is the effects on liquification potential, slope stability, settlement from gas extraction, earthquakes from gas extraction, fluid migration and changes in the stress regime, or effects on ground motion hazard causing salt cavern instability at the proposed Preesall Saltfield Underground Storage Project.

For the prescribed levels to be exceeded, it would necessitate fluids to be injected to the same levels as at Preece Hall, for the traffic light system to fail or fluid transmitted into a fault. It is expected that the mitigation measure will be employed to prevent a level of $3.1M_L$ being exceeded. If it were reached then it is expected vibrations could be felt up to 65km away, minor cosmetic damage to local sensitive structures, rare minor damage to the most sensitive civil infrastructure with no damage anticipated to reinforced buildings. However, the likelihood of such a level being generated is considered to be very low with medium consequences and the risk of magnitude no significant.

As part of the initial flow testing there is likelihood that residual seismic events would be experienced but not in excess of those caused by fracturing. It is not anticipated that such events would be felt at the surface but would be recorded as part of the monitoring. This would similarly be the case for any extended flow testing and therefore any risk is expected to be negligible and not significant.

With regard to cumulative and interactive effects in the event the site at Preston New Road is operationally active, this is considered to minor and not significant for both fracturing operations and flow and extended flow testing.

To ensure that the limits of movement are not exceeded it requires the implementation of a traffic light system which utilises the data collected by the surface seismic monitoring array, the application for which is reported elsewhere on this agenda. This system wood be required to be employed by DECC. Green level is where pumping of fracking fluids would continue providing that induced seismicity is less than $0M_L$; if an event occurs in the amber range of $0M_L$ to $0.5M_L$ while pumping fracturing fluids the stage can be completed and the flow back procedure would be initiated. If an event were to occur in the red range while pumping the fracture stage would be aborted and the flow back procedure would be initiated. Throughout this process results would have to be submitted to DECC and would inform future operations.

An assessment has also been carried out to determine whether the extraction of shale gas could cause settlement of the ground surface. The assessment acknowledges that settlement from extractive hydrocarbon industries has occurred in the past by either:

1. Removing large quantities of rock, for example in the coal industry; or

2. Removing liquid and gas in pore spaces between the rock causing the rock to consolidate, for example in the oil and gas industries.

The assessment recognises that settlement, and more importantly deflection, of the ground surface can cause architectural and structural problems to buildings, services and infrastructure. However, shale gas production does not involve remove rock from underground and therefore the first potential mechanism for causing settlement would not occur.

The second potential mechanism for causing settlement, consolidation or compaction due to extraction of liquids and gas, will not occur because the amount that shale rock changes with the extraction of gas is expected to be almost zero. In addition, it is noted that the ground surface is some 2.5 to 3km or more above the target reservoir, the horizontal wells in the shale will be no more than 8.5 inches in diameter, and the fractures created are equivalent in size to a grain of sand.

The assessment concludes that there is no mechanism for the extraction of gas to cause deflection of the ground surface and notes that the proposal is an exploration well and is not (at present) planned for full scale production. As such there is no plan to extract any great quantity of gas, just to investigate the possible rates of gas flow in the Bowland Basin. Therefore, the risk that the extraction of shale gas will cause deflection of the ground surface during exploration at the Site is considered to be so low as to be negligible.

Subject to the employment of such mitigation it is concluded that there would not be any risk unacceptable levels of seismic movements occurring associated with the hydraulic fracturing process.

Policy and Guidance

In terms of European legislation EIA is required for deep drilling projects and surface installations for the extraction of oil or gas to assess all relevant environmental risks including seismic hazard.

In the UYK all petroleum licences are owned by the Crown and the right to exploit them is governed by DECC. DECC has adopted a traffic light system based on the recommendations of a number of bodies including The Royal Society and The Royal Academy of Engineering. The traffic light system requires monitoring by remote seismometers buried at the surface or at depth to undertake real time monitoring as part of the hydraulic fracturing process to inform, the duration and intensity of fluid injection during hydraulic fracturing stages to ensure that prescribed limits of induced seismicity are not exceeded – $0.5M_L$ – the red light threshold to be used to limit induced seismicity to below the level that may be felt by humans.

There are no policies relating to seismicity in the NPPF, the Joint Lancashire Minerals and Waste Development Plan or the Fylde Local Plan.

In terms of guidance there have been numerous documents and publications but the following are considered most relevant for the purposes of seismicity:

DCLG - Planning practice guidance for onshore oil and gas - provides advice on the planning issues associated with the three phases of extraction of hydrocarbons. It identifies the key regulators for hydrocarbon extraction including DECC who issues Petroleum Licences, gives consent to drill under the Licence once other permissions and approvals are in place, and have responsibility for assessing risk of and monitoring seismic activity, as well as granting consent to flaring or venting. Seismic assessment of the geology of the area to establish the geological conditions, risk of seismic activity and mitigation measures to put in place is required by the DECC for all hydraulic fracturing processes;

The Royal Society: Shale gas extraction in the UK: a review of hydraulic fracturing June 2012 – The UK Government's Chief Scientific Adviser asked the Royal Society and the Royal Academy of Engineering to carry out an independent review of the scientific and engineering evidence relating to the technical aspects of the risks associated with hydraulic fracturing to inform government policymaking about shale gas extraction in the UK. The terms of reference of this review were:

- What are the major risks associated with hydraulic fracturing as a means to extract shale gas in the UK, including geological risks, such as seismicity, and environmental risks, such as groundwater contamination?
- Can these risks be effectively managed? If so, how?

With regard to seismicity the review recognises concerns about seismicity induced by hydraulic fracturing. Advises that Natural seismicity in the UK is low by world standards. On average, the UK experiences seismicity of magnitude 5 ML (felt by everyone nearby) every twenty years and of magnitude 4 ML (felt by many people) every three to four years. The UK has lived with seismicity induced by coal mining activities or the settlement of abandoned mines for a long time. British Geological Survey records indicate that coal mining-related seismicity is generally of smaller magnitude than natural seismicity and no larger than 4 M_L. Seismicity induced by hydraulic fracturing is likely to be of even smaller magnitude. There is an emerging consensus that the magnitude of seismicity induced by hydraulic fracturing would be no greater than 3 M_L (felt by few people and resulting in negligible, if any, surface impacts). Recent seismicity induced by hydraulic fracturing in the UK was of magnitude 2.3 M_L and 1.5 M_L (unlikely to be felt by anyone). The risk of seismicity induced by hydraulic fracturing can be reduced by traffic light monitoring systems that use real-time seismic monitoring so that operators can respond promptly. Monitoring should be carried out before, during and after shale gas operations to inform risk assessments. Methane and other contaminants in groundwater should be monitored, as well as potential leakages of methane and other gases into the atmosphere. The geology of sites should be characterised and faults identified. Monitoring data should be submitted to the UK's regulators to manage potential hazards, inform local planning processes and address wider concerns. Monitoring of any potential leaks of methane would provide data to assess the carbon footprint of shale gas extraction.

In particular the review considers that vibrations from a seismic event of magnitude 2.5 ML are broadly equivalent to the general traffic, industrial and other noise experienced daily and sets out the average annual frequency of seismic events in the UK in the following table:

Magnitude (ML)	Frequency in the UK	Felt effects at the surface
-3.0	Not detected by BGS' network	Not felt
-2.0	Not detected by BGS' network	Not felt
-1.0	Not detected by BGS' network	Not felt
0.0	Not detected by BGS' network	Not felt
1.0	100s each year	Not felt, except by a very few under especially favourable conditions.
2.0	25 each year	Not felt, except by a Very few under especially favourable conditions.
3.0	3 each	Felt by few people at rest or in the upper floors of buildings; similar to the passing of a truck.
4.0	1 every 3-4 years	Felt by many people, often up to tens of kilometres away; some dishes broken; pendulum clocks may stop.
5.0	1 every 20 years	Felt by all people nearby; damage negligible in buildings of good design and construction; few instances of fallen plaster; some chimneys broken.

The assessment concludes that the health, safety and environmental risks associated with hydraulic fracturing (often termed 'fracking') as a means to extract shale gas can be managed effectively in the UK as long as operational best practices are implemented and enforced through regulation. Hydraulic fracturing is an established technology that has been used in the oil and gas industries for many decades. The UK has 60 years' experience of regulating onshore and offshore oil and gas industries.

The review made 10 recommendations. Recommendation 3 is most pertinent to mitigate seismicity:

- BGS or other appropriate bodies should carry out national surveys to characterise stresses and identify faults in UK shales. Operators should carry out site-specific surveys to characterise and identify local stresses and faults.
- Seismicity should be monitored before, during and after hydraulic fracturing.
- Traffic light monitoring systems should be implemented and data fed back to well injection operations so that action can be taken to mitigate any induced seismicity.
- DECC should consider how induced seismicity is to be regulated. Operators should share data with DECC and BGS to establish a national database of shale stress and fault properties so that suitable well locations can be identified.

Summary of Consultee comments and Representations

The Director of Public Health has undertaken a HIA on the two drill sites and identified that the key risks to health and wellbeing of the population from the two proposed sites are a lack of public trust and confidence in the regulatory process and the industry, stress and anxiety from uncertainty about the industry that could lead to poor mental wellbeing; potential noise related health effects due to continuous drilling for at least five months for the initial borehole on each site and for three months for each of the subsequent three boreholes per site (14 months of continuous drilling), and potential health risks due to the presence of mining wastes generated as part of the drilling and hydraulic fracturing process being retained on site if adequate off site treatment facilities are not found.

A number of key recommendations to inform the planning process have been made and for the purposes of seismicity include the need to:

- Undertake an independent verification of the assessment of air quality, transport, waste management and induced seismicity prior to determining the planning applications.

A number of aims of the assessment include the need to:

- To establish an independent, reliable, single source of local information on shale gas exploration in Lancashire.

As part of the objectives, the HIA recommends the need to:

- To develop a framework to establish a baseline and ongoing monitoring of environmental and health conditions.

And with regard to data collection and analysis (an indicative list), this should include:

- Characterisation of the extent of fracture propagation and the permeability of layers above and beyond the faults

Whilst the EA is a statutory consultee and DECC and the HSE has been consulted, they have not provided any specific advise or comments on the potential impacts of seismicity. As part of the scoping opinion provided by the County Council earlier in 2014 the County Council appointed specialist seismologists to advise what should be included in the EIA relating to seismology. The seismologists have undertaken a review of the EIA in terms of seismology and following the clarification of a number of issues with the applicant are satisfied that the proposed mitigation and adherence to national requirements would ensure that induced seismicity would not cause unacceptable impacts. A number of conclusions are drawn and recommendations made as summarised below:

- With a sensitive, buried array of monitoring instruments (e.g. in 100m boreholes), then it is highly likely that many more small magnitude induced events would be detected than the number felt by people. However, this is not

the normal situation, which is to detect events using distributed regional monitoring stations that are sometimes supplemented with additional local stations, on the surface, following the initial occurrence of mining events. The BGS catalogue of UK earthquakes (covering the many natural ones as well as induced) shows that a few hundred coal mining induced events have been felt over the past 40 years. These events have been fairly common in UK coalfields where the local communities have largely accepted small tremors as not being a particular nuisance except where, on rare occasions, one has been of greater than magnitude $2.0M_L$. These mining events occur generally at very shallow depths of 0.5 to 1.0km, so are felt, for low magnitudes, as people are close to the energy source.

- In addition to the proposed monitoring, consideration should be given to establishing a plan to conduct macroseismic surveys for any events that residents report they feel. Some will be spurious (e.g. a lorry really was passing), others may be genuine as there is a small probability of exceeding the peak ground motions predicted and even a small probability of exceeding the $1.5M_L$ “maximum” event on occasion. The data collected would help to calibrate predictions, and the exercise would be reassuring and provide the opportunity to explain that damaging events are not in the offing.
- BGS report that small natural earthquakes are commonly felt – on average, 2-3 each month somewhere in the country. During fracking and fluid flow at a geothermal project in Cornwall felt, induced events were very rare. Only one was felt by residents ($2.0M_L$) with another only by staff working at the drilling site ($0.7M_L$). The BGS local, surface array detected more than 1000 which were not felt, and the projects’ downhole instruments detected many thousands. The actions already taken as reported in the Statement of Community Involvement are supported as are those proposed through the continuation of the Community Liaison Group and various public lines of communication throughout the projects. It is recommend that, in addition to the efforts made and those proposed for the future, consideration be given to establishing a plan to conduct macroseismic surveys for any events that residents report they feel. Some will be spurious (e.g. a lorry really was passing); others may be genuine as there is a small probability of exceeding the peak ground motions predicted and even a small probability of exceeding the $1.5ML$ “maximum” event on occasion. The data collected would help to calibrate predictions, and the exercise would be reassuring and provide the opportunity to explain that damaging events are not in the offing.
- Calculating the probability of exceeding the $1.5ML$ scenario earthquake is difficult, and the likelihood of such an occurrence is a small possibility. If there were to be an event at that level, the impacts would be low; no damage but perhaps a low level of nuisance to a few people. The strengthening of two-way communications with residents would allay concerns; i.e. conveying more information about any felt and establishing a rapid response to anything reported felt.
- It is accepted that there will be continuous recording and no breaks, regardless of the level of operations, throughout the whole of the exploratory period. This will ensure that when the number of minor, instrumentally detected events falls to, or near to, zero, there will be objective evidence to demonstrate this and to learn from the patterns of seismicity associated with different phases of the operations. It is understood that battery consumption is

higher during fracking operations (in order to achieve real-time communications), and drops between those operations but without compromising data collection.

DECC has advised that the proposed activities include hydraulic fracturing for shale gas and that they require the operator to produce Environmental Risk Assessments, taking account of guidance published to the industry by DECC in April 2014, which flows from the recommendations of the Royal Academy of Engineering and the Royal Society, in their report on the hazards of hydraulic fracturing for shale gas published in June 2012.

Drilling of wells requires Secretary of State consent under the terms of the licence and DECC will undertake a number of checks regarding well targeting and operator funds and insurance before giving consent. DECC also requires for hydraulic fracturing, the implementation of measures to mitigate seismic risk including the submission to DECC of a detailed Hydraulic Fracturing Programme (HFP) for each well to be hydraulically fractured. DECC will monitor the conduct of fracturing operations in accordance with the HFP.

Proposals to flare gas during the initial testing phase will require the consent from the Secretary of State under the Energy Act 1976 and any venting is subject to DECC consent. Any venting should be reduced to a minimum. DECC's standard online drilling consent allows 96 hours of testing. To test for a longer period, the applicant will need to apply to DECC for a paper-based Extended Well Consent. DECC will expect the operator to minimise flaring during the period of any Extended Well Consent.

Abandonment of any well requires the Secretary of State's consent under the terms of the licence. DECC will check for completeness of well data before giving consent.

Many of the representations make reference to the risks associated with hydraulic fracturing and object to the proposals on this specific issue for the following summarised reasons:

- Potential and actual triggering of earth tremors the risk of which is not adequately addressed given past experience of test drilling in Fylde and could lead to injury to humans and wildlife.
- Strong risk earthquake in an unstable geology near to power nuclear power station at Heysham
- Fracking at Preese Hall caused earthquakes resulting in failure of the well, shaking and damage to properties - cracks in plaster, patio sinking, resulting in fear and anxiety.
- Undermines the surface strata causing sinkholes – growing evidence, risk of injuries/loss of life, property/town damage.
- Fracking test project – felt tremors in Poulton.
- There are too many local faults in national and local geology that are still moving and would act as pathways for the leakage of fluids.
- Earth movement happened in Lancashire as a result of initial testing – safety assurances are of no value.

- David Smythe, Professor of Geophysics at Glasgow University – research raised questions about dangers of fracking in UK. Induced seismic activity
- Link between fracking and previously geologically stable areas – Ohio/US.
- Intention is to drill into a fault line (fault 1) with Harves Ho and Moor Hey faults adjacent, will this induce seismic activity. Contrary to DECC guidance to avoid drilling wells into or close to existing pre stressed regional faults.
- Still not clear what happened at Preese Hall.
- Fracking could destabilise the entire bedrock beneath the Fylde, upon which sits several mine workings and unstable ground conditions – running sand etc.
- Fracking fluids migrating from wells near faults could lead to ground collapse releasing chemical slurry
- Fracking could cause risk to the proposed high pressure gas storage in salt caverns beneath Wyre estuary.
- PNR area moss land – significant risk to local properties of subsidence especially Carr Bridge Residential Caravan Park.
- Seismic monitoring will not stop the risk of earthquakes from the development
- Traffic light system of seismic monitors provides warning only, will not stop an earthquake.
- Earthquake risk –contrary to DM2.
- Annular pressure checks at Preese Hall are not independent

Assessment of Impacts

Considerable concern has been expressed to the potential impacts of seismicity particularly in light of the apparently uncontrolled events associated with Preese Hall and the consequent risk of ground contamination associated with fracking fluids and gas as a result of migration from the geological horizon via the well and via unknown stressed fault lines. There is continued fear that induced seismicity will cause earthquakes and damage to properties and should not be permitted under private property without the consent of the landowner. There is a fear that there is insufficient understanding of the geology of the area and that fracking will cause irreparable damage both to the target geological horizon and potentially to those above and below it both in the short and long term that cannot be actually predicted. In view of these perceived fears considerable review and assessment of seismicity has been carried out, most particularly by The Royal Society which concludes that health, safety and environmental risks associated with hydraulic fracturing (often termed 'fracking') as a means to extract shale gas can be managed effectively in the UK as long as operational best practices are implemented and enforced through regulation. The review is clear that at $1.0M_L$ there are 100s of natural seismic events in the UK and which are not felt, except by a very few people under especially favourable conditions. DECC will control fracking in a way, through a traffic light system that prevents fracturing generating more than $0.5M_L$ which means induced seismicity will not be felt at all, or only by a few under especially favourable conditions. Whilst perceived fears are understandable, they cannot be supported by independent review and guidance. It is safe to assume that BGS or other appropriate bodies will carry out national surveys to characterise stresses and identify faults in UK shales and operators will carry out site-specific surveys to characterise and identify local stresses and faults. It is proposed that seismicity will be monitored

before, during and after hydraulic fracturing (see application LCC/2014/0102). Monitoring has already been carried out in the Becconsall area. A traffic light monitoring systems would be implemented and data fed back to well injection operations so that action can be taken to mitigate any induced seismicity and which would be overseen by DECC and whom the county council can be satisfied will operate within its own regulatory framework.

With regard to possible subsidence DECC has reported (Review and Recommendations for Induced Seismic Mitigation (April 2012) that there are no documented cases of fracturing operations causing subsidence or tremors large enough to cause damage at the surface and that unlike coal mining, shale gas production does not remove large quantities of rock from underground, which can cause subsidence. The report notes that subsidence can happen when rock is compressed and collapses in on itself, but that shale rock is not easily compressed, so subsidence is unlikely and that rock samples would be tested before any commercial production is approved. The conclusions of the applicant and the previous conclusions of DECC are accepted. It is considered that the proposed exploration and appraisal of shale gas would not lead to any subsidence at surface and should there be an opportunity for any further stage of exploration that could lead to commercial exploitation, that would require the benefit of planning permission and would be the subject of greater scrutiny by DECC.

With regard to the representations received it is not likely that seismic activity would lead to injury to humans or wildlife or destabilise the geology in a way that would generate earthquakes that would place the Heysham power station or the proposed underground gas storage project at Preesall at risk. The County Council is not aware of any verified evidence of damage to property as a consequence of the seismic events at Preese Hall or that the surface strata was undermined in any way or present a risk of subsidence to moss land or nearby properties. There is no evidence to support that fact induced seismicity would led to pollution of surface or ground water or that the process could be safely carried out. A 3D survey has been carried out to give a clear understanding of the geological conditions and faulting in the area and the sites, depth and direction of drilling and horizons proposed to be fracked have been chosen and designed in a way to minimise seismic movement and which, if undertaken in accordance with a traffic light system would prevent the migration of fluids. There are no mine workings in the Fylde.

With regard to specific points raised DECC has advised that faults should be avoided, whatever their scale where hydraulic fracturing is involved. From the viewpoint of seismic hazards, there is no need to be concerned about drilling through a fault, as opposed to hydraulically fracturing into or near a fault. Drilling, as such, is not in the experience of the oil industry an operation associated with seismic activity. DECC is not aware of any factor in the geology around the proposed drilling sites which should require avoidance of all faults, so far as the drilling phase of operations are concerned.

It is maintained that the 3D seismic survey is inadequate in coverage, in particular because the proposed Roseacre drilling site is very near the edge of the survey area and the resolution of faults is consequently poor at that location. DECC considers that drilling through a fault does not entail any seismic hazard. The location of the

site, or more precisely the trajectory of the initial vertical well, is not material to the adequacy of the 3D survey so far as seismic hazards is concerned. What matters is the resolution of faults available in the areas in which fracturing is proposed. A DECC geoscientist has reviewed Cuadrilla's 3D data on a workstation at their office, and considers that the data quality is adequate in those areas to enable detection of all faults likely to be significant from the viewpoint of seismic hazard. DECC will scrutinise the Hydraulic Fracturing Plans (HFPs) and the plans for monitoring the growth of the fractures to ensure that the stimulated rock volume does not extend too close to any of the mapped faults.

It is said that faults should be assumed to be transmissive unless proved otherwise. This comment is not directly relevant to seismic hazards; the purpose of the HFPs and their scrutiny by DECC is to ensure that the full extent of the stimulated rock volume preserves a safe distance from any detectable fault. The fracturing fluids will therefore never enter the fault, and will not be transmitted along it.

It is said that Cuadrilla's definition of faults is defective. However, the purpose of the definitions adopted is to distinguish between "local" faults, which Cuadrilla propose to drill through, and regional faults, which they do not intend to drill through. DECC does not see drilling through faults as material to the assessment of seismic risk. As to the location and extent of fracturing operations, which are very material, Cuadrilla plans to avoid all detectable faults, which is the correct approach.

It is said that the current regulatory system is inadequate, in that no criteria have been specified in the "traffic light" system for shutting down operations, other than temporarily. DECC would not agree that this is a shortcoming. The association between hydraulic fracturing and seismic activity remains a relatively novel discovery and a developing area of knowledge. However, the data from the Preese Hall tremors indicate that careful monitoring of seismic activity in real time is likely to detect precursor events, providing scope to halt operations, reduce stresses, and avoid any more substantial tremor. That is the purpose of the traffic light system. But in the present state of knowledge, any predetermined protocol for action which should follow a red-light event would risk excessive precaution on the one hand, or avoidable disturbance to nearby residents on the other.

DECC's intention in any such instance is to explore the implications of the occurrence of the red-light event promptly but thoroughly, with a view to deciding whether operations can be resumed without undue risk of disturbance to local residents; and if so, what operations are acceptable and whether any further precautions are appropriate. DECC thinks this strikes an appropriate balance in present circumstances between precaution and protection and have no doubt that their powers are sufficient to curtail operations in any such case should it prove necessary.

Whilst the concerns are understandable it is concluded that they cannot be supported and that the County Council can assume and be satisfied that the development would be carried out to meet the requirements of DECC.

Conclusions

It is concluded that induced fracturing will generate seismic movement but providing it is within the limits of a traffic light system it will not cause unacceptable impacts and would be overseen by DECC to ensure it would be carried out safely.

It is considered that the proposed exploration and appraisal of shale gas would not lead to any subsidence at surface.

It is therefore considered that the proposal would not have an unacceptable impact and would not be in conflict with the policies of the NPPF or the development plan policies.

Appendix 10

Land Use

Proposal

The applicant has undertaken an assessment of the potential for the proposal to impact on the agricultural land use in and around the site. The agricultural land affected would include an area of approximately 2.6ha and is currently fields used for cattle grazing and access track as part of a 275ha farm holding (0.9%). The land affected by the proposal has been assessed as moderate in terms of its agricultural land quality. The exploration activities would involve surface works and below ground works. The surface works would include the construction, operation and restoration of the well pad, access track and potentially any infrastructure required to connect the site to the gas grid during extended flow testing. Soil would be excavated to create a well pad and associated drainage ditch and then would be utilised to construct earth banks seeded with grass and wild flowers at the northern and southern ends of the well pad. The proposed development would last for up to 6 years. Due to the clay content of the soil there is the potential for an adverse significant effect on soil resources from compaction from heavy plant and machinery during the construction of the access track and well pad and presence of the site. Stripped soils would be retained on site, stored and used in site restoration.

The ES states that approximately of the 2.6ha of land affected 0.02ha is classed as good quality (Class 3a) with approximately 2.58ha being of moderate quality (Class 3b). Policy EP22 of the Fylde Local Plan protects the permanent loss of the best and most versatile agricultural land (Grades 1, 2 and 3a). The applicant states that as the majority of the site is sub grade 3 due to the wetness of the soil, the land as a resource is of low sensitivity. Further, the scale of change is small and is assessed as being of negligible magnitude. The Environmental Statement points out that due to the vulnerability of clay soils there is the potential for the soil to be irreparably damaged and rendered unusable to fulfil agricultural or ecological functions which would be an effect of high magnitude. Therefore, the temporary impact on soil resources is moderate to major and a significant effect.

The assessment concludes the impact on the loss of agricultural land is not significant.

Stripped soils would be retained on site, stored and used in site restoration.

Policy

National Planning Policy Framework (NPPF)

Paragraph 28 of the NPPF seeks to support the sustainable growth and expansion of all types of business and enterprise in rural areas.

Paragraph 112 of the NPPF states that local planning authorities should take into account the economic and other benefits of the best and most versatile agricultural land. Where significant development of agricultural land is demonstrated to be

necessary, local planning authorities should seek to use areas of poorer quality land in preference to that of a higher quality.

Paragraph 122 states that local planning authorities should focus on deciding whether the development itself is an appropriate use of the land and the impact of the use, rather than the control of processes or emissions themselves where these are subject to approval under control pollution regimes.

Paragraph 144 sets out matters to consider in determining applications for mineral development including (in summary) giving great weight to the benefits of mineral extraction, and ensuring that there is no unacceptable adverse impacts on the natural and historic environment.

Joint Lancashire Minerals and Waste Local Plan

Policy DM2 of the JLMWLP supports developments for mineral operations (including hydrocarbons) where it can be demonstrated that all material, social, economic or environmental impacts that would cause demonstrable harm can be eliminated or reduced to acceptable levels. In assessing proposals, account will be taken of the proposal's setting, baseline environmental conditions and neighbouring land uses, together with the extent to which its impacts can be controlled in accordance with current best practice and recognised standards.

Fylde Local Plan

Policy SP2 states that development in such areas will not be permitted except where proposals are essentially required for the purposes of agriculture, horticulture or forestry or other use appropriate to a rural area.

Policy EP22 of the Fylde Local Plan does not permit development which would involve the permanent loss of the best and most versatile agricultural land where it could reasonably take place on previously developed sites, on land within the boundaries of existing developed areas or on poorer quality agricultural land.

Emerging Fylde Local Plan

Policy GD1 directs development towards existing settlements and within settlement boundaries .National Policy and any relevant Local Plan policies will be used to assess development outside settlement boundaries.

Policy EC3 seeks to protect the best and most versatile agricultural land outside settlement boundaries unless it is necessary to deliver development allocated in the local plan or for strategic infrastructure.

Consultees and representations

There are no consultees specifically for land use.

There is no heading for objections relating to land use but representations objecting to the proposal include the following:

- The proposal will destroy/degrade/permanently damage the beautiful Lancashire/Fylde countryside by industrialisation and traffic.
- Rich arable land / grazing land will be polluted from leaching of chemicals onto the land and water supply with subsequent entry into the food chain, rendering produce unsalable.
- Cannot sacrifice food growing, need to keep prime farming land safe for food production, for local economy and to avoid world food shortages.
- Impact on coastal settlements from potential loss of jobs in tourism/farming
- Fracking fluid contains carcinogens, toxins, radioactive and hazardous materials which will contaminate land and water sources affecting food production and drinking water.

Assessment of Impacts

The applicant has stated that policies CS1 and CS4 of the JLMWDF predate the proposed development and as such the development is not a departure from the Core Strategy. Rather, the JLMWDF is silent and out of date in regard to land use and shale gas exploration. It is acknowledged that the JLMWDF does not make reference to this type of proposal and therefore the application must be assessed against national policy, the local development plan in this case the Fylde Local Plan, the emerging Fylde Local Plan and any other material considerations. Whilst the JLMWDF may not be relevant with regard to specific land use based policies for shale gas, the proposal would still need to be assessed against the development management policies relating to the criteria to assess waste and mineral applications as set out in the JLMWLP.

The main land use issues include the impact of the development within open countryside and the potential loss of agricultural land.

The proposal map that accompanies the Fylde Local Plan identifies the site as being in Open Countryside and is subject to Policy SP2. This policy states that development in such areas will not be permitted except where proposals are essentially required for the purposes of agriculture, horticulture or forestry or other use appropriate to a rural area. The emerging Fylde Local Plan includes Policy GD1 which directs development towards existing settlements and makes clear that development outside settlement boundaries would be assessed against national policy and other relevant local plan policies.

Whilst it is acknowledged that minerals can only be worked where they are found, the Bowland Shale occurs beneath most of the Fylde area and therefore there may some flexibility as to where an exploration site can be located. A suggestion has been put forward that this type of development would be more suited to an industrial location. The applicant maintains that there has been an active decision to choose site locations away from large populations centres so that the development would only affect a small number of people and would minimise the extent of any potential disturbance. The site has also been identified due to its relatively consistent geology to undertake gas exploration. Therefore, given the temporary nature of the proposal, the geological conditions and the need to ensure that there is a separation between

exploration sites and main areas of population, the location within the open countryside could be found acceptable.

The exploration site and access covers an area of approximately 2.65ha and is located within a parcel of agricultural land approximately 7.2ha. Approximately 1.5ha is classed as good quality (Class 3a) with approximately 1.1 ha moderate quality (Class 3b). Policy EP22 of the Fylde Local Plan protects the permanent loss of the best and most versatile agricultural land (Grades 1, 2 and 3a). The applicant has advised that the majority of the land associated with the well pad and access track has been assessed as moderate quality. The Environmental Statement states that there is the potential for an adverse significant effect on soil resources from compaction due to the clay content in the soil, whilst the access track and well pad are constructed. The applicant has advised that they would implement best practice measures for the excavation and handling of soils to mitigate this aspect during construction. Whilst the main land use issue would be the loss of agricultural land associated with the main site and the monitoring arrays, it is considered that this would be minimal and for a temporary period. A condition requiring the reinstatement of the land following cessation could be imposed. As the development is for a temporary period it would not involve the permanent loss of agricultural land and would not therefore conflict with Policy EP22 of the Fylde Local Plan.

With regard to representations received, the proposal is for a temporary period. It would not destroy/degrade/permanently damage the Lancashire/Fylde countryside by industrialisation and traffic. The land is not arable, is used for grazing and subject to the employment of good practices in accordance with conditions, permits or licences grazing land would not be polluted from leaching of chemicals onto the land and water supply with subsequent entry into the food chain, rendering produce unsalable. The loss of agricultural land is small scale and would not adversely affect prime farming land for food production, or affect the local economy or create world food shortages. It would not result in an unacceptable impact on coastal settlements from potential loss of jobs in tourism/farming.

Conclusion

The impact of the proposal in terms of land use planning would not be significant. The loss of agricultural land would be for a temporary period and provided that appropriate mitigation measures are imposed with regard to soil compaction and conditions controlling the storage of soils and the reinstatement of the land, the proposal would be acceptable. The proposal would not be contrary to the policies of the NPPF or the policies of the development plan.

Appendix 11

Landscape and Visual Amenity

Proposal

The applicant has undertaken an assessment of the landscape and visual amenity of the site and area within a 5km radius. As part of the EIA an assessment has been undertaken of the impacts of the proposal on the landscape and visual effects. It concludes there would be no significant landscape effects although there would be very localised direct change due to the development temporarily altering a very small proportion of the local character area during construction of the well pad but no effect during other phases. The visual findings conclude there would be significant adverse visual effects arising during the drilling, hydraulic fracturing and flow testing phases. Eleven of the principal viewpoints would experience significant adverse visual effects. Nine of these are public rights of way receptors, one with a recreational viewpoint along with two residential receptors (a group of five residences have been assessed as one receptor at Stanley Farm since all would experience the same effect. No significant adverse visual effects were judged to occur on any receptor more than 900m from the site during any phase of the project.

The Roseacre site is currently in agricultural use and is surrounded on all sides by agricultural pasture and arable fields. The field boundaries in the area are formed by native hedgerows, largely without mature trees except for around farms and individual properties. Roseacre Wood, a mature deciduous woodland is located adjacent to the proposed access road and is 200m to the east of the proposed exploration site compound but is adjacent to the access road. The land surrounding the site is generally flat at an elevation of around 17m OAD. The site is not covered by any national landscape designations, the Forest of Bowland AONB being the nearest such area and 11 km east of the site. A dominant landscape feature in the area is the tall radio masts and other infrastructure that form part of the DHFCS Inskip site. A public footpath passes approximately 350m to the west of the site from which views of the site are currently gained.

In terms of landscape impact, the development would require the removal of approximately 30m of hedgerow and the lowering to 1 metre of a further 280 length of hedgerow on the western side of Roseacre Road in order to form the visibility splays at the site access. A further short length of hedgerow would also need to be removed where the access road enters the proposed exploration site compound. On the eastern side of Roseacre Road where the access road would enter the DHFCS Inskip site, similar amounts of vegetation removal / lowering would be required. Limited hedgerow removal / lowering would also be required where the DHFCS route exits onto Inskip Road. The only other vegetation removal that would be required is a small number of trees on the northern edge of Roseacre Wood in order to construct the site access road.

The compound and access road would be surfaced with tarmac / hardcore which would form the base for the equipment to be used for the exploration operations. The soils stripped from the area of the compound would be used to form mounds on the northern and southern boundary of the site up to 4m in height. The site would be

secured by 4m high weld mesh fencing located on the outside of the perimeter bunds which would also extend along the length of the access road. The applicant also proposes screen planting immediately adjacent to the fencing to provide additional landscaping.

A number of shipping containers (single storey in height) to provide for storage of equipment, workshops and office / site welfare would be required but it is likely that these elements of the development would have a relatively low visual impact from the main viewpoints given the screening provided by the existing hedgerows and Roseacre Wood and perimeter bunding. The main elements of the development in terms of visual impact would be the drilling rig which would be up to 53m in height depending on the type of rig used, various cranes used for assembly of the rig and other equipment, a well services rig of 36m height, two sand storage silos each 15m in height and two flare stacks of around 10m in height. Not all of these elements would be present at the same time but the worst case from a visual impact perspective would arise when the drilling rig is being used in combination with the 36m high rig associated with the initial flow testing. This would occur for approximately four, three month periods over the duration of the development.

Policy

The NPPF states that the planning system should contribute to and enhance valued landscapes and that developments should include appropriate landscaping. Policy DM 2 of the Lancashire Minerals and Waste Local Plan states that development for minerals operations will be supported where it can be demonstrated to the satisfaction of the mineral planning authority that all material environmental impacts can be eliminated or reduced to acceptable levels. The policy requires that proposals should make a positive contribution towards factors such as landscape character.

Policies SP2 and EP11 of the Fylde Local Plan relate to development in country side areas and building design and landscape character.

Summary of Consultee comments and Representations

LCC Landscaping: Focusing on a 2.0km radius from the centre of the application site, the elements of the development which have the most potential for creating significant landscape and visual impacts are drilling, hydraulic fracturing and flow testing operations which involve the use of a drilling rig (up to 53m high), fracturing rig, well services rig and flare stacks.

It is recommended that additional photomontages for viewpoints 3, 5 9 and 14 to a prescribed methodology are submitted as the submitted images to do reflect the true scale of the proposed development, with the rig appearing approximately 3x smaller than it will in reality.

The site falls within the County Council's Coastal Plain landscape character type and The Fylde landscape character area, which are characterised by rural farmland, hedgerows, shelter belts and field ponds, slightly undulating topography, long views across the landscape and a strong sense of openness. The application site has a strong rural farmland character which is enhanced by the intactness of key features

such as hedgerows, shelter belts and field ponds. The gently undulating topography and the low levels of tree cover afford long views over the rural landscape and create a strong sense of openness. There are some significant landscape detractors which affect the landscape character including electricity pylons, large barns, wind turbines and a plethora of communication masts which are a dominant feature in views to the east of the site. The application site clearly lies within an area where tall vertical structures have become a key feature of the local landscape character.

A detailed assessment of the potential impacts and significance on the landscape and receptors, taking account of the development site and area landscape characteristics has been undertaken with the following summarised observations:

- Moderate to major significance on views from Roseacre Road, Old Orchard Farm and Public Rights of Way 5-13-FP3, 4 and 5 and on local landscape amenity
- Minor to moderate significance on views from Public Rights of Way 5-13-FP1 and 2
- Minor significance on views from Wharles and landscape fabric and cumulative effects with Preston New Road.
- Negligible to minor significance on views from Roseacre, Seaswick House, Roseacre Lane, Church Road and Moorside and on the Coastal Plain Landscape Character Type and Fylde Landscape Character Area
- Negligible significance on the landscape value of the site and wider landscape.

The assessment of the proposal has also taken account of the effects of time, with regard to the duration of the landscape effects, and has also taken account of mitigation proposals which will reduce the impact of low level site structures.

The proposed development would have some temporary but reversible localised landscape and visual effects of moderate-major significance. However, these are not considered to significantly affect the overall character of the Coastal Plain Landscape Character Type or The Fylde Landscape Character Area. In addition, the likely effects of the development proposals on the landscape's value and fabric would not be significant and, there would be no significant cumulative effects. For these reasons, the overall temporary effects of the proposals are deemed to be acceptable in landscape terms.

The applicant's options for mitigating the most significant localised effects are limited due to the height of the drill well (potentially 53m), characteristics of the receiving landscape and the 3 year operations period which does not leave enough 'growing time' for planting to have any significant impact. So, whilst there is much about the proposals which could be deemed acceptable in landscape terms, especially in the context of the wider landscape, the applicant needs to address the likely significant localised effects to ensure that overall, this form of temporary industrial development is successfully assimilated into the rural landscape. The most appropriate way of achieving this would be through implementation of the additional mitigation measures outlined above.

It is concluded that significant localised landscape and visual effects are unavoidable although there is scope to further mitigate the likely effects by reducing the height of the drilling rig to a maximum of 35m; finish the drilling and fracturing rigs in a more suitable colour than red/white as proposed and to finish the various cabins and other temporary buildings in a more appropriate colour than blue as proposed.

The Campaign to Protect Rural England: No objection subject to conditions requiring mitigation measures for landscape and visual amenity.....

Medlar-with-Wesham Parish Council and Kirkham Town Council: Object to the proposal for a number of reasons including the following summarised reasons in respect of impact on landscape:

- The visual impact of the development cannot be minimised.
- Detrimental impact on property values and insurance premiums.
- Concern regarding future site expansion for production following exploratory phase. An increase in well heads will lead to further noise, traffic and pollution.

Roseacre, Wharles and Treales Parish Council: Objects to the proposal for a number of reasons including the following summarised reasons in respect of impact on landscape:

- Contrary to Policy SP2 and NPPF due to the huge industrial scale, associated utilities and infrastructure and thousands of HGV movements on narrow lanes
- Cuadrilla has not adequately assessed alternative sites. The development should be located in a SP1 site which has appropriate infrastructure.
- Contrary to Policy EP28 due to sky glow. As no mitigation is possible night-time operations should not be permitted.
- Adverse impacts on rural tourism, leisure and countryside character.
- Visual impact of the development could be reduced by enclosure of site works, horizontal rig and a waste methane generator instead of a flare stack.

Roseacre Wood Awareness Group: Object to the proposal for a number of reason including the following summarised reasons in respect of landscape:

- The site infrastructure including the 53m high rig will be a major blight on the landscape and damage the rural character and affect tourism.
- The site will be visible from several houses, to road users and from local natural landmarks e.g. Beacon Fell, Longridge Fells, Carr Hill.
- Contrary to Policy EP16 as EP28 as light pollution will cause harm to both local residents and wildlife and will distract passing road users.
- The light pollution will transform an idyllic countryside area into an industrial zone with loss of social amenity. Detrimental to tourism and property prices.

Many of the representations received object to the visual impact of the site and the potential impact of long term development and the cumulative impacts of more sites. The objections are summarised as follows:

- Need 30,000 wells to extract the gas.
- If goes into full production, farmland and rural spaces will be lost to hundreds of pads, gas processing sites, pipelines, compressor stations and new roads.
- Industrialisation of the rural environment and Lancashire countryside.
- Others sites on brownfield land should have been considered.
- Contrary to NPPF paragraph 112 and Policy CS4, as applicant has not demonstrated that the development could not be undertaken elsewhere due to no viable alternatives.
- Contrary to Policy DM2 as the development does not take account of the deviation from the baseline environmental conditions of a quiet rural area.
- Contrary to Policies SP2, SP5 and SP9 as it is not appropriate in a rural area and will prejudice the rural and undeveloped character and appearance of the countryside and impact rural communities.
- The proposal will destroy /change the beautiful Lancashire/Fylde countryside.
- Totally unsuitable in the heart of rural Fylde.
- Destruction of the rural habitat. The countryside should be preserved and cherished now and for future generations.
- Need to preserve the idyll rural landscape and rural heritage.
- Contrary to objectives to limit development in open countryside to that appropriate to a rural area, due to physical size, drilling rig height, fracking structure and security fencing.
- The development will visually split the two villages of Roseacre and Wharles.
- Need to examine sites for evidence of early settlements before it is lost.
- Environmental damage from construction and operation.
- The development will be an eyesore in pleasant fields.
- The size and scale of the development will be far greater than any agricultural development and will have an adverse effect.
- Visual nightmare with 53m high rig and site the size of a floodlit football pitch.
- Contrary to Fylde Borough Council's objective 1.50, no.2 - visually intrusive due to 53m high rig, the scale and size and distraction to motorists.
- A 53m high rig, comparable to Nelson's Column, grotesque in a country field.
- How is a 53m high rig and ugly noisy intrusive monstrosity allowed when planning refused for smaller structures/buildings in the area?
- How can wind farms and turbines be rejected as eyesores whilst this hideous drilling may be allowed?
- Impact of 4m high security fence.

Assessment of impacts

In terms of policy, the NPPF states that the planning system should contribute to and enhance valued landscapes and that developments should include appropriate landscaping. Policy DM 2 of the Lancashire Minerals and Waste Local Plan states that development for minerals operations will be supported where it can be demonstrated to the satisfaction of the mineral planning authority that all material environmental impacts can be eliminated or reduced to acceptable levels. The policy requires that proposals should make a positive contribution towards factors such as landscape character.

The County Council produced a landscape character assessment as part of the Lancashire Structure Plan which has been retained for development control purposes. The assessment defines the key features of each landscape character tract and identifies forces for change and policy to preserve landscape character. The site is located within the Fylde Coastal Plain landscape character tract, the key features of which include the large arable fields giving long views over the landscape, areas of semi natural woodland along brooks and watercourses and meandering rural lanes. The assessment identifies that communications masts and other prominent developments will be particularly prominent on local skylines.

In terms of landscape impact, it is important to recognise that the proposal is for a temporary exploration site for a period of approximately four years after which the site would be restored. Whilst there will be landscape impacts arising from the development, very few natural features such as trees or hedgerows would be removed and therefore it should be possible to restore the site to its existing condition. The long term impacts on landscape should therefore be minor.

The development would have some impact on the character of Roseacre Road mainly from the removal and reduction in height of hedgerow on both sides of the road and from the construction of the new access road and security fencing. This would have an urbanising impact on this existing rural road but only for a limited length and following completion of the development, the access and hedgerows could be reinstated to their existing condition.

The earth mounding on the northern and southern boundary combined with the screening provided by the existing Roseacre Wood would also mitigate some of the visual impacts of the development including the perimeter fencing, site buildings and the items of plant and equipment that are below four metres in height. The applicant is also proposing to undertake planting around the boundaries of the site. However, it is considered that this would only make a limited contribution to the landscaping of the site given the small areas of land proposed and the lack of time for any planting to mature.

The main visual impacts would arise from the drilling rig and other tall items of plant required to drill the borehole and undertake the fracturing operations. Due to the height of these elements the visual mitigation provided by bunding and existing natural features would be limited and therefore the rig would be a highly visible feature especially given the flat landscape of the area. However, the visual impacts arising from the tallest elements of the plant would be intermittent over the four year period of the development as it is likely that the drilling rig would be removed from site after each borehole is completed. The landscape impact is also mitigated to some extent by the presence of the radio masts and other equipment belonging to the DHFCS Inskip site which are a prominent feature in this area.

One of the main visual impacts would arise from the lighting used as part of night time working. During the drilling operations, the site would be operational of a 24 / 7 basis for drilling periods where lighting would be required on the rig and around many ground structures. The site is in a very rural area and therefore at present experiences very little light pollution. Whilst it may be possible to reduce the impacts of lighting by shielding and appropriate direction, the lighting required during the

drilling operations is still likely to be a particularly noticeable impact in this area but only during the limited period of drilling operations.

In summary, given the flat and open nature of the landscape, the development would have some significant landscape impacts but only for a limited period and in the main restricted to locations near to the site, in particular the footpath to the west of the site and Roseacre Road. The development would not require the removal of any significant existing landscape features and therefore any landscape change would not be of a permanent nature. The development is therefore considered acceptable in terms of landscape impacts. However, it is considered that any planning permission should be subject to conditions relating to the colour of the drilling rigs and other equipment, the design and location of the perimeter landscaping mounds, the colour and design of fencing, lighting design and control and details of the restoration and aftercare of the site to include the replanting of any hedgerows that are removed.

The applicant has also proposed to undertake some works to replant gaps in existing hedgerows around the site and to undertake management of existing hedgerows so that they are allowed to grow to height providing increased screening. Due to the time planting takes to mature any planting works would not mitigate the visual impacts of the development. However, the planting works including management of existing hedgerows would help to provide some local landscape enhancement which would offset some of the impacts arising from the removal of any vegetation and would meet the requirement in policy DM2 of the LMWLP to make a positive contribution to landscape character.

Conclusion

It is concluded that the proposal would generate significant localised landscape and visual impacts and which would be unavoidable due to the nature and duration of the proposal, particularly at the nearest receptors on public rights of way and at the nearest residential properties at Orchard Hall Farm and Stanley Terrace. However, whilst the duration is over an extended period of time, it would still be temporary. Mitigation measures are proposed and there is scope to further mitigate the likely effects by reducing the height of the drilling rig to a maximum of 35m; finish the drilling and fracturing rigs in a more suitable colour than red/white as proposed and to finish the various cabins and other temporary buildings in a more appropriate colour than blue as proposed. Subject to such conditions it is considered that the proposal would not be contrary to Policy D2 of the Lancashire Minerals and Waste Local Plan and whilst it could be seen as contrary to Policy EP11 of the Fylde Local Plan, the proposed development, due to its nature for a temporary period it could not be designed in a way to meet the requirements of this policy.

Appendix 12

Lighting

Proposal

As part of the EIA an assessment has been undertaken of the effects of the potential night time light obtrusion from the project in view of the site being in a rural location away from built up areas and where there is little existing night time lighting. The assessment has used national policy and light obtrusion guidance including the Institute of Lighting Professionals (ILP) Guidance Note for the Reduction of Obtrusive Light.

The assessment identifies the consequences of light obtrusion are associated with loss of dark night skies, loss of visibility of stars, perception of an unsatisfactory nocturnal environment and harming of wildlife habitats. Light obtrusion could also have detrimental effects on human health and present physiological and ecological problems. It may also constitute unnecessary energy waste.

Baseline nocturnal lighting measurements were taken at selected viewpoints identified as part of the landscape and visual impact assessment to provide a nocturnal baseline study around the site and which were used as a basis for the light assessment in November 2013 between 19.00 and 01.30 hours. The measurements identified sky glow above Preston, Blackpool and Lytham St Annes and aviation lighting at varying heights on the nearby radio transmitters at Inskip and which are clearly visible over long distances. The nearest receptors to the site would be the villages of Wharles and Roseacre.

The construction of the well pad, access track and gas pipeline would take place during normal daytime hours but there may be temporary lighting required in the event works continue when natural light has diminished during normal working hours and which may be seen from local properties depending on the time of the year and topography and if required is likely to cause some minor adverse effect due to it's design for temporary usage. Security lighting would comprise low power over-door bulkhead luminaries using low energy light sources which are unlikely to exceed ILP guidance.

The project proposes 24 hour drilling and fracturing operations involving the need for lighting of working areas during hours of darkness. This would include the need for elevated parts of the drilling rig to be illuminated to ensure safe working practices. Site and security lighting would also be required. Whilst not confirmed it is likely that the lighting for the site would comprise four mobile lighting towers with four 400W floodlights each; for the drilling rig, nine 500W floodlights and fourteen 2x35W luminaires mounted at varying heights; and tank lighting two 2x 18W luminaires.

The assessment states that the light into windows and light source intensity can be designed to be compliant with ILP guidance. The luminance of the rig would be generally below the limit for the taller sections of the rig, where the rig would be most visible from a distance, although the low level luminance on the site cabins would exceed the limit for obtrusive light. Given the drilling of the wells would last initially 5

months, then for up to three months albeit with intervals, although the lighting would be temporary it would be greater than a week and would have a significant effect without mitigation.

A similar impact to that associated with site development can be expected from fracturing activities, initial flow testing, the installation and operation of extended flow testing equipment, namely not a significant effect.

The assessment is that the Roseacre Wood and Preston New Road sites are sufficiently distant from each other that there would not be a combined or cumulative lighting impact on receptors from both sites.

The assessment concludes that due to the combination of few sources of night time lighting in the vicinity of the site, the use of lighting during the project without mitigation would result in a significant effect for drilling and fracturing and a not significant effect for site construction, initial flow testing and extended flow testing.

It also concludes that avoidance of light pollution beyond the site boundary would minimise any significant residual effect on local wildlife habits or residents and would result in a negligible or minor effect meaning the residual effects would not be significant.

It is proposed to mitigate potential effects during the construction, initial and extended flow periods by employing best practice, confining lighting to the task area, orientating lights and operating a curfew.

With regard to drilling and fracturing, lighting will be employed in accordance with ILP guidance using the lowest powered light sources possible; direct lighting to tasks avoiding wide area lighting; target light using precision optics; shield plant lighting from view from the nearest properties and sensitive habitats; employ low key security lighting with movement sensor controls or part light diming; maximise the shielding effect of site cabins; minimise the height of lighting columns (6m); employ a curfew and monitor the site and respond to complaints promptly.

It is considered that by implementing such measures the lighting could be kept below lighting limits for light into windows and overall light intensity to the extent that residual effects would not be significant. The mitigation measures would reduce the magnitude of the developments impact on sky glow and building luminance levels from the equipment at the site and the surface of the well pad. However, it is recognised that because of the low levels of night time light sources around the site, the lighting effects would remain significant and mitigation would be necessary.

Summary of Consultee comments and Representations

LCC Lighting: No objection to the proposals and has advised that the lighting design generally complies with the required standards, with the exception of predicted sky glow, which marginally exceeds permitted standards.

He does not anticipate any issues to surrounding area, highway or users.

LCC Director of Public Health: recommends that an assessment of light pollution as part of the site operations should be carried out, and if there are likely to be significant impacts associated with light pollution from the sites that cannot be mitigated or controlled, the Applicant should be requested to consider the opportunity to offer to fit blackout blinds to those homes most likely to be affected.

Roseacre Awareness Group: Object for a number of reasons including the following summarised reason in respect of lighting:

- The light pollution will transform an idyllic countryside area into an industrial zone with loss of social amenity. Detrimental to tourism and property prices.

Objections have been received against light pollution and in particular relating to:

- Contrary to Policy EP28 as it will not minimise harm relating to loss of local character, amenity or reduction in highway safety.
- Impact of light pollution and disturbance from floodlighting every night, 7 days a week, 365 days a year. Blight to the countryside.
- Little light pollution now so development will significantly affect local residents.
- The site will look like a football pitch with floodlighting in contrast to the beautiful rolling countryside.
- Visual impact of gas flaring and site lighting, in the setting of a rural locality, the light pollution will be greater than any agricultural development and will have an adverse effect on the community and tourism.
- Floodlights will ruin the night sky. The sky glow level is too high so nighttime operation should not be permitted.
- Will be visible from Roseacre and Inskip. Not acceptable.
- Concern regarding impact of lighting on road safety with regard to threshold increment (loss of visibility) and veiling luminance (disability glare).
- Detrimental impact on wildlife including resident bird population.

The Director of Public Health recommends that an assessment of light pollution as part of the site operations should be carried out, and if there are likely to be significant impacts associated with light pollution from the sites that cannot be mitigated or controlled, the Applicant should be requested to consider the opportunity to offer to fit blackout blinds to those homes most likely to be affected.

Policy

Section 11 of the NPPF relates to conserving and enhancing the natural environment. Paragraph 125 encourages good design, planning policies and decisions to limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.

Policy DM2 of the LMWLP supports proposals for minerals operations where it can be demonstrated that all material social, economic or environmental impacts that would cause demonstrable harm can be eliminated or reduced to acceptable levels.

Policy EP28 of the Fylde Borough Local Plan relates to Light Pollution. In relation to proposals involving external lighting, light pollution must be addressed and provision made to avoid or minimise harm relating to loss of local character, loss of amenity or reduction in highway safety. The policy requires lighting schemes to be well designed and the light intensity not excessive in relation to its function and that light sources must be directed at the object to be illuminated to minimise extraneous emissions.

Assessment of Impacts

The applicant's assessment concludes that because of the low levels of night time light sources around the site, the lighting effects would be significant and mitigation would be necessary. There is no doubt that the site falls within a very rural area with minimum light pollution, the main pollution being distant night glow from the urban areas of Lytham, Blackpool and Preston. There are phases of the development that would not generate light pollution, namely site construction, initial flow testing and extended flow testing. However, operations involving drilling and hydraulic fracturing would create light pollution because of their extended nature of greater than one week. There would be more light at a higher elevation associated with the drilling operations in view of the need for operational safety. Whilst this would be temporary it would be over an extended period of initially five months for the first bore hole and three months for each subsequent borehole. Similar lighting would be required throughout the fracturing operations thereby generating light over a continuous minimum period of 19 months. This would result in some sky glow and building luminance that could be significant.

The flare would be enclosed and therefore there would be no light pollution associated with such.

The County Council's lighting advisor has raised no objection to the proposals and has advised that the lighting design generally complies with the required standards, with the exception of predicted sky glow, which marginally exceeds permitted standards. He does not anticipate any issues to surrounding area, highway or users.

The Director of Public Health has recommended that an assessment of light pollution as part of the site operations should be carried out, and if there are likely to be significant impacts associated with light pollution from the sites that cannot be mitigated or controlled, the applicant should be requested to consider the opportunity to offer to fit blackout blinds to those homes most likely to be affected.

Lighting has properly been assessed; it concludes there would be some light pollution at night. Notwithstanding it would be for an extended period of time, with the mitigation measures proposed, and which could be controlled by condition, on balance, it is considered that lighting could be made acceptable and that the impacts associated with such would not be so great to affect amenity on a permanent basis or lead to unacceptable effects on nature conservation to constitute a sustainable reason for refusal. It would not be appropriate to require blackout blinds to be fit to those properties most likely to be affected.

Conclusion

Subject to the mitigation measures proposed, and which could be controlled by condition, it is considered on balance that the proposed lighting for a temporary period would be acceptable for the purposes of the NPPF Policy DM2 of the LMWLP and Policy EP28 of the Fylde Local Plan.

Appendix 13

Noise

Proposal

The applicant's Environmental Statement contains a chapter that assesses the noise and vibration impacts from the project and their effects on the surrounding sensitive receivers.

Baseline noise levels have been established by a measurement survey. This data is used to assess the potential significance of any effects. The site is in a rural location.

Different stages of the project will have different noise levels. The applicant says the noisiest activities are most likely to occur within the first two to three years of the project. However, the noise levels for all stages of the project have been assessed. The applicant says the only stage with the potential to result in a significant noise effect is where hydraulic fracturing occurs during night time (2300-0700) where noise limits are at their most stringent.

The applicant proposes to mitigate this by only operating the pumps used (only for up to 3 hours at a time during hydraulic fracturing) during weekday daytime and Saturday mornings.

Vibration impacts have been ruled out by the applicant because of the nature of the project, method of construction for the well pad, arrays and pipeline connection for the extended flow testing.

The nearest properties are: Old Orchard Farm which is approximately 280m to the south and Roseacre Farm is to the north.

Assessing existing noise levels and ensuring control of noise at Old Orchard Farm will ensure that other (more distant) noise sensitive premises are protected from noise from the site.

Consultee responses and representations

The following concerns have been raised about noise:

The County Council's Director of Public Health: Has provided specific advice to inform the planning process and provide public health advice to protect and improve the health of local residents living near the proposed shale gas exploration sites of Preston New Road (planning application numbers LCC/2014/0096 and 0097) and Roseacre Wood (planning application numbers LCC/2014/0101 and 0102). The advice was published as a Health Impact Assessment (HIA) in November 2014.

The Health Impact Assessment makes 45 recommendations to a broad range of agencies, suggesting actions before, during and after any permissions or permits are

granted. Appendix J contains 16 specific recommendations to inform the determination of this application. Recommendation number one relates to noise:

1. *Consider the need for further noise assessment, particularly on the proposed Roseacre Wood site and if necessary, require additional mitigation measures to reduce noise associated with the development of the sites and more particularly the drilling and hydraulic fracturing phases of the development and which could be controlled by conditions attached to any planning permission.*

Fylde Borough Council: Objects to the proposal on the grounds that it is contrary to Policy DM2 of the Minerals and Waste Local Plan and Policies EP12, EP26, EP27 and EP28 of the Fylde Borough Local Plan, which are considered to be in conformity with the provisions of the National Planning Policy Framework.

The proposed drilling operations would result in the introduction of considerable traffic onto the rural highway network and would require alterations that would detract from the character of the rural area and cause significant environmental harm, particularly given the distance from the primary highway network and the uncertainty surround the alternative access arrangement through HMS Inskip. In addition to the noise and general disturbance from 24hour drilling operations and associated activity that would be significant, as would the impact on Roseacre Wood.

The County Planning Authority should be also be satisfied that the below and above ground operations will not have any significant adverse impacts in respect of Policies SP2, TR9, TREC10, EP10, EP11, EP13, EP14, EP15, EP18, EP19, EP21, EP22, EP23, EP24 and EP25.

Fylde Borough Council also resolved that the following summarised noise related comments of the Council's Environmental Protection Team be considered:

- The exclusion of a sensitive noise receptor in the applicants noise report may mean current calculations are artificially elevated resulting in the prediction that noise levels will not exceed current background levels.
- Recommend that the applicant ensures that there are continuous sound level monitoring at the nearest residential property to ensure sound levels accord with WHO guidelines.
- The sound levels are currently less than WHO guidelines so residents may experience an increase in noise. Ideally criteria should be set such that "as a result of the activity at the site no dwelling shall experience sound levels that are more than 5dB above current background levels between 07.00 – 23.00 and no increase in background level between 23.00 and 07.00"
- Recommend that no HGVs arrive at or leave the site between 23:00 and 07:00.

Fylde Borough Council subsequently provided a copy of a noise impact assessment on wintering birds, at the Annas Road Exploration Well site, which concludes that the noise from drilling operations will be essentially steady in character, producing decreasing levels from 58 – 42dB(A) in relation to increasing distances between 50m to 500m from the boundary of the well site. The Environmental Protection Team

have noted that the survey data shows that the impulsive sound could be up to 16dB greater than the background noise in addition to the drilling operation.

Medlar-with-Wesham Parish Council and Kirkham Town Council: The Council's object to the proposal as submitted and requests that it be refused planning permission for the following reasons:

- Increase in ambient noise levels from the continuous operation of this site and any future sites in the parish.
- Impact on local Wildlife including wintering and migrating birds, birds of prey, game birds, garden birds and bats from increased noise, traffic and lighting.

Roseacre, Wharles and Treales Parish Council: Objects to the proposal on a range of issues including the following grounds related to noise:

- Contrary to Policy EP27 and SP9 as it will not meet required noise limits and will have an adverse impact on the amenity of local residents.
- The baseline noise measurement is inadequate and the minimum approach for assessment of noise impact should be BS4112.
- Noise impacts on Stanley Mews have not been considered.
- There is no need for 24hr a day drilling, as per the UKOOG website guidance
- Drilling noise levels might be exceeded, so need real time monitoring, with immediate enforcement if levels are exceeded.
- HGVs will have significant noise impacts causing health and wellbeing impacts including daytime nuisance and sleep disturbance.

Roseacre Awareness Group: Representations received on behalf Roseacre Awareness Group object to the proposal on a range of issues, including the following noise grounds:

- Contrary to SP2, SP9 and EP27 due to harm from drilling noise pollution. It will seriously affect residents living close to the site, affecting quality of life resulting in health issues. Noise levels cannot be mitigated.
- Elswick site operations are not representative of a live fracking site.
- No consideration of cumulative effects of onsite machinery (generators, separators, compressors) with noise from drilling, fracking, flaring and HGVs
- Noise assessment should have used BS4142 and not BS5228, to be relevant to a quiet rural area and not a construction site.
- Actual increase in noise level should be no more than 5db but proposal higher
- No adequate baseline surveys or assessment of sensitive local receptors (Stanley Farm mews) No information to demonstrate that residential amenity will not be significantly affected.

Friends of the Earth: Object to the proposal on a range of issues including the following summarised reason on noise:

- Several years of disruption to the local community with 14 months of drilling 24hours a day, 8 months of hydraulic fracturing and 12 months of flaring with dust, light and noise emissions.

Other representations

A large number of other representations raise concerns in relation to the following summarised noise concerns:

- There will be noise pollution
- Noise assessment results and analysis is disputed.
- The noise assessment should have used BS4142 (nuisance on local receptors) instead of BS5228 for construction sites.
- Receptors at Stanley Mews have not been considered.
- The noise levels will severely and adversely affect people's right of a quiet enjoyment of their homes.
- Will be able to hear the noise from Inskip
- Predicted noise levels may be ok in an urban area with ambient noise but will be loud and intrusive in a rural area
- Area around Roseacre Wood is extremely quiet, development will be loud and intrusive in the rural area
- 24 hours a day, 365 days a year of noise from site operations of drilling, traffic noise will affect people's physical and mental health.
- Concerned about fracking noise from 7am to 7pm during the week and from 7am at weekends for 365 days of the year
- Noise from HGV, heavy drilling and fracking will destroy communities
- Moved to area to enjoy the peace and quiet, but this will be disrupted by HGV passing in front of house
- Peace and quiet will be shattered by noise from fracking
- Not acceptable to have drilling 24 hours a day, 7 days a week, it will destroy the peaceful fabric of the village
- Increased daytime noise
- Increased night-time noise
- Impact of constant noise to migraine sufferer will significantly affect quality of life
- Noise will affect pets and horses, including livery yards in Elswick and Wharles
- Cuadrilla exceeded set noise levels at Balcombe
- The proposal will be contrary to FBLP Policy EP27 as constant noise will be detrimental to health
- Noise will be intrusive. Can already hear firearms activity from Weeton in Elswick when wind is coming from that direction.

Policy

Paragraph 109 of the NPPF states that the planning system should contribute to and enhance the natural and local environment by *inter alia* preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability.

Paragraph 123 of the NPPF states that *planning policies and decisions should aim to:*

- *avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;*
- *mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;*
- *recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and*
- *Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.*

Assessment of 'significant adverse impacts' is directed to the DEFRA publication *Explanatory Note to the Noise Policy Statement for England*.

In the accompanying practice guidance for the NPPF the management of the noise associated with particular development types is considered in a number of separate documents. For minerals development there is National Planning Practice Guidance: Minerals (PPG).

In relation to noise the PPG states that applicants *should carry out a noise impact assessment, which should identify all sources of noise and, for each source, take account of the noise emission, its characteristics, the proposed operating locations, procedures, schedules and duration of work for the life of the operation, and its likely impact on the surrounding neighbourhood.*

Proposals for the control or mitigation of noise emissions should:

- *consider the main characteristics of the production process and its environs, including the location of noise-sensitive properties and sensitive environmental sites;*
- *assess the existing acoustic environment around the site of the proposed operations, including background noise levels at nearby noise-sensitive properties;*
- *estimate the likely future noise from the development and its impact on the neighbourhood of the proposed operations;*
- *identify proposals to minimise, mitigate or remove noise emissions at source;*

- monitor the resulting noise to check compliance with any proposed or imposed conditions.

The PPG continues by adding that *Mineral planning authorities should take account of the prevailing acoustic environment and in doing so consider whether or not noise from the proposed operations would:*

- give rise to a significant adverse effect;
- give rise to an adverse effect; and
- enable a good standard of amenity to be achieved.

In line with the Explanatory Note of the Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure would be above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation.

The PPG recommends appropriate noise standards and advises that *Mineral planning authorities should aim to establish a noise limit, through a planning condition, at noise-sensitive property that does not exceed the background noise level ($L_{A90,1h}$) by more than 10dB(A) during normal working hours (0700-1900). Where it will be difficult not to exceed the background level by more than 10dB(A) without imposing unreasonable burdens on the mineral operator, the limit set should be as near that level as practicable. In any event, the total noise from the operations should not exceed 55dB(A) LAeq, 1h (free field). For operations during the evening (1900-2200) the noise limits should not exceed the background noise level ($L_{A90,1h}$) by more than 10dB(A) and should not exceed 55dB(A) LAeq, 1h (free field). For any operations during the period 22.00 – 07.00 noise limits should be set to reduce to a minimum any adverse impacts, without imposing unreasonable burdens on the mineral operator. In any event the noise limit should not exceed 42dB(A) LAeq, 1h (free field) at a noise sensitive property.*

Where the site noise has a significant tonal element, it may be appropriate to set specific limits to control this aspect. Peak or impulsive noise, which may include some reversing bleepers, may also require separate limits that are independent of background noise (e.g. Lmax in specific octave or third-octave frequency bands – and that should not be allowed to occur regularly at night.)

For particularly noisy short term events such as soil stripping and road construction the PPG advises:

Increased temporary daytime noise limits of up to 70dB(A) LAeq 1h (free field) for periods of up to eight weeks in a year at specified noise-sensitive properties should be considered to facilitate essential site preparation and restoration work and construction of baffle mounds where it is clear that this will bring longer-term environmental benefits to the site or its environs.

Where work is likely to take longer than eight weeks, a lower limit over a longer period should be considered. In some wholly exceptional cases, where there is no viable alternative, a higher limit for a very limited period may be appropriate in order to attain the environmental benefits. Within this framework, the 70 dB(A) LAeq 1h (free field) limit referred to above should be regarded as the normal maximum.

Policy DM2 of the Joint Lancashire Minerals and Waste Local Plan (JLMWLP) states that development for minerals operations will be supported where it can be demonstrated that all material social, economic or environmental impacts that would cause demonstrable harm can be eliminated or reduced to acceptable levels. In assessing proposals account will be taken of the proposal's setting, baseline environmental conditions and neighbouring land uses, together with the extent to which its impacts can be controlled in accordance with current best practice and recognised standards.

Policy EP27 of the Fylde Borough Local Plan states that development which would unnecessarily and unacceptably result in harm by way of noise pollution will not be permitted. Where appropriate, planning permission will be granted subject to conditions to minimise or prevent noise pollution. This policy is considered not to be in conflict with the NPPF.

Assessment

The Environmental Statement contains a noise assessment including details of existing background noise levels at noise sensitive receptors and details of predicted noise levels from proposed operations including traffic, drilling and hydraulic fracturing. The assessment outlines the available British Standards and guidance in relation to noise measurement and recommended acceptable noise levels. From this the applicant employed noise levels based on recommendations and guidance set out in BS5228-1:2009 – *Code of practice for noise and vibration control on construction and open sites*, which the applicant considers is the most appropriate by virtue of being representative of the nature of the proposed development.

Drilling would take place for 24 hours per day. The first drilling phase would last for five months. Three other separate drilling phases would then follow. Each of the three phases would last for three months. Between each drilling phase would be a hydraulic fracturing stage that would last for two months. Hydraulic fracturing would not take place at night time, and would last for three hours per day. Cumulatively there would be 14 months of 24 hour drilling.

The closest residential properties to the site are located at Roseacre village. Old Orchard Farm is approximately 280m to the south, and Roseacre Farm is to the north with further residential properties beyond.

Background noise levels at Old Orchard Farm have been recorded as low as 26.7dB L_{A90} at night (LCC's own measurements) and 39.4 dB L_{A90} during the day. Noise from operations is predicted to raise background noise levels by approximately 13.3 dB at night and 14.6 dB by day.

Background noise levels at Roseacre Farm have been recorded as low as 28 dB L_{A90} at night (LCC's own measurements) and 33 dB L_{A90} during the day.

The applicant has advised that different stages of the proposed development would generate different noise levels and noise levels for all stages of the project have been assessed. The applicant has concluded that the only stage with the potential

to result in a significant noise effect would be where hydraulic fracturing occurs during night time (2300-0700) where noise limits are at their most stringent. The applicant proposes to mitigate this by only operating the pumps used (only for up to 3 hours at a time during hydraulic fracturing) during weekday daytime and Saturday mornings.

Vibration impacts have been ruled out by the applicant because of the nature of the project, method of construction for the well pad, arrays and pipeline connection for the extended flow testing.

The assessment concludes that there would be no significant adverse impacts on sensitive receptors and consequently no further mitigation is required. Nevertheless, a number of possible noise reduction measures have since been proposed by the applicant (and were consulted upon) and the applicant has stated that recommended noise limits in the PPG could be achieved.

Proposed mitigation measures for drilling include:

- Installing enclosures to mud pumps.
- Fitting noise absorbent materials to the housing containing shale shakers and generators.
- Identify items of pipework or equipment that can be fitted with rubber bushings to reduce vibration and impact noise.

Proposed mitigation measures for hydraulic fracturing include:

- Confine fracturing pumping operations to Monday to Friday 0700 to 1900 and Saturdays 0700 to 1300 only with no fracturing on Sundays or Bank Holidays.
- Installation of an acoustically designed, up to 5m high hoarding around the fracturing pumps

Additionally, real time noise monitoring could be installed throughout the development.

The applicant's background noise readings and predicted noise levels are considered to be sufficiently robust and have been verified by independent noise measurements undertaken by consultants on behalf of LCC with the exception that background noise readings were found to be slightly lower than those set out in the ES. Furthermore, it is concluded that it is unlikely there are any significant tonal or impulsive aspects to the noise from the drilling rig or from the hydraulic fracturing phase of the project.

The difference between existing low background noise levels and predicted noise levels is of concern. Fundamentally, the PPG states that *Mineral planning authorities should take account of the prevailing acoustic environment and in doing so consider whether or not noise from the proposed operations would give rise to a significant adverse effect and whether it would enable a good standard of amenity to be achieved.*

PPG-Minerals seeks to ensure that noise is minimised as far as practicable and it should be demonstrated that noise would be no more than 10dB above background during daytime and evening working at noise sensitive receptors (subject to a maximum of 55dB) and that for any operations during the period 22.00 – 07.00 noise would be reduced to a minimum, without imposing unreasonable burdens on their operations subject to a ceiling noise limit not exceeding 42dB(A) LAeq,1h (free field) at a noise sensitive property.

Fylde Borough Council's Environmental Health Team has commented that residents may experience an increase in noise with the proposed development and ideally criteria should be set such that "as a result of the activity at the site no dwelling shall experience sound levels that are more than 5dB above current background levels between 07.00 – 23.00 and no increase in background level between 23.00 and 07.00".

Clearly there is a balance to be struck between not imposing unreasonable burden on developers and ensuring that there would be no impact or an acceptable impact on local residents and the environment. The applicant has indicated that a range of noise attenuation measures could be employed to reduce noise levels but that further attenuation would result in unreasonable burden. What constitutes unreasonable burden has not been explained.

Notwithstanding assurances by the applicant that PPG –Minerals maximum noise levels could be achieved for both day and night periods, it is considered that there has not been clear demonstration that noise impacts would be reduced to an acceptable level given the low background levels in the area. It is concluded that noise from the proposed operations would be above the significant observed adverse effect level (SOAEL) as defined in the *Noise Policy Statement for England*. This is the level above which significant adverse effects on health and quality of life occur.

Conclusion

The proposed development would be contrary to Policy DM2 of the JLMWLP and Policy EP27 of the Fylde Borough Local Plan as it has not been satisfactorily demonstrated that noise impacts would be reduced to acceptable levels and would therefore unnecessarily and unacceptably result in harm to the amenity of neighbouring properties by way of noise pollution.

Appendix 14

Resources and waste

Proposal

The applicant has undertaken an assessment of the management of waste, including inert, non-hazardous and hazardous waste, and including waste water. The wastes described would be solid, liquid and gas and both oil and gas are defined as minerals. The waste produced would be:

- Non-hazardous and inert waste.
- The accumulation of injected hydraulic fracturing fluid which would remain in the underground target formation and has become waste;
- Above ground hazardous waste including the temporary deposit and accumulation of hazardous waste in storage containers as the wells are successively drilled. The hazardous waste would include flow back water and drill cuttings coated with residual Low Toxicity Oil Based Muds ("LTOBM").
- The incineration by flaring of hazardous waste, namely natural gas above 10 tonnes per day, as an activity listed in schedule 1 of the Environmental Permitting (England and Wales) Regulations 2010.

The management of waste is set out in a proposed waste management plan and subject to environmental permits that would be regulated by the EA and needed by the applicant to carry out their proposed operations. The permits would set out the conditions needed to manage waste and naturally occurring radio active material (NORM). If permits are issued, Cuadrilla would have to comply with the proposed conditions that are designed to ensure that operations do not cause harm to people or the environment.

The assessment concludes that all types of waste would not result in a significant effect; that there is sufficient capacity to treat flow back fluid even though at peak times it could use up to 68% of identified treatment capacity but which would have a significant effect. Consequently re use of flow back fluid is proposed to reduce this effect. Fracturing at the site would be staggered with Roseacre Wood to avoid increasing weekly waste water production rates to minimise cumulative effects. In the event on site storage and treatment capacity is exceeded, operations would be suspended.

General measures would be employed to reduce the quantity of waste generated, increase the re-use, recycling and recovery of materials and improve waste management.

Policy

National Planning Policy Framework (NPPF)

Paragraphs 11-14	Requirement for Sustainable Development
Paragraph 17	Core Planning Principles
Paragraphs 56-66	Requirement for Good Design

National Planning Policy Guidance (NPPG)

Water supply, wastewater, water quality Quality and infrastructure

**Joint Lancashire Minerals and Waste Development Framework Core Strategy
Development Plan documents (LMWDF)**

Policy CS1	Safeguarding Lancashire's Mineral Resources
Policy CS5	Achieving Sustainable Minerals Production

**Joint Lancashire Minerals and Waste Local Plan – Site Allocation and
Development Management Policies – Part One (LMWLP)**

Policy NPPF 1	Presumption in favour of sustainable development
Policy DM2	Development Management

Fylde Borough Local Plan

Policy EP23	Pollution of Surface Water
Policy EP24	Pollution of Ground Water
Policy EP26	Air Pollution

Summary of Consultee comments and representations

LCC Director of Public Health: Has undertaken a Health Impact Assessment (HIA) on the two drill sites and identified that the key risks to health and wellbeing of the population from the two proposed sites are a lack of public trust and confidence in the regulatory process and the industry, stress and anxiety from uncertainty about the industry that could lead to poor mental wellbeing; potential noise related health effects due to continuous drilling for at least five months for the initial borehole on each site and for three months for each of the subsequent three boreholes per site (14 months of continuous drilling), and potential health risks due to the presence of mining wastes generated as part of the drilling and hydraulic fracturing process being retained on site if adequate off site treatment facilities are not found.

As part of the recommendations it is recommended that:

11. Further clarification or new information on the occurrence and magnitude of equipment likely to be contaminated with radioactive waste and how such waste would be managed on the site and disposed of should be sought.
12. Should planning permission be granted, it should be a pre requisite that no activity can start until the onsite and offsite waste treatment capacity is defined.

Medlar-with-Wesham Parish Council and Kirkham Town Council: Recommend the application should be refused for a number of reasons including the following specifically to resource and waste:

- Potential flow back water site leakages and spillage during disposal and transportation.
- No information on water treatment plans. Where will flow back water be treated and will any new treatment plan accept waste from other UK sites.

Friends of the Earth: has objected to the proposal and further information for a number of reasons including waste. They have also commissioned consultants to advise on waste. The reasons for objecting are summarised as follows:

- Insufficient information on how overflow water and wastewater discharges, and pollutants, will affect the local environment and protected sites.
- Management of contaminated wastewater is wholly inadequate. There is a lack of treatment centres, resulting in potential capacity issues, especially if flow back rates are higher than estimated. This is not an adequate solution.
- Contrary to Planning Policy (Statement 10) as the application produces huge quantities of waste.
- It is unclear what waste quality standards would be applied by the applicant to ensure that concentration of pollutants in the wastewater did not accumulate beyond safe levels as a result of re-use for fracking and how risks to the environment and health and safety would be mitigated.
- Further investigation is required before the Council can lawfully grant an application to drill.
- Legacy of underground waste which will be present is denied, not a temporary development as it will create permanent contaminated wastewater
- Risks from flow back fluid and waste water.
- Risks of storage of waste to protected ecological areas.

Roseacre Awareness Group: object to the proposal in respect of waste and resources for the following summarised reasons|:

- Surface water drainage into Nigget Brook could contaminate Thistleton Brook which flows into River Wyre and Morecambe Bay.
- Accidental spillages from the site or vehicles could impact on water and land. with impacts on local wells used by livestock and groundwater contamination
- Storm impacts have not been taken into account, with risk of flooding.
- Insufficient evidence that fracking fluid will not leak into local water sources through existing faults. Flow back fluid estimates do not cover worst scenario.
- Wastewater treatment sites do not have capacity to treat all the flow back fluid, including radioactive waste resulting in storage concerns.
- Concern regarding content and quantity of chemicals in fracking fluid.
- Huge amounts of waste will be produced and could lead to significant traffic removing hazardous and toxic waste products.
- Applicant not demonstrated how they would reuse/recycle/treat flowback fluid.

Concerns have been expressed in representations received objecting to the proposal relating to the production, management and transportation of waste and the location and capacity of waste management facilities.

- Creation of toxic wastewater.
- Each well will produce 2.5million gallons of flow back.
- Lack of information and research on how the massive amounts of waste water will be disposed of and treated.
- Inadequate measures are in place to treat and dispose of vast quantities of waste water. No adequate disposal solution has been presented

- There is no adequate treatment facilities that have insufficient capacity for huge volumes of hazardous and wastewater waste.
- Insufficient information in the Waste Management Plan regarding drill cuttings storage and disposal and dust implications.
- What will happen to flowback water and its treatment?
- No guarantee of safe disposal of chemical waste and drilling muds.
- Manchester Ship Canal cannot take anymore waste.
- Cuadrilla have dumped two million/thousands of gallons of radioactive/contaminated waste water into Manchester Ship Canal (from Barton Moss) and were allowed to get away with it. The EA cannot guarantee that this will not happen again.

Assessment of impacts

An assessment of the proposals has been carried out. With regard to inert, non-hazardous and hazardous waste associated with the construction, drilling, hydraulic fracturing, initial and extended flow testing and decommissioning it is considered that subject to compliance with the necessary permits issued by the EA the quantities generated would not result in a significant effect.

The treatment of the quantity of waste water generated by the project would result in a significant effect and so mitigation to reduce this effect is proposed to include recycling of flow back water and staggering of operations. In particular there would be a requirement, wherever possible, to re-use the flow back fluid once the gas has been separated. This would reduce the amount of waste which needs to be disposed at an offsite facility. About 10-40% of the injected fluid is predicted to return to the surface.

The applicant proposes to leave some fracture fluid deep underground. The EA is of the view that leaving some of the retained fluid in situ is the 'Best Available Technique'. The EA has assessed the components of the fluid to be used in fracking process and is satisfied that it is non-hazardous. They are also satisfied that the fluid that would be retained underground would be non-hazardous and that over time the retained fluid would become indistinguishable from the water already present in the target formation.

Naturally occurring radioactive material (NORM) is present in many geological formations including oil and gas bearing strata such as shale formations. The flow-back fluid that returns to the surface following hydraulic fracturing as well as the sediments and scales in gas or water process vessels, is likely to contain sufficient NORM that it will be classed as radioactive waste. The level of radioactivity is considered to be extremely low. The EA has assessed the impact and proposals for NORM disposal and is satisfied that the applicant has demonstrated that it can have suitable arrangements in place with licenced waste disposal companies for its treatment.

Drill cuttings can be contaminated with hazardous waste. All hazardous waste must be stored in solid steel containers which are subject to inspections. The EA has advised that they are satisfied with the proposed arrangements.

With regard to representations received, it is considered that waste can be acceptably contained and that there are available facilities with capacity to accommodate the waste to which safe purpose designed transport would deliver it. The permitting process would restrict the available storage on site and the continued production of such in the event off site facilities were unavailable. The site can be contained in a way top prevent discharge or over spill off site and provide secure storage facilities. The permitting process would apply the necessary controls on waste quality standards. There would be no risk of migration of fracking fluids that could result in cross contamination of water resources and leaving fluids in the ground would not result in contamination in their own right. The waste is not toxic and would not be stored close to residential properties or schools and the site would be secure preventing unauthorised access.

Paragraph 122 of the NPPF requires that planning authorities should not seek to control processes or emissions were these are subject to approval under separate pollution control regimes and that LPA's should assume that these regimes will operate effectively. Nonetheless, paragraph 112 of PPG Minerals, notes that before granting permission the local planning authority should be satisfied that the issues dealt with under other regimes can be adequately addressed by taking advise from the relevant regulatory body'. The County Council has consulted with the EA and which has not objected.

The EA says it is 'minded to grant' the environmental permits needed to carry out the proposed operations. The draft permits set out the conditions needed to manage waste and NORM. If permits are issued, the applicant would have to follow the proposed conditions that are designed to ensure that operations do not cause harm to people or the environment.

The EA is satisfied that the draft permit and associated conditions will require that extractive wastes are managed in a way that minimises harm to human health and the impact on the environment. The operator has demonstrated this through a waste management plan that accompanies the permit application. The EA is satisfied that the proposals are in line with the waste hierarchy.

Conclusion

Resource and waste issues have been assessed by the applicant. It is considered that the quantity of inert, non hazardous and hazardous waste that would be generated along with the quantity of wastewater and industrial waste water would not result in a significant effect.

The EA has been consulted and has advised on the regulatory regime that would be employed to manage the risks and that they are satisfied that such risks could be managed in a way that would not cause any unacceptable impact.

It is considered that the waste can be managed in an acceptable way. The County Council should assume that these regimes will operate effectively and can be satisfied that the issues dealt with under other regimes can be adequately addressed.

The proposal could be acceptably controlled by other regulatory regimes and would not have any unacceptable impacts and would comply with national guidance and policies and the policies of the development plan.

Appendix 15

Transport / Access Issues

Proposals

The applicant has undertaken an assessment of the potential effect of the proposal on the transport networks serving the site and surrounding area. The potential effects from transport and traffic have been assessed:

- Driver delay
- Pedestrian delay
- Pedestrian amenity
- Severance
- Accidents and safety
- Dust and dirt

The assessment concludes that the proposed increase in traffic would only be over a number of peak periods and only for a few days at a time. Consequently the assessment concludes that even during peak periods, such an increase would not lead to a significant transport effect. To reduce the impact of transport a number of traffic plan measures are proposed including traffic routing, site management to minimise impact on highway users, driver training, pre and post monitoring surveys, employing complaint procedures.

The assessment identifies that the Roseacre Site is served by a network of minor and unclassified roads. Roseacre Road itself is directly to the east of the site and is an unclassified single carriageway road. Due to the network of country lanes in the vicinity of the Roseacre site, there are a number of potential access routes to this site. The applicant has examined a number of different options to access the site and has concluded that Route 3 is the most suitable, the other options being rejected due to issues such as the numbers of residential properties, narrow roads, accident history and presence of schools and general unsuitability for HGV traffic.

Route 3A proposes that the site would be accessed from the A583 to the south close to Clifton village. Traffic would then use Clifton Lane, Station Road, a short section of Treales Road, Dagger Road, Salwick Road, Inskip Road and Roseacre Road to reach the site, a distance of approximately 9km from the A583. All of these roads are unclassified roads.

The access to the site from Roseacre Road would require lowering approximately 300m of hedge along its western side in order to create surfaced priority junction with visibility splays. From the junction with the public highway a 4m wide access road with passing places would lead to the site compound.

On the eastern side of Roseacre Road opposite the proposed site access is an existing farm gate allowing access into the DHFCS site. This access would be improved thereby allowing vehicles to pass through the DHFCS site avoiding Wharles village. Some improvement would also be required where the DHFCS internal roads exit onto Inskip Road / Higham Side Road.

The other roads to be used by traffic between Wharles and the A583 are all unclassified, predominately country lanes. Generally these roads are of reasonable width. However, there are some locations on Roseacre Road, particularly on an 800m – 1km section of Dagger Road where the highway is narrowed and where it is difficult for two HGV's to pass. In order to ease traffic movements on this road, five passing places are proposed to provide localised widening to between 5.5 and 6.5m thereby allowing two HGV's to pass. In all cases the widening can be achieved using highway verge and it would not be necessary to remove roadside hedgerow.

The ES includes an assessment of traffic impacts which includes details of the anticipated traffic flows and an assessment of likely impacts in terms of highway capacity and safety.

The traffic movements associated with the development would vary over the duration of the project depending upon the activities being undertaken. During stage 1 (construction of the site), which would last approximately 2 months, there would be an average of 22 two way HGV movements per day (maximum of 48). During stage 2 (mobilisation of rig, drilling of first borehole and demobilisation of rig) lasting five months, there would be an average of 14 two way HGV movements (maximum of 50). For drilling of the subsequent three wells, the duration of the movements would be over a shorter period of three months but would equate to around 17 two way HGV movements per day. For hydraulic fracturing, (taking one to two months for each well) the average two way HGV movements would be around 10 per day. For the initial flow testing, (around three months), it is anticipated that the average two way movements would be around 5 per day. The extended flow testing would generate minimal HGV movements whilst the decommissioning and restoration of the site over approximately 2 months would generate an average of 22 two way HGV movements.

The peak traffic flows will occur as a result of combined traffic associated with activities at more than one well. The total traffic numbers in the ES are based on such conditions. The peak traffic generated would be around 50 two way HGV movements per day which would occur for around one week on eight occasions over the life of the project.

Traffic counts have been undertaken at various locations along routes 3A and 3B in order to ascertain existing traffic conditions. Clifton Lane is the most heavily used part of the route and carries around 2800 vehicles per day of which around 200 are HGV's. Most of the other roads that would be used as part of route 3B carry between 400 – 600 vehicles per day of which 20 – 30 are HGV's. Clifton Lane forms the access to the Westinghouse nuclear fuels site and is therefore already used by significant levels of HGV's. The HGV traffic from the development would therefore be less significant on this part of the route. However, on the remainder of the roads, the development would add significantly to total and HGV movements. For example, on Roseacre Road including through Wharles village, the development would result in an increase in total traffic by 12% and of HGV's by around 50 %. On Dagger Road the increase would be around 19% in terms of total traffic and 50% in terms of HGV's. Whilst the development would not be permanent, the vehicle movements would take place over a significant period of time and would affect a number of roads

that are not of a standard that would normally be considered suitable to carry large numbers of HGV's.

The applicant has recognised the constrained nature of this road network and has proposed the following mitigation measures to reduce the impacts of traffic of local amenity and other highway users.

The use of Route 3A would require traffic to pass through Wharles village to access the site via Roseacre Road. In order to allow traffic associated with the site construction, drilling, hydraulic fracturing and initial flow testing stages of the project (lasting approximately 2½ years) to avoid passing through Wharles, a variant of Route 3 is suggested by the applicant (Route 3B) which would involve traffic bypassing Wharles village by turning right onto Inskip Road and following this road and Higham Side Road for approximately 1km before turning left to gain access to the exploration site via internal site roads located within DHFCS Inskip site. For the remaining stages (extended flow testing and restoration), it is proposed that all traffic would use Route 3A to access the site via Roseacre Road through Wharles village as traffic during these stages would be lower.

Use of this variant would also require a slightly different design for the exploration site access road and junction with Roseacre Road although the environmental impacts, including hedgerow removal would be similar to that associated with route 3A.

In light of concerns raised by the local highway authority over the potential conflict of two large vehicles passing at certain locations along the proposed HGV route set out in the draft TMP, the applicant has presented an alternative proposal for HGV access to the site and further information to demonstrate the suitability of this alternative proposal.

The proposed alternative inbound HGV route to the site would be from Junction 1 of the M55 and along the B5269 via the A6. This route was included as a possible two-way route in the Transport Assessment (TA) submitted as part of the planning application as Route 4. The assessment of this route in the TA found that it was technically feasible, however as it would pass more residential areas/properties than the preferred route it was not progressed for further assessment at that stage. Subsequent to the production of the TA, the use of the DHFCS Inskip route for site HGVs has been agreed by the Secretary of State for Defence. The alignment of Route 4 passes the entrance to the DHFCS Inskip site. The alternative proposal would therefore also permit traffic to be routed through the DHFCS Inskip route, minimising the impact upon Wharles.

The route described in the draft TMP (and in the application as submitted) was selected as the preferred route according to a number of selection criteria. One of the key reasons was the limited number of residential properties that the route passes. For this reason, the route as initially submitted is maintained as an integral part of the alternative proposal. To address concerns raised by the local highway authority, it is proposed to amend this so that the route is used by site HGVs travelling in one direction only.

The applicant is of the view that the departure of HGVs from the site could be more easily controlled and co-ordinated by site management than the corresponding arrivals. It is therefore proposed to use the permitted route described in the draft TMP as a one-way route for outbound HGVs from the site.

It would be a requirement of the TMP (via a planning condition or unilateral undertaking) that HGVs would use a route through the DHFCS Inskip site during the construction of the exploration site, and the drilling, hydraulic fracturing, initial flow testing and well plugging & site restoration stages. The Ministry of Defence has confirmed that it is prepared to provide access to the DHFCS Inskip site for this purpose and is in the process of concluding final access agreements with the Applicant. This would minimise any traffic effects on the village of Wharles.

Summary of Consultee comments and Representations

Highways Agency (HA): No objection due to there being no significant impact on the strategic road network, namely A585 (T) and M55.

The Campaign to Protect Rural England: No objection subject to conditions requiring mitigation measures for.....transport impacts,

Fylde Borough Council: Objects to the proposal on the grounds that it is contrary to Policy DM2 of the Minerals and Waste Local Plan and Policies EP12, EP26, EP27 and EP28 of the Fylde Borough Local Plan, which are considered to be in conformity with the provisions of the National Planning Policy Framework.

The proposed drilling operations would result in the introduction of considerable traffic onto the rural highway network and would require alterations that would detract from the character of the rural area and cause significant environmental harm, particularly given the distance from the primary highway network and the uncertainty surround the alternative access arrangement through HMS Inskip. In addition to the noise and general disturbance from 24hour drilling operations and associated activity that would be significant, as would the impact on Roseacre Wood.

The County Planning Authority should be also be satisfied that the below and above ground operations will not have any significant adverse impacts in respect of Policies SP2, TR9, TREC10, EP10, EP11, EP13, EP14, EP15, EP18, EP19, EP21, EP22, EP23, EP24 and EP25.

The Councils Environmental Protection Team has advised and made recommendations on a number of issues including:

- Recommend that no HGVs arrive at or leave the site between 23:00 and 07:00.

LCC Developer Support (Highways): Objects to the proposal as initially submitted in view of the increase in traffic, particularly HGV movements would be severe, there would be a material impact on existing road users, particularly vulnerable road users

and overall highway safety of which the potential is considered severe. The reasons for which are set out as follows:

The temporary nature of the proposed works is acknowledged. The comments are in respect of the temporary exploration works only and not any future use that may be sought, since any further appraisal or production phases will be the subject of separate planning applications and assessments.

Highway access routes and Existing Highway conditions

In assessing the impact of the proposals on the highway network the following key elements have been considered:

(i) Proposed access routes

The Transport Assessment presented in the ES, Appendix R1, considers 6 potential HGV routes:

- Route 1 , from the A585 via Thistleton, Elswick and Roseacre;
- Route 2, from the A585 via Elswick, Crossmoor, Inskip and Wharles;
- Route 3A, from the A583 via Clifton, Salwick and Wharles;
- Route 3B, from the A583 and through DHFCS Inskip site;
- Route 4, from the A6 via Broughton, Woodplumpton and Wharles; and
- Route 5, from the A583 via Clifton, catforth and Wharles.

In each case the result is a significant increase in the level of traffic movements on the local network in the vicinity of the proposed Roseacre site and in particular a significant increase in HGV movements. This is a concern given the nature of the local rural lanes, their limitations and constraints to provide suitable means of routeing to access the site from a primary corridor.

The latest Traffic Management Plan (TMP) dated 11th December 2014 indicated that a preferred route for HGV's has been identified by the applicant. This route proposed utilises the DHFCS Inskip site, for the site construction, drilling, hydraulic fracturing and initial flow testing stages of the project, bypassing Wharles. Once initial flow testing has completed, the proposal is for the HGV route to revert to a route through Wharles. In both cases additional traffic management measures are proposed (including passing places at some locations on the narrow corridor).

Feedback has been provided to the applicant in respect of these concerns as a result of the proposals (as presented in the ES and the Traffic Management Plan, TMP) and the additional traffic impact on the local network. In particular, these were set out in an email to the applicants transport consultant (ARUP) on 21st December 2014 in response to the TMP passed to LCC on the 11th December. In summary the email highlighted concerns regarding the following: Site management; operational hours/delivery hours; Vehicle maintenance and inspection; permitted HGV routes; Enforcement of permitted HGV routes; co-ordination of vehicle arrival and departure; Route signing; HGV speeds and stopping; protection of pedestrian, cyclists and equestrians; and plans/route description.

(ii) Traffic Flows - Existing and Proposed

The existing traffic figures on the network and the forecast volume generated by the development are presented in the submitted Transport Statement.

The Environmental Statement (ES) includes a number of tables that highlight 12hour traffic data for HGV's and total vehicle flows (2way); and also peak hour (pm) flow which is compared against the theoretical capacity of the highway. The ES provides levels of generated HGV's and light vehicles for a number of key stages being:

- Site set up/construction,
- Drilling (of wells),
- Fracturing,
- Testing, and
- Decommissioning

The information presented within the ES has been considered and additional analysis of potential generated trips per day for each phase which has resulted in differing numbers of vehicles has been undertaken. Forecasting for each stage includes greater level of deliveries/servicing (HGV's), security, visitors and staff is considered reasonable. In addition the influence of program slippage (daily), as well as uncertainty during the Fracturing stage has been considered.

In addition, the impacts during the peak period/hours has been considered.

The approach has resulted in impacts that are higher; the following table highlights that presented in the ES, LCC forecasts and the net difference.

Comparison of Environmental Statement Daily Maximum Data (2way) and that Considered by LCC Based on the Above Influences								
Stage	Description	ES			LCC			Net Increase
		Light	Heavy	Total	Light	Heavy	Total	
1	Set up/Construction	12	48	60	38	58	96	36
2	Mobilisation	32	40	72	48	46	94	22
	Drilling	36	36	70	50	38	89	19
	Demobilisation	32	50	82	48	53	101	19
3	Mobilisation	22	27	43	36	41	77	34
	Fracturing	30	24	54	35	36	71	17
4+	Impacts lower than those highlighted above							

The LCC flows have been considered and all 6 potential access routes and ultimately the local network to access the proposed site in forming a view on the acceptability or otherwise of the impact. These (LCC) maximum daily flows, highlighted above, are at a level that is a significant cause for concern when location and routeing to access the site is considered. The routes proposed (with pass by provision) will still result in conflict compromising the surrounding network and environment used by existing familiar and also unfamiliar users.

The ES included limited information on peak periods, the peak hours for the highest occurring stage which results in the Demobilisation (and cleanout) stage (as highlighted in bold, above), which is expected to last for 2 days has been considered.

Assuming that a daily profile based 30-35% of all HGV's and 45% of all cars arriving and departing in each peak period that lasts up to 90mins with the remaining 30-40% of HGV's and 10% cars being prorated throughout the day. Based on this would result in up to 14HGV and 14 cars movements (2way) during each peak hour.

These (LCC) maximum hourly flows are at a level that are a significant cause for concern when location and appropriate routeing options to access the site without conflict or compromising the surrounding network or environment is considered.

(iii) Impact on Vulnerable Road users, Cyclists, Pedestrians, Equestrians

There is an extensive network of PROW on the local network in the vicinity of the site. Movement of vulnerable road users on this part of the network can be expected to be higher in the summer months. There is limited footway provision on this local network.

The very narrow nature of the lanes on the routes in the local vicinity of the site would suggest that there will be a material impact on vulnerable road users (both familiar and unfamiliar) as a result of the additional traffic and in particular the impact due to a significant increase in the numbers of HGV movements expected.

(iv) Accidents and Safety

Accident Data has been provided in Appendix C of the Transport Statement for a five year period between 2008 and 2013 for each of the six proposed access routes. With consideration for the local network in the vicinity of the site, the expected increase in particular of HGV movements, the narrow rural lanes, location of public rights of way, cycle routes and Equestrian activity, it is considered there are significant potential safety concerns that would have a material impact on safety on this part of the network if the application was approved as presented.

With regard to the proposed Traffic Management Plan Addendum (TMP), dated 13th January 2015 proposes an alternative routing strategy the key changes in the TMP it is considered that there remains a lack of detail in respect to the route description and the issues the proposal creates. Whilst it is indicated that vehicles will include GPS tracking it is not indicated how it will be applied to reduce HGV influence. There is a concern as previously indicated that the layby (as set out in the first TMP) which is available for public use may not be available when needed by the developer, as it is not in their control.

With regard to the proposed inbound and outbound routes it is noted that this had previously been discounted by the applicant. In the ES, Transport Assessment, Route 4 – Access via Broughton, Woodplumpton and Wharles was considered and discounted by the applicant due to the significant number of residential properties potentially affected, the increased length of the route from the SRN and the number of tight bends along the route. Contrary to the route descriptions provided in the "Environmental Statement Appendix R1 – Transport Assessment" that indicates there are no schools or other similarly sensitive land uses along this route, this is

incorrect as the route passes the entrance to Broughton Business and Enterprise College, the major secondary school serving the area. It should also be noted that this error also occurs in the description for route 3, where the route passes the entrance to Oakfield House School in Salwick.

The proposed inbound route suggested in the TMP Addendum creates a number of concerns which cannot be ignored.

Route Issues – M55J1 to Roseacre via Broughton

(i)The issues identified on the inbound alternative proposal via the A6 include the following:

- A6 Garstang Rd/B5269 Woodplumpton Lane – If n/b r/t lane is occupied by a turning vehicle a heavy/large vehicle cannot pass in the inside lane, this would include l/t vehicles on to B5269 Woodplumpton Lane;
- Swept paths require HGV's to cross opposing stop line on Woodplumpton Lane. This is a concern as HGV's require its use as a route for a sustained period. It will result in delays on the A6 and will impact on the operation of Broughton crossroads which does suffer from the effects of severe congestion;
- Existing daily and hourly traffic count information (2014) indicates currently 36 HGV's make the left turn during a typical day and only 1 HGV during the peak AM or PM period. The forecast impact is 25 in a day.
- Collisions Record - 14 collisions at A6/B5269 junction;
- B5269 Woodplumpton Lane – Broughton Business and Enterprise College entrance
- B5269/Sandygate Lane – sharp right turn bend with visibility issues (central hatching is present)
- B5269 n of Sunningdale – sharp left turn bend with visibility issues (central hatching is present)
- B5269 @ rail-bridge over WCML – narrowing leads to loss of pedestrian footway on w/b side, visibility issues
- B5269 Newsham Hall Lane
- B5269/Whittle Hill – visibility issues on bend (Whittle Hill is well used as a rat-run to avoid Broughton and M55J1)
- B5269/Hollowforth Lane – sharp left turn bend on junction with visibility issues
- B5269 Bell Fold Bridge over Lancaster Canal – narrow single width bridge (3.6m) at 1:14.5 gradient with a sharp left turn bend immediately after. Visibility issues, bridge is grade 2 listed.
- The applicant has suggested temporary traffic signals could be operated; however, this raises concerns over the duration of the temporary period and safety concerns associated with non-compliance in this rural location.
- B5269 Moorside Lane
- B5269 between Electricity substation and Holly Cottage – narrow pedestrian footway, possible safety issues as no street lighting is present.
- B5269/School Lane – sharp right turn bend with visibility issues
- B5269 north of School Lane – sharp left turn bend with visibility issues

- B5269 @ Blackpole Farm – sharp left turn bend at junction with Eaves lane, no pedestrian footways
- B5269 N of Blackpole Farm – sharp left turn bend with visibility issues followed by sharp right turn bend (central hatching is present) with visibility issues followed by moderate left turn bend. These are all within a 450m length of road.
- B5269/driveway to Hill House farm – sharp left turn bend with visibility issues
- B5269 N of Hill House Farm – sharp left turn bend with visibility issues and HGV run over on outside of bend.
- B5269 @ Rolling Pin Farm – Sharp left turn bend with visibility issues and farm entrance.
- B5269 W of Cinder lane – sharp left turn bend with visibility issues and residential access
- B5269 @ The Hermitage – right turn bend with visibility issues
- B5269 @ Meadow View – sharp right turn bend
- B5269 @ Woodfolds Barn – left turn bend with visibility issues
- B5269 Preston Road @ Woodsfold Bridge – no weight restrictions
- B5269/Catforth Road – right turn bend at road junction with residential/rural industrial entrances with no pedestrian footway.
- B5269 N of Woods Lane – narrow road with soft verges

(ii) Traffic Flows - Existing and Proposed

In my initial response on the draft traffic Management Plan, I indicated that I did not agree with the forecast traffic figures provided in the Transport Assessment and that numbers may be significantly higher. However, the applicant has committed to a maximum of 50 HGV's per day to be enforced through an appropriate planning condition. However, these numbers still represent a concern to the LHA.

The restricted maximum daily flows, proposed above, are at a level that is a significant cause for concern when location and routeing to access the site is considered. The routes proposed (with passby provision) will still result in conflict compromising the surrounding network and environment used by existing familiar and also unfamiliar users.

In terms of maximum hourly flows, these are also at a level that are a significant cause for concern when location and appropriate routeing options to access the site without conflict or compromising the surrounding network or environment is considered.

(iii) Impact on Vulnerable Road users, Cyclists, Pedestrians, Equestrians

There is an extensive network of PROW on the local network in the vicinity of the site and on the proposed inbound and outbound access routes. Movement of vulnerable road users on this part of the network can be expected to be higher in the summer months. There is limited footway provision on this local network.

The very narrow nature of the lanes on the routes in the local vicinity of the site would suggest that there will be a material impact on vulnerable road users (both familiar and unfamiliar) as a result of the additional traffic and in particular the impact due to a significant increase in the numbers of HGV movements expected.

(iv) Accidents and Safety

Accident Data has been provided in Appendix C of the Transport Statement for a five year period between 2008 and 2013 for each of the six proposed access routes. With consideration for the local network in the vicinity of the site, the expected increase in particular of HGV movements, the narrow rural lanes, location of public rights of way, cycle routes and Equestrian activity, it is considered that there are significant potential safety concerns that would have a material impact on safety on this part of the network if the application was approved as presented.

With consideration for the additional information that has been presented in support of the application it is considered that the increase in traffic, particularly HGV movements would be severe, there would be a material impact on existing road users, particularly vulnerable road users and overall highway safety of which the potential is considered severe and therefore unable to support this application.

With consideration for all the information that has been presented to date in support of the application it is considered that the impact of the increase in traffic, particularly HGV movements would be severe. There would be a material impact on existing road users, particularly vulnerable road users and overall highway safety of which the potential is considered severe and therefore unable to support this application.

Should it be minded to grant planning permission the following should be considered and dealt with by planning conditions:

Main Site Access Layout

The proposed main site access is shown in ARUP drawing, CH-001a issue 1, Upgrade of existing access.

The speed limit on Roseacre Road is derestricted, 60mph, in the vicinity of the proposed main site access junction.

The latest proposals suggest that a new crossroads junction will be created with an access opened up opposite the existing access to the DHFCS Inskip site. Once initial flow testing has completed, the proposal is for the HGV route to revert to a route through Wharles.

It is accepted that visibility splays of 4.5m x 215m would be appropriate in each direction and would need to be provided and maintained for the duration of the use of the site access (if the PA were minded to approve). In addition, suitable junction turning radii will be required to allow large vehicles to enter/exit the junction without undue delay on Roseacre Road, as this would impact on the safe operation of traffic. The junction layout considering all access options (whether utilising the DHFCS site access road or not) must allow for an HGV to enter at the same time as a second HGV is waiting to exit.

The layout of the site access road, as shown, is proposed as 4m wide with local widening at the entry. The widened section would allow two HGV's to pass. The

layout of the DHFCS site access road, as shown, is as 4m wide This would not allow two HGV's to pass and would result in large vehicles waiting on the main carriageway (this is not acceptable). Adequate road width would be required exiting/entering the highway for a distance on both the site access road and the DHFCS site access road that includes sufficient space for waiting HGV vehicles to ensure no parked/stationary vehicles on the public highway (at any time).

Advanced warning signs will be required to inform road users of the new road layout ahead and any necessary signing will be incorporated into the detailed design of the main access junction, which would be delivered as part of a s278 agreement were the PA minded to approve this application.

Internal site Layout

Parking on site must be adequate to ensure that site vehicles do not park, even temporarily, on Roseacre Road (or any other local road) or on the site access road thus impacting on the safe and efficient movement of the highway network.

In regard to the dirt and dust created by site construction and exploration works traffic, this will need to be managed. Wheel washing facilities will be necessary and this should be controlled by an appropriate condition.

LCC Director of Public Health: Has undertaken a Health Impact Assessment (HIA) on the two drill sites and identified that the key risks to health and wellbeing of the population from the two proposed sites are a lack of public trust and confidence in the regulatory process and the industry, stress and anxiety from uncertainty about the industry that could lead to poor mental wellbeing; potential noise related health effects due to continuous drilling for at least five months for the initial borehole on each site and for three months for each of the subsequent three boreholes per site (14 months of continuous drilling), and potential health risks due to the presence of mining wastes generated as part of the drilling and hydraulic fracturing process being retained on site if adequate off site treatment facilities are not found.

A number of key recommendations to inform the planning process are made and which include the following in respect of traffic:

13. Further clarification should be sought that any specific risks due to using the MOD site for accessing the Roseacre Wood site have been addressed before any planning permission is granted.
14. A full assessment of the impacts of additional traffic associated with the proposals on road safety should be carried out and appropriate traffic management options considered to address the public concerns, particularly in respect of the Roseacre Wood site.
15. Should planning permission be granted, provision should be made with the Applicant to maintain road safety, particularly on the access routes to Roseacre Wood site and road safety and any related incidents on the access to both the sites should be monitored.

Elswick Parish Council: An initial objection to the proposal was withdrawn. The Parish Council does not object but makes the following summarised comment in respect of traffic:

- In favour of the preferred traffic route which enables Elswick, a densely populated area to remain outside the routing of the tankers, ensuring the safety of over 200 children living in the village.

Medlar-with-Wesham Parish Council and Kirkham Town Council: The Council's object to the proposal as submitted and requests that it be refused planning permission for a number of reasons including the following related to traffic:

- Increasing vehicle movements, particularly HGV's will exacerbate existing problems along the A585 and at the M55 Junction 3 at peak times.
- Concern regarding future site expansion for production following exploratory phase. An increase in well heads will lead to further noise, traffic and pollution.

Newton-with-Clifton Parish Council: Objects to the proposal as submitted and requests that it be refused planning permission for the following reasons:

- The 'Wharles route' along Lodge Lane, Clifton Lane and Station Road is considered unsuitable for the projected number and type of HGVs and if approved is detrimental to highway safety and parish amenity
- The suggested routes has several potentially hazardous sections to highway safety and is lacking a sufficient number of constructed passing places
- The route comprises a dangerous right turn exit from Lodge Lane, Clifton onto the A583 which could adversely affect highway safety
- Clifton Lane/ Lodge Lane in Clifton are in close proximity to a children's recreational park and children have to cross the road to access the park. The proposed increase in type and volume of traffic is clearly hazardous to their highway safety.
- The site access/egress through Elswick is shorter in distance and as a consequence a reduced environmental impact.

Roseacre, Wharles and Treales Parish Council: Object to the proposal as submitted and requests that it be refused planning permission for a number of reasons including the following related to traffic:

- HGVs will have significant noise impacts causing health and wellbeing impacts including daytime nuisance and sleep disturbance.
- If tankered water is required, it will increase traffic and emissions.
- HGV traffic volumes will have an unacceptable adverse impact on the community through air and noise pollution and general nuisance,
- Strongly dispute existing and proposed traffic data in comparison to own parish traffic survey and predictions, with particular regard to HGV requirements and movements throughout the life of the development.
- HGV movements could be higher subject to HGV availability and the quantity of construction materials, water and flow back fluid to be transported

- The proposed HGV route is unsuitable with restricted sight lines, narrow carriageways, poor road surfaces and no kerb edgings.
- It is physically impossible for HGVs to go round corners without traversing centre line or all of the road in some places along the proposed route.
- Significant safety and conflict risks to all road users including walkers, cyclists, horse riders, children/pushchairs, mobility impaired, and for those accessing local farms, businesses and schools including Salwick school.
- Concern regarding impacts at Wharles village, Shorrocks Cottage, Dagger Road, Salwick Road, Station Road, Moss Lane East and Roseacre Road,
- Traffic increase to Roseacre Road, Inskip Road, Dagger Road will cause significant congestion and hazards to pedestrians and cyclists.
- Potential conflict between HGVs and agricultural machinery e.g. Dagger Lane
- Traffic especially HGVs should be using the primary route network.
- Traffic access and exist should be confined to DHFCS Inskip
- HGV movements should be restricted to 09.30-15.00hrs.
- Contrary to LTP objectives of safe and punctual travel between home and workplace and sustainable transport.
- Passing places for HGV will be restricted at all points along the route and proposed passing places are not suitable or in keeping with the surroundings.
- No consideration of utilisation of passing places at Wharles and Dagger Lane.
- Poor and hazardous road surfaces will be made worst by daily HGV use
- Potential cumulative effect with Westinghouse traffic and displacement of Salwick traffic over canal bridge and conflict at Trealeas near the school.
- No route identified for oversized vehicles during mobilisation / demobilisation.

Friends of the Earth: has objected to the proposal for a number of reasons including on traffic issues and which are summarised as follows:

- Concern at number of vehicle movements, particularly HGVs on rural single land carriageways (including Inskip Road and Roseacre Road) which have cycle and pedestrian usage.
- Contrary to Policy DM2, due to unacceptable adverse transport impacts from length and number of transport journeys.
- Generation of approximately 23,610 two way vehicle movements of which 11,670 HGV movements, over the lifetime of the project will emit greenhouse gas emissions and air pollution.
- Rural network impacts due to requiring new or widened junctions and access.
- Peak vehicle movements are to be spread throughout the day, but at Balcombe and Barton Moss there was a convoy of vehicles.
- The assessment of cumulative effects of operations at Roseacre Wood and in combination with Preston New Road does not account for operational delay.
- Traffic generated could breach statutory thresholds for noise and air quality.
- HGVs travelling on rural roads with hazardous chemicals or wastewater.

A number of representations include objections to traffic for the following summarised reasons:

- Contrary to Policy SP7 as 200 vehicle journeys a day cannot be safely served proposed means of transport. It will be dangerous. Existing roads are not designed to cope with such traffic.
- Traffic will increase by 100% and will ruin the countryside.
- Significant increase in HGV traffic using roads that were not built for that use.
- One HGV every 3-4 minutes for 12 hours per day with associated air pollution.
- Contrary to Policies SP7 and SP9 as 6 axle HGVs will not be able to turn into Roseacre Wood without the whole vehicle on the wrong side of the road.
- Contrary to Policies SP7 and SP9, as HGVs on village roads / narrow country lanes will impact negatively on daily lives and residents amenity.
- Contrary to Policy SP7 as the development cannot safely be served by the proposed means of access and local road network.
- The roads will not safely serve Cuadrilla's operational needs with regard to size, quantity and nature of vehicles.
- Unacceptable/ Inappropriate use of small narrow rural bumpy lanes around villages of Roseacre, Wharles, Elswick and Treales by HGVs.
- Twisting roads in Roseacre, Wharles and Treales are already used by large and small agricultural vehicles, buses, school buses, delivery vehicles and commuter traffic to Springfields at Salwick and walkers, cyclists, horse riders.
- HGV use of Wharles narrow winding road would be detrimental to Wharles residents through noise, fumes and road disruption.
- The second preferred route along Inskip Road, through the busy centre of Catforth village, along Catforth Road and over the narrow and inadequate canal bridge at Swillbrook is totally unacceptable and ridiculous.
- Unsuitable for lorries to use narrow rural (B) roads as the access route to the site, especially Dagger Road and Roseacre Road, HGVs will not be able to pass safely and will endanger other road users.
- No sight lines for oncoming traffic on Dagger Road making it particularly dangerous. A HGV could not overtake a cyclist or horse rider.
- In Bucks Wood, Station Road has a significant hazard from poor sight lines when elevated, with a steep fall-off into the canal below.
- New rail bridge at Salwick is only 5.5m wide with steel barriers, so potential for accidents if a tanker meets a car and caravan going to a caravan site.
- HGV traffic from Clifton to Wharles will result in increased traffic along Inskip Road to Treales, which will impact the school and Salwick commuters.
- Clifton village is a 20mph zone, will suffer road vibration from heavy lorries.
- Contrary to SP7. Elswick village will have up to 50 HGVs thundering through the village each day, with noise and air pollution and posing danger to children as there are no safe road crossings in the village.
- Traffic management plan controlling flow of traffic through Wharles will severely impact on our local amenity.
- Appalled that Treales will be turned into a glorified layby.
- DHFCS Inskip route would greatly reduce traffic and noise problems.
- There is no guarantee of use of DHFCS Inskip and residents have previously been warned about site dangers so is it a feasible option for site traffic.
- Object to the use of the A585 to junction 3 of the M55 for 75% of all HGV movements as it is seriously overloaded and has to take traffic from new housing at Wesham, Kirkham, Wrea Green and Warton, with serious existing problems from access, noise and pollution.

- Increased traffic on M55, A585 and A583. 'A' roads are extremely busy and dangerous roads already.
- Contrary to NPPF as there will be conflict between HGVs and other road users including pedestrians and cyclists.
- Contrary to Policies SP5 and SP9 as the local roads are used by hundreds of cyclists, horse riders, runners and pedestrians including children who will be at serious risk of injury and will lose an important social amenity.
- HGV traffic will make villages and country lanes a no-go area for cyclists, horse riders, runners, walkers, dog walkers and vulnerable road users.
- Risks to children travelling on school buses to local schools, from site accidents, road accidents and disruption from travel delays.
- Concerned for safety of children given increased traffic.
- Concern for walking on roads where there are no paths making it dangerous to walk between villages.
- Lack of pavements/narrow pavements will lead to intimidation of pedestrians.
- Danger of being pushed into dykes.
- Road safety risks from collision, skidding, failure to manage manoeuvres, weather and intimidation to other road users have not been addressed.
- Roads are not wide enough for 2 HGV's.
- Passing places on single track roads will not solve the problem and could cause accidents and deaths.
- Fatalities in recent years on country lanes will be increased by HGV traffic.
- It will cause disruption on narrow local roads, especially in summer months when the roads are used by visitors and tourists.
- Horse riders will not be able to ride down quiet lanes around Wharles as HGVs will be using them for 12 hours a day.
- Will cause major problems from confrontations between HGV and road users when unable to manoeuvre.
- Existing roads already have poor road surfaces with potholes and fractures which will be made worse by HGV usage, creating more danger for all.
- Vibrations and verge degradation has not been addressed.
- Cuadrilla traffic figures are incorrect, volumes are understated.
- Cuadrilla traffic assessment done in winter months so does not reflect higher traffic usage in summer including cyclists and horse riders.
- Lots of people use these roads already, major holdups in summer months.
- Who will monitor and enforce that the HGVs use a certain route?
- Traffic management system will cause great inconvenience.
- Improvements to road infrastructure through new roads and/or widening are not an acceptable solution, as following works (for profit) they will be abandoned for the ratepayer to maintain.
- Dangers of transporting toxic waste on roads where families live/travel
- Risk of spillage of hazardous material from HGVs in accidents on narrow road and/or with other motorists.
- Potential hazard from toxic spillage from use of narrow roads.
- Cyclists will be affected by spillages from vehicles leaving the site if inadequate washing down of vehicles.
- Application is contrary to Lancashire Local Transport Plan aims and goals.
- The sites should be located with access directly onto a main road.

Policy

The policies of the NPPF support sustainable development as does policy NPPF 1 of the Joint Lancashire Minerals and Waste Local Plan – Site Allocation and Development Management Policies. Policy DM2 of the Joint Lancashire Minerals and Waste Local Plan – Site Allocation and Development Management Policies seeks to ensure that proposals do not have an unacceptable impact on amenities.

Assessment

The Roseacre Site is served by a network of minor and unclassified roads. The route as proposed has been chosen due to it having the lowest impact on the number of residential properties, narrow roads, accident history and presence of schools and general unsuitability for HGV traffic.

The route would be accessed from the A583 to the south close to Clifton village. Traffic would then use Clifton Lane, Station Road, a short section of Treales Road, Dagger Road, Salwick Road, Inskip Road and Roseacre Road to reach the site, a distance of approximately 9km from the A583 all of which are unclassified.

The peak traffic flows will occur as a result of combined traffic associated with activities at more than one well. The total traffic numbers in the ES are based on such conditions. The peak traffic generated would be around 50 two way HGV movements per day which would occur for around one week on eight occasions over the life of the project.

Whilst the development would not be permanent, the vehicle movements would take place over a significant period of time and would affect a number of roads that are not of a standard that would normally be considered suitable to carry large numbers of HGV's.

The applicant has recognised the constrained nature of this road network and has proposed mitigation measures to reduce the impacts of traffic of local amenity and other highway users.

To minimise impacts on the village of Wharles access is proposed through the MOD land at Inskip. To ease traffic movements on Dagger Road which is too narrow to accommodate two HGV's passing, five passing places are proposed to provide localised widening to between 5.5 and 6.5m thereby allowing two HGV's to pass. In all cases the widening is proposed to be achieved using highway verge without removing roadside hedgerow.

To address concerns regarding vehicle access a traffic management plan (TMP) has been proposed and includes the following:

- A code of conduct for all drivers
- Limiting traffic to the permitted route with disciplinary action against all drivers who do not comply
- Restriction in hours of delivery

- Co ordination of arrival and departure times of HGV's including planning of arrival and departure times for vehicles to control the risk of HGV's meeting along the route
- Use of a layby on the A583 in order to hold incoming HGV's until such time as site management have confirmed that the route is clear of outgoing HGV's.
- During peak times, it is proposed to operate patrol cars between the site and the A583 in order to provide 'live' information to co ordinate arrival and departure of HGV's
- Use of convoys during certain circumstances
- Use of signage
- Undertaking of a highway condition survey to monitor the impacts of traffic on the route.

Some of the measures proposed would clearly be of assistance to mitigate the impacts of traffic. However, many of the proposals, such as co-ordination of HGV movements and convoying, are only necessary due to the constraints of the highway route and would be difficult and complex to implement. Even if the applicant is able to control the passage of site traffic, the same does not apply to the other HGV traffic which uses the route. Due to the nature of the roads used to reach the Roseacre site, there may still be highway impacts such as verge over running and conflicts with other traffic even if the measures proposed in the traffic management plan to control site traffic are successful.

There has been considerable opposition to the use of this highway network to facilitate the development by Fylde Borough Council, parish councils, opposition groups and individuals. An assessment of the application as proposed, the alternative access through the MOD land and an assessment of the proposed TMP, has been undertaken by LCC Highways and to which a number of concerns were expressed. To address these concerns the applicant has presented an alternative proposal for HGV access to the site and further information to demonstrate the suitability of this alternative proposal.

The alternative proposal is to use a one-way route to and from the site for HGVs utilising the exit as proposed, but directing vehicles in via Woodplumpton and Broughton to the A6. The view of the applicant is this would significantly reduce the probability of two HGVs meeting on sections of the highway with a constrained width. The applicant also believes it would halve any increase in site related HGV traffic flows along the proposed route.

The applicant is of the view that the departure of HGVs from the site could be more easily controlled and co-ordinated by site management than the corresponding arrivals. It is therefore proposed to use the route described in the draft amended TMP as a one-way route for inbound HGVs from the site.

Accident Data has been provided in Appendix C of the Transport Statement for a five year period between 2008 and 2013 for each of the six proposed access routes (including the latest amendment now submitted). With consideration for the local network in the vicinity of the site, the expected increase in particular of HGV movements, the narrow rural lanes, location of public rights of way, cycle routes and Equestrian activity, it is considered that there are significant potential safety

concerns that would have a material impact on safety on this part of the network if the application was approved as presented.

The County Council's assessment concludes that notwithstanding the temporary nature of the proposed works and the mitigation and management measures proposed, the proposal as submitted would be severe in view of the increase in traffic (particularly HGV movements) during restricted maximum daily flows and maximum hourly flows. Notwithstanding the applicant's commitment to a maximum of 50 HGVs per day, these would still be at a level that would give rise to a significant cause for concern when location and routing to access the site along the route proposed (including with passing spaces) would still result in conflict. This would compromise the surrounding network and environment used by existing familiar and unfamiliar users.

There would also be a material impact on existing road users, particularly vulnerable road users and overall highway safety of which the potential is also considered to be severe, a view reflective of those in opposition.

There is an extensive network of PROW on the local network in the vicinity of the site and on the proposed inbound and outbound access routes. Movement of vulnerable road users on this part of the network can be expected to be higher in the summer months. There is limited footway provision on this local network.

The very narrow nature of the lanes on the routes in the local vicinity of the site would suggest that there will be a material impact on vulnerable road users (both familiar and unfamiliar) as a result of the additional traffic and in particular the impact due to a significant increase in the numbers of HGV movements expected

With consideration for the additional information that has been presented in support of the application it is considered that the increase in traffic, particularly HGV movements would be severe, there would be a material impact on existing road users, particularly vulnerable road users and overall highway safety of which the potential is considered severe and therefore unable to support this application.

With consideration for all the information that has been presented to date in support of the application it is considered that the impact of the increase in traffic, particularly HGV movements would be severe. There would be a material impact on existing road users, particularly vulnerable road users and overall highway safety of which the potential is considered severe and therefore unable to support this application. The alternative has not been advertised as further information but it is anticipated that further representations objecting to such a change would be received. Irrespective an assessment of the revised TMP has been carried out by LCC Highways and it is concluded that the increase in traffic, particularly HGV movements would be severe, there would be a material impact on existing road users, particularly vulnerable road users and overall highway safety of which the potential is considered severe.

It is further concluded that for **all** the information that has been presented to date in support of the application that the impact of the increase in traffic, particularly HGV movements would be severe. There would be a material impact on existing road

users, particularly vulnerable road users and overall highway safety of which the potential is considered severe and that the application cannot be supported.

Conclusion

To summarise on highways issues, the Roseacre site is served by a network of minor unclassified roads.

In order to make the development acceptable a number of mitigation measures are required in order to address the highway and local amenity impacts of the development. If such mitigation measures cannot be successfully implemented or would have their own environmental impacts, then it may be considered that the highway impacts of the development would not be acceptable.

In this case, the main impact of the development arises from the use of the route through Wharles. Whilst the applicant has proposed measures to avoid such traffic impacts and provided certainty that the alternative route would be available and that the unacceptable impacts would not occur through Wharles, it is considered that even with the passing places and traffic management plan proposed and amended, such measures are only required due to the constraints of the affected highways and the measures would either have their own environmental impacts or insufficient confidence can be given to their success.

Notwithstanding the proposed amendments to the TMP and the proposed amended routing to create a one way system, an assessment concludes that the increase in traffic, particularly HGV movements, would be severe, there would be a material impact on existing road users, particularly vulnerable road users and overall highway safety of which the potential is considered severe.

It is concluded that for **all** the information that has been presented to date by the applicant in support of the application that the impact of the increase in traffic, particularly HGV movements would be severe and which would result in a material impact on existing road users, particularly vulnerable road users and overall highway safety of which the potential is considered severe. Consequently it is considered that the application cannot be supported.

In these circumstances, it is considered that the development would give rise to unacceptable impacts on existing road users that would be contrary to Policy DM2 of the Lancashire Minerals and Waste Local Plan.

Appendix 16

Water Resources

Proposal

The applicant has undertaken an assessment of the impact of the proposal on water supplies and surface water runoff or drainage and the consequent impact on flood risk. As a result there are no existing hard surfaces that could impede rainwater from entering the soil or exacerbate surface water flooding. The Site is not located within an area prone to flooding from rivers.

The construction of the well pad would include the installation of an impermeable plastic membrane to be laid to prevent infiltration from the well pad through the underlying soils and water bodies. A min 300mm thick layer of crushed and compacted stone would be laid on top of the membrane. Ditches would be constructed around the perimeter of the well pad with the outer edge of the ditch raised 50mm above the well pad surface. The ditches would provide the means to collect storm water. The void space in the granular fill, ditches and the 50mm "air freeboard" would provide a storage volume to attenuate drainage flows from the site.

An isolation valve would be fitted to the discharge pipe from the site. During drilling and hydraulic fracturing operations, the valve would be closed preventing storm water from leaving the site. During these periods storm water would be removed by tanker to a licenced wastewater treatment works. At other times when the water quality in the ditch system meets the requirements of EA the site would drain freely to Carr Bridge Brook. An interceptor installed at the outfall would provide further security that discharges to watercourses would meet quality criteria.

The water requirements for the Project would be provided by a pipe connection to a nearby United Utilities (UU) water main. Cuadrilla has consulted with UU to confirm that they could provide the quantity and flow rate of water needed for the Project. UU have confirmed that this supply would not affect their current customers (including residential properties). The use of mains water negates the need to transport water to the site by tanker to reduce transport impacts. Estimated daily water use during hydraulic fracturing activities has been reduced from $765^3\text{m} \text{ per day}$ to $600^3\text{m} \text{ per day}$ by reducing the proposed number of hydraulic fracturing stages and reusing flow back water to make up part of the fracturing fluid for the subsequent fracturing stages. Flowback fluid would be subject to physical treatment using ultra violet disinfection to control bacterial growth. If possible collected storm water would also be used to make up part of the fracturing fluid volume.

The assessment concludes that subject to such measures the proposed development would not have a significant effect on surface water runoff, drainage or water supplies.

Summary of Consultee comments and Representations

United Utilities PLC (UU): No objection subject to the inclusion of a specific worded condition to protect assets in Preston New Road from HGV movements.

With regards to water supply to the site, UU has advised that the principal water demand would be during the hydraulic fracturing operations. During other times, water would be required to support the drilling operation, site cleaning and welfare operations. The water demand during hydraulic fracturing operations is anticipated to be approximately 765m³ of water per day (a maximum of one hydraulic fracturing stage will be carried out in a single day). This water would be supplied from the United Utilities (UU) potable water network.

UU have confirmed that the 15" trunk main to the western corner of the site has the capacity to supply the site without restrictions (see Appendix 5 of the application ES for confirmation). UU have reported that the main has a history of bursts so installation of a pressure management valve (PMV) and flow meter would be required in order to reduce the burst risk. UU have also stated it may be possible to re-zone their network so the site would be the only user of the main.

To meet the current and future water quality needs of their customers across the Fylde, as well as fulfilling their obligations to their quality regulator (the DWI), a circa £13 million scheme to clean and upgrade the Lytham pipeline, which runs from Singleton into Blackpool is currently being planned. To allow for this work to take place a new 630mm water supply main section is being installed; the main will be completed in 2015. Consequently a new water supply point of connection has been identified on the new stretch of water main.

To facilitate the water supply needs of the temporary shale gas exploration scheme, and maintain the integrity of the new main an additional connection point is to the installed (at the Applicant's expense) while the main is being laid. A separate metered supply to each unit will be required at the Applicant's expense and all internal pipe work must comply with current Water Supply (Water Fittings) Regulations 1999.

Environment Agency (EA): No objection in principle and recommends the following:

- A scheme to dispose of surface water between the drill pad and Carr Bridge Brook to be submitted to ensure the proposed development does not increase the risk of pollution to Carr Bridge Brook.
- Routine monitoring of on-site surface water quality and maintenance, and inspection of surface water drains, valves and interceptors to ensure correct and efficient operation.
- Surface water run-off retained on site during operations to be tankered away for off-site disposal and to not be discharged to the watercourse.
- To consider whether the Control of Pollution (Oil Storage) (England) Regulations 2001 apply. If not any facilities, above ground, for the storage of oils, fuels or chemicals to be sited on impervious bases and surrounded by impervious bund walls.

With regard to flood risk the EA confirmed that the proposed development is located in Flood Zone 1 which is defined as having a low probability of flooding in the National Planning Practice Guidance. The Agency has reviewed the Flood Risk Assessment submitted with the application and is satisfied that the development would not be at risk of flooding or increased flood risk off-site.

With regard to radon release during the flaring of gas, the Environment Agency confirmed that radon is exempt from their permitting by the Natural Gas Exemption Order 2002 and from regulation under the Environmental Permitting Regulations 2010. This is on the basis of its low risk, widespread use and that it was not amenable to regulation. Discharges of radon in natural gas, being flared or vented at gas sites is not subject to regulation under radioactive substances regulation (RSR).

Public Health England (PHE): Has raised no objection subject to the local planning authority being satisfied on a number of issues including the proposed definition of significant variation for other determinants regarding....and surface water and ground water potential contaminants.

Medlar-with-Wesham Parish Council and Kirkham Town Council: Objects to the proposal for a number of reason including the potential impact on resident's water supplies; potential well failure and the huge potential for land contamination, particularly to aquifers and agricultural land; and potential flow back water site leakages and spillage during disposal and transportation.

Roseacre Wharles and Treales Parish Council: Objects to the proposal for a number of reasons including the potential impacts on water resources and which are summarised as follows:

- Not sustainable development due to....water supply issues, permanent waste repository and lack of suitable waste treatment
- Contrary to Policy CL1 which requires minimal potable mains water in new developments with a need to recycle and conserve water resources.
- Potential water supply problems water required is higher than estimates.
- If tankered water is required, it will increase traffic and emissions.
- Water supply route re-zoning infers potential impact to Roseacre and Wharles
- Contrary to Policy EP25, treatment facilities are inadequate/ not available as there are no authorised treatment sites in the Northwest and proposed sites have insufficient capacity. Waste should not be transported great distances.
- Contrary to Policy CS9 as fracking fluids will create permanent waste on site
- Flowback fluid calculations are disputed. Higher rates and no suitable disposal could result in risk of breach of the well pad containment area.
- Contrary to Policies EP10, EP23, EP24, EP30 and CS5 as the development will not protect ponds, watercourses, groundwater or natural resources and will increase surface run off, resulting in poorer air and water quality.
- Any spills, well blowouts, accidents or releases into local drainage ditches (and wider watercourse system) poses could contaminate surface and groundwater. Monitoring will not mitigate due to lead times for test results.
- Risk of imperfectly sealed wells leaking into groundwater.

- Storm weather could increase surface water drainage volumes with risks to site containment and potential discharge of contaminated surface run-off.

Friends of the Earth: have raised objection on a number of issues including the impact of the proposal on groundwater, flooding and water resources for the following summarised reasons:

Water Resources

- Information is inaccurate and ambiguous making assessment difficult.
- When compared to Preese Hall data, the information seems inaccurate.
- Development will need more water than supplied by United Utilities so further supplies will be required by tanker, with impacts on local community.
- Existing water pressure issues, water supply to residents may be restricted.
- If goes to full production, where will additional water come from?

Waste Management

- Surface water drainage into Nigget Brook could contaminate Thistleton Brook which flows into River Wyre and Morecambe Bay.
- Accidental spillages from the site or vehicles could impact on water and land. with impacts on local wells used by livestock and groundwater contamination
- Storm impacts have not been taken into account, with risk of flooding.
- Insufficient evidence that fracking fluid will not leak into local water sources through existing faults. Flow back fluid estimates do not cover worst scenario.
- Wastewater treatment sites do not have capacity to treat all the flow back fluid, including radioactive waste resulting in storage concerns.
- Concern regarding content and quantity of chemicals in fracking fluid.
- Huge amounts of waste will be produced and could lead to significant traffic removing hazardous and toxic waste products.
- Applicant not demonstrated how they would reuse/recycle/treat flowback fluid.

Roseacre Awareness Group: Objects to the proposal for a number of reasons including the potential impacts on water resources and which are summarised as follows:

- Information is inaccurate and ambiguous making assessment difficult.
- When compared to Preese Hall data, the information seems inaccurate.
- Development will need more water than supplied by United Utilities so further supplies will be required by tanker, with impacts on local community.
- Existing water pressure issues, water supply to residents may be restricted.
- If goes to full production, where will additional water come from?
- Surface water drainage into Nigget Brook could contaminate Thistleton Brook which flows into River Wyre and Morecambe Bay.
- Accidental spillages from the site or vehicles could impact on water and land. with impacts on local wells used by livestock and groundwater contamination
- Storm impacts have not been taken into account, with risk of flooding.
- Insufficient evidence that fracking fluid will not leak into local water sources through existing faults. Flow back fluid estimates do not cover worst scenario.

- Wastewater treatment sites do not have capacity to treat all the flow back fluid, including radioactive waste resulting in storage concerns.
- Concern regarding content and quantity of chemicals in fracking fluid.
- Huge amounts of waste will be produced and could lead to significant traffic removing hazardous and toxic waste products.
- Applicant not demonstrated how they would reuse/recycle/treat flowback fluid.

Representations received include objections relating to water resources, drainage and flooding for the following summarised reasons:

- Creation of toxic wastewater.
- Each well will produce 2.5million gallons of flow back.
- Lack of information and research on how the massive amounts of waste water will be disposed of and treated.
- Inadequate measures are in place to treat and dispose of vast quantities of waste water. No adequate disposal solution has been presented.
- There is no adequate treatment facilities that have insufficient capacity for huge volumes of hazardous and wastewater waste.
- Insufficient information in the Waste Management Plan regarding drill cuttings storage and disposal and dust implications.
- What will happen to flowback water and its treatment?
- No guarantee of safe disposal of chemical waste and drilling muds.
- Manchester Ship Canal cannot take anymore waste.
- Cuadrilla have dumped two million/thousands of gallons of radioactive/contaminated waste water into Manchester Ship Canal (from Barton Moss) and were allowed to get away with it. The EA cannot guarantee that this will not happen again.
- Contrary to CL1, vast quantities of water out of the hydrological cycle forever.
- Unsustainable use of water.
- Not enough water available for this use, where will it come from?
- Public drinking water must be preserved at all costs.
- Vast amounts of water should not be utilized / wasted for gas drilling, especially given water shortages in recent years.
- Recent droughts have resulted in water shortages and severely affected pressure and fracking will make the impact worse.
- United Utilities may not have adequate resources to protect drinking water.

Policy

National Planning Policy Framework (NPPF)

Paragraphs 11-14	Requirement for Sustainable Development
Paragraph 17	Core Planning Principles
Paragraphs 100	Flood Risk
Paragraph 103	Requirement for Flood Risk Sequential Test

Technical Guidance to the NPPF: Flood Risk and Minerals Policy

Paragraphs 5	Flood Risk
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Paragraphs 20-51 Minerals Policy

National Planning Policy Guidance (NPPG)

Flood Risk and Coastal Change Flood Risk Assessment
Water supply, wastewater, water quality Quality and infrastructure

Joint Lancashire Minerals and Waste Local Plan – Site Allocation and Development Management Policies – Part One (LMWLP)

Policy NPPF 1 Presumption in favour of sustainable development
Policy DM2 Development Management

Joint Lancashire Minerals and Waste Supplementary Planning Guidance

SPD Oil and gas exploration, production and distribution (draft)

Fylde Borough Local Plan

Policy EP23 Pollution of Surface Water
Policy EP24 Pollution of Ground Water

Assessment of Impacts

An assessment of the potential impacts of the proposal on water supplies and surface water runoff or drainage and the consequent impact on flood risk has been carried out. UU has confirmed that the water required for the hydraulic fracturing process would be sourced from a main below Roseacre Road which has the capacity to supply the site without restrictions to their potable water network. The applicant has also confirmed that flow back water would be reused in the next hydraulic fracturing event. The direct source of water from the mains would reduce the amount of HGV movements to and from the site and the reuse of flow back water would reduce the amount of water required.

The site would be constructed on an impermeable membrane laid to prevent infiltration from the well pad through the underlying soils and water bodies. Ditches would be constructed around the perimeter of the well pad with the outer edge of the ditch raised 50mm above the well pad surface. The ditches would provide the means to collect storm water. The void space in the granular fill, ditches and the 50mm “air freeboard” would provide a storage volume to attenuate drainage flows from the site.

An isolation valve fitted to the discharge pipe from the site would prevent storm water from leaving the site during drilling and fracking operations. During these periods storm water would be removed by tanker to a licenced wastewater treatment works. At other times when the water quality in the ditch system meets the requirements of EA the site would drain freely to a local field drain to the east of the site. An interceptor installed at the outfall would provide further security that discharges to watercourses would meet quality criteria.

The EA has raised no objection in principle subject to conditions requiring routine monitoring of on-site surface water quality and maintenance, and inspection of surface water drains, valves and interceptors to ensure correct and efficient operation; surface water run-off retained on site during operations to be tankered away for off-site disposal and to not be discharged to the watercourse; and facilities, above ground, for the storage of oils, fuels or chemicals to be sited on impervious bases and surrounded by impervious bund walls.

With regard to flood risk the EA confirmed that the proposed development is located in Flood Zone 1 which is defined as having a low probability of flooding in the National Planning Practice Guidance. The EA has reviewed the Flood Risk Assessment submitted with the application and is satisfied that the development would not be at risk of flooding or increased flood risk off-site.

With regard to representations received measures would be in place to contain the site and prevent increased run off leaving the site thereby preventing the risk of contamination to ground and surface water and the nearest watercourses. The site falls with a Flood Zone 1 which is defined as having a low probability of flooding in the National Planning Practice Guidance. The EA is satisfied that the development would not be at risk of flooding or increased flood risk off-site. UU has confirmed that the proposal would have no impact on potable water supply or the supply of water to residential properties and for which upgrades to the current system are currently being put in place. Flow back water will be reused to minimise the use of potable water. The aquifer is saline and not used for potable water. The reasons for objecting to the proposal on the potential impacts on water supplies and surface water runoff or drainage and the consequent impact on flood risk cannot be supported.

Conclusion

It is concluded that the proposal would have no adverse effect on potable water supply and would not be an unacceptable use of potable water. Flow back water would be reused resulting in lower quantities of potable water being required. Water will be supplied direct to the site thereby reducing the number of HGVs travelling to and from the site. The site would be contained and managed to ensure the protection of surface and ground water and nearby water courses. The site is in a Flood Zone 1 which is defined as having a low probability of flooding. The EA has reviewed the Flood Risk Assessment submitted with the application and is satisfied that the development would not be at risk of flooding or increased flood risk off-site. The development is therefore considered to comply with the national guidance and policies and the policies of the development plan.

Appendix 17

Public Health

Proposal

The applicant has provided an overview of potential public health impacts relevant to the proposal. The overview is set out as a separate chapter in the Environmental Statement (ES). The applicant also sets out an assessment of any potential public health impacts in each of the various chapters of the ES (e.g., noise, air quality, water, etc).

In February 2014, Public Health England (PHE) identified a range of public health concerns that should be addressed in the preparation of the applicant's ES. This was in response to the scoping opinion request by the applicant. PHE raised the following points:

- Identification of where within the ES receptors that could be affected by health impacts are identified;
- Highlighting where, within the ES, the impacts from construction decommissioning have been assessed;
- How potential health impacts relating to emissions to air and water have been assessed and where in the ES these are documented;
- Specific issues concerning emissions to air;
- Specific issues concerning emissions to water;
- How potential health issues relating to land quality and contamination have been assessed;
- How potential health issues relating to waste management have been assessed;
- Other health related issues such as the management of pollution incidents, the regulation of the site and how potential public stress and anxiety have been taken into account by the Project; and
- The organisations that have been consulted regarding health related issues during the EIA process.

The following issues have been explored in detail by the applicant in separate chapters of the ES, and have also been summarised in an overview section of the ES on public health (chapter 20).

- Noise;
- Air quality;
- Water (surface and groundwater);
- Perception effects

This report and its appendices similarly makes an assessment of the applicant's proposal in separate sections (e.g. noise, air, water, etc) and provides an overview in this appendix on public health.

Noise

The site is located away from residential properties. The noise impact of the project has been assessed in the Noise Chapter (Chapter 16 of the ES).

Baseline noise levels have been established by a measurement survey by the applicant. This data is used to assess the potential significance of any effects. The site is in a rural location.

Different stages of the project will have different noise levels. The noisiest activities are most likely to occur within the first two to three years of the. However, the noise levels for all stages of the project have been assessed by the applicant.

The applicant concludes that only stage with the potential to result in a significant noise effect is where hydraulic fracturing occurs during night time (2300-0700) where noise limits are at their most stringent. This will be mitigated by only operating the pumps used (only for up to 3 hours at a time during hydraulic fracturing) during weekday daytime and Saturday mornings. Vibration impacts have been ruled out by the applicant because of the nature of the project, method of construction for the well pad, arrays and pipeline connection for the extended flow testing.

The Roseacre Wood and Preston New Road sites are sufficiently distant from one another that there will not be a combined or cumulative lighting impacts on receptors from both sites.

The applicant has concluded that the Project will not have significant noise effects on the nearest residential properties or businesses.

Air Quality

The applicant has assessed air quality impacts in Chapter 6 and Appendix E of the ES.

The predicted air quality emissions from the Project have been compared to Air Quality Objectives and Limit Values for the different pollutants likely to be emitted by the Project activities (Section 6.7 of the ES). These objectives and limit values are based on minimizing health effects as a result of acute or chronic exposure to potentially sensitive individuals. It is noted that the PM10 levels have been screened out by the applicant as being insignificant

Dust

The applicant concludes that the area has low sensitivity to dust because of its rural nature, there are no receptors within 100m of the site and there are less than 10 within 350m and the local PM10 concentrations are low. The risk of dust impacts is therefore negligible to low.

Furthermore, the scale and duration of the Project activities (construction of the access track and well pad and decommissioning) will not be carried out over a long period of time (less than 2 months for each activity).

Emissions from generators

The applicant has provided details of equipment that will be used at the site, i.e. pumps, fracturing water transfer pumps, generators, blender units and service rigs. The equipment will be used during the drill phases for the duration of the drilling. During the hydraulic fracturing the engines will be run for only a few hours at a time. Given the size of the generators and engines and the relatively short period of operation, these sources have been scoped out of the assessment by the applicant. A table summarising the generators used on site is provided in Appendix F of the ES. Further information was requested from the applicant to justify the decision to remove the generators from the scope of the assessment. This has been provided.

Emissions from road traffic.

To assess the impacts from road traffic an initial screening exercise was undertaken by the applicant that examined the likely changes in vehicle numbers on the road and compares these with criteria from the Design Manual for Roads and Bridges (DMRB) to determine whether a more detailed assessment was required. The criteria are not exceeded so no significant air quality impacts are likely, according to the applicant's assessment. Again, further information was requested to justify this decision and this has been provided.

Emissions from the Flare

The Air Quality chapter of the ES (Chapter 6) includes a forecast and assessment of the potential quantity and effects of NORM in the form of gas (specifically radon) that may be present in the gas that is burnt in the flare stacks. These predictions have been compared to an annual dose limit of 300 microSv/yr for a single source. The predicted emissions from the combustion of gas in the flares is 0.3 microSv/yr. This is one thousand times lower than the International Commission on Radiological Protection (ICRP) limit. Therefore, the applicant concludes, the levels of NORM emitted to the atmosphere by the Project do not present a significant risk to health.

The flares that will be used to burn gas generated during initial flow testing are the main source of emissions to air associated with the Project. The concentrations and distribution of pollutants (specifically NO₂ and benzene) have been modelled by the applicant so that the effect on air quality, and indirectly health, can be predicted at potentially sensitive receptor locations around the site (residential properties). The ES air quality assessment concludes that the levels of NO₂ and benzene are well within the regulatory limits and therefore do not present significant risk to health.

In summary the air quality effects from the project have been assessed for dust, NO₂, PM10, PM2.5, benzene and NORM. The assessment by the applicant for all of these parameters has concluded that the emissions from the project will not be significant.

Surface and groundwater

As part of the analysis reported in Chapter 11 of the ES, a review of potable water abstractions was undertaken by the applicant. There are no surface or groundwater abstractions in the vicinity of the surface or below ground works that are used for potable water. This is based on a review of abstraction points registered with the EA and local authorities.

Potable water within the vicinity of the site is provided by United Utilities by their mains potable water supply.

The applicant states the design of the wells, including multiple layers of containment through the shallow sections of the wells, and the characteristics of the geology below the site means that there are no plausible pollutant pathways between the well and drinking water supplies.

The well pad has also been designed to provide the level of containment required by the Environment Agency's Pollution Prevention Guidelines. This, it is reasoned, in combination with the implementation of the Environmental Operating Standards (See Appendix E of the ES), will minimise the risk of surface spills of potentially polluting materials affecting surface watercourses, soils, crops and animals.

For these reasons the applicant concludes that the risk of a pollutant linkage being created that could then impact on human health is negligible.

Perception Effects

The applicant states that the key health effects raised by residents during the various consultation events prior to submission of the various planning applications are:

- Risk from radioactive materials;
- Risk from flammable gases;
- Risks from the presence of potentially hazardous materials at the site;
- Risk from emissions to air (including flaring);
- Risk from induced seismicity;
- Risk of pollution to ground and surface water
- Road safety and traffic concerns; and
- Concerns regarding potential sensitive groups or individuals (e.g. children or people with pre-existing health conditions).

In order to respond to these issues, the applicant has undertaken or will undertake the following:

- Provided information about shale gas exploration and the processes of drilling, hydraulically fracturing and flow testing wells;
- Undertaken early engagement with the wider community to allow them to communicate their concerns, to feed into the development of an Environmental Risk Assessment (ERA) and then the development of the planning applications for Roseacre Wood and Preston New Road;
- Provided evidence on known risks either as part of the ERA, the ES, other documentation supporting the planning applications and applications for Environmental Permits;
- Develop a programme of environmental monitoring during the exploration works and mechanism to publicise the results and provide affected parties with a means to raise concerns and communicate with the applicant throughout the life of the Project; and

- Development of a framework for environmental management of the site, through implementation of a comprehensive Environmental Operating Standards (see Appendix E of this ES).

Summary of consultee comments and representations

A number of statutory consultees and other bodies have referenced potential health impacts in their responses to the consultation. The responses and representations that specifically reference potential health impacts are summarised as follows:

LCC Director of Public Health: On 6 November 2014 the County Council's Cabinet endorsed a Health Impact Assessment (HIA) of the Potential Health Impacts of the Proposed Shale Gas Exploration sites in Lancashire.

The HIA was prepared by the County Council's Director of Public Health (DPH) to inform the planning, environmental permitting and consenting process by the County Council and the regulatory roles of Environment Agency(EA), Department of Energy and Climate Change (DECC) and the Health and Safety Executive (HSE) respectively.

The HIA concluded that shale gas exploration, like any other industrial activity, has its risks to the health and wellbeing of the population. Having completed the HIA for each of the two sites the DPH has concluded that the key risks to the health and wellbeing of the residents who live near the two proposed sites in Lancashire include:

- Lack of public trust and confidence, stress and anxiety from uncertainty that could lead to poor mental wellbeing
- Noise related health effects due to continuous drilling, and
- Issues related to capacity for flowback waste water treatment and disposal.

The DPH advises that these risks and other issues highlighted in this report can be mitigated by LCC, EA, DECC, and the HSE to protect the health and wellbeing of local residents. In particular:

- There is also a need to be vigilant during the operations, and in emergency preparedness.
- A robust baseline and long term monitoring of environmental and health conditions is required in order to reassure communities and to understand the cumulative and long term effects.
- Local communities should be actively involved and the risks should be communicated in a transparent and reliable manner that is proportionate to the exploratory phase of the industry. This needs a closer working relationship between the industry, national and local agencies as well organisations with an interest in local shale gas exploration.
- If this industry is to develop further, there is a need for shale gas specific spatial strategy at a local level and an onshore oil and gas industry specific integrated regulatory framework at a national level. Further research on effects of shale gas development on health and wellbeing will help to improve

the policy and regulatory framework as the industry moves into production phase

The HIA contains 45 recommendations aimed at range of organisations (e.g., the County Council, the EA, DECC, the HSE, the LGA, the applicant, etc). Some of the recommendations are relevant to the determination of this planning application, while others relate to the development of the industry more generally. Indeed, Appendix J of the HIA contains 16 recommendations for the County Council in its role as mineral planning authority.

The 16 recommendations are set out below:

1. Consider the need for further noise assessment, particularly on the proposed Roseacre Wood site and if necessary, require additional mitigation measures to reduce noise associated with the development of the sites and more particularly the drilling and hydraulic fracturing phases of the development and which could be controlled by conditions attached to any planning permission.
2. Establish with the Applicant that liability and compensation arrangements are in place to cover any structural damages to properties that can be attributed to an unlikely event of induced seismicity.
3. Undertake an independent verification of the assessment of air quality, transport, waste management and induced seismicity prior to determining the planning applications.
4. Seek agreement with the Applicant to establish an independent comprehensive baseline and on-going long term monitoring of environmental and health conditions prior to any activity on the sites. An indicative framework is described at the end of this document.
5. The Director of Public Health should be informed of the results of the measurements and any breaches to the planning condition or environmental permit.
6. Consider the need to seek further clarification from the Applicant that the cumulative impacts of the operations from the flare, generators, vehicles and drilling will not exceed the national air quality objective thresholds, particularly for PM 10, 24 hour mean levels.
7. As part of either the planning or permitting process, the Applicant should be required to submit regular data on the ambient air quality on site measuring all the common air pollutants relevant to the activity and report them regularly. PM10 and PM2.5 should be reported separately (PM10 stands for particulate matter less than 10 microns in diameter).
8. The Roseacre Wood site is within 55m of a National Grid gas transmission pipeline. Interconnections into national transmission pipelines are proposed at both sites. Advice should be sought and an assessment undertaken as to whether the nearby gas transmission pipelines are considered to be a major hazard.
9. Any extended flow testing provided for by any planning permissions should be aligned with the permits to be issued by the Environment Agency.
10. An assessment of light pollution as part of the site operations should be carried out, and if there are likely to be significant impacts associated with light pollution from the sites that cannot be mitigated or controlled, the

- Applicant should be requested to consider the opportunity to offer to fit blackout blinds to those homes most likely to be affected.
11. Further clarification or new information on the occurrence and magnitude of equipment likely to be contaminated with radioactive waste and how such waste would be managed on the site and disposed of should be sought.
 12. Should planning permission be granted, it should be a pre requisite that no activity can start until the onsite and offsite waste treatment capacity is defined.
 13. Further clarification should be sought that any specific risks due to using the MoD site for accessing the Roseacre Wood site have been addressed before any planning permission is granted.
 14. A full assessment of the impacts of additional traffic associated with the proposals on road safety should be carried out and appropriate traffic management options considered to address the public concerns, particularly in respect of the Roseacre Wood site.
 15. Should planning permission be granted, provision should be made with the Applicant to maintain road safety, particularly on the access routes to Roseacre Wood site and road safety and any related incidents on the access to both the sites should be monitored.
 16. In the event planning permissions are granted, any breach of planning conditions should be reported to the Director of Public Health so that necessary steps can be taken in protecting and improving the health of local communities from issues arising due to the alleged or identified breaches of planning control.

The Director of Public Health has also set out indicative proposals for long term monitoring associated with the project. The aim is to establish baseline and on-going monitoring through a shale gas observatory to:

- monitor environmental and health conditions
- support risk communication and reassurance to local communities on the safety and impacts of shale gas activities in Lancashire.
- govern and manage the observatory in consultation with various stakeholders including the local communities, the industry, and the regulatory agencies.

The DPH believes that establishing a shale gas monitoring unit in Lancashire as an independent source of reliable information will help with the understanding of any environment and health impacts and the communication of risks to the local communities. It will also support the development of future policy and practice of shale gas extraction.

Public Health England: Public Health England (PHE) has sought a number of clarifications regarding the planning application in two separate consultation responses. In turn, the clarifications and questions contained in both PHE responses have been satisfactorily addressed as a result of further information or clarification provided by the applicant.

In nearly all cases, the applicant has clarified how and where the PHE comments are addressed in the Environment Statement submitted with the planning application.

Many of the clarifications requested by PHE are already addressed in the ES, or are controlled by the Environment Agency through the permit process.

PHE conclude that although onshore oil and gas extraction and related activities have the potential to cause pollution to air, land and water, the currently available evidence indicates that the potential risks to public health from exposure to the emissions associated with such extraction are low if the operations are properly run and regulated.

Based solely on the information contained within the application provided, PHE has no significant concerns in relation to the potential emissions from the site adversely impacting the health of the local population from this proposed activity, providing that the applicant takes all appropriate measures to prevent or control pollution, in accordance with the relevant sector technical guidance or industry best practice.

PHE agrees with the proposals to undertake baseline monitoring of ground waters, surface waters and local air quality to better assess the impact on the environment from any development.

However, it says the details of the baseline monitoring prior to operations need to be provided to ensure it will allow assessment of the impact of operations on the local environment. Baseline monitoring, and on-going monitoring, is a requirement of the Environment Agency draft permit as set out in the Waste Management Plan (which is part of the permit). In addition, a pre-operational condition of the draft permit requires the applicant to obtain written approval from the Agency for an Environmental Management and Monitoring Plan (EMMP) at least 4 weeks before commencement of the gas flaring activity. This will include details of the baseline air quality study undertaken before activities commence, together with details of the ambient air monitoring programme proposed during and after the period of gas flaring.

PHE say the levels of radon are very small and there are no grounds for concern about the potential radiological impact of radon arising from the proposed activities. Similarly, on naturally occurring radioactive material (NORM) PHE confirm the dose is significantly below PHE's recommended level and is not a concern.

Fylde Borough Council: Objects to the proposal on the grounds that it is contrary to Policy DM2 of the Minerals and Waste Local Plan and Policies EP12, EP26, EP27 and EP28 of the Fylde Borough Local Plan, which are considered to be in conformity with the provisions of the National Planning Policy Framework.

The proposed drilling operations would result in the introduction of considerable traffic onto the rural highway network and would require alterations that would detract from the character of the rural area and cause significant environmental harm, particularly given the distance from the primary highway network and the uncertainty surround the alternative access arrangement through HMS Inskip. In addition to the noise and general disturbance from 24hour drilling operations and associated activity that would be significant, as would the impact on Roseacre Wood.

The County Planning Authority should be also be satisfied that the below and above ground operations will not have any significant adverse impacts in respect of Policies SP2, TR9, TREC10, EP10, EP11, EP13, EP14, EP15, EP18, EP19, EP21, EP22, EP23, EP24 and EP25.

The Councils Environmental Protection Team has advised and made recommendations as follows:

- The exclusion of a sensitive noise receptor in the applicants noise report may mean current calculations are artificially elevated resulting in the prediction that noise levels will not exceed current background levels.
- Recommend that the applicant ensures that there are continuous sound level monitoring at the nearest residential property to ensure sound levels accord with WHO guidelines.
- Recommend that no HGVs arrive at or leave the site between 23:00 and 07:00.
- The sound levels are currently less than WHO guidelines so residents may experience an increase in noise. Ideally criteria should be set such that “as a result of the activity at the site no dwelling shall experience sound levels that are more than 5dB above current background levels between 07.00 – 23.00 and no increase in background level between 23.00 and 07.00”
- Recommend continuous monitoring of air quality as a result of increase in road traffic to demonstrate that AQ guidelines are being met, alongside EA monitoring of air pollutants from chemicals and flare burn off.
- Recommend dust significance should be reclassified from medium to large, due to a large site size and increased HGV movements on the roadways, with further mitigation measures to be implemented
- Recommend a plan to be provided detailing the predicted lux levels originating from the site to the vicinity. As a rural area, which is very dark at night, any increase in illumination will be more prevalent. Lighting should only be permitted as the minimum needed for security and/or working purposes and that it minimises the potential for obtrusive light from glare or light trespass to an acceptable level and in accordance with guidance for mineral sites.

Fylde Borough Council subsequently provided a copy of a noise impact assessment on wintering birds, at the Annas Road Exploration Well site, which concludes that the noise from drilling operations will be essentially steady in character, producing decreasing levels from 58 – 42dB(A) in relation to increasing distances between 50m to 500m from the boundary of the well site. The Environmental Protection Team have noted that the survey data shows that the impulsive sound could be up to 16dB greater than the background noise in addition to the drilling operation. The impulsive noise levels are not included in the EIA report for the Roseacre site.

Elswick Parish Council: An initial objection to the proposal was withdrawn. The Parish Council does not object but has the following comments:

- In favour of the preferred traffic route which enables Elswick, a densely populated area to remain outside the routing of the tankers, ensuring the safety of over 200 children living in the village.

- A small group of residents have expressed concerns regarding the visual impact and character of landscape and the risk of methane/water contamination and environmental impacts.

Medlar-with-Wesham Parish Council and Kirkham Town Council: Object to the proposal as submitted and requests that it be refused planning permission for the following summarised reasons:

- The potential major problems outweigh the benefits.
- The Chartered Institute of Environmental Health has highlighted shortcomings of the regulatory system regarding local environment and public health risks.
- Potential for earth tremors despite the traffic light system. Tremors can damage property and associated services including septic tanks. Any damage to underground services could result in watercourse pollution.
- Air pollution from gas emissions. Flaring can lead to over 250 pollutants including methane.
- Potential well failure and the huge potential for land contamination, particularly to aquifers and agricultural land.
- Light pollution from the 24hour operation.
- Potential flow back water site leakages and spillage during disposal and transportation.
- No information on water treatment plans. Where will flow back water be treated and will any new treatment plan accept waste from other UK sites.
- Increasing vehicle movements, particularly HGV's will exacerbate existing problems along the A585 and at the M55 Junction 3 at peak times.
- Increase in ambient noise levels from the continuous operation of this site and any future sites in the parish.
- Potential impact on resident's water supplies.
- The visual impact of the development cannot be minimised.
- Detrimental impact on property values and insurance premiums.
- Concern regarding future site expansion for production following exploratory phase. An increase in well heads will lead to further noise, traffic and pollution.
- Impact on local Wildlife including wintering and migrating birds, birds of prey, game birds, garden birds and bats from increased noise, traffic and lighting.

Newton-with-Clifton Parish Council: Objects to the proposal as submitted and requests that it be refused planning permission for the following reasons:

- The 'Wharles route' along Lodge Lane, Clifton Lane and Station Road is considered unsuitable for the projected number and type of HGVs and if approved is detrimental to highway safety and parish amenity
- The suggested routes has several potentially hazardous sections to highway safety and is lacking a sufficient number of constructed passing places
- The route comprises a dangerous right turn exit from Lodge Lane, Clifton onto the A583 which could adversely affect highway safety
- Clifton Lane/ Lodge Lane in Clifton is in close proximity to a children's recreational park and children have to cross the road to access the park. The

proposed increase in type and volume of traffic is clearly hazardous to their highway safety.

- The site access/egress through Elswick is shorter in distance and as a consequence a reduced environmental impact.

Roseacre, Wharles and Treales Parish Council: Objects to the proposal for the following summarised reasons:

- Contrary to Policy SP2 and NPPF due to the huge industrial scale, associated utilities and infrastructure and thousands of HGV movements on narrow lanes
- Cuadrilla has not adequately assessed alternative sites. The development should be located in a SP1 site which has appropriate infrastructure.
- The need for mineral extraction has not been demonstrated
- Contrary to NPPF and CS5 as mineral development should have no adverse impacts on natural environment and human health.
- Cumulative effects for this site with Preston New Road and other potential sites have not been assessed.
- Not sustainable development due to location, road restrictions, water supply issues, permanent waste repository and lack of suitable waste treatment
- Regulations are not robust to provide adequate protection. The safe operation of shale gas operations is not yet assured
- Contrary to Policy EP26 and CS5 as the flare will emit 15,000 tonnes of methane and there is no mitigation for the health hazards of particulate matter
- Contrary to NPPF as it will not support a low carbon future
- Air quality monitoring regime is not acceptable. Need baseline data and real time publicly available data on a range of pollutants and the combined impact of flaring, fugitive emissions and equipment and transport emissions.
- Evidence from USA, America and UK Breast Cancer charity regarding emissions and risks to human health.
- Dust assessment is inadequate and does not take account of construction and daily utilisation of passing places through Wharles and Dagger Lane.
- Contrary to Policy EP27 and SP9 as it will not meet required noise limits and will have an adverse impact on the amenity of local residents.
- The baseline noise measurement is inadequate and the minimum approach for assessment of noise impact should be BS4112.
- Noise impacts on Stanley Mews have not been considered.
- There is no need for 24hr a day drilling, as per the UKOOG website guidance
- Drilling noise levels might be exceeded, so need real time monitoring, with immediate enforcement if levels are exceeded.
- HGVs will have significant noise impacts causing health and wellbeing impacts including daytime nuisance and sleep disturbance.
- Contrary to Policy EP28 due to sky glow. As no mitigation is possible night-time operations should not be permitted.
- Drivers will have loss of visibility from glare from the installation.
- Contrary to Policy CL1 which requires minimal potable mains water in new developments with a need to recycle and conserve water resources.
- Potential water supply problems water required is higher than estimates.
- If tankered water is required, it will increase traffic and emissions.
- Water supply route re-zoning infers potential impact to Roseacre and Wharles

- Contrary to Policy EP25, treatment facilities are inadequate/ not available as there are no authorised treatment sites in the Northwest and proposed sites have insufficient capacity. Waste should not be transported great distances.
- Contrary to Policy CS9 as fracking fluids will create permanent waste on site
- Flowback fluid calculations are disputed. Higher rates and no suitable disposal could result in risk of breach of the well pad containment area.
- The development is a harmful hazardous installation. Radioactive chemicals, including NORM are in flow back fluid chemicals
- Contrary to Policies EP10, EP23, EP24, EP30 and CS5 as the development will not protect ponds, watercourses, groundwater or natural resources and will increase surface run off, resulting in poorer air and water quality.
- Any spills, well blowouts, accidents or releases into local drainage ditches (and wider watercourse system) poses could contaminate surface and groundwater. Monitoring will not mitigate due to lead times for test results.
- Risk of imperfectly sealed wells leaking into groundwater.
- Seismic activity could cause wells to leak and the heavily faulted geology could create pathways for seepage of fluid and gases into aquifers.
- Storm weather could increase surface water drainage volumes with risks to site containment and potential discharge of contaminated surface run-off.
- Contrary to Policies EP15, EP19 regarding impacts on protected species
- No surveys of barn owls and brown hare and surveys for water vole and badger taken outside of recommended survey times,
- Wintering birds and the functional link between designated sites has not been considered, a full habitats assessment is needed.
- Adverse impacts on rural tourism, leisure and countryside character.
- Visual impact of the development could be reduced by enclosure of site works, horizontal rig and a waste methane generator instead of a flare stack.
- Local planning authority should support a thriving rural community, but this development will have an adverse impact on local communities.
- Local community is fearful for the future with adverse impacts on health and wellbeing, community cohesion and quality of life.
- Decline in house sales, if unable to sell cannot move on to next life stage.
- Health risks from carcinogenic silica, benzene, particulate matter and volatile compounds. Potential early mortality, asthma, stroke, heart disease, fertility issues, neural tube defects, congenital heart defects and low birth weights.
- HGV traffic volumes will have an unacceptable adverse impact on the community through air and noise pollution and general nuisance,
- Strongly dispute existing and proposed traffic data in comparison to own parish traffic survey and predictions, with particular regard to HGV requirements and movements throughout the life of the development.
- HGV movements could be higher subject to HGV availability and the quantity of construction materials, water and flow back fluid to be transported
- The proposed HGV route is unsuitable with restricted sight lines, narrow carriageways, poor road surfaces and no kerb edgings.
- It is physically impossible for HGVs to go round corners without traversing centre line or all of the road in some places along the proposed route.
- Significant safety and conflict risks to all road users including walkers, cyclists, horse riders, children/pushchairs, mobility impaired, and for those accessing local farms, businesses and schools including Salwick school.

- Concern regarding impacts at Wharles village, Shorrocks Cottage, Dagger Road, Salwick Road, Station Road, Moss Lane East and Roseacre Road,
- Traffic increase to Roseacre Road, Inskip Road, Dagger Road will cause significant congestion and hazards to pedestrians and cyclists.
- Potential conflict between HGVs and agricultural machinery e.g. Dagger Lane
- Traffic especially HGVs should be using the primary route network.
- Traffic access and exist should be confined to DHFCS Inskip
- HGV movements should be restricted to 09.30-15.00hrs.
- Contrary to LTP objectives of safe and punctual travel between home and workplace and sustainable transport.
- Passing places for HGV will be restricted at all points along the route and proposed passing places are not suitable or in keeping with the surroundings.
- No consideration of utilisation of passing places at Wharles and Dagger Lane.
- Poor and hazardous road surfaces will be made worst by daily HGV use
- Potential cumulative effect with Westinghouse traffic and displacement of Salwick traffic over canal bridge and conflict at Treales near the school.
- No route identified for oversized vehicles during mobilisation / demobilisation.

Friends of the Earth: Object. The public health section of the ES does not review the evidence on the adverse public health impacts of unconventional gas, nor acknowledge that the development of the industry has outpaced the knowledge about health impacts.

Friends of the Earth cite a number of health studies as a growing body of the negative impacts of shale gas on health:

- Concerned Health Professionals of New York has published a compendium of scientific, medical and media findings demonstrating risks and harms of fracking, which references over 300 pieces of research.
- A US National Institute of Environmental Health Sciences study which found a correlation between intensity of shale gas development and heart and neural defects in newborns, within a 10 mile radius of maternal residence.
- A pilot study from the US Centres for Disease Control and Prevention found dangerous levels of human exposures of benzene from shale gas sites, which is known to leak from wells, along with methane, during drilling and fracking operations.
- Breast Cancer UK has reviewed the evidence on health risks and the chemicals used in drilling and fracking fluids and concluded that "Breast Cancer UK has strong concerns about the potentially adverse health effects of increased exposure to harmful chemicals as a result of fracking".
- The US National Institute for Occupational Safety and Health (NIOSH) identified exposure to silica (from sand used in fracking process) as a health hazard to workers conducting some hydraulic fracturing operations during field studies.
- The Umweltbundesamt (German Federal Environment Ministry) has found that "there is great lack of basic information that would be needed for any well-founded assessment of the pertinent risks and the degree to which they can be controlled by technical means".

Friends of the Earth also question the impact of the proposal on cycling and walking in the area; the decision to leave air emissions from the generators out of scope of the ES; and the track record of the applicant.

Friends of the Earth submitted a second representation on 19 December 2014. The public health aspects of the representation are summarised as follows:

- Peer reviewed medical evidence from the USA and other countries on the impacts on health of shale gas extraction cannot be ignored
- Reference is made to research by the Council of Canadian Academies and by Physicians, Scientists and Engineers for Healthy Energy from north America which indicate adverse health impacts.

Medact: Medact is a public health charity whose members are public health specialists. Medact is currently producing a paper (to be published in February 2015) on the health effects of hydraulic fracturing in the UK, based on the evidence about its safety and direct impact on health; its wider social, ecological and economic impacts; and the threat presented by greenhouse gas emissions.

Medact say a report is needed because of the absence of an authoritative and comprehensive assessment of the health-related costs and risks associated with fracking. Medact say the report produced by Public Health England is inadequate and incomplete and arrived at an erroneous conclusion. Medact also claim the Health Impact Assessment prepared by the County Council's Director of Public Health is incomplete, and claim that the limited focus on eight 'exploratory wells', without including an assessment of projected county-wide industrial-scale fracking is irresponsible and illogical.

Although Medact's position paper will not be published until February 2015, they say the planning application for exploratory wells at Preston New Road and Roseacre Wood should not be granted. Under current circumstances, they say these applications pose unacceptable risks to the health and well-being of local residents.

It is stated that pollution will occur at all stages of the shale gas process, and pollutants include carcinogens, mutagens, teratogens, respiratory irritants and neurological, endocrine and haematological disrupters/toxins.

Medact say the extent of human exposure to the various hazards will vary from site to site, depending on multiple factors including the proximity, size and demographic characteristics of local communities; local geological factors; and the operating practices of fracking companies. In terms of the latter, the extent of pollution and human exposure will depend on various factors such as the structural integrity of wells; composition of fracking fluid; frequency of surface spills and leakage of hydraulic fracturing and natural contaminants from storage containers and during transportation; and the number of heavy transport vehicles.

Medact also cite concerns about regulation and say that fracking is incompatible with the UK's efforts to reduce greenhouse gas emissions.

Roseacre Awareness Group (RAG): Object to the proposal for the following summarised reasons:

Countryside Location

- Site is totally unsuitable for industrial development
- Area used by local residents, cyclists, joggers, horseriders, tourists.
- Detrimental impact on recreational activities, tourism and agriculture
- Contrary to Policy SP2 Development in the Countryside
- If goes into full production will have serious, long-lasting and damaging impact on the landscape and character of the area.

Socio- Economic

- Impacts on residents at Roseacre, Wharles and Stanley Mews residents need to be considered, including stress and anxiety.
- No consideration of impacts on community infrastructure parish population (490), primary school, church, Women's Institute, recreational fields, footpaths, bridleways, pubs, tearooms, farm shop, 3 caravan parks, livery yards and social events. Industrialisation will affect the rural character and community.
- Development will split the communities of Roseacre and Wharles in half.
- Applicant not identified groups and number of people affected that visit the community for sporting and leisure activities e.g. ramblers, bird spotters
- Impacts of daily drilling, fracking, flaring, HGVs and hazardous waste will make it an undesirable area to live and visit.
- Impacts on agriculture and food production including harmful effects of noise, air, water and light pollution on livestock as reported in the US and potential impacts on supply chain to supermarkets.
- Contrary to Policy DM2 as economic and environmental impacts cause demonstrable harm.
- A local caravan site has already lost business this year.
-

Traffic

- Significant danger/conflicts from increased volume and size of vehicles
- Additional 49,000 vehicle movements in a quiet rural area
- Traffic will be 24hrs a day, 7 days a week, existing countryside unsuitable for significant increase in traffic volumes.
- No assessment of impacts on vehicles passing hundreds of residential properties in Medlar, Wesham, Kirkham, Newton, Clifton, Salwick and Wharles
- Narrow country lanes have blind bends, limited visibility, no footpaths and are used by farm vehicles, cars, motorbikes, caravans, cyclists, horseriders and pedestrians. Too narrow for HGVs and impossible for safe vehicle passing.
- Road safety issues at alternative routes including Clifton children's playing field; Hand & Dagger pub Salwick and Treales Primary School
- LCC will need to repair the roads as maintenance requirements will increase

- Roads can be hazardous from mud from farm vehicles/livestock so will become more hazardous with site vehicles
- Roads can be subject to flooding from heavy rain, the development will reduce drainage making the situation worse.
- Impacts of HGV vibrations on old buildings has not been taken into account
- Proposed mitigation measures of altering roads, verges, hedgerows and installing passing places will damage the rural character and deter use of roads for recreation and tourism with knock on economic effects.
- Inskip route option will not stop traffic going through Wharles village
- Inskip route will involve crossing Roseacre Road for entry and exit posing a danger to users of Roseacre Road
- Additional traffic will increase air and noise pollution with health impacts
- No detail on how emergency services would access the site.

Landscape

- The site infrastructure including the 53m high rig will be a major blight on the landscape and damage the rural character and affect tourism.
- The site will be visible from several houses, to road users and from local natural landmarks e.g. Beacon Fell, Longridge Fells, Carr Hill
- Contrary to Policy EP16 as EP28 as light pollution will cause harm to both local residents and wildlife and will distract passing road users.
- The light pollution will transform an idyllic countryside area into an industrial zone with loss of social amenity. Detrimental to tourism and property prices.

Noise

- Contrary to SP2, SP9 and EP27 from harm from noise pollution from drilling. It will seriously affect residents living close to the site, affecting quality of life resulting in health issues. Noise levels cannot be mitigated.
- References to Elswick are not representative of a live fracking site.
- No consideration of cumulative effects of onsite machinery (generators, separators, compressors) with noise from drilling, fracking, flaring and HGVs
- Noise assessment should have used BS4142 and not BS5228, to be relevant to a rural area with minimal noise and not a construction site.
- Actual increase in noise level should be no more than 5db but proposal higher
- No adequate baseline surveys or assessment of sensitive local receptors (Stanley Farm mews) No information to demonstrate that residential amenity will not be significantly affected.

Air Quality

- Information inadequate to assess real impacts of development and whether standards of the Air Quality Directive will be met.
- Assessment should recognise area is rural and not urban, with higher air quality as a baseline.
- Potential impacts on Roseacre Hall and Stanley Farm and Old Orchard Farm
- Emissions from site and traffic will affect residents health and wellbeing including children and elderly residents

- Evidence from the US, Breast Cancer UK and the media of health impacts

Water Resources

- Information is inaccurate and ambiguous making assessment difficult
- When compared to Preese Hall data, the information seems inaccurate
- Development will need more water than supplied by United Utilities so further supplies will be required by tanker, with impacts on local community
- Existing water pressure issues, so water supply to residents may be restricted
- If goes to full production, where will additional water come from?

Waste Management

- Surface water drainage into Nigget Brook could contaminate Thistleton Brook which flows into River Wyre and Morecambe Bay.
- Accidental spillages from the site or vehicles could impact on water and land with impacts on local wells used by livestock and groundwater contamination
- Storm impacts have not been taken into account, with risk of flooding.
- Insufficient evidence that fracking fluid will not leak into local water sources through existing faults. Flow back fluid estimates do not cover worst scenario
- Wastewater treatment sites do not have capacity to treat all the flow back fluid, including radioactive waste resulting in storage concerns.
- Concern regarding content and quantity of chemicals in fracking fluid.
- Huge amounts of waste will be produced and could lead to significant traffic removing hazardous and toxic waste products.
- Applicant not demonstrated how they would reuse/recycle/treat flowback fluid

Ecology

- Potential impacts on protected species, some of which have not been surveyed or surveys have limitations and missing data. Need a full habitats survey.
- No information on impacts on Holmes Wood, Carr Wood, Nigget Wood and Medlar Brook and impacts on Roseacre Wood, a possible ancient woodland
- Ecological organisations have not been consulted and Lancashire Wildlife Trust has raised numerous objections.
- Contrary to Policies DM2, EP15, EP19 and NPPF.
- Hedgerows should be protected and not removed to install passing places

Safety

- Contrary to policy EMP5 as local people at risk of accidents from the industrial site and fracking activities including well blow out.
- US fracking sites have had serious accidents - chemicals and pollution.

Seismology

- Fylde is heavily faulted and induced seismic activity.
- Other countries have banned fracking in highly faulted areas. Significant earthquakes in US and Poland associated with fracking activities

- Extremely risky for applicant to frack through local faults especially given earthquake at Preese Hall
- Seismic monitoring will only detect an event as it happens, may be too late to stop fluids leaking into faults.
- Contrary to Policy and the precautionary principle should apply. Faults could leak fracking fluid and methane into the groundwater and atmosphere and pollute aquifers and drinking water supplies.
- Use of 3D seismic surveys are inadequate as faults are complex and unpredictable.

Representations

The following is a summary of the issues raised in representations that refer specifically to public health:

- Irresponsible to consider fracking in the UK until prospective studies have been completed and the cumulative health impacts of fracking have been determined, need proof of no adverse health impacts
- Proven adverse impact on human health, leading to other countries banning it
- We do not want to be human guinea pigs
- Contrary to NPPF which states that local authorities should ensure that mineral development does not have unacceptable adverse impacts on human health
- Potential for 120 fracking sites in the Fylde meaning many people will fall into high risk category for health impacts, which is contrary to Policy EMP5 regarding risk from hazardous installations
- Health impacts to family from living in the vicinity of the site
- People have a human right to remain safe
- Full short term and long term public health effects are unknown
- Growing evidence of serious risk to human health.
- American reports have linked air pollution/gas flaring, contamination and groundwater contamination from shale gas developments with health impacts in individuals within a radius of 10 miles
- US shale gas air pollution reported to have 50 hazardous chemicals of which 35 affect the brain and nervous system
- In New York State a 3 year moratorium on shale gas followed a report from hundreds of health professionals regarding health impacts
- Lancet, British Medical Journal and the Medical Journal of America have linked the proximity of shale gas sites with increased health risks.
- Lancet article reported insufficient regulations to safeguard public health.
- NHS website states that the gases emitted are highly toxic and cancer inducing
- Breast Cancer UK has reported that fracking chemicals are linked to an increased risk of breast cancer.
- The risk to human health is frightening, Lancashire residents are terrified
- The council should protect people's lives and not destroy them, it's too dangerous to risk the health of local people
- People will get sick and die, it will be a living hell
- Fracking is very scary/ terrifying

- Need before and after baseline check on residents health.
- What damage will be done to children's health growing up with fracking
- Reported health risks from living in the vicinity of fracking sites include neurological conditions (brain damage, memory problems, sensory conditions), cancer, breast cancer, leukaemia, heart disease defects, respiratory problems disease, asthma, infertility, stillbirths, neural tube defects, congenital heart defects, reduced Apgar scores for newborn babies, low birth weights dermalogical conditions (skin rashes), chemical burns, poisoning, sickness, weight loss, stress, emotional distress and sleep problems
- Risk of exposure to sulphur dioxide, polyaromatic hydrocarbons, radon and particulate matter which have health implications
- Risk of exposure to carcinogenic gases (benzene) neurotoxins (toluene) and central nervous system impacts (xylene)
- Elderly residents (including Carr Bridge residents) with respiratory conditions including COPD, asthma and heart problems have moved to the countryside to improve their health and life expectancy, but now concerned that the development will affect their health, particularly from methane which is an asphyxiate
- Potential for toxins to enter the food chain risking starvation and death
- Silica sand can cause pulmonary, lung cancer and cardio vascular diseases
- Blind people will not be able to see that water is discoloured
- Concerned about health impacts especially to children
- Impact of constant noise on peoples physical and mental health
- Health impacts will cause a strain on the NHS as people become ill.
- Need to think about present and future generations including elderly and younger generations safety
- The EIA does not consider impacts on humans
- There are no guarantees that the health of local people will not be adversely affected. No decision should be made until a Health Impact Assessment (HIA) / investigation into health risks (supported by empirical data) has been completed
- Regulations can't mitigate against health impacts from accidental waste spillage and well failure
- No amount of money is worth the risks of the health of the community
- Will Cuadrilla pay compensation for health impacts
- The proposal is contrary to NPPF Paragraphs 120 and 144 as it poses a considerable risk to human health
- The proposal is contrary to Policy EMP5 as US studies show an increase in cancer caused by chemicals produced during the fracking process chemicals in the air make it contrary to health
- Who will compensate us for health and well being impacts
- Impact on leisure pursuits

Policy

National Planning Practice Guidance states that the range of issues that could be considered through the decision-making processes in respect of health includes, among other issues, how potential pollution and other environmental hazards, which might lead to an adverse impact on human health, are accounted for in the consideration of new development proposals.

Policy DM2 of the JLMWLP states that development for minerals operations will be supported where it can be demonstrated that all material social, economic or environmental impacts that would cause demonstrable harm can be eliminated or reduced to acceptable levels. In assessing proposals account will be taken of the proposal's setting, baseline environmental conditions and neighbouring land uses, together with the extent to which its impacts can be controlled in accordance with current best practice and recognised standards.

Policy EP27 of the Fylde Borough Local Plan states that development which would unnecessarily and unacceptably result in harm by way of noise pollution will not be permitted. Where appropriate, planning permission will be granted subject to conditions to minimise or prevent noise pollution.

Assessment of Impacts

The County Council's Director of Public Health has provided specific advice to inform the planning process and provide public health advice to protect and improve the health of local residents living near the proposed shale gas exploration sites of Roseacre Wood (planning application numbers LCC/2014/0101 and 0102) and Preston New Road (planning application numbers LCC/2014/0096 and 0097). The advice was published as a Health Impact Assessment (HIA) in November 2014.

The Health Impact Assessment makes 45 recommendations to a broad range of agencies, suggesting actions before, during and after any permissions or permits are granted. Appendix J contains 16 specific recommendations to inform this planning process.

Given the advice is specific to this application, it is appropriate that an assessment is undertaken in relation to each of the 16 recommendations in Appendix J.

- 1. Consider the need for further noise assessment, particularly on the proposed Roseacre Wood site and if necessary, require additional mitigation measures to reduce noise associated with the development of the sites and more particularly the drilling and hydraulic fracturing phases of the development and which could be controlled by conditions attached to any planning permission.*

The County Council appointed specialist noise consultants (Jacobs) to review the applicant's noise assessment, and to also undertake some background monitoring at night time.

The applicant's predicted night time noise level of 40dB (at the nearest property – taking account of the façade to free-field conversion factor of minus 3dB) is 13.3 dB higher than the lowest night time value recorded by Jacobs at Old Orchard Farm (26.7 dB).

Drilling will take place for 24 hours per day. The first drilling phase will last for five months. Three other separate drilling phases will follow. Each of the three phases will last for three months. Between each drilling phase will be a hydraulic fracturing stage that will last for two months. Hydraulic fracturing will not take place at night time, and will last for three hours per day. Cumulatively there will be 14 months of 24 hour drilling.

The predicted night time noise levels at the nearest property (Old Orchard Farm) is 40dB, which is 13.3 dB above background levels at night time. For such a sustained period this would be perceived as noticeable and disruptive. It is likely this would have significant adverse effects on the health and quality of life of the nearby residents.

The applicant has stated that, through mitigation measures, the standards in the NPPF (PPG-N) can be complied with. This was the subject of a further consultation under Regulation 22, and has clarified that the noise level at Old Orchard Farm would be 54dB during the day. Hydraulic fracturing is the loudest phase of the project. Noise from hydraulic fracturing would occur for three hours per day, for 30 to 45 days over a two month period. There will be 4 of these two month periods over the 5.5 year lifetime of the project. Each of these two month periods for fracturing will be interspersed by a three month period of drilling.

Noise is emitted by off-site traffic (including HGVs) associated with the proposal. For the construction phase the data shows that even the worst case assessment gives an increase of traffic noise of 6dB on Roseacre Road and 4dB at Wharles. Due to the short nature this is not significant.

Noise will be emitted from the construction phase (about 8 weeks). Construction activities will only take place during the day. The construction noise levels are predicted to be 57dB at Old Orchard Farm and 59 dB at Roseacre Farm.

2. Establish with the Applicant that liability and compensation arrangements are in place to cover any structural damages to properties that can be attributed to an unlikely event of induced seismicity.

The applicant has provided a letter of confirmation from their insurance brokers (Willis Energy). This confirms Cuadrilla Resources Ltd (Cuadrilla):

- Purchased Third Party Liability insurance on an industry standard policy form which will respond to valid claims for their legal liability for loss or damage to third parties.
- Willis Energy have benchmarked for Cuadrilla the limit of liability purchased by other onshore Oil and Gas operators with similar type and scale of operations and found Cuadrilla's limit to be in the upper quartile of this group.
- For the avoidance of doubt this policy covers Cuadrilla Resources Ltd and all subsidiaries including Cuadrilla Elswick Ltd and Cuadrilla Bowland Ltd.

3. *Undertake an independent verification of the assessment of air quality, transport, waste management and induced seismicity prior to determining the planning applications*

Air Quality.

Lancashire County Council Scientific Services (LCCSS) carried out a review of the air quality chapters (including radon) of the Environmental Statements.

This concluded that the documents provide sufficient detail to show that the companies have carried out the assessment in a satisfactory manner and that the conclusions drawn from the assessment are valid.

The review found that the documents for both sites identified the following emissions from the activities before, during and after operations: fugitive dust, nitrogen oxides and particulate matter, volatile organic compounds (VOCs) and odours.

The review suggested there are other potential pollutants not mentioned in the assessment which may adversely affect air quality. These include sulphur dioxide, hydrogen chloride and other potentially carcinogenic VOCs. It was suggested that the assessment should explicitly consider these chemicals, but if the consideration concludes these chemicals are of little or no concern this should be confirmed. Further information has been provided by the applicant in relation to these points:

Sulphur Dioxide & Hydrogen Chloride

Results of testing of gas from Cuadrilla's Preese Hall well did not detect any sulphurous compounds or chlorine compounds in the gas. It is therefore assessed as very unlikely that there will be any significant concentrations of sulphur dioxide or hydrogen chloride in the gas produced at the proposed site. Monitoring of the gas quality will be undertaken once the site is operational. This will mitigate the risk of any unexpected pollutant emissions going undetected. In addition, the EA draft permit (which incorporates the Waste Management Plan) provides for ambient sulphur dioxide monitoring.

Potentially Carcinogenic VOCs

The air quality assessment has identified the most significant VOCs (volatile organic compounds) as benzene and benzo-a-pyrene (BaP) (selected to represent carcinogenic VOCs). The main pollutants of concern which are included in the air quality objectives are benzene and BaP. The benzene results are included within the ES, section 6.7.5.

BaP: Due to limited amounts of information on polycyclic aromatic hydrocarbons (PAHs) being available in the UK, for the assessment at Preston New Road a precautionary approach has been taken by the applicant by making assumptions based on data from Alberta, Canada. The information has been used to determine the emissions of BaP that could potentially result in a breach of the UK objective for BaP (0.25ng/m³ annual mean).

Analysis undertaken by M.Strosher et al looking at the composition of flare gas from natural gas extraction sites in Canada is the report which has been used for the assumptions made for the Preston New Road site, which in discussion with the Environment Agency is considered the best source of information regarding BaP content of shale gas.

The applicant has made a worst case assumption for the Preston New Road site in the ES (chapter 6) that assumes that C6 hydrocarbons constitute 0.1% of the total emissions. The Alberta report indicates that BaP is around 1/1000th of the amount of Benzene. Using this as the worst case assumption, the potential contribution from the Preston New Road site can be calculated. Based on this approach the highest predicted annual mean concentration is 0.0224 ng/m³ which is well below the UK objective (0.25ng/m³).

In summary, the findings in the ES and the further information submitted by the applicant conclude that the risk of any impacts of VOCs emissions from the flare on local receptors would be not significant.

In addition, the EA draft permit (which incorporates the Waste Management Plan) requires ambient monitoring of VOCs and BTEX (benzene, toluene, ethylbenzene, and xylenes) and indirect monitoring of the flare of VOCs among other chemicals.

The Environment Agency has undertaken its own detailed assessments of the emissions to air that will arise from the flow testing operations (i.e. from the flare) and the potential impact of these emissions on human health and ecological receptors.

Detailed air dispersion modelling has been carried out by the Agency. This considered the potential impacts of the main pollutants that could be emitted from the combustion of natural gas based on its expected composition:

- Oxides of nitrogen / nitrogen dioxide
- Benzene (a volatile organic compound)
- PAH emissions (a reference to benzo-a-pyrene)

Particulate emissions have been covered by a qualitative assessment as the Agency would not expect particulate (PM10) to result from gaseous emissions.

Sulphur dioxide (SO₂) was not included in the Agency's assessment because the applicant provided information based on other gas extraction locally that no hydrogen sulphide (H₂S) has been identified during monitoring of the drilling muds or gas.

Having undertaken a detailed assessment, the Agency is satisfied that the emissions from the flare would be insignificant at locations closest to the site.

In terms of public health impact of the flare emissions, the Agency's audit checks, modelling and sensitivity analysis confirms there will be no exceedences of standards established for human protection. Indeed, the modelling assumed the flares would be operating for 24 hours, 365 days per year per well. The actual proposal is for the flares to operate for no more than 90 days per well.

Transport

The County Council's Strategic Highways Planning Manager has assessed the applicant's transport assessment. With consideration for all the information provided, he cannot support this application in respect of the impact on the highway and its users.

Waste Management

Under the Mining Waste Directive, an operator of a mining waste operation must draw up a waste management plan (WMP) for the minimisation, treatment, recovery and disposal of extractive waste.

The Environment Agency has assessed the applicant's WMP and approved the plan as a whole, subject to conditions in the draft permit. The Agency is satisfied that the draft permit requirements, including the requirements of the WMP, will protect the environment and that the Mining Waste Directive is met.

Induced Seismicity

The County Council commissioned AB Consulting (Edinburgh) to undertake an assessment of induced seismicity of the planning applications for Roseacre Wood and Preston New Road.

ABCConsulting (ABC) reviewed the ES submitted by Arup, on behalf of the applicant, and presented a number of questions on key issues in order to seek clarification. Arup then responded.

A discussion meeting then took place between Arup, Cuadrilla, and ABC, providing the opportunity to better understand the background to these exchanges and clarifications.

Through these exchanges more clarity on the key issues was identified to the extent that ABC is satisfied with the applicant's proposal to manage induced seismicity.

4. *Seek agreement with the Applicant to establish an independent comprehensive baseline and on-going long term monitoring of environmental and health conditions prior to any activity on the sites. An indicative framework is described at the end of this document.*

The Royal Society/Royal Academy of Engineering report 'Shale Gas Extraction in the UK' (2012) recommends that monitoring arrangements should be developed to detect possible well failure post abandonment. The report says that continuous ground gas monitoring and aquifer sampling could be similar to that carried out before and during fracturing operations. Temporary monitoring equipment could be used, such as that used to monitor emissions from landfill sites or even semi-permanent monitoring stations could be installed. The report suggests that monitoring would be at a reduced frequency, perhaps every few years, but says this

requires techniques that can reliably distinguish between methane from non-shale operations in the areas of abandoned wells.

The report recommends:

"Arrangements for monitoring abandoned wells need to be developed. Funding of this monitoring and any remediation work needs further consideration."

The applicant has agreed to undertake baseline monitoring before the project starts. Indeed the Environment Agency (EA) draft permit requires monitoring for a period of three months before operations commence. The Agency requires over 50 determinants to be monitored for air, surface water and ground water.

Post decommissioning monitoring will require the operator to provide sufficient evidence to satisfy the EA that, following decommissioning of the well, there will not be any unacceptable residual, on-going impacts on the environment before surrender of the permit would be accepted by the EA. Monitoring at the site will therefore continue into the post decommissioning period and will have to demonstrate this. The EA's powers to set monitoring requirements are also more flexible than planning conditions or a section 106 legal agreement because any requirements imposed by the EA may then be adjusted by it according to conditions at the site and monitoring data derived at the time.

A planning authority's reliance on other (non-planning) regulatory bodies to provide the appropriate controls and conditions in relation to their statutory responsibilities has been established through the courts on many occasions. Most recently it was re-confirmed in the Balcombe Judgment (Frack Free Balcombe Residents Association v West Sussex County Council– 5th December 2014). Paragraph 102 of the judgment is particularly relevant:

"the existence of the statutory regimes applied by the HSE, the EA and the DECC shows that there are other mechanisms for dealing with the very proper concerns which the Claimant's members have about the effects on the environment. The Claimant and its members' concerns are in truth not with the planning committee's approach of relying on the other statutory regimes, but rather with the statutory bodies whose assessments and application of standards they disagree with. That does not provide a ground of legal challenge to the decision of the planning committee."

In light of this judgment as well as national guidance (NPPF paragraph 122) the applicant does not believe it is necessary or appropriate to impose planning conditions or a section 106 legal agreement with respect to matters, such as longer term monitoring, that are within the remit of other regulatory regimes.

Nevertheless, while there is a question around the appropriateness of using a planning condition or section 106 agreement to provide for such monitoring, the County Council would have pursued a Unilateral Undertaking with the applicant to provide for such in the event of a recommendation to grant permission.

The Director of Public Health's locally commissioned Health Impact Assessment has highlighted potential health impacts arising from a perceived mistrust of the regulatory bodies involved in the process. He has recommended that an independent monitoring body should be set up – supported by funding from the applicant. This body would be intended to be an additional independent repository for all of the information collected (both environmental and health related) – enabling a single point of reference and providing independent, easily understandable interpretation of the publicly available data.

The proposed arrangements, if a recommendation for approval was made, would include data and information collected by other agencies and would not seek to be a replacement of the functions provided under other statutory provisions. It would provide the local repository and interpretation of monitoring data as well as filling any missing gaps that may be required to provide local reassurance. Local governance of the monitoring arrangements would provide the reassurance to the local communities.

5. *The Director of Public Health should be informed of the results of the measurements and any breaches to the planning condition or environmental permit.*

The Director of Public Health will be informed of the results of the measurements and any breaches to the planning conditions if planning permission is granted. The Environment Agency, Health and Safety Executive and Department of Energy and Climate Change will be invited to do similar if permission is granted.

6. *Consider the need to seek further clarification from the Applicant that the cumulative impacts of the operations from the flare, generators, vehicles and drilling will not exceed the national air quality objective thresholds, particularly for PM 24 hour mean levels.*

Further clarification was sought from the applicant through a Regulation 22 information request as follows:

PM10 from generators and vehicles:

An assessment of PM10 (particulate matter of 10 microns diameter or less) from generators and vehicles has been undertaken and presented for both the Preston New Road and the Roseacre Wood proposed exploration sites as part of a further information request. Detailed dispersion modelling has been used to assess the impacts from the generators and the vehicle movements to/from the site. A number of worst case assumptions have been made in the modelling to ensure a conservative approach has been taken. The modelling shows that no significant effects are likely to result.

In order to calculate the total cumulative impacts from generators and traffic the scheme related concentrations are added together. The findings from this cumulative assessment of PM10 for the Roseacre Wood and Preston New Road site during operations are that the results indicate no receptor is likely to experience a change of greater than, or equal to 1% of the annual mean objective (40 $\mu\text{g}/\text{m}^3$). As such no

significant effects are likely to result from cumulative impacts. The total concentrations are also well below the air quality objectives for PM10

PM10 from Flaring

The generation of PM10 emissions from the flare has been scoped-out of the assessment due to the gas composition and high efficiency of combustion. This has been agreed with the Environment Agency and is described in the draft permit:

"Particulates have been covered by a qualitative assessment as we would not expect PM10 to result from gaseous emissions. It formed part of the air quality assessment submitted by the applicant and is included in the habitats section for completeness".

Indeed the Agency has further clarified its position in relation to particulates from flaring of natural gas in that when there is full and efficient combustion (based on temperature and retention time) the emissions are not likely to contain particulate matter.

An enclosed flare, which is a requirement for these activities, allows more control of the process, and the temperature can be continuously monitored along with the retention time to ensure the combustion process is complete. The gas flow to the flare and the gas composition are also measured.

In this case the applicant will produce an Environmental Management and Monitoring Plan before they are operational which will need to be approved by the EA; this plan will contain details of appropriate control measures they will put in place should efficient combustion not be achieved.

PM10 from Drilling

No PM10 emissions from drilling would be expected as the material drilled would be wet. Also any dust-creating processes on site would be mitigated by following the site Environmental Operating Standard (see ES: 4.13.1 & Appendix E).

7. As part of either the planning or permitting process, the Applicant should be required to submit regular data on the ambient air quality on site measuring all the common air pollutants relevant to the activity and report them regularly. PM10 and PM2.5 should be reported separately.

The draft Environment Agency permit requires, through the Waste Management Plan (section 9.6, version 7 of the WMP), monitoring of 13 ambient air quality parameters including PM2.5 and PM10. This will be done prior to operations commencing to establish a baseline, during operations and after operations have ceased. Four sampling positions will remain constant at the perimeter of the site. The parameters are: methane, carbon monoxide, hydrogen sulphide, nitrogen dioxide, nitrogen monoxide, sulphur dioxide, ozone, total petroleum hydrocarbons, VOCs, BTEX, PM2.5 and PM10, dust. Results will be published monthly and submitted to the Agency for check and verification.

Monitoring of particulates will be undertaken throughout the operational period of the site using Frisbee-type dust gauges with directional adhesive strips (for nuisance

dust) plus pumped gravimetric sampling for PM10 and PM2.5 will be located at four locations in close proximity to key receptors.. The sampling period for gravimetric monitoring for PM10 and PM2.5 will be 24 hours.

In addition the Agency requires point source emission monitoring from the flare for oxides of nitrogen, carbon monoxide, total volatile organic compounds, and methane (using emission modelling calculations)

8. *The Roseacre Wood site is within 55m of a National Grid gas transmission pipeline. Interconnections into national transmission pipelines are proposed at both sites. Advice should be sought and an assessment undertaken as to whether the nearby gas transmission pipelines are considered to be a major hazard.*

Advice has been sought from the Health and Safety Executive who is satisfied with the proposal.

National Grid Gas has no objection to the proposal. The development site is in close proximity to a high pressure gas pipeline – Feeder 21 Carnforth to Treales. National Grid have no objection to the proposal subject to the access track which runs over the pipeline being reinforced to protect the pipeline and for a Deed of Consent to be agreed prior to construction vehicles crossing the pipeline.

9. *Any extended flow testing provided for by any planning permissions should be aligned with the permits to be issued by the Environment Agency.*

This planning application includes extended flow testing and the Environment Agency has confirmed the permit application does similar.

10. *An assessment of light pollution as part of the site operations should be carried out, and if there are likely to be significant impacts associated with light pollution from the sites that cannot be mitigated or controlled, the Applicant should be requested to consider the opportunity to offer to fit blackout blinds to those homes most likely to be affected*

An assessment of light pollution has been undertaken as part of the determination.

The project will involve 24 hour operations during drilling and hydraulic fracturing. Lighting of working areas will also be necessary during winter when standard working hours overlap with the hours of darkness. Low-level security lighting will also be required so that the site operatives and security staff can carry out their monitoring activities during night time hours.

Lighting has properly been assessed; it concludes there would be some light pollution at night. This would be for a temporary period but would be significant particularly when seen from the nearest residential properties. Notwithstanding it would be for an extended period of time, with the mitigation measures proposed, and which could be controlled by condition, on balance, it is considered that lighting could be made acceptable and that the impacts associated with such would not be so

great to affect amenity on a permanent basis or lead to unacceptable effects on nature conservation to constitute a sustainable reason for refusal. It would not be appropriate to require blackout blinds to be fit to those properties most likely to be affected.

Subject to the mitigation measures proposed, and which could be controlled by condition, it is considered on balance that the proposed lighting for a temporary period would be acceptable for the purposes of the NPPF Policy DM2 of the LMWLP and Policy EP28 of the Fylde Local Plan.

11 *Further clarification or new information on the occurrence and magnitude of equipment likely to be contaminated with radioactive waste and how such waste would be managed on the site and disposed of should be sought*

From the outset, it is important to stress that the levels of radiation associated with contaminated waste are very low and come from Naturally Occurring Radioactive Materials (NORM). Nevertheless, NORM is regulated through the Radioactive Substances Regulations

The applicant has provided further information following an information request. Section 5.2 of the Waste Management Arrangement of the Radioactive Substances Regulations (RSR) permit applications to the Environment Agency state the build-up of insoluble carbonate and/or sulphate scales inside pipes is a possibility due to a change in pressure or temperature as the water is brought to the surface. It is highly unlikely however, due to the short term nature of the operations that any significant scale will build up inside the pipes. In the unlikely event that significant scaling of components occurs (and is identified via the proposed contamination monitoring regime), it shall be ensured that the pipework/component is capped/sealed to prevent release of material, and the Agency will be contacted for advice.

Similarly, physico-chemical changes within the accumulating waters may lead to the formation of small volumes of precipitate, which could contain elevated concentrations of radionuclides. The potential for such waste will be addressed by the proposed contamination monitoring regime.

The Best Available Technique (BAT) statement section 3.2 of the RSR permit application to the Environment Agency states: “*given the potential for the scaling-up of pipework (with insoluble radium carbonate and sulphate scales), and/or the contamination of phase separator equipment/material, allowance has also been made for the generation of a relatively small quantity of solid radioactive waste. Accumulation and disposal of a nominal 40 MBq each of Ra-226 and Pb-210, and 16 MBq each of Ra228 and Th-228 has been requested within the Permit application.*”

Section 7.1 goes on to state: “*As soon as practicable, after identification And characterisation, low-level solid waste would be transferred to a suitable EPR10-permitted treatment or disposal facility.*”

Section 7.2 (contamination monitoring) states: “*A number of baseline samples will be taken prior to commencement of works on the sites, to determine background concentrations of radionuclides in the local area. A background contamination survey*

will also be performed (using a suitable alpha/beta contamination monitor). A contamination monitoring programme will be devised, to ensure that any significant (albeit improbable) environmental contamination is promptly identified. This will include alpha/beta contamination monitoring of key areas/surfaces, including:

- *Well-head (and immediately surrounding site surface)*
- *Separator equipment [external surfaces, and any internal surfaces opened for maintenance/access (and the immediately surrounding site surface)]*
- *Storage tanks (internal surfaces where practicable, external valves and immediately surrounding site surface)*

Consignments of flowback fluid will also be screened externally for contamination, prior to leaving site. At close of works, all potentially-contaminated equipment will be screened prior to leaving site. The frequency, actions and responsibilities associated with monitoring shall be documented in the site Environmental Management and Monitoring Plan (EMMP)".

Section 7.3 goes on to state: "Solid waste would be stored within a secure container, or within a secure lay-down area, as appropriate. Where appropriate, pipework/components would be capped to prevent release of contamination.

In addition flowback tanks will be monitored on arrival at site to establish a baseline radiation contamination level. Prior to leaving site further radiation contamination monitoring will identify any elevated levels of radiation. In the unlikely event an elevated level is identified above baseline levels the tanks will be cleaned to remove any precipitate and subsequently disposed at an offsite waste treatment facility."

12. Should planning permission be granted, it should be a pre requisite that no activity can start until the onsite and offsite waste treatment capacity is defined.

The Environment Agency draft permit (through the Waste Management Plan which it incorporates) sets out controls for the management of waste onsite and offsite.

Onsite, the draft permit controls the storage arrangements for different the waste types. The maximum volume of storage and storage structure are prescribed. For example, a maximum of 3,000m³ is given for flowback fluid at any one time, and this must be regularly removed to an offsite permitted waste facility. Flowback fluid must be stored in steel solid tanks (approx. 6mm thickness with annual non-destructive testing inspection)

The Agency has assessed the application and is satisfied that the waste can be safely dealt with. If an appropriate permitted outlet for the waste cannot be found, the Agency draft permit requires that operations will have to stop.

As explained in the assessment of recommendation 4, in light of case law as well as national guidance (NPPF paragraph 122) it is not appropriate to impose planning conditions with respect to matters that are within the remit of other regulatory regimes. The mineral planning authority should focus on whether the development itself is an acceptable use of the land, and the impact of the use, rather than the control of processes or emissions themselves where these are subject to approval

under pollution control regimes. The County Council should assume that these regimes (in this case the regulation of waste disposal) will operate effectively.

In terms of on site waste management spill containment protocols, assessment of the containment capacity of the well pad is presented in the ES. Appendix B to the ES identifies that a total volume of 1170m³ will be provided to contain spilt fluids. This volume is provided by use of the perimeter ditches, voids within the stone matrix and min 50mm air freeboard. Section K2.4 of Appendix K to the ES refers to Environment Agency guidance, in particular EA PPG26 'Drums and intermediate bulk containers', on the recommended storage capacity to contain spills and leaks of potentially polluting liquids. Where more than one tank is situated in a single bund the bond volume should be at least 25% of the aggregate tank contents. Section K2.4 of the ES details the aggregate tank contents as 3176m³ and identifies that 25% of this volume (795m³) is significantly less than proposed containment volume provided at the site. It is concluded that there is adequate capacity to contain spills assessed in accordance with EA guidance.

Section 4.5.4 of the ES describes the proposed construction of the well pad. Migration of any spilt fluid to underlying soils and ground waters will be prevented by the 1mm thick fully welded HDPE [plastic] membrane - such membranes are commonly used to construct water retaining structures such as swimming pools. Joints in the membrane are fully tested for water tightness and certified as part of the construction process. The membrane is protected against puncturing by the geotextile materials placed above and below the membrane. Further protection against puncturing is also provided by the geogrid placed below the granular sub-base layer (see Appendix B of the ES).

13. *Further clarification should be sought that any specific risks due to using the MoD site for accessing the Roseacre Wood site have been addressed before any planning permission is granted.*

The MOD maintains no safeguarding objections to the application but requested some further assessments are undertaken if permission is granted. The MOD does not object to the applicant's proposal to utilise this route across MOD property and will establish relevant terms of access directly with the applicant to facilitate this.

14. *A full assessment of the impacts of additional traffic associated with the proposals on road safety should be carried out and appropriate traffic management options considered to address the public concerns, particularly in respect of the Roseacre Wood site.*

A full assessment of traffic impacts associated with the proposed development has been carried out by the applicant as part of the EIA. An assessment of the impacts has been carried out against the policies of the NPPF, the development plan policies and in light of advice received from the Highways Agency, LCC Developer Support (Highways) and with regard to those views received in representations. The assessment is in Appendix 17.

- 15 *Should planning permission be granted, provision should be made with the Applicant to maintain road safety, particularly on the access routes to Roseacre Wood site and road safety and any related incidents on the access to both the sites should be monitored.*

An assessment of the impacts of additional traffic has been carried out by the applicant in the ES. This has been subject to review and assessment by the County Council's Highways Service, with further information requests being made.

Conditions will be monitored to ensure that highway safety is maintained.

16. *In the event planning permissions are granted, any breach of planning conditions should be reported to the Director of Public Health so that necessary steps can be taken in protecting and improving the health of local communities from issues arising due to the alleged or identified breaches of planning control*

The recommendation is to not grant planning permission.

Health studies referred to in representations.

Many representations received by the County Council refer to research conducted in north America and overseas that indicate shale gas extraction is linked to adverse health impacts. A large number of studies are referenced. Some of the research referred to examines a wide range of other studies to draw conclusions about health impacts.

While much research exists, and is growing in volume each year, it is difficult to gain an objective view of the veracity of the research. Anti-fracking campaigners frequently point to studies that indicate increased health risks (e.g. elevated risks of cancer or birth defects) as a result of shale gas activity in north America. Conversely, pro-fracking campaigners point to numerous methodological flaws in the research. It is also difficult to translate the findings of research from north America into the UK environment. Operating and regulatory practices are very different.

In June 2014, Public Health England (PHE) published a review into the potential health impacts of shale gas extraction. The review drew on significant scientific evidence in peer reviewed or published reports up to January 2014. Much of the research cited in representations to the County Council was reviewed by PHE.

PHE say there have been very few epidemiological studies or health risk assessments published in the peer reviewed literature. Epidemiology is the branch of medical science that investigates all the factors that determine the presence or absence of diseases and disorders. It aims to assess the cause of a disease, and seeks to look beyond associations which might be a result of chance, bias or confounding effects.

Two of the most frequently cited studies in representations relate to work by a research group in the School of Public Health at the University of Colorado. The studies look at possible associations between health status and exposure to air pollutants from shale gas activities.

McKenzie et al (2012) used a risk assessment methodology which considers cancer and non-cancer endpoints separately to assess the potential health impact of air emissions from shale gas extraction and related activities. PHE say it should be noted that the risk assessment methodology used in this study is not recommended for use in the UK.

McKenzie et al (2014) examined a possible link between air pollution and adverse birth outcomes, including congenital malformations.

Both papers are considered in some detail by PHE.

In McKenzie et al (2012) the key finding was that the estimated risks for cancer were elevated for those residents living within half a mile of the gas wells during well completion.

PHE say the research has a number of limitations and uncertainties, many of which are acknowledged by the authors. These include:

- Small sample size and the limited amount of data on emissions around well completion sites
- Further work is needed to profile emissions during the stages of gas well development
- Non-methane pollutant emissions appear to vary substantially by field type, number of well heads, completion process and types of controls in place. This makes application of the results to other shale gas extraction sites difficult
- A limited number of volatile organic compounds was explored. Other pollutants such as aldehydes, diesel exhaust, ozone and particulate matter, were not considered.
- The existing background level of pollution needs further assessment to enable pollution caused by shale gas extraction and related activities to be reliably assessed
- The impact of local meteorology and topography means that the results are not easily applicable to other areas and other extraction sites.

Also, PHE point out the approach used for cancer risk assessment in the US is not recommended for use in the UK by the UK advisory Committee on Carcinogenicity of Chemicals in Food, Consumer Products and the Environment (COC) if the risk values used are derived from animal data.

The same research group has examined a possible link between maternal exposure to air pollutants associated with shale gas extraction activities and birth outcomes such as congenital heart defects, neural tube defects and low birth weight (McKenzie et al, 2014). Public Health England has similarly reviewed this study.

McKenzie et al (2014) reported a positive association between exposure and prevalence of congenital heart defects. The association with neural tube defects was considerably weaker.

PHE's review concludes that the reported risks have wide confidence intervals which weaken the reported association and chance findings cannot be excluded, given the number of analyses carried out. The exposure assessments relied upon an indirect approach rather than direct measurements of exposure. Furthermore, the study was unable to differentiate between the phases of well development, which could be important in terms of the type of and amount of pollutants emitted.

Maternal education, age, smoking status and alcohol consumption were considered as potential confounding factors, but it is not clear that confounding was adequately addressed for socioeconomic status or previous experience of birth defects.

Overall, the study suggests a possible link between maternal exposure to air pollutants which may arise from shale gas extraction activities and a range of birth defects, particularly congenital heart defects, although the authors acknowledge that further research is needed to examine whether a link with shale gas drilling was causal.

PHE state the obvious limitations in terms of exposure assessment highlight the need for such health studies to have access to robust assessments of exposure both before and after development of a site for gas exploration and extraction.

Further criticism of the Mckenzie et al (2014) research came from the Chief Medical Officer and Executive Director of the Colorado Department of Public Health and Environment in the USA. In a statement from the Department, the Chief Medical Officer said:

“...we disagree with many of the specific associations with the occurrence of birth defects noted within the study. Therefore, a reader of the study could easily be misled to become overly concerned.”

Among a range of limitations, the statement points out:

- “*The study showed decreased risk of pre-term birth with greater exposure. This seems counterintuitive, and again, makes the study difficult to interpret. (The study data showed that the nearer the mother lived to a well, the less likely the mother was to give birth prematurely or to have a low-birth-weight baby.)*”
- “*As the authors noted, they don't necessarily know where the mother lived at the time of conception or during the first trimester of pregnancy, when most birth defects occur. This makes interpretation of their study difficult.”*

Another study cited in representations is the research by Kassotis et al (2013). The study, reported in the national media at the time, indicated that chemicals used in fracking could cause infertility, cancer and birth defects.

PHE reviewed the study. The researchers detected endocrine disrupting activity (oestrogenic, anti-oestrogenic or anti-androgenic activity) in laboratory tests for a selection of 12 chemicals used in natural gas extraction in the US. Endocrine disruptors are chemicals that, at certain doses, can interfere with the endocrine (or

hormone) system in mammals. These disruptions can cause cancerous tumors, birth defects, and other developmental disorders.

Endocrine disrupting activity was also detected in groundwater and surface water considered to have been contaminated by fluids/wastewater from natural gas extraction processes (i.e. from spills/leaks), again using a laboratory test system.

PHE report that the authors suggested that the reported endocrine disrupting activity of the chemicals used in natural gas extraction may have contributed to the endocrine disrupting chemical activity detected in the water samples, i.e. in areas where contamination spills of fluids/wastewater used in gas extraction may have occurred. PHE say this is a single study showing a relatively weak response in laboratory tests.

The County Analyst has also reviewed this research and highlighted limitations in the study which include a lack of direct identification of shale gas chemicals in the water that was tested. In other words, the chemicals found in water samples could have come from many sources, including agriculture, industry or from natural sources.

PHE has reviewed other research on health and shale gas, and its report can be found here:

<https://www.gov.uk/government/publications/shale-gas-extraction-review-of-the-potential-public-health-impacts-of-exposures-to-chemical-and-radioactive-pollutants>

In summary, as well as highlighting the limitations of the studies, PHE state that direct application of the north American research to the UK situation is impossible because of the wide differences between the two countries. It is clear from experience in the US that emissions vary widely depending on the phase of development, operational practices, the geology, local topography and meteorology, and the types of activities and equipment on-site.

PHE state that such variability makes direct application to the UK situation impossible, but shows that control of emissions from shale gas extraction and related activities will be of central importance. PHE say that comprehensive air monitoring and associated assessments of health risks will be required in the UK to inform regulation of each phase of the operation. Such assessments should also consider the cumulative impact of multiple wells. It will be important to ensure that environmental monitoring is undertaken in advance of, as well as during, operations.

At present there is limited environmental and health surveillance data within the published literature in relation to existing shale gas extraction operations. There have been very few epidemiological studies (as opposed to statistical associations) and those that have been carried out generally lack robust exposure assessments according to PHE.

There are also fundamental differences between north America and the United Kingdom in relation to the potential risks from shale gas, according to the Royal Society/Royal Academy of Engineering report 'Shale Gas Extraction in the UK':

- The operating practices of shale gas companies in the USA are different from those in the UK (para 3.1.4).
- The UK's regulatory approach is commended (para 6.1)

Conclusion

The County Council's Director of Public Health has provided specific advice to inform the planning process and provide public health advice to protect and improve the health of local residents living near the proposed shale gas exploration sites of Roseacre Wood (planning application numbers LCC/2014/0101 and 0102) and Preston New Road (planning application numbers LCC/2014/0096 and 0097). The advice was published as a Health Impact Assessment (HIA) in November 2014.

The Health Impact Assessment makes 45 recommendations to a broad range of agencies, suggesting actions before, during and after any permissions or permits are granted. Appendix J contains 16 recommendations to specifically inform the determination of the applications.

Given the advice is specific to this application, an assessment has been undertaken in relation to each of the 16 recommendations in Appendix J of the HIA. All of the recommendations in Appendix J have been addressed as part of this determination.

Recommendation 1 states: 'Consider the need for further noise assessment, particularly on the proposed Roseacre Wood site and if necessary, require additional mitigation measures to reduce noise associated with the development of the sites and more particularly the drilling and hydraulic fracturing phases of the development and which could be controlled by conditions attached to any planning permission'.

The predicted night time noise levels at the nearest properties (Old Orchard Farm) are at the national night time standard of 42dB. The elevation of 13.3 dB above background levels at night time at the nearest property, for such a sustained period, would be perceived as noticeable and disruptive. It is likely this would have significant adverse effects on the health and quality of life of the nearby residents

Recommendation 4 states: 'Seek agreement with the Applicant to establish an independent comprehensive baseline and on-going long term monitoring of environmental and health conditions prior to any activity on the sites'.

The applicant has questioned the appropriateness of providing for such long term monitoring through the planning system, and has cited national guidance and case law as justification for this position. Nevertheless, while there is a question around the appropriateness of using a planning condition or section 106 agreement to provide for such monitoring, the County Council would have pursued a Unilateral Undertaking with the applicant to provide for such in the event of a recommendation to grant permission.

Many representations received by the County Council refer to research conducted in North America and overseas that indicate shale gas extraction is linked to adverse health impacts.

While much research exists, and is growing in volume each year, it is difficult to gain an objective view of the veracity of the research. Anti-fracking campaigners frequently point to studies that indicate increased health risks (e.g. elevated risks of cancer or birth defects) as a result of shale gas activity in North America. Conversely, pro-fracking campaigners point to numerous methodological flaws in the research. It is also difficult to translate the findings of research from North America into the UK environment. Operating and regulatory practices are very different.

In June 2014, Public Health England (PHE) published a review into the potential health impacts of shale gas extraction. The review drew on significant scientific evidence in peer reviewed or published reports up to January 2014. Much of the research cited in representations to the County Council was reviewed by PHE.

PHE say there have been very few epidemiological studies or health risk assessments published in the peer reviewed literature. Epidemiology is the branch of medical science that investigates all the factors that determine the presence or absence of diseases and disorders. It aims to assess the cause of a disease, and seeks to look beyond associations which might be a result of chance, bias or confounding effects.

PHE highlight significant methodological flaws in the research that has been cited to the County Council.

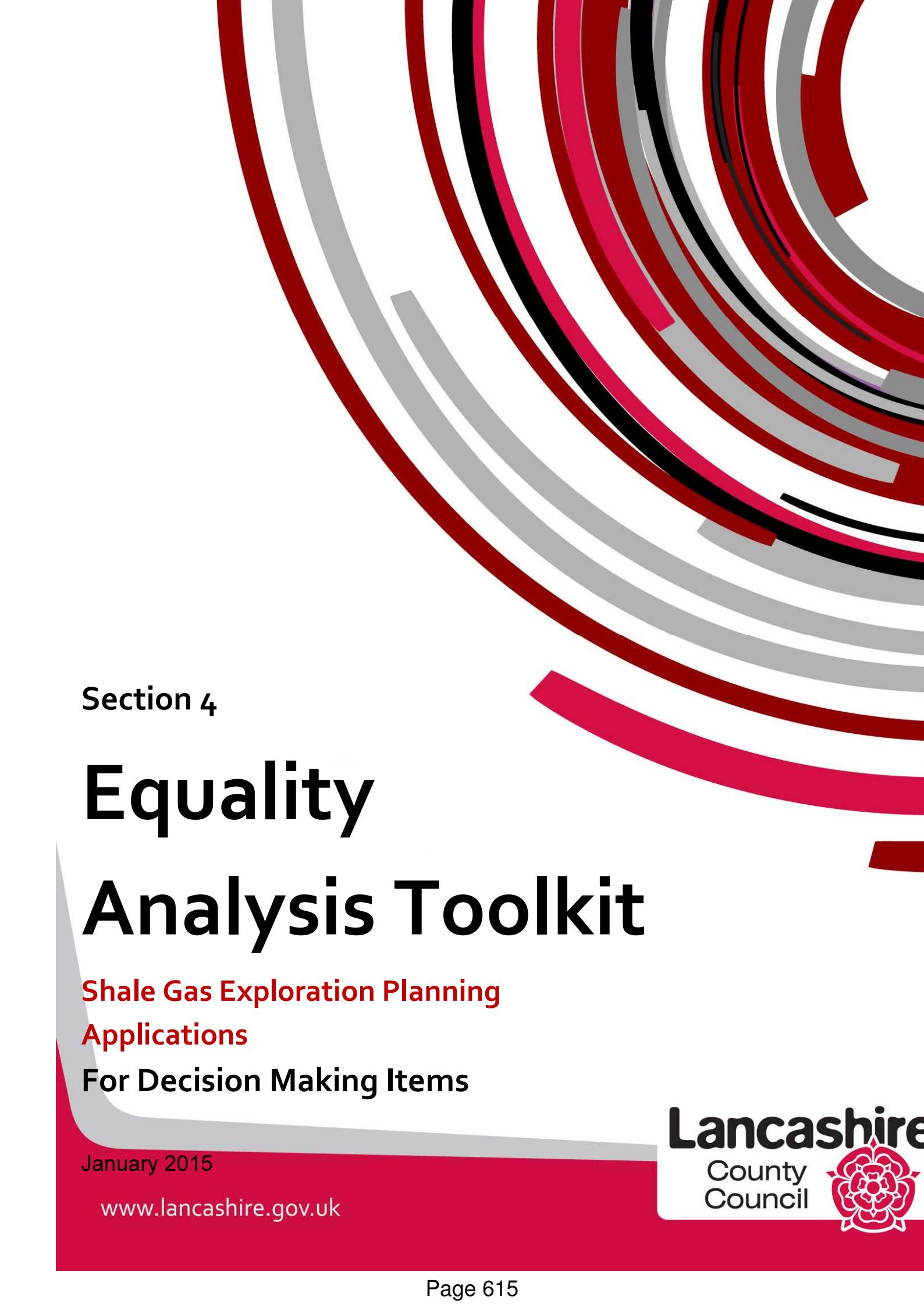
Moreover, one study frequently cited by objectors (McKenzie, 2014) has been publically criticised by the Chief Medical Officer and Executive Director of the Colorado Department of Public Health and Environment as follows "*we disagree with many of the specific associations with the occurrence of birth defects noted within the study. Therefore, a reader of the study could easily be misled to become overly concerned.*"

PHE state that direct application of the North American research to the UK situation is impossible because of the wide differences between the two countries. It is clear from experience in the US that emissions vary widely depending on the phase of development, operational practices, the geology, local topography and meteorology, and the types of activities and equipment on-site. PHE state that such variability makes direct application to the UK situation impossible. There are also different regulatory practices in the UK.

At present there is limited environmental and health surveillance data within the published literature in relation to existing shale gas extraction operations. There have been very few epidemiological studies (as opposed to statistical associations) and those that have been carried out generally lack robust exposure assessments according to PHE.

Nevertheless, because of the significantly increased noise levels above background, the proposed development would be contrary to Policy DM2 of the JLMWLP and

Policy EP27 of the Fylde Borough Local Plan as it has not been satisfactorily demonstrated that noise impacts would be reduced to acceptable levels and would therefore unnecessarily and unacceptably result in harm to the amenity of neighbouring properties by way of noise pollution.



Section 4

Equality Analysis Toolkit

**Shale Gas Exploration Planning
Applications
For Decision Making Items**

January 2015

www.lancashire.gov.uk



What is the Purpose of the Equality Decision-Making Analysis?

The Analysis is designed to be used where a decision is being made at Cabinet Member or Overview and Scrutiny level or if a decision is being made primarily for budget reasons. The Analysis should be referred to on the decision making template (e.g. E6 form).

When fully followed this process will assist in ensuring that the decision-makers meet the requirement of section 149 of the Equality Act 2010 to have due regard to the need: to eliminate discrimination, harassment, victimisation or other unlawful conduct under the Act; to advance equality of opportunity between persons who share a relevant protected characteristic and persons who do not share it; and to foster good relations between persons who share a relevant protected characteristic and persons who do not share it.

Having due regard means analysing, at each step of formulating, deciding upon and implementing policy, what the effect of that policy is or may be upon groups who share these protected characteristics defined by the Equality Act. The protected characteristic are: age, disability, gender reassignment, race, sex, religion or belief, sexual orientation or pregnancy and maternity – and in some circumstance marriage and civil partnership status.

It is important to bear in mind that "due regard" means the level of scrutiny and evaluation that is reasonable and proportionate in the particular context. That means that different proposals, and different stages of policy development, may require more or less intense analysis. Discretion and common sense are required in the use of this tool.

It is also important to remember that what the law requires is that the duty is fulfilled in substance – not that a particular form is completed in a particular way. It is important to use common sense and to pay attention to the context in using and adapting these tools.

This process should be completed with reference to the most recent, updated version of the Equality Analysis Step by Step Guidance (to be distributed) or EHRC guidance - [EHRC - New public sector equality duty guidance](#)

Document 2 "Equality Analysis and the Equality Duty: Guidance for Public Authorities" may also be used for reference as necessary.

This toolkit is designed to ensure that the section 149 analysis is properly carried out, and that there is a clear record to this effect. The Analysis should be completed in a timely, thorough way and should inform the whole of the decision-making process. It must be considered by the person making the final decision and must be made available with other documents relating to the decision.

The documents should also be retained following any decision as they may be requested as part of enquiries from the Equality and Human Rights Commission or Freedom of Information requests.

Support and training on the Equality Duty and its implications is available from the County Equality and Cohesion Team by contacting

AskEquality@lancashire.gov.uk

Specific advice on completing the Equality Analysis is available from your Directorate contact in the Equality and Cohesion Team or from Jeanette Binns

Jeanette.binns@lancashire.gov.uk

Name/Nature of the Decision

The County Council has received applications for planning permission for the temporary exploration and appraisal of shale gas and for the installation of surface and buried monitoring arrays at the following sites and surrounding areas:

- Preston New Road – Little Plumpton, Fylde West. Located north of Preston New Road (the A583), to the west of Little Plumpton (Cuadrilla Bowland Ltd).
- Roseacre Wood - Roseacre, Fylde East. Located to the south of the village of Roseacre (Cuadrilla Elswick Ltd)

For the purposes of Equality Impact Assessment the applications are being considered together, so that the cumulative impact of the applications can be considered. If planning permission is granted to both sites, the proposed works would run in parallel.

What in summary is the proposal being considered?

An oil and gas company called Cuadrilla Bowland and Cuadrilla Elswick Ltd (Cuadrilla) is applying for temporary planning permission to develop two new sites to explore for shale gas by drilling, hydraulically fracturing, (fracking) and testing the flow of gas and for a series of surface and buried monitoring stations to monitor for seismic movement and water quality. The proposed sites are at Preston New Road, Little Plumpton, Lancashire and Roseacre Wood, Roseacre, Lancashire and surrounding areas for the monitoring arrays.

The planning applications are accompanied by environmental statements which have been produced as a result of the environmental impact assessment of the proposed development. The environmental statements describe the impacts of the proposed developments and proposed mitigation and are an important consideration in the determination of the planning applications.

Is the decision likely to affect people across the county in a similar way or are specific areas likely to be affected – e.g. are a set number of branches/sites to be affected? If so you will need to consider whether there are equality related issues associated with the locations selected – e.g. greater percentage of BME residents in a particular area where a closure is proposed as opposed to an area where a facility is remaining open.

At both of the drilling sites, Cuadrilla is proposing a working area of 1.55 ha in order to construct a well pad. In addition, seismic monitoring equipment is proposed to be installed within 4 km of the sites.

For the purposes of the Equality Impact Assessment a radius of 1.5 km around each site was used to select the Lower Super Output areas (LSOAs) surrounding each site. It is considered that the impact of the development (for Equality Impact Assessment purposes) will not extend to any significant degree out with these areas, with the exception of the traffic route to the proposed sites, which will also be assessed.

The Lower Super Output areas within 1.5km of the Cuadrilla test sites at Preston New Road (grid reference E337408 N432740) and Roseacre Wood (grid reference E343904 N436438) were selected. In total there were 5 LSOAs, 2 within 1.5km of the Preston New Road site and 3 within 1.5km of the Roseacre Wood site. A map showing the test sites and the selected LSOAs is available. 2011 Census statistics were examined for these LSOAs to see how they compared to the rest of Fylde, Lancashire, the North West, England and England and Wales for a number of key indicators. A spreadsheet showing all the census statistics for the selected indicators is available and more information about the 2011 Census is available at <http://www.ons.gov.uk/ons/guide-method/census/2011/index.html>. The main findings are listed below.

Could the decision have a particular impact on any group of individuals sharing protected characteristics under the Equality Act 2010, namely?

- Age
- Disability
- Gender reassignment
- Pregnancy and maternity
- Race/ethnicity/nationality
- Religion or belief
- Sex/gender
- Sexual orientation no data
- Marriage or Civil Partnership Status census

In considering this question you should identify and record any particular impact on people in a sub-group of any of the above – e.g. people with a particular disability or from a particular religious or ethnic group.

It is particularly important to consider whether any decision is likely to impact adversely on any group of people sharing protected characteristics to a disproportionate extent. Any such disproportionate impact will need to be objectively justified.

The physical, social, community and economic impacts of the proposal are well documented in the Environmental Statement that accompanies the planning applications.

Further to this, the Equality Impact Assessment considers the projects for their impact on the following groups.

- Age
- Disability
- Gender reassignment
- Pregnancy and maternity
- Race/ethnicity/nationality
- Religion or belief including strongly held 'green' beliefs

- Sex/gender
- Sexual orientation no data
- Marriage or Civil Partnership Status census

Representations made by individuals to the County Council have commented that the following groups could be impacted. The groups can be defined by:

- Age,
- Disability
- Pregnancy and maternity
- Sex and gender

The potential impacts have been recorded below, along with an assessment of their significance.

If you have answered "Yes" to this question in relation to any of the above characteristics, – please go to Question 1.

If you have answered "No" in relation to all the protected characteristics, please briefly document your reasons below and attach this to the decision-making papers. (It goes without saying that if the lack of impact is obvious, it need only be very briefly noted.)

Question 1 – Background Evidence

What information do you have about the different groups of people who may be affected by this decision – e.g. employees or service users (you could use monitoring data, survey data, etc. to compile this)? As indicated above, the relevant protected characteristics are:

- Age
- Disability including Deaf people
- Gender reassignment/gender identity
- Pregnancy and maternity
- Race/Ethnicity/Nationality
- Religion or belief
- Sex/gender
- Sexual orientation
- Marriage or Civil Partnership status (in respect of which the s. 149 requires only that due regard be paid to the need to eliminate discrimination, harassment or victimisation or other conduct which is prohibited by the Act).

In considering this question you should again consider whether the decision under consideration could impact upon specific sub-groups e.g. people of a specific religion or people with a particular disability. You should also consider how the decision is likely to affect those who share two or more of the protected characteristics – for example, older women, disabled, elderly people, and so on.

2011 Census statistics were examined for these Lower Supper Output Areas (LSOAs) to see how they compared to the rest of Fylde, Lancashire, the North West, England and England and Wales for a number of key indicators. A spreadsheet showing all the census statistics for the selected indicators is available and more information about the 2011 Census is available at <http://www.ons.gov.uk/ons/guide-method/census/2011/index.html>. The main findings are listed below.

Age

For the majority of age ranges the proportion of residents in the area is within 1% of the proportions for England. The exceptions are the 45 to 59, 60 to 64 and 65 to 74 age ranges which are all slightly higher than the national levels. (Age 45 to 59 22% compared to 19.4% in England, age 60 to 64 7.7% compared to 6% in England, age 65 to 74 11% compared to 8.6% in England).

They are also higher than the North West and Lancashire levels but are roughly in line with Fylde as a whole.

Health and Disability

Residents in the selected area are less likely to have their day to day activities limited a lot by health or disability than residents in Fylde, Lancashire, North West and England. This difference is particularly noticeable with the rest of Fylde with only 7.6% of residents in the selected area stating their day to day activities are limited a lot compared to 10.4% in Fylde.

The residents in the selected areas are also more likely to be in very good health than the other geographies with just over half, 50.9%, stating they are in very good health. This compares very favourably with Fylde (44.6%), Lancashire (45.9%), North West (46.5%) and England (47.2%).

Ethnicity

The vast majority of residents in the selected areas are white (97.3%) this is a similar proportion to Fylde as a whole (97.5%) but is significantly higher than Lancashire (92.3%), North West (90.2%) and England (85.4%).

There are also significant variations between the proportions of Asian/Asian British residents in the selected areas (1.3%) and Fylde (1.1%) compared to Lancashire (6.1%), the North West (6.2%) and England (7.8%).

Nationality

Two-thirds of the residents in the selected areas (66.7%) identify themselves as English only. This proportion is broadly similar to those in Fylde, Lancashire and the North West but is higher than for England, with only 60.4% identifying themselves as English only.

Approximately a fifth of the residents of the selected area (20.4%) have no English identity which is roughly 2% lower than for Fylde, Lancashire and the North West. Nearly a third of residents in England have no English identity (32.9%).

Religion

A higher proportion of residents in the selected area are religious than the other geographies with 78.1%. This compares to 75.4% in Fylde, 74.8% in Lancashire, 74% in the North West and just 68.1% in England.

Of the residents who are religious in the selected area the vast majority, 98.5%, are Christian. The proportion of residents who are Christian in Fylde is similar at 97.7% but is much lower in Lancashire (92%), the North West (90.0%) and England (87.2%).

Conversely, of the residents who are religious in the selected area the proportion who are Muslim is 0.4% which is significantly lower than the proportion in Lancashire (6.4%), the North West (6.8%) and England (7.4%).

Gender

The gender split in the selected area is 49.5% male and 50.5% female. This split is broadly in line with the whole of England which has a 49.2% male and 50.8% female split.

Marital and Civil Partnership Status

There are a significantly lower proportion of single residents in the selected area compared to the other geographies, with just less than a quarter (24.2%) compared to approximately a third in Lancashire (32.1%), the North West (35.6%) and England (34.6%). However, the proportion of single Fylde residents is only slightly higher than the selected LSOAs at 26.4%.

The proportion of married residents in the selected LSOAs is much higher than for the other geographies. Nearly three-fifths are married in the selected LSOAs (58.6%) compared to less than half in Lancashire (47.8%), the North West (44.8%) and England (46.6%).

The proportion of residents in same sex civil partnerships is less than 1% with a similar level for all the other geographies.

Question 2 – Engagement/Consultation

How have you tried to involve people/groups that are potentially affected by your decision? Please describe what engagement has taken place, with whom and when.

(Please ensure that you retain evidence of the consultation in case of any further enquiries. This includes the results of consultation or data gathering at any stage of the process)

The County Council has carried out extensive consultation on the current planning applications for the Preston New Road and Roseacre Wood sites. Over 25,000 representations have been received and we will carefully consider all the views expressed before any decision is taken.

All the applications, Environmental Statements, plans and the further information submitted in support of the applications for Preston New Road and Rosacre Wood are available to view at:

- the County Council website
 - at Lancashire County Council, County Hall, PO Box 100, Preston, PR1 0LD
 - The Planning Department, Fylde Borough Council, One Stop Shop, Lytham St Annes,
 - Kirkham Library, St Anne's Library, Lytham Library and Ansdell Library.
- The planning applications and environmental statements can also be

downloaded from the Cuadrilla website free of charge:
www.cuadrillaresources.com.

The consultation process on the applications has cumulatively resulted in over 25,000 representations being received for all the applications. Because of the numbers of representations received, it has meant that the County Council is unable to make every representation available to view on the County Council's website. However, representations made by letter or email including names and addresses have been placed on the application files and which are open to inspection by the applicant and groups or individuals by appointment, at Lancashire County Council Offices, County Hall, Preston, PR10LD.

Notwithstanding the consultation period has ended, the County Council has provided assurance that it will continue to carefully consider all views expressed on the proposals before any decision is taken. A summary of representations, including the numbers of representations received objecting and supporting the proposals, will be included in the reports to the Development Control Committee when the applications are presented for determination. Statutory consultee responses and those representations received from groups or bodies will continue to be made available to view online and as hard copies on the respective files at the County Council's offices.

The County Council would normally have 16 weeks to determine the applications for the sites given they constitute Environmental Impact Assessment development. However the County Council extended the consultation period for the applications at Preston New Road and Roseacre Wood having received confirmation from Cuadrilla first that they would agree to a time extension to determine the applications to accommodate the extended consultation period.

During the consultation period the County Council received representation from an individual that suggested there might be impacts of the proposal on vulnerable people in the caravan park to the west of the Preston New Road Site and that they should be provided with their own copies of the Preston New Road applications due to their inability to access them online or at the respective council offices or public libraries. The site is approximately 1,200m away from the boundary of

the caravan park. The applicant subsequently made hard copies of all the application documents available for inspection at the caravan site office. Copies of the consultation documents are also contained in local libraries, and there is a short door-to-door bus service from the caravan site to Kirkham library.

Question 3 – Analysing Impact

Could your proposal potentially disadvantage particular groups sharing any of the protected characteristics and if so which groups and in what way?

It is particularly important in considering this question to get to grips with the actual practical impact on those affected. The decision-makers need to know in clear and specific terms what the impact may be and how serious, or perhaps minor, it may be – will people need to walk a few metres further to catch a bus, or to attend school? Will they be cut off altogether from vital services? The answers to such questions must be fully and frankly documented, for better or for worse, so that they can be properly evaluated when the decision is made.

Could your proposal potentially impact on individuals sharing the protected characteristics in any of the following ways?

- Could it discriminate unlawfully against individuals sharing any of the protected characteristics, whether directly or indirectly; if so, it must be amended? Bear in mind that this may involve taking steps to meet the specific needs of disabled people arising from their disabilities
- Could it advance equality of opportunity for those who share a particular protected characteristic? If not could it be developed or modified in order to do so?
- Does it encourage persons who share a relevant protected characteristic to participate in public life or in any activity in which participation by such persons is disproportionately low? If not could it be developed or modified in order to do so?

- Will the proposal contribute to fostering good relations between those who share a relevant protected characteristic and those who do not, for example by tackling prejudice and promoting understanding? If not could it be developed or modified in order to do so? Please identify any findings and how they might be addressed.

For the purposes of equality impact assessment the following sources have been used to analyse the practical impacts on groups with protested characteristics.

- The planning applications are accompanied by Environmental Statements which have been produced as a result of the environmental impact assessment of the proposed development. The Environmental Statements describe the impacts of the proposed developments and are an important consideration in the determination of the planning applications.
- In November 2014, the County Council's cabinet endorsed the recommendations of the Director of Public Health in his report on the 'Potential Impacts of the Proposed Shale Gas Exploration Sites in Lancashire'. The report contains 45 recommendations relating to a broad range of shale gas issues and processes.
- The consultation process on all the applications has cumulatively generated over 25,000 representations from individuals, groups and organisations which will be analysed to inform the Equality Impact Assessment.

For the purposes of Equality Impact Assessment the practical impacts of the proposed sites are identified and analysed as:

Traffic

This topic is concerned with a proposed increase in heavy goods vehicles travelling to and from the sites. It is particularly concerned with the effects on the groups with the protected characteristics defined as

- *age and disability.*

It is concluded that the projects have the potential to make an impact on some groups with protected characteristics including those defined as age and disability. Impacts might be capable of being minimised through the delivery of a Traffic Management Plan (TMP) if an acceptable plan can be delivered, and if permission is granted. On current evidence, the traffic impacts are unacceptable.

Environmental pollution factors and health

The topic is concerned with the effects of potential pollution of the environment , which includes pollution of water, ground and air on groups with protected characteristic and in particular:

- health and disability
- and pregnancy and maternity.

The County Council has consulted the Environment Agency, Public Health England and the Health and Safety Executive, none of which have raised any objections or significant concerns to any of the applications. The Environment Agency says it is 'minded to grant' Cuadrilla the environmental permits needed to carry out their proposed operations at Roseacre Wood. Permits have been granted for the site at Preston New Road. The draft permits/ permits set out the conditions needed to protect groundwater, surface water and air quality, and to ensure there are no unacceptable impacts on people. Cuadrilla will have to comply with the conditions which are designed to ensure that operations do not cause harm to people or the environment. The Agency is satisfied that pollutants will be limited so as not to cause pollution or impact on people.

The County Council must assume that the sites would be managed in accordance with the regulatory requirements of the Environment Agency, the Health and Safety Executive and the Department of Energy, Climate and Change and industry specific guidance. National Planning policy requires that planning authorities should not seek to control processes or emissions where these are subject to approval under separate pollution control regimes and that LPA's should assume that these regimes will operate effectively. Nonetheless, paragraph 112 of

PPG Minerals, notes that before granting permission the County Council should be satisfied that the issues dealt with under other regimes can be adequately addressed by taking advice from the relevant regulatory body'.

The County Council agreed to a proposal by the Director of Public Health to undertake a Health Impact Assessment (HIA) of shale gas exploration and appraisal in Lancashire, at the two proposed new sites in Roseacre and Preston New Road. The Director of Public Health has overseen the preparation of the HIA and has produced a report based on the findings of the HIA. The HIA report and recommendations were considered by Cabinet on 6th November 2014. The recommendations are an important consideration in the determination of planning the applications for Preston New Road and Roseacre Wood and will be implemented if planning permission is granted

- It is therefore considered that the majority of anticipated environmental impacts of the works (except for noise impacts – see next section) on the areas identified can be satisfactory controlled through the regulatory regimes and the recommendations and controls that will be conditions of planning permission if granted.**

Community and socio economics

This topic is concerned with the effects on community, social and economic factors. These are temporary projects that could last up to a maximum of six years, but have the potential to generate impacts that may have an adverse effect on community, social and economic factors.

The projects have the potential to create economic benefits through jobs and service creation and a community benefit scheme that will make payments for each well that is fractured (a maximum of £400,000 at each site).

Concerns have been expressed in consultation responses from individuals and groups that existing businesses will be impacted on including the established market garden economy, agriculture and tourism. Marketing Lancashire (the tourism board) has publically countered this view, arguing that the hospitality industry would benefit.

There are no statistics that support either view. It is considered that groups with protected characteristics would not be disproportionately affected by this element.

In terms of community cohesion, recent experience has shown that drill sites can attract public attention and a degree of protest and environmental extremist activities may also occur. The Lancashire Constabulary have been consulted on the proposals and have not objected. It is assumed that public order would be maintained by the police and that Cuadrilla would fully engage in this process.

- **It is concluded that the projects (centred on 8 experimental boreholes) will not have a significant socio-economic effect on communities particularly in groups with protected characteristics.**

Noise

This topic is concerned with the noise generated by the projects particularly from the operation of the plant and machinery associated with drilling and fracking and the movement of HGV. It is particularly concerned with the effects on the groups with the protected characteristics defined as

- disability
- age

The County Council's assessment of noise impacts shows there will be an unacceptable impact on noise pollution for residents of the nearest properties. However, there is no reason to conclude this will have a disproportionately higher impact on people with protected characteristics. Nevertheless, the impact on the general population nearby is unacceptable and it is recommended that both planning applications are refused.

- **It is concluded that noise impacts on the general population nearby is unacceptable, but this will not disproportionately impact on people with protected characteristics to any greater degree than it will impact on the people without protected characteristics.**

Question 4 –Combined/Cumulative Effect

Could the effects of your decision combine with other factors or decisions taken at local or national level to exacerbate the impact on any groups?

For example - if the proposal is to impose charges for adult social care, its impact on disabled people might be increased by other decisions within the County Council (e.g. increases in the fares charged for Community Transport and reductions in respite care) and national proposals (e.g. the availability of some benefits). Whilst LCC cannot control some of these decisions, they could increase the adverse effect of the proposal. The LCC has a legal duty to consider this aspect, and to evaluate the decision, including mitigation, accordingly.

If Yes – please identify these.

The potential impacts of both the Preston New Road site and Roseacre Wood site have been considered together.

The Environmental Impact Assessment has also assessed the potential impact of the Projects combined within 10km of the site. This has been assessed and concluded that the projects will not result in greater number of significant effects when combined compared to each in isolation, or with those from other developments in the vicinity.

Question 5 – Identifying Initial Results of Your Analysis

Repeat of what was in 3. Summary

As a result we would suggest conditions

As a result of your analysis have you changed/amended your original proposal?

Please identify how – no

For example:

Adjusted the original proposal – briefly outline the adjustments

Continuing with the Original Proposal – briefly explain why

Stopped the Proposal and Revised it - briefly explain

The proposals will have an impact on people living nearest to the sites, but this will not have a disproportionate impact on people with protected characteristics compared to people without. The impact will be universal for nearby residents. Nevertheless, it is recommended that permission is refused because of the noise impact on people living nearest to the sites.

Question 6 - Mitigation

Please set out any steps you will take to mitigate/reduce any potential adverse effects of your decision on those sharing any particular protected characteristic. It is important here to do a genuine and realistic evaluation of the effectiveness of the mitigation contemplated. Over-optimistic and over-generalised assessments are likely to fall short of the “due regard” requirement.

Also consider if any mitigation might adversely affect any other groups and how this might be managed.

Mitigation is detailed in the Environmental Statements that accompany the Planning Applications. If planning permission is granted, the conditions and controls that fall within the responsibility of the County Council would be enforced. However, it is recommended that planning permission is refused for both sites.

Question 7 – Balancing the Proposal/Countervailing Factors

At this point you need to weigh up the reasons for the proposal – e.g. need for budget savings; damaging effects of not taking forward the

proposal at this time – against the findings of your analysis. Please describe this assessment. It is important here to ensure that the assessment of any negative effects upon those sharing protected characteristics is full and frank. The full extent of actual adverse impacts must be acknowledged and taken into account, or the assessment will be inadequate. What is required is an honest evaluation, and not a marketing exercise. Conversely, while adverse effects should be frankly acknowledged, they need not be overstated or exaggerated. Where effects are not serious, this too should be made clear.

The County Council has a duty to meet the requirement of section 149 of the Equality Act 2010.

The County Council is also the strategic planning authority for mineral and waste developments in the county. This involves managing the planning process according to planning rules set out by the government to assess applications for mineral developments, including mineral exploration and appraisal. The County Council must determine applications in accordance with planning law. A planning application can only be refused if it is contrary to the policies of the development plan and there are sustainable reasons to do so. If planning permission is granted, the County Council would monitor and inspect the operations to ensure they comply with any conditions imposed. The County Council has to be fair and neutral in the way it considers planning applications within the limitations of planning law.

The County Council does not work in isolation when determining planning applications and works closely with other regulators, agencies and bodies in determining applications. For example, safety and environment are important factors and the advice provided by other agencies is carefully considered before decisions are taken.

This assessment has been undertaken for the purposes of judging that the County Council has met its own requirements under the duty.

The assessment has concluded that impact of the proposal can be mitigated so that they will not have a significant impact on groups with protected characteristics.

Question 8 – Final Proposal

In summary, what is your final proposal and which groups may be affected and how?

This assessment has been undertaken for the purposes of judging that the County Council has met its own requirements under the duty.

The assessment has concluded that the noise impact of the proposal on people living nearest to the sites is unacceptable, but this would not disproportionately impact people with protected characteristics compared to people without.

Question 9 – Review and Monitoring Arrangements

Describe what arrangements you will put in place to review and monitor the effects of your proposal.

If planning permission is granted the developer is required to operate within the conditions imposed on the planning permission. Monitoring and inspection visits will form a key part of the successful implementation of any planning permission, to ensure the operator complies with any conditions imposed on the planning permission. The frequency with which sites are visited will depend on the nature and scale of the development. Sites where breaches of planning control have been identified will be visited more regularly.

Where a breach of planning control is identified the council will take appropriate and proportionate action to remedy the breach using the powers at its disposal, in accordance with the Development Control Enforcement Policy¹.

¹ <http://www.lancashire.gov.uk/corporate/web/viewdoc.asp?id=47630>

Monitoring will also be carried out through the other regulatory regimes, by the Environment Agency and the Health and Safety Executive, and by an independent body on behalf of the operator which reports to the Health and Safety Executive and DECC.

Equality Analysis Prepared By Clare Phillips

Position/Role Specialist Advisor

Equality Analysis Endorsed by Line Manager and/or Chief Officer

Decision Signed Off By

Cabinet Member/Chief Officer or SMT Member

Please remember to ensure the Equality Decision Making Analysis is submitted with the decision-making report and a copy is retained with other papers relating to the decision.

Where specific actions are identified as part of the Analysis please ensure that an EAP001 form is completed and forwarded to your Directorate's contact in the Equality and Cohesion Team.

Direktorate contacts in the Equality & Cohesion Team are:

Karen Beaumont – Equality & Cohesion Manager

Karen.beaumont@lancashire.gov.uk

Contact for Adult & Community Services Directorate

Jeanette Binns – Equality & Cohesion Manager

Jeanette.binns@lancashire.gov.uk

Contact for Environment Directorate, Lancashire County Commercial Group and BTLS

Saulo Cwerner – Equality & Cohesion Manager

Saulo.cwerner@lancashire.gov.uk

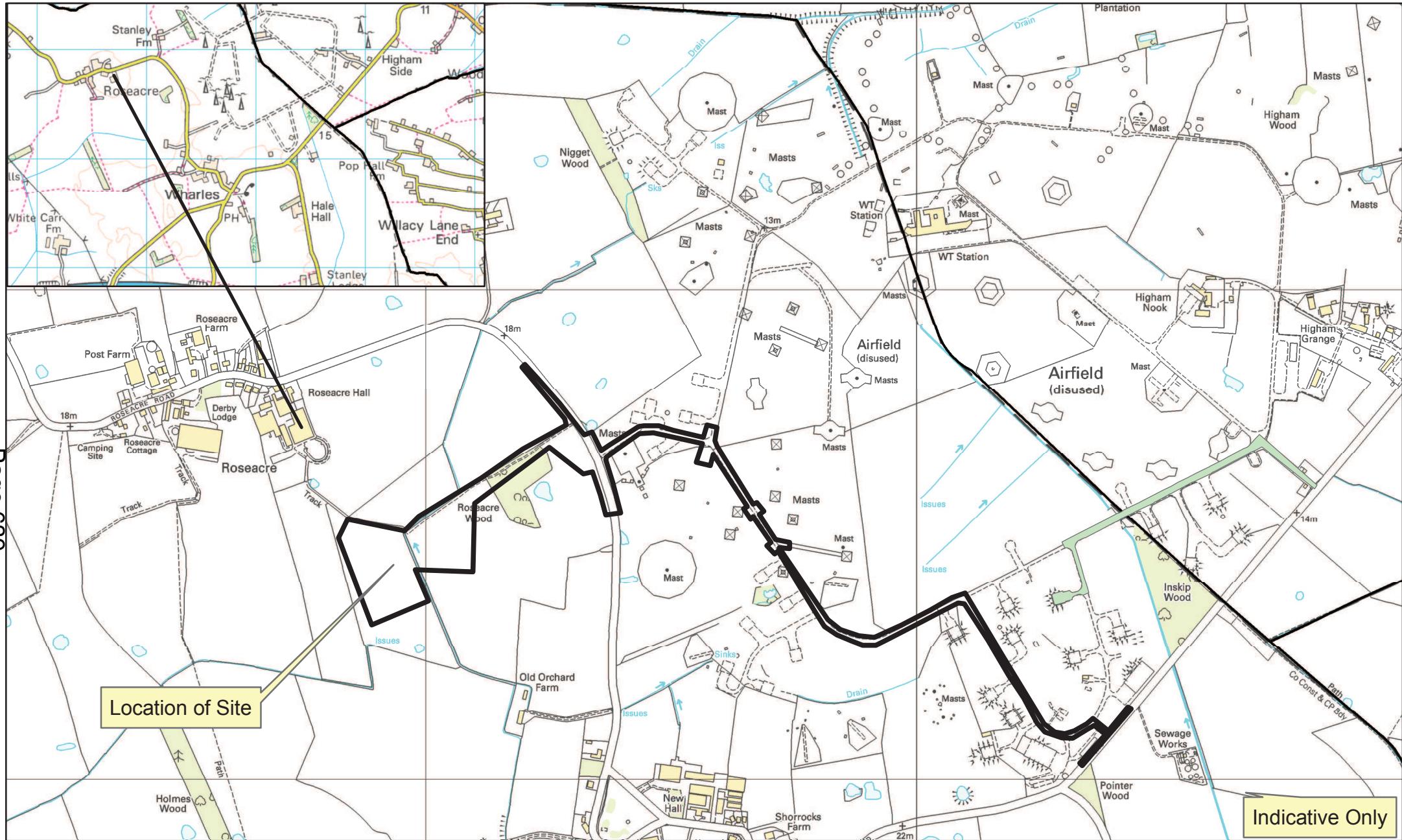
Contact for Children & Young Peoples Directorate

Pam Smith – Equality & Cohesion Manager

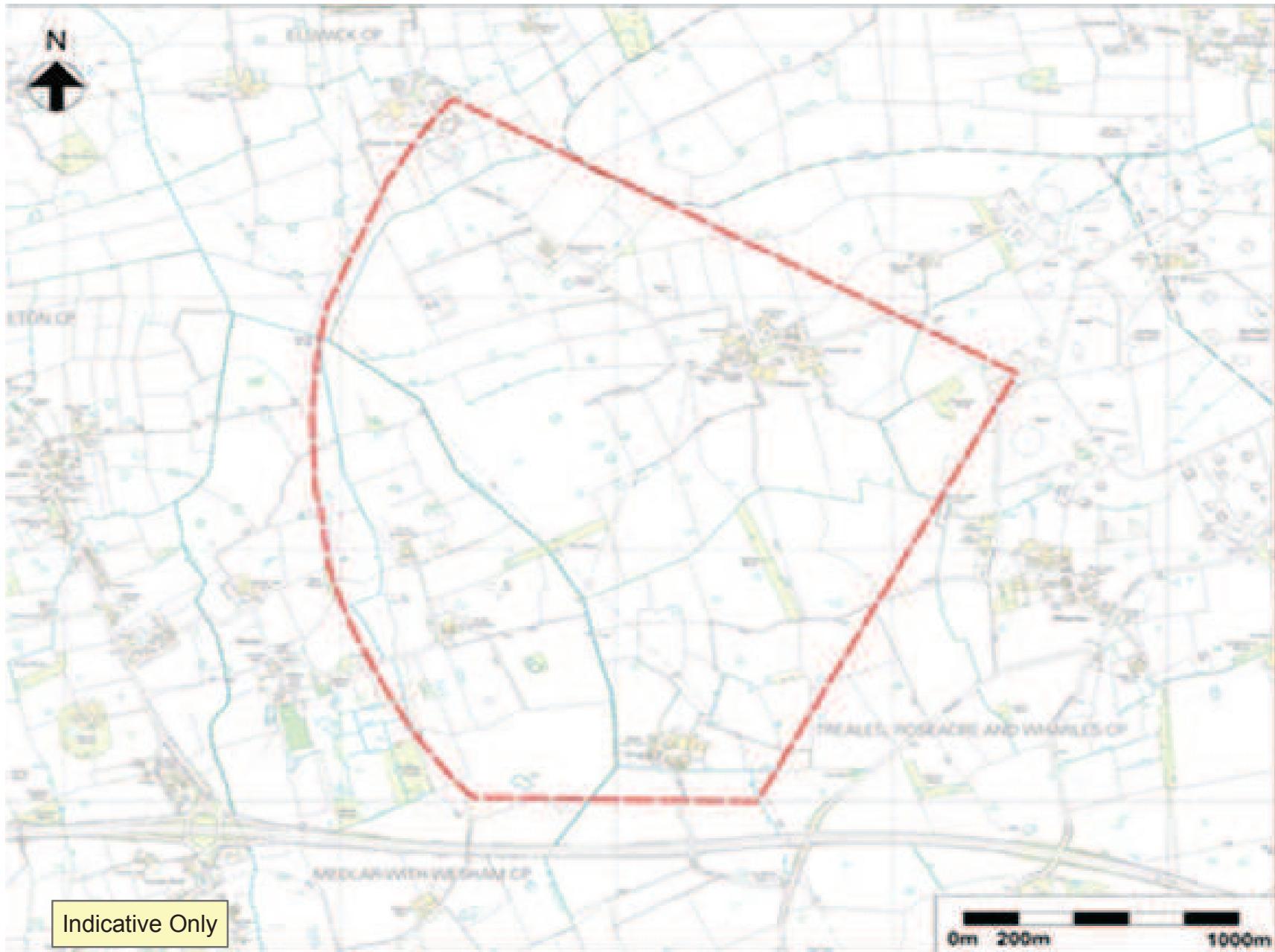
Pam.smith@lancashire.gov.uk

Contact for Office of the Chief Executive and the County Treasurer's Directorate

Thank you



APPLICATION LCC/2014/0101 CONSTRUCTION AND OPERATION OF A SITE FOR DRILLING UP TO FOUR EXPLORATORY WELLS, HYDRAULIC FRACTURING OF THE WELLS, TESTING FOR HYDROCARBONS, ABANDONMENT OF THE WELLS AND RESTORATION, INCLUDING PROVISION OF ACCESS ROADS AND IMPROVEMENT OF ACCESSES ONTO THE HIGHWAY, SECURITY FENCING, LIGHTING AND OTHER USES ANCILLARY TO THE EXPLORATION ACTIVITIES, INCLUDING THE CONSTRUCTION OF A PIPELINE AND A CONNECTION TO THE GAS GRID NETWORK AND ASSOCIATED INFRASTRUCTURE TO LAND WEST, NORTH AND EAST OF ROSEACRE WOOD AND BETWEEN ROSEACRE ROAD, ROSEACRE AND INSKIP ROAD, WHARLES. AGRICULTURAL LAND THAT FORMS PART OF ROSEACRE HALL, TO THE WEST, NORTH AND EAST OF ROSEACRE WOOD, AND LAND THAT FORMS PART OF THE DEFENCE HIGH FREQUENCY COMMUNICATIONS SERVICE (DHFCS) SITE BETWEEN ROSACRE ROAD AND INSKIP ROAD, OFF ROSEACRE ROAD AND INSKIP ROAD, ROSEACRE AND WHARLES, PRESTON



APPLICATION LCC/2014/0101 EXTENT OF THE UNDERGROUND OPERATIONS AS EXTENDED TO THE SURFACE. ROSEACRE WOOD

Agenda Item 6

Development Control Committee
Meeting to be held on 28 January 2015

Electoral Division affected: FYLDE EAST

Fylde Borough Council: application number. LCC/2014/0102

Application for monitoring works in a 4 km radius of the proposed Roseacre Wood exploration site comprising: the construction, operation and restoration of two seismic monitoring arrays comprising of 80 buried seismic monitoring stations and 8 surface seismic monitoring stations. The seismic monitoring stations will comprise underground installation of seismicity sensors; enclosed equipment and fenced enclosures. The surface array will also comprise monitoring cabinets. The application is also for the drilling of three boreholes, each installed with 2 monitoring wells, to monitor groundwater and ground gas, including fencing at the perimeter of the Roseacre wood exploration site. Monitoring works in a 4km radius of the proposed Roseacre Wood site, off Roseacre Road and Inskip Road, Roseacre and Wharles, Preston.

Contact for further information:

Development Management, 01772 531929, Environment Directorate
DevCon@lancashire.gov.uk

Executive Summary

Planning permission is sought for the installation of monitoring works in a 4 km radius of the proposed Roseacre Wood exploration site comprising: the construction, operation and restoration of two seismic monitoring arrays comprising of 80 buried seismic monitoring stations and 10 surface seismic monitoring stations. The seismic monitoring stations will comprise underground installation of seismicity sensors; enclosed equipment and fenced enclosures. The surface array will also include the siting of monitoring cabinets. The application is also for the drilling of three boreholes, each installed with 2 monitoring wells, to monitor groundwater and ground gas, including fencing at the perimeter of the Roseacre Wood site off Roseacre Road and Inskip Road, Roseacre and Wharles, Preston.

The application is associated with application LCC/2014/0101 reported elsewhere on this agenda. The applications are supported by a planning statement and an Environmental Statement that assesses the potential impacts of the proposals on the application site and surroundings; a description of the proposed development; scheme alternatives; air quality, archaeology and cultural heritage, greenhouse gas emissions; community and socio economics; ecology; hydrogeology and ground gas; induced seismicity; land use; landscape and visual amenity; lighting; noise; resources and waste; transport; water resources and public health.

Recommendation – Summary

That after first taking into consideration the environmental information and further information, as defined in the Town and Country Planning (Environmental Impact Assessment) Regulations 2011, planning permission be **granted** subject to

conditions controlling time limits, working programme, site operations, times and hours of working, highway matters, protection of public rights of way, drainage, noise, protection of trees, ecological and archaeological protection, restoration and aftercare.

Applicant's Proposal

Planning permission is sought for the installation of an array of monitoring boreholes within a 4 km radius of the proposed Roseacre Wood exploration site (application reference LCC/2014/0101). The proposed array would comprise of 80 buried seismic monitoring stations, 8 surface seismic monitoring stations and three pairs of groundwater monitoring wells.

The array is proposed in support of the application for the construction and operation of a site for drilling up to four exploration wells, hydraulic fracturing of the wells, testing for hydrocarbons, abandonment of the wells and restoration, including provision of an access road and access onto the highway, security fencing, lighting and other uses ancillary to the exploration activities, including the construction of a pipeline and a connection to the gas grid network and associated infrastructure (ref LCC/2014/0101). It is proposed to develop the array in tandem with the development of the site the subject of planning application LCC/2014/0101 and before any of the wells for shale gas are hydraulically fractured to enable data to establish baseline data on naturally occurring seismicity for a period of at least four weeks before the commencement of hydraulic fracturing.

It is proposed to drill 80 underground seismic monitoring stations in the form of boreholes to be drilled up to 100m in depth and diameter of 150mm. The array stations are proposed to be drilled by a truck mounted drilling rig similar to those used for drilling water wells utilising an area of approximately 20m x 20m and would take approximately four days to complete – one day to mobilise, two days to install and one day to demobilise. Each well head would comprise of a concrete pad or collar with an inspection cover mounted flush with the ground surface located at sites away from buildings, roads and other potential sources of interference surrounded by small wooden fenced enclosures approximately 2m x 2m x 1.2m high. Excavated materials would be reused on site. Each borehole would generate approximately 3m³ of bentonite slurry waste and 0.03m³ of cement waste which would be removed off site. Each well would house seismic monitoring equipment designed to provide data on the location, extent and direction of the fractures that occur within the shale rock during hydraulic fracturing and allow the hydraulic fracturing process to be refined throughout the hydraulic fracturing activities.

The surface array would be a network of shallow buried seismic monitoring stations comprised of up to 8 shallow pits to a depth of approximately 0.8m below ground level within which sensitive seismometers would be placed. It would take two days to install each surface array point, which would be dug by hand or mini digger utilising an area approximately 20m x 20m after which they would be surrounded by a 2m x 2m x 1.2m high wooden fenced enclosure. Excavated materials would be reused on site and no waste materials would be exported off site. The monitors are designed to monitor and provide data to mitigate the level of induced seismicity from hydraulic fracturing operations so they are below a level of magnitude that will not damage buildings or infrastructure and is unlikely to be felt by people. The installation of each

surface array station would also include small junction boxes to house batteries, data logging equipment, modem and GPS units housed in a kiosk approximately 1.1m high and located between 1m and 3m from the seismometer.

There would be approximately 10 traffic movements necessary for the construction of each array point comprising 6 light vehicles for the transportation of staff and four tractors transporting drilling equipment. The completed array sites would be visited to change batteries used to power the seismometers and up to 2 light vehicle movements per day per location during the periods of hydraulic fracturing.

It is also proposed to drill three pairs of groundwater monitoring wells within the proposed site fence line but outside the impermeable liner and drainage ditches. The wells would be drilled using a small drilling rig to a depth of 20 - 30m and diameter of 150mm. Excavated materials would be reused on site. Each borehole would generate approximately 3m³ of bentonite slurry waste and 0.03m³ of cement waste which would be removed off site. It is expected each station would be constructed over a period of 3 – 5 days. Continuous monitoring devices to record ground water quality and gas concentrations in the monitoring wells would be deployed. They are designed to allow groundwater quality and ground gas base line data to be collected prior to drilling and then used during and post exploration and for an a period to be agreed following abandonment.

The applications are supported by a Planning Statement (PS), Supporting Documents, an Environmental Statement (ES) and a Non Technical Summary (NTS). The PS includes a Sustainability Appraisal and the Supporting Documents include a Flood Risk Assessment, Utilities Statement and a Statement of Community Involvement.

The ES provides a full description and assessment of the following:

- The application site and surroundings
- A description of the proposed development
- Scheme alternatives
- Air quality
- Archaeology and cultural heritage
- Greenhouse gas emissions
- Community and socio economics
- Ecology
- Hydrogeology and ground gas
- Induced seismicity
- Land Use
- Landscape and visual amenity
- Lighting
- Noise
- Resources and waste
- Transport
- Water resources
- Public health

The applicant submitted further information in support of the Environmental Impact Assessment and in response to matters raised by a number of consultees, groups and individuals. The further information relates primarily to matters raised in respect of the drill site on air quality, seismology, ecology, policy, highway matters, noise and public health although some information relates to the proposed monitoring stations, most particularly in respect of ecology, seismology and policy.

The proposed drill site and monitoring array all fall within the applicants Petroleum Exploration Development Licence issued by the Department of Energy and Climate Change.

Description and Location of Site

The surface array and buried array would all be located in rural locations within a 4 km radius of the proposed Roseacre Wood exploration site. Access to each array station would be taken either directly from the public highway via existing field access points or from existing agricultural tracks or bridleways. No new access points are proposed. Some of the access points to the array stations are in close proximity to residential properties although the stations themselves are generally well removed or even remote from sensitive properties. Some access points serve more than one proposed array station. Detailed plans of the proposed array and access points are set out in the ES (Volume 2C, Section 9 Appendix R2). A plan identifying the location of the proposed array stations is attached to this report.

The site and surrounding array stations are located within open countryside in the Coastal Plain. The area is characterised by intensively managed areas of arable, horticultural and dairy farmland although there are also small areas of mosslands and peat bogs, a small number of species rich meadows / fens and ancient woodlands. Some of the proposed monitoring points are in close proximity to Biological Heritage Sites (BHS).

Background

The proposed monitoring boreholes are in support of planning application LCC/2014/0101 (reported elsewhere on this agenda) and which includes reference to the interests in shale gas exploration in the Fylde to date. Reference is made in the ES to the opportunity to use existing monitoring boreholes installed as part of the development of a site at Annas Road providing they are suitable to use and which are included in the proposed array as part of this application; if they are not suitable it is proposed to re-drill them.

The array is proposed in support of the application for the construction and operation of a site for drilling up to four exploration wells, hydraulic fracturing of the wells, testing for hydrocarbons, abandonment of the wells and restoration, including provision of an access road and access onto the highway, security fencing, lighting and other uses ancillary to the exploration activities, including the construction of a pipeline and a connection to the gas grid network and associated infrastructure (ref LCC/2014/0101). It is proposed to develop the array in tandem with the development of the site the subject of planning application LCC/2014/0101 and before any of the wells for shale gas are hydraulically fractured to enable data to establish baseline data on naturally occurring seismicity for a period of at least four weeks before the commencement of hydraulic fracturing.

A planning application has also been submitted for the construction and operation of a site for drilling up to four exploration wells, hydraulic fracturing of the wells, testing for hydrocarbons, abandonment of the wells and restoration, including provision of an access road and access onto the highway, security fencing, lighting and other uses ancillary to the exploration activities, including the construction of a pipeline and a connection to the gas grid network and associated infrastructure at a site at Roseacre Wood, Roseacre (ref LCC/2014/0096).

An application has also been submitted to support that application for a monitoring array (ref LCC/2014/0097). It is proposed to develop the array in tandem with the development of the site the subject of planning application LCC/2014/0096 and before any of the wells for shale gas are hydraulically fractured to enable data to establish baseline data on naturally occurring seismicity for a period of at least four weeks before the commencement of hydraulic fracturing.

The two array applications are very similar in principle in terms of their purpose, design and intention. Consequently there are many common issues to the two applications in terms of their design and intention and how they have been assessed. The two reports relating to such are therefore very similar.

Planning Policy

Strategic Policy

European Policy

EU Habitats Directive

EU Directive – Control of Major Accidental Hazards Involving Dangerous Substances

National Policy

DECC About shale gas and hydraulic fracturing (fracking) 30 July 2013

House of Commons Standard Note Shale Gas and Fracking 22 January 2014

Regulatory Framework

HSE	Shale gas and hydraulic fracturing (fracking) Q&A date?
EA	Regulatory Position Statement Onshore oil and gas well decommissioning and abandonment for well prior to 1 October 2013
UKOOG	UK Onshore Shale Gas Well Guidelines – Exploration & Appraisal phase 1 February 2013
CIWEM	Shale Gas and Water January 2014

Planning Policy

National Planning Policy Framework (NPPF)

The following paragraphs are relevant with regard to the requirement for sustainable development, core planning principles, the requirement for good design, conserving

and enhancing the natural environment and facilitating the sustainable use of minerals.

Paragraphs 11-14	Requirement for Sustainable Development
Paragraph 17	Core Planning Principles
Paragraphs 56-66	Requirement for Good Design
Paragraphs 100-103	Flood Risk
Paragraphs 109-112	Conserving and Enhancing the Natural Environment
Paragraphs 118-125	Conserve and Enhance Biodiversity
Paragraphs 142-148	Facilitating the Sustainable use of Minerals
Paragraphs 186-216	Decision-making

Planning Practice Guidance (NPPG)

Air Quality	Air quality impacts
Climate Change	Mitigation and adaption measures
Design	Key design points
Flood Risk and Coastal Change	Flood Risk Assessment
Health and Well Being	Healthy communities / environmental risks
Land Stability	Risk of Unstable Land/ subsidence
Light Pollution	Obtrusive light impacts
Minerals	Mineral Extraction
Natural Environment	Protect biodiversity
Noise	Manage noise impacts
Water supply, wastewater, water quality	Quality and infrastructure

Joint Lancashire Minerals and Waste Development Framework Core Strategy Development Plan documents (LMWDF)

- Policy CS1 Safeguarding Lancashire's Mineral Resources
Policy CS5 Achieving Sustainable Minerals Production

Joint Lancashire Minerals and Waste Local Plan – Site Allocation and Development Management Policies – Part One (LMWLP)

- Policy NPPF 1 Presumption in favour of sustainable development
Policy DM2 Development Management

Onshore Oil and Gas Exploration, Production and Distribution – Supplementary Planning Document - The Supplementary Planning Document will provide guidance on the interpretation and application of the policies in the adopted Joint Lancashire Minerals and Waste Core Strategy and Site Allocation and Development Management Local Plan, describing how these policies can be applied to developments for onshore oil and gas exploration, production and distribution.

Fylde Borough Local Plan

Policy SP2	Development in Countryside Areas
Policy EP11	Building Design and Landscape Character
Policy EP12	Conservation of Trees and Woodland
Policy EP19	Protection of Ecology
Policy EP21	Protection of Archaeological interests

Policy EP23	Pollution of Surface Water
Policy EP24	Pollution of Ground Water
Policy EP26	Air Pollution
Policy EP27	Noise Pollution

Consultations

The following bodies have been consulted or made representations on the application and supporting documents as initially submitted and in some cases on subsequent information / clarification provided by the applicant in response to requests for further information on issues raised. Their views in respect of the application as initially submitted and on the clarification information provided by the applicant are summarised as follows

Department of Energy and Climate Change: No comments received

Ministry of Defence (Safeguarding): No safeguarding objection.

Fylde Borough Council: Object to the proposal as the proposed buried monitoring arrays and associated works would result in the unnecessary industrialisation of the countryside locations and would detract from the rural character of the locality. It is also considered that the harm to the rural character of the area is not outweighed by the need to provide the proposed monitoring stations as part of the proposal. In the event planning permission is approved for the proposed exploratory drilling site contrary to the wishes of the Borough Council, it is requested that any planning permission granted be limited to the monitoring equipment deemed necessary by the Department of Energy and Climate Change.

Great Eccleston Parish Council: No observations. The monitoring stations are necessary for the safety of residents.

Newton-with-Clifton Parish Council: The proposed development should be granted planning permission.

Woodplumpton Parish Council: If planning permission is granted all monitoring and safety measures should be in place. Have concerns that if a stress line is triggered, monitoring would only alert staff and it would not prevent an earthquake occurring. Request assurance that if activity is recorded by monitors that work would cease immediately and whether the data recorded by monitors would be in the public domain and open to scrutiny by the county council or an independent company other than Cuadrilla.

Kirkham Town Council: Object to the proposed exploration activities as a whole and are of the view that the benefits are outweighed by the potential major problems relating to seismicity; air, land and aquifer pollution risk; light pollution; flow back water; vehicle movements; noise; water supplies; visual impact, property values and insurance; potential future expansion and impact on local wildlife.

Medlar-with-Wesham Parish Council: Object to the proposed exploration activities as a whole and are of the view that the benefits are outweighed by the potential major problems relating to seismicity; air, land and aquifer pollution risk; light pollution; flow back water; vehicle movements; noise; water supplies; visual impact,

property values and insurance; potential future expansion and impact on local wildlife.

Health & Safety Executive: The proposed operations will be conducted in accordance with recognised regulations standards and good industry practice. From a well's operations perspective the Executive has no issues or concerns with the proposals

Public Health England (PHE): makes extensive comments regarding both the planning applications. PHE agrees with the proposals to undertake baseline monitoring. However, details of the schedule for monitoring of gas and groundwater (e.g. frequency and duration) including base line data should be provided with the Environmental Management and Monitoring Plan. Details of what constitutes significant variation to baseline data resulting in the suspension of activities and subsequent investigation should be provided as part of the Environmental Management and Monitoring Plan.

Environment Agency: No objection in principle. In the event permits are issued for application LCC/2014/0101 they would include a need for monitoring.

Some of the proposed monitoring stations are located close to watercourses which are designated as Main Rivers and are subject to Land Drainage Bylaws. The proposed arrays that may fall within 8m of a Main River are identified and works within 8m of such may require prior written consent.

Highways Agency (HA): No objection – there would be no significant impact on the strategic road network in the area, namely the A583 (T).

National Air Traffic Services: No safeguarding objection.

Civil Aviation Authority: No objection

Blackpool Airport Ltd: Initially objected but subsequently raises no objection to the proposed drilling site subject to satisfactory bird mitigation that would not compromise safety standards. (no specific comment received in respect of the proposed array).

National Grid Gas: National Grid has apparatus in the form of national gas transmission pipelines and associated equipment, electricity transmission and overhead lines and above ground electricity sites and installations in the vicinity of the proposed works. Prior consent would be required where any such infrastructure would be affected.

United Utilities PLC: No objection subject to conditions being imposed requiring the submission of a method statement to ensure the protection of UU assets in the highway.

Police Emergency Planning: No comment

Natural England: Initially objected to the proposal due to there being insufficient information to demonstrate that the requirements of Regulations 61 and 62 of the Habitats Regulations had been considered and that the consultation did not include a

Habitats Regulation Assessment. Further information in respect of air quality and SPA birds was requested. The objection was withdrawn following the submission of additional information and a Shadow Habitat Regulation Assessment by the applicant.

The Campaign to Protect Rural England: Any further 3d surveys should be carried out using the most up to date technologies such as a fibre-optic array rather than any older less sensitive or reliable technology such as an electromagnetic geophone array and that should planning permission be granted a condition requiring such be imposed.

RSPB: Believes the regulatory regime for fracking is not fit for purpose and support the concerns of Natural England regarding the impacts on winter wildfowl.

Wildlife and Wetlands Trust: Object to the principle of fracking and in particular the potential risk to wildlife, weaknesses in the current regulatory framework, long term risk of damage to nature and water quality, continued reliance on green house gases and associated threats to the natural environment and to economic and social well being.

LCC Developer Support (Highways): No objection. An assessment of impacts of the proposed access routes on traffic Flows, Vulnerable Road Users - Cyclists, Pedestrians & Equestrians; and safety has been carried out. Access to the monitoring points from the A583 Preston New Road from both the Preston and Blackpool directions as well as utilising the M55 via junctions 3, near Medlar, and Junction 4 (Peel Hill) and the subsequent use of the local network is not expected to generate traffic flows in volumes that will be of a material concern. Vehicles should not park or obstruct the highway network during monitoring at any location.

Some of the proposed access points affect Public Rights of Way (PROW). A condition survey and monitoring regime should be put in place at each proposed monitoring site to ensure the condition of the local highway including Public Rights of Way (PROW) in the vicinity of the each site is monitored and maintained and any damage rectified at the applicants expense and which should be the subject of a condition. Conditions are also proposed requiring any, access and off-site highway works to be constructed in accordance with the details approved and the submission of a management plan. A number of informatics to the applicant are also proposed.

LCC Emergency Planning: The applications are outside the DEPZ for the nearest REPPIR site but are in the thermal hazard range of the major hazard gas pipelines in that area – probably for eventual linking into the system should production (*at the main site*) go ahead.

LCC Public Rights of Way: The following public rights of way are affected:

011 Site H02 affects Public Footpath 05-13-01

017 Site H08 affects Public Bridleway 05-08-12. Access to the site is along a Public Bridleway

020 Site 147164 affects Public Footpath 05-06-01

023 Site 147162 affects Public Footpath Monitoring station appears to be on the Public Right of Way 027 Site 147141 affects Public Footpath 05-06-09

028 Site 147136 affects Public Footpath 05-13-04

029 Site 147152 and 147158 affects Public Footpath 05-13-01

030 Site 147127 affects Public Footpath 05-13-05

033 Site 147118 affects Public Footpath 05-06-05

034 Site 147142 and 147134 affects Public Footpath 05-08-04a

Map of Public Rights of Way only records a public right of way on foot for the above listed public rights of way and in 2 cases a public right of way is recorded for pedestrians, equestrians and cyclists. Any person taking a motorised vehicle along a public footpath or bridleway without lawful authority commits an offence. Where lawful authority is given the driver of the vehicle is still subject to the provisions of the Road Traffic Act 1988. Typically the use of a public footpath by vehicles has a detrimental effect on the surface.

With respect to Site With regards to Site 147162 (Plan 023) further details are needed with regards to the site layout as the proposed site appears to be on a public right of way. This needs to be brought to the attention of the applicant.

The applicant needs to inform staff and contractors as to their responsibilities when using motorised vehicles on public rights of way and this is something that should be covered by a risk assessment. The applicant will need to assess and record the condition of the surface prior to construction and monitor the condition of the surface of the public rights of way whilst the routes are in use by the applicants vehicles or there contractors. The applicant should confirm what measures will be taken to mitigate wear and tear on the public rights of way surface.

Public Rights of Way must not be obstructed during the proposed development. It is the responsibility of the landowner to ensure that the necessary procedures are followed for the legal diversion of the Public Right of Way if this should be necessary. The granting of planning permission does not constitute the diversion of a Definitive Right of Way. If it is necessary for Public Rights of Way to be temporarily diverted or temporarily closed, this is the responsibility of the landowner to ensure that this is done following the appropriate legal procedures. A temporary closure will only be granted where it is the intention to re-open the right of way upon expiration of the closure on the route recorded on the Definitive Map of Public Rights of Way.

The Town and Country Planning Act 1990 has provision for diverting Definitive Public Rights of Way if a diversion is necessary to allow the development to take place. The Highways Act 1980 also has provision for the diversion of Definitive Rights of Way, though with regards to new developments, the Town and Country Planning Act 1990 is the appropriate legislation to use. It should be noted by the applicant that objections may be raised using either of the above Acts. Lancashire County Council Public Rights of Way Team will not process a diversion application in relation to these paths in connection with a development proposal. Should the paths be obstructed during the development or be obstructed after the development has taken place this would constitute a criminal offence against which action may be taken. The development must not commence until the necessary procedures are in place, either allowing the development to take place without affecting the right of way as recorded on the Definitive Map of Public Rights of Way and subsequent diversion orders and side roads orders, or if it is necessary to divert the above listed Public Rights of Way, then the necessary Orders must be confirmed prior to construction to avoid enforcement action should the above Public Footpath become affected. There is no provision under the Town and Country Planning Act 1990 to allow a

retrospective diversion of paths that are already affected by either partially completed or completed development.

LCC Specialist Advisory Services:

Landscape: Due to their small scale and understated appearance the proposed temporary surface and buried arrays would have only localised and very minor landscape and visual effects. In addition there would be, on average, a separation distance of approximately 0.5km between them which would be far enough to significantly mitigate any cumulative effects. The proposed temporary surface and buried arrays would likely not have any significant landscape and visual effects either individually or in combination with other structures.

Ecology: The proposed monitoring array could have impacts on great crested newts, bats, badgers, water voles, ground nesting birds, reptiles, common toads and brown hare although not in a way that could not be managed or mitigated.

Prior to the commencement of works, a Biodiversity Mitigation Strategy shall be submitted for approval in writing and subsequent implementation in full and maintenance thereafter. The scheme shall include, but not be limited to, details of measures for the avoidance/ mitigation of impacts on protected and priority species (amphibians, bats, nesting and wintering birds, badgers, reptiles, water vole, brown hare) and their habitat during construction and operation of the development.

Prior to the commencement of works, a revised Ecological Mitigation Strategy (landscaping, habitat creation and enhancement) shall be submitted for approval in writing and subsequent implementation in full. The Strategy shall provide details of the creation and enhancement of habitats to offset hedgerow losses and to compensate for impacts on the habitat of protected and priority species. A revised habitat mitigation (Ecological Mitigation Strategy) and species mitigation (Biodiversity Mitigation Strategy / CEMP) should be secured by planning condition.

Archaeology: The Archaeology and Cultural Heritage chapter of the ES has been undertaken in line with the requirements of the County Archaeology Service (LCAS). LCAS agrees with the assessment that the site has a low potential to contain previously unknown archaeological finds or features. The proposed mitigation measures are considered to be appropriate. LCAS recommend therefore that should the application be approved a condition is attached that development should not take place until the implementation of a programme of archaeological work is secured.

Director of Public Health: Has undertaken a Health Impact Assessment on the two main drill sites and identified that the key risks to health and wellbeing of the population from the two proposed sites are a lack of public trust and confidence in the regulatory process and the industry, stress and anxiety from uncertainty about the industry that could lead to poor mental wellbeing; potential noise related health effects due to continuous drilling for at least five months for the initial borehole on each site and for three months for each of the subsequent three boreholes per site (14 months of continuous drilling), and potential health risks due to the presence of mining wastes generated as part of the drilling and hydraulic fracturing process being retained on site if adequate off site treatment facilities are not found.

A number of key recommendations to inform the planning process include:

1. Consider the need for further noise assessment, particularly on the proposed Roseacre Wood site and if necessary, require additional mitigation measures to reduce noise associated with the development of the sites and more particularly the drilling and hydraulic fracturing phases of the development and which could be controlled by conditions attached to any planning permission.
2. Establish with the Applicant that liability and compensation arrangements are in place to cover any structural damages to properties that can be attributed to an unlikely event of induced seismicity.
3. Undertake an independent verification of the assessment of air quality, transport, waste management and induced seismicity prior to determining the planning applications.
4. Seek agreement with the Applicant to establish an independent comprehensive baseline and on-going long term monitoring of environmental and health conditions prior to any activity on the sites.
5. The Director of Public Health should be informed of the results of the measurements and any breaches to the planning condition or environmental permit.
6. Consider the need to seek further clarification from the Applicant that the cumulative impacts of the operations from the flare, generators, vehicles and drilling will not exceed the national air quality objective thresholds, particularly for PM10, 24 hour mean levels.
7. As part of either the planning or permitting process, the Applicant should be required to submit regular data on the ambient air quality on site measuring all the common air pollutants relevant to the activity and report them regularly. PM10 and PM2.5 should be reported separately.
8. The Roseacre Wood site is within 55m of a National Grid gas transmission pipeline. Interconnections into national transmission pipelines are proposed at both sites. Advice should be sought and an assessment undertaken as to whether the nearby gas transmission pipelines are considered to be a major hazard.
9. Any extended flow testing provided for by any planning permissions should be aligned with the permits to be issued by the Environment Agency.
10. An assessment of light pollution as part of the site operations should be carried out, and if there are likely to be significant impacts associated with light pollution from the sites that cannot be mitigated or controlled, the Applicant should be requested to consider the opportunity to offer to fit blackout blinds to those homes most likely to be affected.
11. Further clarification or new information on the occurrence and magnitude of equipment likely to be contaminated with radioactive waste and how such waste would be managed on the site and disposed of should be sought.
12. Should planning permission be granted, it should be a pre requisite that no activity can start until the onsite and offsite waste treatment capacity is defined.
13. Further clarification should be sought that any specific risks due to using the MOD site for accessing the Roseacre Wood site have been addressed before any planning permission is granted.
14. A full assessment of the impacts of additional traffic associated with the proposals on road safety should be carried out and appropriate traffic management options considered to address the public concerns, particularly in respect of the Roseacre Wood site.
15. Should planning permission be granted, provision should be made with the

applicant to maintain road safety, particularly on the access routes to Roseacre Wood site and road safety and any related incidents on the access to both the sites should be monitored.

16. In the event planning permissions are granted, any breach of planning conditions should be reported to the Director of Public Health so that necessary steps can be taken in protecting and improving the health of local communities from issues arising due to the alleged or identified breaches of planning control.

Indicative framework for long term monitoring of environmental and health conditions

1. Context

It is understood that a range of data will be collected by the operator and reported to the regulatory authorities, particularly the EA. What this will constitute is not available to LCC's public health department until the environment permit, planning condition and environmental operating standards are agreed. This document is written with that gap in knowledge. Following the Applicant's surrender of the permit to the EA (who must be satisfied that environmental conditions are acceptable and will remain so before accepting the surrender), current practice suggests there will not be a requirement for long term monitoring of the environment in and around the restored sites of former wells. Establishing a shale gas monitoring unit in Lancashire as an independent source of reliable information will help with the understanding of any environment and health impacts and the communication of risks to the local communities. It will also support the development of future policy and practice of shale gas extraction.

2. Aim

To establish an independent, reliable, single source of local information on shale gas exploration in Lancashire.

2.1 Objectives

- To develop a framework to establish a baseline and ongoing monitoring of environmental and health conditions.
- To support risk communication and reassurance to local communities on the safety and impacts of shale gas activities in Lancashire.
- The governance and management of the shale gas observatory should be determined in consultation with various stakeholders including the local communities, the industry, and the regulatory agencies.

3. The framework for data collection

It is expected that most of the data will be collected under the existing regulatory regime. Hence, the focus should be collating the data in one place with independent verification, analysis and communication of risks to the public in a transparent, reliable and proportionate manner.

Both qualitative and quantitative methods of data collections should be used. It is anticipated that the data collection will start prior to any activities beginning if the applications are approved. It will mainly focus on the geographical area affected by

the two planning applications. This is currently understood to be approximately a 2 kilometres radius from the proposed location of the well pads.

The time period for long term monitoring should be at least 30 years post abandonment or until such time there is national guidance on long term monitoring. The suggested 30 year time period is based on the long term monitoring of landfill gas migration.

3.1 Data collection and analysis (an indicative list)

- Profiling of drill cuttings, fracturing fluids to identify substances hazardous to human health including NORM.
- Information on decontamination of equipments.
- Characterisation of the extent of fracture propagation and the permeability of layers above and beyond the faults.
- Characterisation of combustion gases at the flare, particularly the levels of hydrocarbons, radon, methane, volatile organic compounds and any other substances deemed hazardous to human health.
- Levels of fugitive emissions at well pads, on potential pathways and at receptor households.
- Ground water monitoring of methane.
- Measuring long term well integrity.
- Particulate Matter at source and confirmation of the modelling findings for receptors in the ES.
- Levels of noise at source and receptors.
- Information on any existing private water supplies that aren't covered by abstraction license within 2 km zone.
- Sampling of ground/food chain.
- Information on local climate within the 2 km zone to identify potential hotspots.
- Safety profile of transport routes and modelling to minimise road traffic accidents.
- Safety profile of waste management sites.
- Household survey of human health and wellbeing, and sampling of environmental conditions within the 2km zone. The sampling to be based on modelling from source data.
- Survey of any other sensitive receptors in the vicinity of the two sites.
- Analysis of routinely collected data on health and health care utilisation.
- Analysis of occupational health surveillance data collected by the operator.

Representations – The application has been advertised by press and site notice, and neighbouring residents informed by individual letter.

Friends of the Earth: Object to both applications for the reasons summarised in the report for application LCC/2014/0101 and which primarily relate to the unacceptability of reliance on hydrocarbons as an energy source and the unacceptable environmental and social impacts associated with such. Specifically in respect of the proposed monitoring array some are in very close proximity to Medlar Woods, Medlar Ditch and Wesham Marsh Biological Heritage Sites, with four within 120-200m. The BHS's are only 2-3.1km from the main site and yet have not been considered further in relation to site operations and potential disturbance in the report. 14 of the monitoring array sites are moderate potential and one high for

wintering birds there is a view that evidence has not been provided that the site and arrays have only 'local' value for wintering birds.

Sixty letters of representation have been received objecting to the proposal for the following summarised reasons, many of which object to fracking and associated impacts in general as well as being specific to the proposed monitoring array:

- Oppose fracking in principle and distrust the applicant.
- The application should be refused if the application for the drilling site is refused due to their interrelationship.
- Will introduce more traffic and lead to the industrialisation of a rural area with permanent development.
- The monitoring stations affect public rights of way (array stations 147148, 147152 and 147158).
- Access to three of the proposed array is via a single track access shared by access to residential properties (Stanley Mews) and a public footpath. This would lead to conflict and danger to residents using the track during the construction phase which could take up to 4 weeks.
- Unacceptable impact on land and property.
- Will have a negative effect on reducing greenhouse gases.
- Fracking will cause air, surface and ground water pollution with emissions to atmosphere from the flare stack and the need to manage polluted water.
- Two of the stations would be in close proximity to Medlar Meadows and Medlar Ditch BHS sites designated in view of the presence of water voles. The ES is inadequate in that it has not properly assessed the ecology of the area for bats, breeding birds, amphibians and wintering birds.
- Fracking will lead to adverse health impacts particularly stress and anxiety and a number of health studies in America are referenced.
- Risks from seismological movement and damage to property.
- If the application is approved then by implication so would application LCC/2014/0101 and which would be a foot in the door for more similar developments.
- Would adversely affect agricultural land, water courses and the environment.
- Contrary to Fylde Borough Council Objective 1.50 (no2) 'to limit development in the open countryside, to that appropriate to a rural area and necessary for the well being of the rural community.'
- Local opinion in opposition to fracking should be supported. The applicant has no 'social licence' to propose developments of this nature in this area.
- There is some confusion over the size of the construction platforms and the use of concrete. If a 20mx20m square concrete pad is to be retained they would have an unacceptable cumulative impact on the environment
- Contrary to the polices of the development plan – Policy EP24, SP2, SP5, SP7, SP9, EP26, EMP5, EP11 and EP15 of the Fylde Local Plan and Policy DM2 and CS5 of the LMWP.
- Would have an adverse impact on the amenities of the area and adversely affect its attractiveness to tourists.
- The 80 deeper monitors are only to provide data to the applicant and only 8 will actually inform the traffic light system. The type of array chosen is considered to be permanent and for which there are better alternatives and no restoration proposals.

- There would be an unacceptable cumulative impact on the ecology of the area and in particular fails to take into account the presence of nesting buzzards in Nigget Wood or the presence of Great Crested Newts (array station 147148).
- The water monitors should be an integral part of the drilling site application.
- The application is not for mining or quarrying and therefore should be determined by Fylde Borough Council.
- No planning permission should be granted until outstanding matters at Preese Hall have been addressed.

Roseacre Awareness Group: The Group represents over 100 local residents who object to the project as a whole and set out their reasons for objecting to both the project and the proposed monitoring array. The majority of the reasons for objecting relate to the development of the proposed drill site and the associated drilling and fracking and that the project as a whole is contrary to national and local plan policy. However, with regards specifically to the proposed monitoring array, the group is of the view that the actual area and number of seismic arrays is considerable and that the impacts on the environment and ecology have not been adequately addressed. In particular impacts on European Protected Species namely great crested newts, barn owls, bats and nesting birds have not been adequately addressed. With regard to great crested newts, 14 of the array sites have been identified as having high potential for supporting breeding great crested newts. The claim that the nearby grassland is low risk is contrary to the English Nature Report: Great Crested Newt Mitigation Guidelines, August 200. LEARN records do not appear to have been taken into account with regard to breeding populations in proximity to Stanley Farm. No surveys for great crested newts have been carried out in respect of the proposed passing places to cater for HGV traffic. With regard to barn owls, no survey was carried out despite a long term presence in the immediate vicinity of the drill site whilst LEARN holds records of four separate sightings of barn owls. Barn owls would be affected by the development. With regard to bats the applicant has identified certain trees have roost potential but have not been surveyed; seven of the array sites have potential for bat foraging and 71 of the sites have potential for bat foraging but no surveys have been carried out; the use of hedgerows for foraging and commuting have not been taken into account; Bucks Wood (BHS) was noted as being historic woodland and on the proposed traffic route but not surveyed despite extensive records. With regard to breeding birds, the cumulative impact may not have properly been assessed. 80 of the array points are listed as having potential to support breeding birds and in close proximity to hedgerows where birds will breed. It is unclear when the array would be constructed and what impact the construction may have on breeding birds. With regard to wintering birds Fylde Bird Club data does not appear to have been used. Further assessment should be undertaken. The justification for the array is ambiguous as only some of the stations are actually required to detect seismic occurrences (in the public interest) whilst the rest are directly for the benefit of the operator's business. The noise assessment for the site is flawed, uses the wrong standards and consequently may have failed to identify accurate baseline noise levels meaning those impacts on wintering birds (and other ecology) and the steps to mitigate are called into question. A further assessment should be required.

Chamber of Commerce East Lancashire: Supports the proposed development application which will contribute to provide energy and a buffer against volatile imports and bring well being and prosperity to Lancashire.

One letter has been received which raises no objection to one of the proposed array stations in close proximity to their property.

A representation (Glasgow University) in support of the proposals considers that the microseismic monitoring are appropriately designed and are necessary for monitoring the fracking process in the boreholes and recommend if granted conditions requiring:

- The data and results of the microseismic monitoring be made available to appropriate specialists with suitable track records for analysis and such analysis to include estimation of the strength of ground vibration at points at the Earth's surface to determine whether any unacceptable nuisance has affected any of the local population.
- All data and results from the drilling and microseismic monitoring to be published, maybe after an embargo period of say 3 years.
- The applicant to pay for the analysis of the drilling and microseismicity data.

Advice

Planning permission is sought for the installation of an array of monitoring boreholes within a 4 km radius of the proposed Roseacre Wood exploration site. The array would comprise of 80 surface and buried seismic monitoring stations, 8 surface seismic monitoring stations and three pairs of groundwater monitoring wells.

The array is proposed in support of the application for the construction and operation of a site for drilling up to four exploration wells, hydraulic fracturing of the wells, testing for hydrocarbons, abandonment of the wells and restoration, including provision of an access road and access onto the highway, security fencing, lighting and other uses ancillary to the exploration activities, including the construction of a pipeline and a connection to the gas grid network and associated infrastructure (ref LCC/2014/0101). It is proposed to develop the array in tandem with the development of the site the subject of planning application LCC/2014/0101 and before any hydraulic fracturing takes place to enable data to establish baseline data on naturally occurring seismicity for a period of at least four weeks before the commencement of hydraulic fracturing.

Three pairs of groundwater monitoring wells are proposed to be drilled up to a depth of 20 - 30m within the proposed site fence line but outside the impermeable liner and drainage ditches.

The applications are supported by a Planning Statement (PS), Supporting Documents, an Environmental Statement (ES) and a Non Technical Summary (NTS). The PS includes a Sustainability Appraisal and the Supporting Documents include a Flood Risk Assessment, Utilities Statement and a Statement of Community Involvement.

The application for the development of the drilling site is reported elsewhere on the agenda and a full assessment of the proposal and impacts associated with such has been undertaken. The ES has been prepared in respect of both applications but inevitably there is more assessment of the proposed drilling operations the subject of application LCC/2014/0101. The ES presents an over view of the proposal in respect

of the sources of natural gas, the exploration and appraisal of the Bowland Shale, provides details of the site locations, the context, geology, hydrogeology and hydrology, a development summary, sequencing of activities, surface and below ground works, monitoring arrays, construction of the well pad and access track, well design, fracturing, flow testing, extended flow testing, decommissioning and restoration.

The ES sets out the scheme alternatives and why the sites for drilling were selected which principally relate to interpretation of geological information gleaned from a 3D geological survey demonstrating the makeup of the geology and the most attractive areas of geology to undertake further investigations. This selection process along with the direction of drilling has determined the nature and location of the proposed monitoring array. The ES undertakes an assessment of the proposed drilling site and array in respect of a number of subject areas. The conclusions of the assessment in respect of the monitoring array are summarised as follows:

- Air Quality – the assessment concludes that there would be no significant impacts on air quality associated with the installation of the surface and buried array due to the location of such, limited earth works and vehicle movements.
- Archaeology and cultural heritage – none of the proposed locations for the surface or buried array fall within the boundary of a designated heritage asset or within 100m of non-designated asset or find spot. The ES concludes that the installation of the array would have no significant effect and would not have any cumulative significant effect and no mitigation is proposed.
- Greenhouse gas emissions: for the purpose of the array these would be restricted to vehicles accessing the sites for installation purposes and then for access associated with monitoring. It is expected that greenhouse gas emissions attributable to the installation of the array would be derived from vehicle movements and which would equate to 1% of the project carbon footprint. Consequently no emission mitigation measures have been identified.
- Community and socio economics: for the purposes of the array, a small team of specialists would carry out the installation works over a short period of time and which are unlikely to generate any community or socio economic costs or benefits to the area.
- Ecology: an extensive ecological assessment for the proposed well site and array has been carried out including field surveys, habitat surveys, surveys for badgers, water voles, bats, amphibians, ornithological, wintering birds and breeding birds. An ecological baseline appraisal was carried out for each of the array stations involving walk over surveys and assessment relating to the potential for wintering birds. Wintering bird surveys were undertaken for all the array stations that were considered to have moderate or high potential for wintering birds. The site and surrounding array stations are located within the Coastal Plain. The area is characterised by intensively managed areas of arable, horticultural and dairy farmland although there are also small areas of mosslands and peat bogs, a small number of species rich meadows / fens and ancient woodlands. Due to the areas proximity to the Ribble and Wyre estuaries the area is visited by large flocks of wintering wildfowl. Which feed and roost on farmland on the coastal plain. Numerous field ponds support great crested newts and water voles populate field drains and water courses. There are no statutory designations within the maximum extent of the surface and buried array stations. Whilst there are three Biological Heritage Sites

(BHS) within the 4km search radius covering the maximum extent of the array stations (Medlar Meadows, Medlar ditch and Wesham Marsh) none of the proposed stations are located within a BHS with 3 proposed stations being within 200 or 300m of such. Using the County Councils ecological records (LERN), no protected or notable species were identified within a proposed array station or within the immediate vicinity although great crested newts, water voles, otters, barn owls, bats and badgers were identified within the search radius surrounding the array stations with a possibility for the presence of white clawed crayfish in some of the larger field drains. Brown hares have been recorded as well as the presence of a number of BAP bird species. Only one array site was identified as having high potential for wintering birds at which winter surveys were carried out. 74 of the array sites were identified as having low potential for wintering birds and 13 of moderate potential. It is concluded that due to the small footprint of the array and their positions adjacent to boundary features that the construction of the arrays would not lead to any loss of habitat which supports wintering wildfowl but that there could be potentially significant impact during installation works at 2 of the array sites. In terms of habitats, there would be some risk to ground nesting birds during installation activities. To mitigate the potential impacts on wintering wildfowl it is proposed to construct the arrays outside the wintering bird season. Pre start checks would be made in respect of nesting birds or vegetation would be managed in advance to make sure the area is not suitable for nesting birds. In respect of breeding and wintering birds, monitoring data is proposed to be collected and down loaded remotely preventing the need for vehicles to approach the arrays thereby reducing the potential for disturbance. Whilst some access will be required (e.g. to change batteries), this would be minimised by the employment of best practices.

- Hydrogeology and ground gas: An extensive assessment of the geology of the area has been undertaken and the potential presence of gas and ground water identified. It is proposed to establish the pre-development (baseline) condition of the site for ground gas and ground water by the construction of three ground gas monitoring wells around the proposed well pad perimeter. In respect of the surface and buried array management will be employed during construction works to contain potential contaminants arising from suspended sediment from exposed soils and diesel or lubricants from vehicles to ensure any risk is low. Subject to the employment of such measures it is concluded that the risk to water courses, human health through exposure to contaminated surface water or soil, crops or livestock and ground water associated with the array is low/not significant.
- Induced seismicity: The installation of the surface and below ground array would comprise construction activities at various locations; there is no mechanism for induced seismicity in the construction of either and therefore no effects. The array is designed to record induced and natural seismicity and provide a baseline of background seismicity for the site which would be recorded for at least 4 weeks prior to the commencement of fracking operations and thereafter throughout any hydraulic stimulation as part of the proposed traffic light system to be employed.
- Land Use: An assessment of the impact of the project on agricultural land uses in and around the drill site has been undertaken. The construction of the array would result in a temporary short term impact on farm land. The duration and scale of the construction of the array are such that the potential impact is considered to be negligible and not give rise to a significant effect.

- Landscape and visual amenity: A full landscape assessment has been carried out for the proposed drilling site and the proposed monitoring array. The sites for the monitoring array have been selected following an interactive design /micro siting process to select the least visually intrusive locations for array's, especially in respect of the significant adverse visual effects for users of footpaths. The assessment concludes that the construction of the surface and buried array would only have a minor very localised, low key physical change to the landscape character in discrete areas and no further mitigation would be necessary. Similarly there would be only temporary, very localised and negligible effects on visual receptors accessible by the public confined to routes followed by public rights of way and consequently no further mitigation is considered necessary.
- Lighting: An assessment of the proposed lighting and impacts of such for the drill site and monitoring array has been carried out. It is intended for the surface and buried array to be installed in the daylight and therefore there would be no impact. In the event installation were to extend to twilight hours lighting may be required for a very temporary period at localised points. If this were to be the case lighting would be confined to the task area, orientated away from any dwellings and a curfew operated to minimise the duration. The impacts are therefore considered to be not significant. Mitigation measures would be set out in a Method Statement detailing best practices and working methods and would provide for no work to be carried out within 10m of tree canopies, 6m of a watercourse, monitoring in advance for the presence of and potential location of great crested newts, the installation of the monitors outside the winter wild fowl season, and protection of breeding birds.
- Noise: A full noise assessment for the site and monitoring array has been carried out. The assessment for the surface and buried array is based on a qualitative review of the plant, machinery, equipment and processes required to install them. The assessment concludes that given the nature of the plant to be used and the short duration of such in the locations proposed there would be no significant effects from noise and no mitigation is required.
- Resources and waste: A full assessment of the resources and waste associated with the drill site and the surface and below ground array has been undertaken. In terms of the construction of the ground water monitoring boreholes, surface and buried arrays, soil and stone would be 'non waste' and be retained and reused on the site. Cement and general waste would be non hazardous and would be recycled where feasible or disposed of to landfill. Developing each of the ground water monitoring boreholes and buried array would generate 3m³ of bentonite slurry (and 0.03m³ of waste cement) which would be disposed at a specialist facility. Any contaminated materials from oil or diesel would be treated as hazardous and either recovered or disposed of at a specialised facility.
- Transport: A full traffic assessment has been carried out for the drill site and monitoring array. For the purposes of the monitoring stations, access routes from the highway network have been identified with a view to minimising the length of the route from the highway network and using existing highway access points where practical. Installation of the surface and buried array will be constructed using a rig that will be towed onto the site by a tractor or similar with two support vehicles. Traffic flows would be negligible over the short installation phase and thereafter 1 – 2 light vehicles per week. Due to the low level of traffic involved the assessment concludes that there would be a neutral effect on traffic and highway users thus not requiring any mitigation.

- Water resources: An assessment of the drill site and monitoring array effects on water supplies and surface water runoff or drainage and the consequent risk of flooding. For the purposes of the array the effects have been assessed on any water usage from installation activities and any increased runoff from the installation of the surface and buried arrays due to a change in impermeable surface through alteration in ground / surface materials. The installations are small and not susceptible to flooding and do not alter ground levels or alter the current level of flood risk. There would be no requirements for water supplies as part of their construction or operation. If water were to be required it would be brought in by bowser. The assessment concludes the predicted environmental effects to be negligible and not significant.
- Public health: Consideration has been given to public health concerns associated with the project on communities and groups of the population rather than individuals. The overview is based on issues raised by Public Health England's (PHE) request to ensure that a chapter in the ES should indicate where public health related issues have been covered by different sections of the ES such as air quality, socio-economics and community and hydrogeology and ground gases. PHE set out a number of recommendations relevant to the exploration and appraisal activities. Some of the recommendations relate to baseline and environmental monitoring and socio-economic impacts such as increase traffic and impacts on local infrastructure are relevant to the proposed monitoring array. Health topics including noise, air quality, water (surface and ground water), perception effects, effects on community facilities and social networks and physical activity have been considered. The assessment concludes in respect of the project and not specifically in respect of the array which it has been concluded would not have any impacts. Nevertheless, it concludes that the project would not have any significant effects on health.

The proposed development of both the site and associated array at Roseacre Wood is considered to fall within the definitions of both 'exploration' and 'appraisal' as set out in Planning Practice Guidance (PPG): Minerals.

The main material planning considerations are whether:

- There is a need for the development.
- The development is acceptable in terms of highway capacity and road safety.
- The development is acceptable in terms of impact on amenity and public health.
- The development is acceptable in terms of impacts on the water environment.
- The development is acceptable in terms of impact on landscape.
- The development is acceptable in terms of impacts on ecology.

It should be noted that even though the application is submitted in support of planning application LCC/2015/0101 and is addressed as part of the EIA, in itself it does not constitute EIA development and irrespective must be considered on its own merits.

Policy

The NPPF sets out the Governments' policies and how they are to be applied. Whilst it does not form part of the development plan it is a material consideration when

determining planning applications. Paragraph 144 gives great weight to the benefits of mineral extraction including to the economy, ensuring there is no unacceptable adverse impacts on the natural and historic environment, human health or aviation safety, take into account cumulative impacts mitigating unavoidable noise, dust and vibrations and providing for high standards of restoration at the earliest opportunity.

The NPPF sets out a presumption in favour of sustainable development and approving development that accords with the development plan providing development protects and enhances the natural and local environment, that pollution and other adverse effects are minimised, that new development is appropriate for its location taking into account impact of pollution on health and the environment, that impact of noise health and quality of life are mitigated and which can be achieved by the use of planning conditions.

Planning Practice Guidance

Planning Practice Guides (PPGs) were first published in March 2014 to accompany the NPPF. As with the NPPF, these are a material consideration in considering planning applications.

PPG: Minerals (March 2014) sets out the Government's approach to planning for mineral extraction in both plan-making and the planning application process.

Paragraph 12 sets out the relationship between planning and other regulatory regimes noting that "*the planning system controls development and the use of land in the public interest*" including ensuring development is appropriate for its location and an acceptable use of land. Significantly it notes that "*the focus of the planning system should be on whether the development itself is an acceptable use of the land and the impacts of those uses, rather than any control processes, health and safety issues or emissions themselves where these are subject to approval under regimes. Mineral planning authorities should assume that these non-planning regimes will operate effectively.*"

Paragraph 13 sets out the environmental issues minerals planning authorities should address including noise, air quality, lighting, visual impact, traffic, risk of contamination to land, geological structure, flood risk, impacts on protected landscapes, surface and in some cases ground water issues, and water abstraction.

Paragraph 14 sets out issues which are for other regulatory regimes to address. For hydrocarbon extraction this links to paragraphs 110 to 112 which sets out the key regulators in addition to the Mineral Planning Authority, namely:

- Department of Energy and Climate Change (DECC): issues petroleum licences, gives consent to drill, responsibility for assessing risk of and monitoring seismic activity, grant consent for flaring or venting.
- Environment Agency: protect water resources (including groundwater aquifers), ensure appropriate treatment of mining waste, emissions to air, and suitable treatment/management of naturally occurring radioactive materials (NORMs). Assess chemical content of fluids used in operations.
- Health and Safety Executive: regulates safety aspects of all phases of extraction, particularly ensuring the appropriate design and construction of a well casing for any borehole.

Paragraph 17 notes that the cumulative impact of mineral development can be a material consideration in determining planning applications.

Paragraphs 91 to 128 relate specifically to hydrocarbon extraction.

Paragraph 93 notes that planning permission is required for each phase of hydrocarbon extraction, while paragraph 94 notes that applications can cover more than one phase and paragraph 118 notes that both vertical and horizontal drilling can be included in one application.

Paragraph 95 explains that the exploratory phase of hydrocarbon extraction:

"seeks to acquire geological data to establish whether hydrocarbons are present. It may involve seismic surveys, exploratory drilling and, in the case of shale gas, hydraulic fracturing."

Paragraph 100 explains that the appraisal phase

"...can take several forms including additional seismic work, longer-term flow tests, or the drilling of further wells. This may involve additional drilling at another site away from the exploration site or additional wells at the original exploration site...Much will depend on the size and complexity of the hydrocarbon reservoir involved."

Paragraph 124 states that Mineral Planning Authorities should take account of Government energy policy 'which makes it clear that energy supplies should come from a variety of sources' including onshore oil and gas. It also refers (and electronically links) to the Annual Energy Statement 2013 which notes, among other things, that the UK needs to make the transition to low carbon in order to meet legally-binding carbon emission reduction targets (paragraph 1.2) and that levels of production from the UK continental shelf are declining so the UK will become increasingly reliant on imported energy (paragraph 1.3). The three stated priorities in delivering the UK's energy policies in the near term are:

- *"helping households and businesses take control of their energy bills and keep their costs down;*
- *unlocking investment in the UK's energy infrastructure that will support economic growth; and*
- *playing a leading role in efforts to secure international action to reduce greenhouse gas emissions and tackle climate change."* (paragraph 1.6).

Paragraph 3.69 states:

"With oil and gas remaining key elements of the energy system for years to come (especially for transport and heating), the Government is committed to maximising indigenous resources, onshore and offshore, where it is cost-effective and in line with safety and environmental regulations to help ensure security of supply."

Other PPGs

PPG: Air Quality notes that when deciding whether air quality is relevant to a planning application, considerations could include whether the development would (in summary): significantly affect traffic (through congestion, volumes, speed, or

traffic composition on local roads); introducing new point sources of air pollution; give rise to potentially unacceptable impact (such as dust) during construction; or affect biodiversity (paragraph 5).

PPG: Climate Change notes that addressing climate change is one of the core land use planning principles the NPPF expects to underpin decision taking.

Section 38 (6) of the Planning and Compulsory Purchase Act 2004 requires planning applications to be determined in accordance with the Development Plan, unless material considerations indicate otherwise. In considering the issues that arise from the proposed development, it is necessary to take into consideration the relevant policies of the Development Plan and the planning history of the site and all other material planning considerations. Government policy is a material consideration that should be given appropriate weight in the decision making process.

The Development Plan for the site is made up of the Joint Lancashire Minerals and Waste Development Framework Core Strategy DPD (LMWDF), the Joint Lancashire Minerals and Waste Local Plan – Site Allocation and Development Management Policies (LMWLP), and the Fylde Borough Local Plan. Paragraph 33 of the National Planning Policy Framework Technical Guidance requires that planning authorities should provide for restoration and aftercare of mineral working sites to high environmental standards at the earliest opportunity through the imposition of appropriate conditions.

Policy CS1 of the LMWDF seeks to ensure that Lancashire's Mineral Resources will be identified and conserved where they have an economic, environmental or heritage value. Mineral resources with the potential for extraction now or in the future will be identified as Mineral Safeguarding Areas and protected from permanent sterilisation by other development.

Policy CS5 of the LMWDF seeks to ensure, amongst other criteria, that our natural resources including water, air, soil and biodiversity are protected from harm and opportunities are taken to enhance them; workings will not adversely contribute to surface water flooding; proposals for mineral workings incorporate measures to conserve, enhance and protect the character of Lancashire's landscapes; the amenity, health, economic well-being and safety of the population are protected by the introduction of high operating standards, sensitive working practices and environmental management systems that minimise harm and nuisance to the environment and local communities throughout the life of the development, and the sensitive environmental restoration and aftercare of sites take place, appropriate to the landscape character of the locality and the delivery of national and local biodiversity action plans.

Policy DM2 of the LMWLP supports developments for mineral operations (including hydrocarbons) where it can be demonstrated that all material, social, economic or environmental impacts that would cause demonstrable harm can be eliminated or reduced to acceptable levels. In assessing proposals, account will be taken of the proposal's setting, baseline environmental conditions and neighbouring land uses, together with the extent to which its impacts can be controlled in accordance with current best practice and recognised standards. Development will be supported in accordance with the requirements of Policy CS5 of the LMWDF. Impacts and issues to be considered are the quality of design, layout, form, scale and appearance of

buildings; the control of emissions from the proposal including dust, noise, odour, light and water; the control of the numbers, frequency, timing and routing transport related to the development and, the restoration within agreed time limits, to a beneficial after use and the management of landscaping.

The Fylde Borough Local Plan contains a number of policies for the general control of development in the Fylde area and was adopted in 2005. The Borough Council are producing a replacement Local Plan. However this is at an early stage of preparation and therefore carries limited weight at present. Due to the age of the existing local plan, it may be that some policies of the existing local plan carry limited weight, particularly where they are not consistent with the NPPF. However the policies referred to in the report are considered to still retain weight and are consistent with the NPPF.

Need for the development

The NPPF notes that “*Minerals are essential to support sustainable economic growth and our quality of life*” and that “*...minerals are a finite natural resource, and can only be worked where they are found...*” (Para 142). Paragraph 144 requires that in determining planning applications local planning authorities “*give great weight to the benefits of mineral extraction, including to the economy*”, though this must be balanced against the weight given to environmental impacts of a development.

Paragraph 124 PPG states that minerals provides a clear steer that nationally, energy should come from a variety of sources, including oil and gas, and states that mineral planning authorities should take account of Government energy policy, which makes it clear that energy supplies should come from a variety of sources, including onshore oil and gas.

The Governments Annual Energy Statement referred to in paragraph 124 of the PPG notes that energy policy is underpinned by two key factors: the need to reduce carbon emissions and to ensure energy security. It makes it clear that while renewable energy must form an increasing part of the national energy picture, oil and gas remain key elements of the energy system for years to come.

One of the three key priorities outlined in the Annual Energy Statement is ‘*unlocking investment in the UK’s energy infrastructure that will support economic growth*’. Paragraph 3.69 of the Statement notes the Government is committed to maximising indigenous resources, subject to safety and environmental considerations.

Taking this into account, the proposed monitoring array is considered to accord with the approach set in national guidance by investing in energy infrastructure to establish whether indigenous oil and gas reserves are available and worth exploiting in Lancashire.

Local policy issues and assessment of impacts

The proposed array is associated with the proposal to undertake exploration and appraisal of shale gas reserves as part of planning application LCC/2014/0101. The array is required to undertake monitoring of seismic movement to initially establish base line data of naturally occurring seismicity and ground water conditions. They would then be used throughout the fracking activities to record seismic movement

associated with the fracking operations as part of the traffic light system of controlling fracking operations and to identify the presence of gas in ground water in the event it were to migrate from the fractured geological horizon or from the wells themselves. The array would be a part of the proposed fracking process and would accord with the national guidance to ensure fracking could be carried out in a way to minimise risk and disturbance associated with seismicity and risk of polluting ground water. The principle is therefore found acceptable and would accord with Policy CS1 of the LMWDF in that they would be making a contribution to the identification and proving of a mineral resource.

The purpose of the array would ensure natural resources including water, air, soil and biodiversity are protected from harm. They would not adversely contribute to surface water flooding or adversely affect the character of Lancashire's landscapes. They are designed to protect the amenity, health, economic well-being and safety of the population and contribute to the required standards of mineral exploration that seeks to employ sensitive working practices and environmental management systems that minimise harm and nuisance to the environment and local communities throughout the life of the exploration stage of the development. Subject to conditions the array would not have an adverse effect on the ecology of the area that could not be mitigated. In this respect they would accord with Policy CS5 of the LMWDF.

Policy DM2 of the LMWLP supports developments for mineral operations (including hydrocarbons) where it can be demonstrated that all material, social, economic or environmental impacts that would cause demonstrable harm can be eliminated or reduced to acceptable levels.

Policy SP2 of the Fylde Local Plan prescribes the types of development that would be acceptable in Countryside Areas. Policy EP11 requires new development to be sited in keeping with landscape character types. Policy EP12 provides for the protection of trees, woodlands and hedgerows. Policy EP19 seeks to protect ecological interests. Policy EP21 provides for the protection of archaeological interests. Policy EP23 protects surface water resources. Policy EP24 seeks to protect groundwater. Policy EP26 seeks to control air pollution. Policy EP27 seeks to control noise pollution.

The proposed above and below ground monitoring array is directly associated with the exploration and appraisal of shale gas and would be installed over an extended rural area. It is designed to ensure that such exploration and appraisal could be carried out in a controlled manner and in a way to protect the environment by establishing base line conditions for naturally occurring seismicity and ground water conditions before the commencement of fracking and then during the fracking and post fracking and appraisal phases. The stations would be very small localised individual features consisting of ground covers surrounded in agricultural fencing which would be in keeping with the rural location. They would be constructed over a very short period and would not cause a material loss of amenity during the construction or operational phases. Given their proposed locations they would not readily be seen from public view. They would not adversely affect trees or hedgerows. Conditions could be imposed to protect ecological and archaeological interests. They would not materially affect surface or ground water and there would be no material impact on air or noise pollution either as part of their construction or operation.

The ground water monitoring boreholes are proposed to be constructed in association with the development of the main site subject of planning application LCC/2014/0101. Their construction would not cause any loss of amenity either in their independence or in conjunction with the development of the main site.

In this respect the proposed monitoring array is considered acceptable for the purposes of Policy DM2 of the LMWLP and Policies SP2, EP1, EP12, EP19, EP21, EP23, EP24, EP26 and EP27 of the Fylde Local Plan.

The majority of the statutory consultees have raised no objection to the proposed monitoring array subject to the imposition of conditions where appropriate, most particularly relating to the protection of ecological and archaeological interests. Condition surveys could be imposed to ensure the access surfaces are maintained and there is no conflict with public rights of way. Fylde Borough Council, Kirkham Town Council and Medlar with Wesham Council all object to the application and its relationship to planning application LCC/2014/0101. Specifically to this proposal the reasons for objecting relate to the industrial form of development into a rural setting which will be of detriment to resident's quality of life and lead to the devaluation of property and lead to noise pollution.

With regard to the views of the County Council's Director of Public Health, his comments primarily relate to the proposed process of drilling and fracking and whilst not specifically referring to the array application makes a number of recommendations to inform the planning process, some of which by implication relate to the proposed monitoring array. He recommends that there should be a long term monitoring period of at least 30 years post abandonment of the wells or until such time there is national guidance on long term monitoring. The following areas of data collection and analysis are particularly relevant to the proposed monitoring array:

- Characterisation of the extent of fracture propagation and the permeability of layers above and beyond the faults
- Ground water monitoring of methane.
- Measuring long term well integrity.
- Sampling of ground/food chain.

The very purpose of the proposed array is to monitor induced seismicity and ground water quality. The array for monitoring seismicity does not need to be the subject of retention in the long term. The ground water monitoring is designed to identify the potential for the migration of gas and contamination of ground water associated with the drilling process and its potential to contaminate the ground and by implication the food chain. Should planning permission be granted for planning application LCC/2014/0101 they would be constructed at the outset to establish base line monitoring conditions and thereafter retained throughout the proposed drilling process and beyond until such time as they are considered to be no longer required by the operator and would be abandoned as part of the surrender of the permits to the EA. It would be for the EA to determine whether monitoring is no longer required. However, there is no certainty what this period may be or that it would extend to the 30 years post abandonment of the wells as recommended by the Director of Public Health. The 30 years is based on landfill site monitoring. Modern landfills for putrescible materials are required to be contained for permitting processes; the design of landfill sites involves the construction of purpose designed engineered

cells involving a number of base layers and the employment of geotechnical membranes to contain leachate and prevent leakage and contamination of surface and ground water. Landfill sites are at surface and present a very different potential risk in terms of the impacts that may arise and the implications of such to those associated with fracking. The target geological horizon for fracking is at considerable depth and above which is a geology that is impermeable to the migration of gas or contaminated fluids. The greatest potential for migration of such is around or via the well casing. The well casing would be constructed in accordance with the requirements of the HSE and engineered using a combination of steel and concrete. It is the long term failure of such that has generated concern based on experiences elsewhere, hence the recommendation to monitor such over an extended period. The integrity of well casings is a matter for the HSE and ground and surface water protection is a matter for the EA. It is therefore considered that the need or otherwise for long term monitoring post abandonment of any wells is a matter for the HSE and or the EA as part of the permitting process and is not a matter for the landuse planning process. For the purposes of the planning guidance the county council should assume that other regimes will operate effectively and that they can rely on the assessment of other regulatory bodies. Nevertheless before granting planning permission the county council needs to be satisfied that issues can or will be adequately addressed by taking the advice from the relevant regulatory body.

A planning authority's reliance on other (non planning) regulatory bodies to provide the appropriate controls and conditions in relation to their statutory responsibilities was recently addressed in case law (December 2014) relating to a drilling site in West Sussex {R [on the application of Frack Free Balcombe Residents Association] v West Sussex County Council [2014] EWHC 4108 (Admin)}. Paragraph 102 of the judgment is particularly relevant to this issue:

"the existence of the statutory regimes applied by the HSE, the EA and the DECC shows that there are other mechanisms for dealing with the very proper concerns which the Claimant's members have about the effects on the environment. The Claimant and its members' concerns are in truth not with the planning committee's approach of relying on the other statutory regimes, but rather with the statutory bodies whose assessments and application of standards they disagree with. That does not provide a ground of legal challenge to the decision of the planning committee."

In light of this judgment as well as NPPF guidance (Para 122) it is not necessary or appropriate to impose planning conditions or require an applicant to enter into a S.106 legal agreement with respect to matters, such as longer term monitoring, that are clearly within, and properly, the remit of other regulatory regimes and bodies.

With regards to this application it is considered that the County Council can be satisfied that the HSE and EA will ensure drilled wells are properly abandoned and monitored for whatever period is necessary before the permits can be surrendered. It is therefore not necessary to impose a condition specifying any period for monitoring or requesting the applicant to enter into any legal agreement relating to such.

With regard to the views of CPRE, the applicant has already carried out a detailed 3D geophysical survey of the subsurface area where underground works are proposed at Roseacre Wood. This survey was carried out at an appropriate resolution for finding faults. No more 3D seismic surveys are proposed and the

proposed monitoring of micro-seismicity induced during hydraulic fracturing operations will be carried out using the array proposed as part of this application. This is considered to be go beyond that recommended in reports by The Royal Society and The Royal Academy of Engineering. The sensitivity of the instruments will be to at least two orders of magnitude below the required seismic background noise level. This method of monitoring induced seismicity and the seismometers proposed are to “best industry practice”. Monitoring of the fracture growth will be carried out using the buried seismic array. The fibre optic arrays described by CPRE relate to down hole monitoring of “reservoir pressure and temperature, distributed-temperature sensing (DTS), flow, and phase-fraction sensing...and seismic systems” during drilling and are not appropriate for the surface or buried monitoring arrays and therefore a condition as proposed is considered unnecessary.

Representations

With regard to the representations received some of these are made specifically to the proposed development the subject of this application; some overlap with that proposed as part of planning application LCC/2014/0101 and which is understandable given the proposed interrelationship of the two applications. A number of representations have been received from 60 individuals and a number of groups and organisations objecting to the proposal. The primary reasons for objecting are against fracking in principle, and therefore opposed to any associated development, and maintaining that if the drilling site is refused then the array application should similarly be refused. In respect of the specific objections to this application there is concern that installation of the array would lead to more traffic and affect public rights of way. Whilst there would be more traffic associated with the installation of the array this would be minimal and over a very short period of 2 – 3 days for each station and which would be accessed via existing field access points. Maintenance of the stations would generate one or two vehicles per week. It is considered that the vehicle movements associated with such would be of a scale that could be accommodated on the public highway and would not lead to any adverse impact on highway amenity, residential access or on users of public rights of way. The monitoring stations once constructed would be accessed via existing field access points, would be 4m² surrounded by 1.2m high wooden agricultural fencing. It is considered they would not be visually intrusive nor constitute an industrialisation of the countryside. They would not have a negative impact on land or property, contribute to greenhouse gases or cause air, surface or ground water pollution. Whilst concerns about fracking are understandable the purpose of the array is to provide base line data and protect the environment in the event drilling and fracking goes ahead. With regard to impacts on ecology concern has been expressed to the inadequacy of the surveys undertaken in respect of great crested newts, barn owls, bats, water voles, nesting birds and wintering wildfowl and that further surveys should be carried out. This view is not shared. It is considered that given the nature, duration of installation and locations of the array, the stations would not have an adverse impact on ecology to the degree maintained, that the ecological surveys and assessments are sufficient and that adequate management to minimise the impact on such is both proposed and could be controlled by condition. The results of the monitoring would be a matter for DECC and it would not be appropriate to impose a planning condition requiring the results to be submitted for analysis.

The purpose of the array is to provide base line data and protect the environment. Whilst the application is interrelated to the proposal to drill and frack it must still be

considered on its merits and against the policies if the development plan. Given the scale, nature and purpose of the proposed array it is considered that it would not lead to the industrialisation of the countryside and not cause unacceptable impacts on the amenities of the area or on residential properties. The reasons for objecting cannot therefore be supported.

Conclusions

Notwithstanding the application is integrally linked to the application for exploration and appraisal of shale gas at Roseacre Wood (LCC/2014/0101) it must still be considered on its own merits. The proposed monitoring array is designed to ensure that such exploration and appraisal could be carried out in a controlled manner and in a way to protect the environment by establishing base line conditions for naturally occurring seismicity and ground water conditions before the commencement of fracking and then during the fracking and post fracking and appraisal phases. The stations and would be very small localised individual features consisting of ground covers surrounded in agricultural fencing and which would be in keeping with the rural location. They would be constructed over a very short period and would not cause any loss of amenity during the construction or operational phases. The highway has sufficient capacity to accommodate the construction traffic and would not lead to any greater loss of road safety. Given their proposed locations they would not readily be seen from public view other than from public rights of way and would not have any impact on amenity, landscape or public health. They would not adversely affect trees or hedgerows. Conditions are proposed to protect ecological and archaeological interests. They would not affect surface or ground water and would not generate air or noise pollution either as part of their construction, operation or restoration phases.

The array has been designed to provide baseline and monitoring information associated with planning application LCC/2014/0101 and has been assessed as part of the ES which is common to both applications. Whilst planning application LCC/2014/0101 is recommended for refusal the application for the array must be considered on its merits. The conclusion is that it would not cause any unacceptable harm and would not be unacceptable for the purposes of the policies to the NPPF or the local development plan. To refuse if just because of its association with planning application LCC/2014/0101 would not be correct and would be unlawful. It is therefore considered that the proposed array is acceptable and can be supported.

However, it is considered that it should only be treated as temporary development and provision be made for its removal in the future whether it is developed in its independence or in conjunction with any successful application for drilling and hydraulic fracturing.

With regards to the water monitoring boreholes they are specifically designed and located for the purposes of planning application LCC/2014/0101. The County Council's Director of Public Health has recommended if planning permission were to be granted (and they were to be implemented as part of planning application LCC/2014/0101), there would be merit in retaining them for an extended period post abandonment of the well site to enable monitoring to be carried out to establish the presence of leaking gas or contaminated fluids. However, it is considered that this should be a matter for the HSE and the EA as part of their permitting process and that the County Council should assume that the regulatory process will be employed

by those bodies and be satisfied that the necessary works to abandon the wells and monitor the quality of ground water would be carried out by those regulatory bodies should planning permission be granted for planning application LCC/2014/0101 or any further planning application.

In this respect the proposed monitoring array is considered acceptable for the purposes of the policies of the NPPF and the policies of the development plan.

In view of the scale, location and nature of the proposed development it is considered no Convention Rights as set out in the Human Rights Act 1998 would be affected.

Recommendation

That after first taking into consideration the environmental information and further information, as defined in the Town and Country Planning (Environmental Impact Assessment) Regulations 2011, planning permission be **granted** subject to the following conditions:

Time limits

1. The development shall commence not later than 3 years from the date of this permission.

Reason: Imposed pursuant to Section 91 (1) (a) of the Town and Country Planning Act 1990.

2. Written notification of the date of each of the following events shall be made to the County Planning Authority within 7 working days of each event:

- a) The commencement of the development for the drilling and installation of each of the 80 buried seismic monitoring stations, the burying of the 8 surface seismic monitoring stations and construction of the associated enclosed equipment and the erection of the fenced enclosures to all the array points and the drilling of the 3 ground water monitoring boreholes and erection of fenced enclosures.
- b) The completion of the drilling and installation of each of the 80 buried seismic monitoring stations, the burying of the 8 surface seismic monitoring stations and construction of the associated enclosed equipment and the erection of the fenced enclosures to all the array points and the drilling of the 3 ground water monitoring boreholes and erection of fenced enclosures.
- c) The removal of the seismic monitoring equipment from each of the 80 buried seismic monitoring stations and the 8 surface seismic monitoring stations and the removal of all associated enclosed equipment and fenced enclosures to all the array points and the 3 ground water monitoring boreholes.
- d) The commencement of the plugging and abandonment of the each of the 80 buried seismic monitoring stations and 3 ground water monitoring boreholes and the restoration of the sites of the 80 buried seismic monitoring stations, the 8 surface seismic monitoring stations and removal of associated enclosed equipment and fenced enclosures to all

the array points and the drilling of the 3 ground water monitoring boreholes in accordance with the conditions to this permission.

- e) The completion of the plugging and abandonment of each of the 80 buried seismic monitoring stations and 3 ground water monitoring boreholes and the restoration of the sites of the 80 buried seismic monitoring stations, the 8 surface seismic monitoring stations and the removal of all associated enclosed equipment and fenced enclosures to all the array points and the 3 ground water monitoring boreholes in accordance with the conditions to this permission.

Reason: To enable the County Planning Authority to monitor the development to ensure compliance with this permission and to conform with Policy CS5 of the Joint Lancashire Minerals and Waste Development Plan.

- 3. The 80 buried seismic monitoring stations, the 8 surface seismic monitoring stations and associated enclosed equipment and fenced enclosures to all the array points and the 3 ground water monitoring boreholes authorised by this permission shall be removed and the land restored in accordance with the conditions to this planning permission within 5 years from the date of notification of commencement of the first surface or buried monitoring station or ground water monitoring borehole as required by condition 2a of this permission.

Reason: To enable the County Planning Authority to monitor the development to ensure compliance with this permission and to conform with Policy CS5 of the Joint Lancashire Minerals and Waste Development Plan.

- 4. The development of the surface array, buried array and water monitoring boreholes shall only be carried out outside the period 31st October and 31st March.

Reason: To safeguard the ecological interests in the area and to conform with Policy 23 of the Lancashire Minerals and Waste Local Plan and Policies EP23 and EP24 of the Fylde Borough Local Plan.

Working programme

- 5. The development shall be carried out, except where modified by the conditions to this permission, in accordance with the following documents:
 - a. The Planning Application received by the Director of Transport and Environment on 16 June 2014.
 - b. Submitted Plans and documents received by the Director of Transport and Environment on 16 June 2014:

Drawing No.RW-MW-010
Drawing No.RW-MW-011
Drawing No.RW-MW-012
Drawing No.RW-MW-013
Drawing No.RW-MW-014
Drawing No.RW-MW-015
Drawing No.RW-MW-016
Drawing No.RW-MW-017

Drawing No.RW-MW-020
Drawing No.RW-MW-021
Drawing No.RW-MW-022
Drawing No.RW-MW-023
Drawing No.RW-MW-024
Drawing No.RW-MW-025
Drawing No.RW-MW-026
Drawing No.RW-MW-027
Drawing No.RW-MW-028
Drawing No.RW-MW-029
Drawing No.RW-MW-030
Drawing No.RW-MW-031
Drawing No.RW-MW-032
Drawing No.RW-MW-033
Drawing No.RW-MW-034
Drawing No.RW-MW-035
Drawing No.RW-MW-036
Drawing No.RW-MW-037
Drawing No.RW-MW-038
Drawing No.RW-MW-039
Drawing No.RW-MW-040
Drawing No.RW-MW-050

- c All schemes and programmes approved in accordance with this permission.

Reason: To minimise the impact of the development on the amenities of the area and to conform with Policies SP2, EP11, EP12, EP13, EP14, EP18 and EP28 of the Fylde Borough Local Plan.

Hours of working

6. No soil stripping, delivery or removal of materials, plant and equipment, site development installation of the surface array, buried array and ground water monitoring wells or restoration shall take place except between the hours of:

07.30 to 18.30 hours Mondays to Fridays (except public holidays)
07.30 to 13.00 hours on Saturdays

No soil stripping, delivery or removal of materials, plant and equipment, site development installation of the surface array, buried array and ground water monitoring wells or restoration shall take place on Sundays or public holidays.

This condition shall not apply to the operations of drilling the boreholes or the carrying out of essential repairs to plant and equipment used on the site.

Reason: In the interests of the amenities of the area and to conform with Policies 2 and 74 of the Lancashire Minerals and Waste Local Plan.

Highway matters

7. Measures shall be taken at all times during the site construction, operational and restoration phases of the development to ensure that no mud, dust or other deleterious material is tracked onto the public highway by vehicles leaving the sites.

Reason: In the interests of highway safety and local amenity and to conform with Policies 2 and 37 of the Lancashire Minerals and Waste Local Plan.

8. All vehicles shall enter or leave the sites of the surface and buried array and the ground water monitoring well sites in a forward direction.

Reason: In the interests of highway safety and local amenity and to conform with Policies 2, 37 and 74 of the Lancashire Minerals and Waste Local Plan.

9. No development shall commence until details of the site layout and a condition survey of the access to Site 147162 (Plan 023) which affects Public Footpath 027 has been submitted to and approved in writing by the County Planning Authority. The site layout shall avoid the public right of way and the access survey shall record the condition of the surface prior to construction and provide for the monitoring of the condition of the surface of the public rights of way whilst the route is in use by vehicles associated with the construction and operational phases of the development. The results of the survey on completion of each phase of the development shall be submitted to the County Planning Authority within 7 days of the completion of each phase and where deterioration of the surface has occurred, details shall identifying what measures will be taken to mitigate wear and tear on the public right of way surface shall be submitted to the County Planning Authority for approval in writing. The approved measures shall be carried out within 28 days of their approval and the public right of way shall thereafter be maintained in accordance with the approved measures until the completion of the restoration of the site.

Reason: In the interests of the amenities of the area and to conform with Policies 2 and 74 of the Lancashire Minerals and Waste Local Plan.

Protection of trees and hedges

10. No development including the storage of excavated materials shall take place within the extreme circumference of the branches of any tree.

Reason: To protect existing trees within or adjacent to the site in the interests of the visual amenities of the area and to conform with policy 8 of the Lancashire Minerals and Waste Local Plan.

11. All hedges and trees in close proximity to the monitoring station site shall be retained and protected from any damage throughout the construction phase of development.

Reason: In the interests of visual and local amenity and the local environment and to conform with Policy EP12 of the Fylde Local Plan.

Protection of Ecology

12. Prior to the commencement of development, a Biodiversity Mitigation Strategy shall be submitted to the County Planning Authority for approval in writing. The Strategy shall include, but not be limited to, details of measures for the avoidance/ mitigation of impacts on protected and priority species (amphibians, bats, nesting and wintering birds, badgers, reptiles, water vole, brown hare) and their habitat during the construction and operational phases of the development. The approved Strategy shall be implemented in full.

Reason: To safeguard the ecological interests in the area and to conform with Policy 23 of the Lancashire Minerals and Waste Local Plan and Policies EP23 and EP24 of the Fylde Borough Local Plan.

13. Prior to the commencement of development, a revised Ecological Mitigation Strategy (landscaping, habitat creation and enhancement) shall be submitted for approval in writing. The Strategy shall provide details of the creation and enhancement of habitats to compensate for impacts on the habitat of protected and priority species. The approved Strategy shall be implemented in full.

Reason: To safeguard the ecological interests in the area and to conform with Policy 23 of the Lancashire Minerals and Waste Local Plan and Policies EP23 and EP24 of the Fylde Borough Local Plan.

14. No trees or hedgerows shall be removed during the bird-breeding season between 1 March and 31 July inclusive unless they have been previously checked and found clear of nesting birds in accordance with Natural England's guidance and if appropriate, an exclusion zone set up around any vegetation to be protected. No work shall be undertaken within the exclusion zone until birds and any dependant young have vacated the area.

Reason: To protect nesting birds and to conform with Policy 23 of the Lancashire Minerals and Waste Local Plan and Policies EP23 and EP24 of the Fylde Borough Local Plan.

Archaeology

15. At least 14 days written notice of commencement of a works on any part of the monitoring array shall be given to the County Planning Authority. Access shall be afforded at any time during the development to an archaeologist nominated by the County Planning Authority to enable him to undertake a watching brief and observe the excavation and to record finds, items of interest and archaeological interest.

Reason: In the interests of archaeological understanding and to conform with policy EP21 of the Fylde Borough Local Plan.

Safeguarding of Watercourses and Drainage

16. Provision shall be made for the collection, treatment and disposal of all water entering or arising on the site during the installation of the array to ensure that there shall be no discharge of contaminated or polluted drainage to ground or surface waters.

Reason: To safeguard local watercourses and drainages and avoid the pollution of any watercourse or groundwater resource or adjacent land and to conform with Policy 23 of the Lancashire Minerals and Waste Local Plan and Policies EP23 and EP24 of the Fylde Borough Local Plan.

Control of noise

17. All plant, equipment and machinery used in connection with the installation and removal of the monitoring array and restoration of the sites shall be equipped with effective silencing equipment or sound proofing equipment to the standard of design set out in the manufacturer's specification and shall be maintained in accordance with that specification at all times throughout the construction and restoration phase of the development.

Reason: To safeguard the amenity of local residents and adjacent properties/landowners and land users and to conform with Policy 2 and 74 of the Lancashire Minerals and Waste Local Plan.

Restoration

18. Restoration shall be carried out in accordance with the following:
 - a) All associated plant, kiosks, hardstandings, pollution control membranes, aggregates, hardcore and fencing shall be removed from the land of the surface array and buried array and for the ground water monitoring wells following their formal abandonment.
 - b) The upper layers of the subsoil material shall be subsoiled (rooted) to a depth of 600mm with a heavy-duty subsoiler (winged) prior to the replacement of topsoils to ensure the removal of material injurious to plant life and any rock, stone, boulder or other material capable of preventing or impeding normal agricultural land drainage operations, including mole ploughing and subsoiling.
 - c) Following the treatment of the subsoil, topsoil shall be placed over the site to a minimum depth of 150mm and shall be ripped, cultivated and left in a state that will enable the land to be brought to a standard reasonably fit for agricultural use.

Reason: To secure the proper restoration of the site in the interests of the visual amenity of the area and to conform with Policy 106 of the Lancashire Minerals and Waste Local Plan.

Aftercare

19. Within 3 months of the certification in writing by the County Planning Authority of the completion of restoration as required by condition 2 to this permission, a scheme and programme for the aftercare of the sites of the surface and buried monitoring array and the ground water monitoring wells for a period of five years to promote the agricultural afteruse of the site shall be submitted to the County Planning Authority for approval in writing. The scheme and programme shall contain details of the following:
 - a) Maintenance and management of the restored site to promote its agricultural use.

- b) Weed control where necessary.
- c) Measures to relieve compaction or improve drainage.
- d) An annual inspection to be undertaken in conjunction with representatives of the County Planning Authority to assess the aftercare works that are required in the following year.

Reason: To secure the proper aftercare of the site and to conform with Policy 106 of the Lancashire Minerals and Waste Local Plan.

Notes

1. If bats are found or suspected at anytime during construction activities, work in that area should cease immediately until further advice has been sought from Natural England and/or the scheme ecologist. The scheme ecologist, Natural England or their agents in the Lancashire area will be able to locate a licensed bat worker to remove any bats present which might be harmed during the works. If bats are exposed during the works and are vulnerable to harm, gloves or a container should be used to move them to a dark and quiet area, until a bat worker has been contacted.
2. The grant of planning permission does not entitle a developer to obstruct a right of way and any proposed stopping - up or diversion of a right of way should be the subject of an Order under the appropriate Act. The following stations affect Footpath and Bridleway nos.:

011 Site H02 affects Public Footpath 05-13-0.
 017 Site H08 affects Public Bridleway 05-08-12. Access to the site is along a Public Bridleway.
 020 Site 147164 affects Public Footpath 05-06-01.
 023 Site 147162 affects Public Footpath. Monitoring station appears to be on the Public Right of Way 027. Site 147141 affects Public Footpath 05-06-09.
 028 Site 147136 affects Public Footpath 05-13-04.
 029 Site 147152 and 147158 affects Public Footpath 05-13-01.
 030 Site 147127 affects Public Footpath 05-13-05.
 033 Site 147118 affects Public Footpath 05-06-05.
 034 Site 147142 and 147134 affects Public Footpath 05-08-04a.

3. Some of the proposed monitoring stations are located close to watercourses which are designated as Main Rivers and are subject to Land Drainage Bylaws. The proposed arrays that may fall within 8m of a Main River are identified and works within 8m of such may require prior written consent. The applicant is advised to contact the Environment Agency.
4. The applicant's attention is drawn to the letter from United Utilities dated 24/10/14 attached to and forming part of this decision notice relating to the need to protect their assets and services.

Local Government (Access to Information) Act 1985 List of Background Papers

Paper	Date	Contact/Directorate/Ext
LCC/2014/0101	16/06/2014	Stuart Perigo/Environment/531948
LCC/2014/0102	16/06/2014	
LCC/2014/0096	02/06/2014	
LCC/2014/0097	02/06/2014	

Reason for Inclusion in Part II, if appropriate

N/A



Roseacre
Wood *



APPLICATION LCC/2014/0102 APPLICATION FOR MONITORING WORKS IN A 4 KM RADIUS OF THE PROPOSED ROSEACRE WOOD EXPLORATION SITE COMPRISING: THE CONSTRUCTION, OPERATION AND RESTORATION OF TWO SEISMIC MONITORING ARRAYS COMPRISING OF 80 BURIED SEISMIC MONITORING STATIONS AND 8 SURFACE SEISMIC MONITORING STATIONS. THE SEISMIC MONITORING STATIONS WILL COMprise UNDERGROUND INSTALLATION OF SEISMICITY SENSORS; ENCLOSED EQUIPMENT AND FENCED ENCLOSURES. THE SURFACE ARRAY WILL ALSO COMPrISE MONITORING CABINETS. THE APPLICATION IS ALSO FOR THE DRILLING OF THREE BOREHOLES, EACH INSTALLED WITH 2 MONITORING WELLS, TO MONITOR GROUNDWATER AND GROUND GAS, INCLUDING FENCING AT THE PERIMETER OF THE ROSEACRE WOOD EXPLORATION SITE. MONITORING WORKS IN A 4KM RADIUS OF THE PROPOSED ROSEACRE WOOD SITE, OFF ROSEACRE ROAD AND INSKIP ROAD,

ROSEACRE AND WHARLES, PRESTON



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