West Newton B Wellsite Environmental Risk Assessment Exploratory Operations

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1. INTRODUCTION

Rathlin Energy (UK) Limited (Rathlin Energy) is a wholly owned subsidiary of Connaught Oil & Gas Ltd, a private company with its head office in Calgary, Canada. Connaught Oil & Gas Ltd is an international petroleum exploration, development and production company with operations in Western Canada and the United Kingdom. The experienced senior management team has an average of 30 years of direct operating experience in Canada and internationally. The United Kingdom operations are conducted through Rathlin Energy (UK) Limited and are directed from the Rathlin Energy office in London.

Rathlin Energy is engaged in the exploration and production of petroleum onshore United Kingdom and holds 100% interest in Petroleum Exploration and Development Licence (PEDL) 183, within which it has drilled two exploration boreholes, Crawberry Hill 1 and West Newton 1.

The West Newton B exploration was the subject of a planning application in December 2014 to the East Riding of Yorkshire Council, which was subsequently approved in June 2015.

In support of permit application for exploratory operations at the West Newton B Wellsite, an Environmental Risk Assessment has been undertaken. The Environmental Risk Assessment has been carried out in accordance with the following Environmental Agency guidance;

- Environment Agency horizontal guidance H1 Environmental Risk Assessment for Permits. (Version 2.1, December 2011)
- EPR 6.14: How to comply with you environmental permit: Additional guidance for: mining waste operations, Version 2 February 2011

When undertaking the Environmental Risk Assessment a conceptual model has been referenced based on a true representation of the subsurface geology encountered during the drilling of WN1. The conceptual model is included as Appendix 1. In addition, specific risk assessments relating to ecology, hydrogeology and air emissions associated with the West Newton B exploratory operation have also been referenced.

2. SCOPE

This Environmental Risk Assessment is applicable to the West Newton B wellsite and all exploratory operations permitted therein, in accordance with planning consent. It is provided in support of an application to the Environment Agency under the Environmental Permitting (England and Wales) Regulations 2010, as amended.

3. DEFINITIONS

Below is a list of definitions that are used on the H1 Environmental Risk Assessment Template.

ID:	Identification number the hazard has been given to allow for easy referencing.
Source:	A source of pollutants from the activity taking place such as flaring. (Source can also be referred to as 'hazard').
Receptor:	Although the likelihood of pollution is low it may have an adverse effect on surrounding residents, wildlife and habitats; these are known as the pollutants receptors.
Pathway:	The pathway the pollutant is taking such as air or unsaturated zones.
Risk Management:	Mitigation measures that will be put in place to control the risks so far as reasonably practicable.
Probability of Exposure:	The chance of the hazard occurring taking into account mitigation measures.
Consequence:	A result of an event or action that has occurred.
Overall Risk:	A hazard that has been assessed and has been given a risk rating level post mitigation measures i.e. not significant, low, medium, high very high etc.
Not Significant:	The severity of risk together with the likelihood of the risk is not expected to cause harm to the environment.
Low:	The severity of risk together with the likelihood of the risk has low potential for causing harm to the environment.
Medium:	The severity of risk together with the likelihood of the risk has a moderate potential for causing harm to the environment.
High:	The severity of risk together with the likelihood of the risk has a high potential for causing harm to the environment.

4. METHODOLOGY

The structure of the Environmental Risk Assessment is consistent with the Environment Agency horizontal guidance H1 Environmental Risk Assessment for Permits (Version 2.1, December 2011) using the following four step process:

- Identifying the risk from the activity
- Assess risks and check they are acceptable
- Justify appropriate measures to control the risk (if needed)
- Present the risk assessment.

The Environmental Risk Assessment has included the following items, which have been reviewed for applicability within the West Newton B exploratory operations.

- Accidents & incidents that have potential to cause harm to the environment
- Air emissions
- Dust
- Fugitive emissions
- Global warming potential
- Light
- Noise
- Odour
- Releases to water
- Waste

Environmental Risk Assessment that has been carried out is qualitative and details the activities and events that may lead to environmental impact on one or more receptors.

The risk assessment template is based on the examples given within Annex A and has been applied throughout all annexes deemed relevant by the horizontal guidance H1.

5. APPLICABLE DOCUMENTATION

A review of the West Newton B exploratory operations has been undertaken using the Environment Agency Horizontal Guidance Note H1 Overview Document to determine which annexes are applicable. A list of the applicable annexes is detailed below, together with a summary of each annex:

- Annex (A) Amenity and accident risks from installations and waste operations
- Annex (D) Discharges to Surface Water
- Annex (F) Air emissions
- Annex (G) Disposal and recovery of waste produced onsite

- Annex (H) Global warming potential
- Annex (J) Groundwater
- Annex (K) Justifying and cost-benefit analysis of control measures

5.1 Annex A – Amenity and accident risks from installations and waste operations

Annex A has been used and utilised to aid in the development of the Rathlin Energy Environmental Risk Assessment. The content relates specifically to 5 main categories including; odour, fugitive emissions, noise and vibration, visible plumes and accidents. They will help to identify hazards such as vehicle noise production and odour releasing materials. As stated each hazard will be displayed individually and follow the guidance of Annex A throughout the whole assessment phase.

5.2 Annex D – Discharges to Surface Water

Annex D covers the discharge of surface water to the environment; it is designed to quantify the impact of discharges into surface waters. Following the assessment of the proposed West Newton B exploratory operations and consultation with the Environment Agency, Annex D has been undertaken to assess the environmental risk from the proposed fitting and use of a Class 1 Oil-water Separator.

5.3 Annex F – Air Emissions

Annex F will be used to help Rathlin Energy determine its potential air emissions during operations and allow Rathlin Energy to decide whether detailed air modelling is required. Certain air emissions will also be grouped together provided they are in accordance with Annex F such as Volatile Organic Compounds (VOCs).

5.4 Annex G – Disposal or recovery of waste produced on site

Annex G outlines guidance notes for the disposal or recovery of waste. It also highlights the need to identify and record any waste streams produced onsite. The guide will assist Rathlin Energy in choosing the best available technique to take for the environment rather than the cheapest to show its commitment to preserving the environmental conditions.

5.5 Annex H – Global Warming potential

Annex H guide will help Rathlin Energy identify its own emissions from the activity it has chosen to carry out. This will include the emissions and the indirect greenhouse gases from the corresponding activities.

5.6 Annex J – Groundwater

Annex J guidance document explains that groundwater as a whole is very vulnerable and states what should be applied to protect vulnerable groundwater reservoirs. The West Newton B wellsite has been the subject of a Hydrogeological Risk Assessment and Flood Risk Assessments.

5.7 Annex K – Cost Benefit Analysis

Annex K provides the steps required if Rathlin Energy wish to look at cost benefits compared to other mitigation controls, or if any risks that have been identified have not been mitigated to an appropriate level. Annex K will be used only if it is deemed required.

Additional guidance used for all of the Annexes above can be found within:

Environment Agency horizontal guidance H1 Environmental Risk Assessment for Permits. (Version 2.1, December 2011)

6. ENVIRONMENTAL RISK ASSESSMENT

A copy of the Environmental Risk Assessment is included as Appendix 2.

7. CONCLUSIONS

The chosen mitigation measures Rathlin Energy has identified has produced a Risk Rating of Medium to Low, the majority of which are Low. Rathlin Energy is committed to ensuring all risks associated with its operations are acceptable and is committed to continually reviewing this Environmental Risk Assessment, acknowledging continual technological advancements in mitigation controls and continual improvement as a goal in the Environmental management System.

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APPENDIX 1 – WEST NEWTON B CONCEPTUAL MODEL

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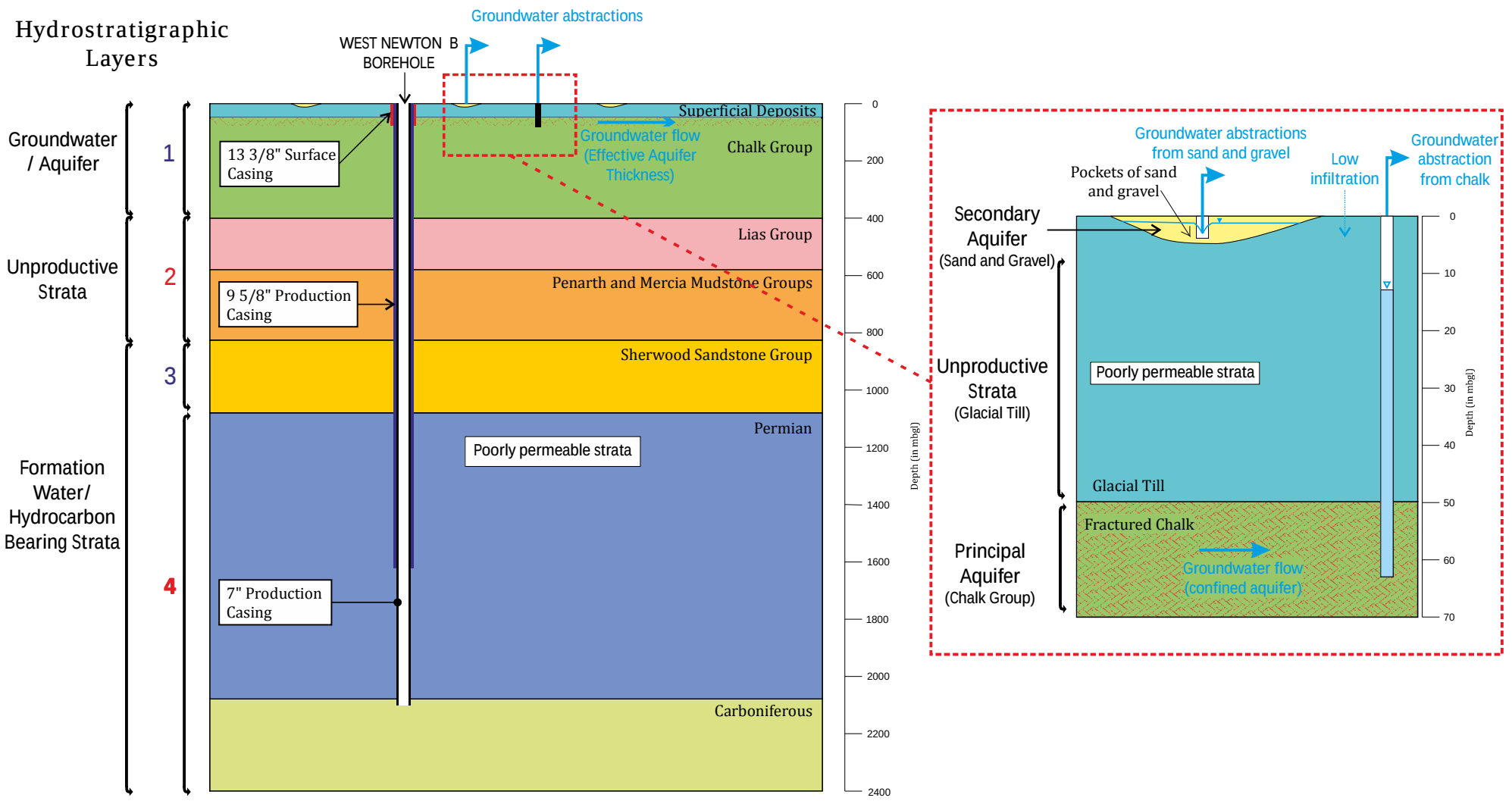
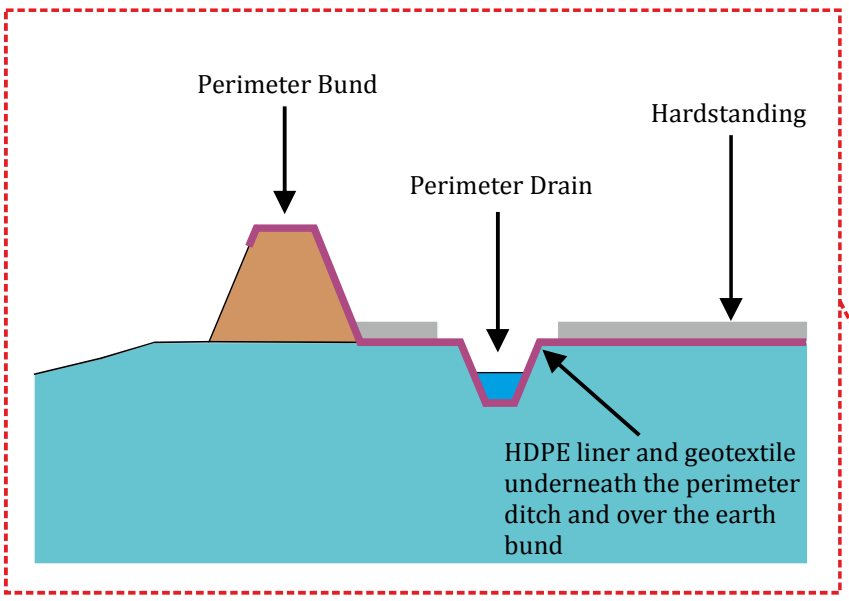
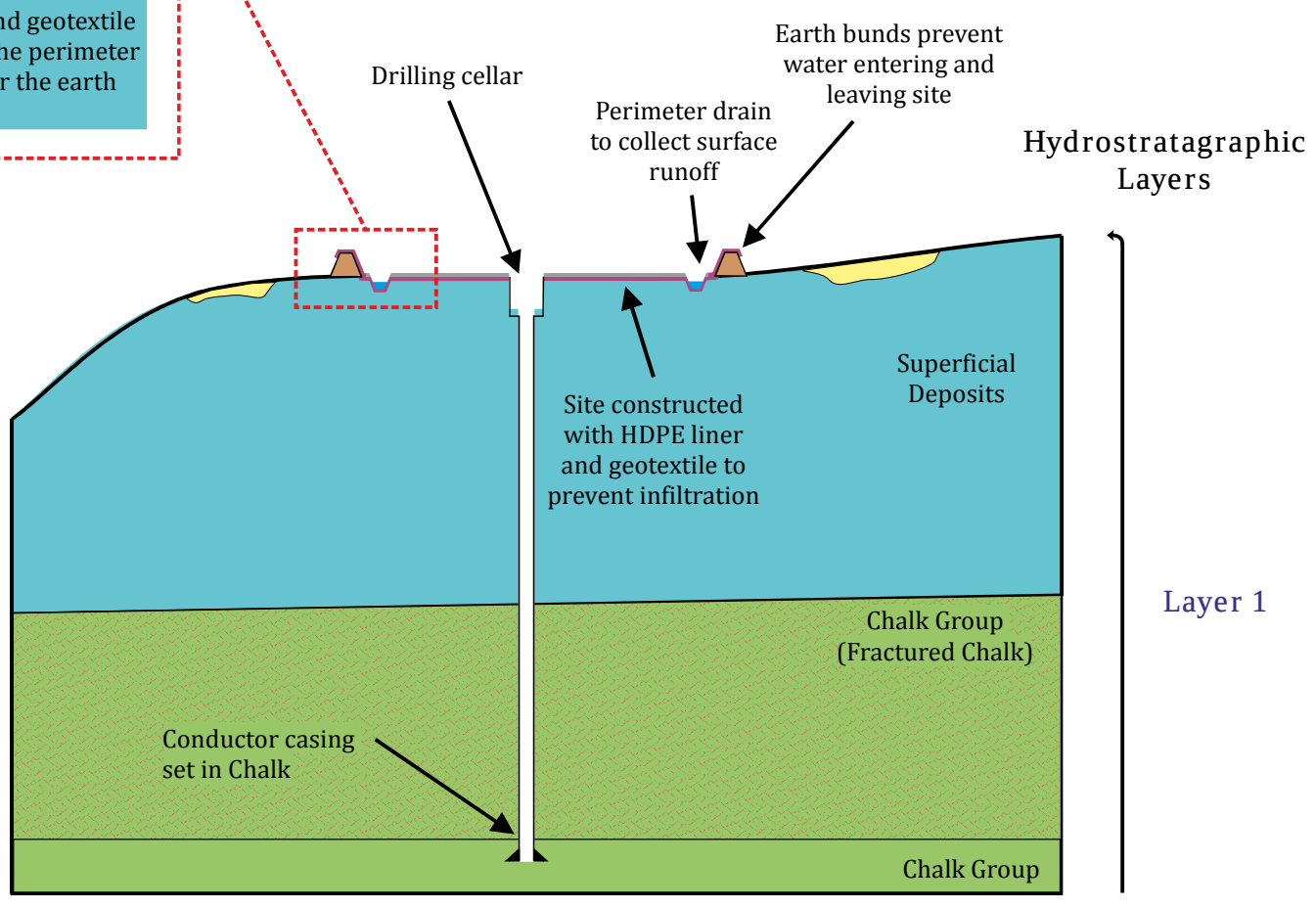
Generalised Vertical Section





Construction Site Conceptual Section



	Rathlin Energy - West Newton B Wellsite
	Conceptual Hydrogeological Model and Construction Concept

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APPENDIX 2 – WEST NEWTON B WELLSITE ENVIRONMENTAL RISK ASSESSMENT

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H1 – Annex A – Table 1 Assessment of Odour Risks

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
001	Release of odour when breaking containment on tanks and pipework used in transporting produced fluid from the wellbore to surface storage tanks. Note: Produced fluid includes wellbore fluids, wellbore liquids and formation fluids.	**Local Residents:** West Newton village 700m to the North. Flinton village 1,900m to the South East. Old Farm Cottages 580m to the North. West Newton Grange 690m to the East. Smithy Briggs farm 415m to the South West. Burton Constable Hall 1550m to the South West. Moat Farm 1500m to the East. High Fosham 1920m to the North. Low Fosham 900m to the North East. Swiss Cottage 660m to the South West. **Site of Special Scientific Interest:** Lambwath Meadows 2,350m to the North East and 2,500m to the North. Humber Estuary 10,000m to the South West. **Special Protection Areas:** Hornsea Mere 9,500m to the North. Humber Estuary 10,000m to the South West. **Wildlife Sites:** Lambwath stream – 2,450m to the North. The Moors 1675m to the North West. Mill Avenue – 900m to the West. Smithy Bridge Plantation 350m to the West. Brickfield Plantation 700m to the West. **Watercourses:** L Dike stream 200m to the South. L Dike stream 300m to the North. Lambwath stream 2,450m to the North. Lake at Burton Constable Hall 2,100m to the South West. Pond at West Newton 500m to the North. Norwood drain 300m to the North.	Air – Prevailing winds from south west (average statistics from the Met Office)	Site location is within rural area where local receptors are very few. Tanks and pipework to be built according to manufacturer's and industry standards. Tanks and pipework to be tested for leaks prior to delivery / use as required by manufacturer / written procedures. Breaking containment of tanks and pipework systems is to be kept to a minimum. Tanks and pipework to be cleaned / purged where possible prior to breaking containment. Regular maintenance and inspections are to be conducted as directed by the manufacturer / written procedures. An Ecological report was conducted prior to operations to assess impact on local wildlife and habitat. Local residents informed of planned operations via liaison committee meetings. Records will be kept of complaints and action taken to resolve complaints if required. Authorities to be notified of the operation prior to commencement. Odour Management Plan to be in place, distributed and adhered to by site personnel.	Odorous emissions may be released during breaking containment of the tanks / pipework. Breaking containment of tanks / pipework will be kept to a minimum – at end of operations or essential maintenance work only. Breaking of containment expected to be at end of operations only. N_2 purging to flare will be performed where practicable to minimise release	Complaints of odours / smells in vicinity of local receptors. Will not last for more than 60 minutes.	Not significant if managed correctly.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
002	Release of odour from produced fluids on the external surface of pipework / equipment at surface when used in transporting produced fluid from the wellbore to surface storage tanks. Note: Produced fluid includes wellbore fluids, wellbore liquids and formation fluids.	**Local Residents:** West Newton village 700m to the North. Flinton village 1,900m to the South East. Old Farm Cottages 580m to the North. West Newton Grange 690m to the East. Smithy Briggs farm 415m to the South West. Burton Constable Hall 1550m to the South West. Moat Farm 1500m to the East. High Fosham 1920m to the North. Low Fosham 900m to the North East. Swiss Cottage 660m to the South West. **Site of Special Scientific Interest:** Lambwath Meadows 2,350m to the North East and 2,500m to the North. Humber Estuary 10,000m to the South West. **Special Protection Areas:** Hornsea Mere 9,500m to the North. Humber Estuary 10,000m to the South West. **Wildlife Sites:** Lambwath stream – 2,450m to the North. The Moors 1675m to the North West. Mill Avenue – 900m to the West. Smithy Bridge Plantation 350m to the West. Brickfield Plantation 700m to the West. **Watercourses:** L Dike stream 200m to the South. L Dike stream 300m to the North. Lambwath stream 2,450m to the North. Lake at Burton Constable Hall 2,100m to the South West. Pond at West Newton 500m to the North. Norwood drain 300m to the North.	Air – Prevailing winds from south west (average statistics from the Met Office)	Site location is within rural area where local receptors are very few. Pipework / equipment to be built according to manufacturer's and industry standards. Tanks, pipework and equipment to be tested for leaks prior to delivery / use as required by manufacturer / written procedures. Pipework / equipment to be cleaned / purged where possible prior to pulling out of the hole. Regular maintenance and inspections are to be conducted as directed by the manufacturer / written procedures. An Ecological report was conducted prior to operations to assess impact on local wildlife and habitat. Local residents informed of planned operations via liaison committee meetings. Records will be kept of complaints and action taken to resolve complaints if required. Authorities to be notified of the operation prior to commencement. Odour Management Plan to be in place, distributed and adhered to by site personnel.	Odorous emissions may be released from pipework / equipment at surface after contact with produced fluids from within the wellbore. Pulling out of hole operations will be kept to a minimum or essential maintenance work only. N_2 purging to flare / well control fluid circulation and or renewal will be performed where practicable to minimise release.	Complaints of odours / smells in vicinity of local receptors. Will not last for more than 60 minutes.	Not significant if managed correctly.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
003	Release of odour from open top mud tanks when used in the transporting of well control fluid from the wellbore to surface.	**Local Residents:** West Newton village 700m to the North. Flinton village 1,900m to the South East. Old Farm Cottages 580m to the North. West Newton Grange 690m to the East. Smithy Briggs farm 415m to the South West. Burton Constable Hall 1550m to the South West. Moat Farm 1500m to the East. High Fosham 1920m to the North. Low Fosham 900m to the North East. Swiss Cottage 660m to the South West. **Site of Special Scientific Interest:** Lambwath Meadows 2,350m to the North East and 2,500m to the North. Humber Estuary 10,000m to the South West. **Special Protection Areas:** Hornsea Mere 9,500m to the North. Humber Estuary 10,000m to the South West. **Wildlife Sites:** Lambwath stream – 2,450m to the North. The Moors 1675m to the North West. Mill Avenue – 900m to the West. Smithy Bridge Plantation 350m to the West. Brickfield Plantation 700m to the West. **Watercourses:** L Dike stream 200m to the South. L Dike stream 300m to the North. Lambwath stream 2,450m to the North. Lake at Burton Constable Hall 2,100m to the South West. Pond at West Newton 500m to the North. Norwood drain 300m to the North.	Air – Prevailing winds from south west (average statistics from the Met Office)	Site location is within rural area where local receptors are very few. Tanks and pipework to be built according to manufacturer's and industry standards. Tanks and pipework to be tested for leaks prior to delivery / use as required by manufacturer / written procedures. Breaking containment of tanks and pipework systems is to be kept to a minimum. Tanks and pipework to be cleaned where possible prior to breaking containment. Regular maintenance and inspections are to be conducted as directed by the manufacturer / written procedures. An Ecological report was conducted prior to operations to assess impact on local wildlife and habitat. Local residents informed of planned operations via liaison committee meetings. Records will be kept of complaints and action taken to resolve complaints if required. Authorities to be notified of the operation prior to commencement. Odour Management Plan to be in place, distributed and adhered to by site personnel.	Odorous emissions may be released from open top mud tanks at surface from produced fluids. Breaking containment of tanks / pipework will be kept to a minimum – at end of operations or essential maintenance work only. N_2 purging to flare / well control fluid circulation and/or renewal will be performed where practicable to minimise release.	Complaints of odours / smells in vicinity of local receptors. Will not last for more than 60 minutes.	Not significant if managed correctly.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
004	Release of odour from flaring of natural gas during well testing operations.	**Local Residents:** West Newton village 700m to the North. Flinton village 1,900m to the South East. Old Farm Cottages 580m to the North. West Newton Grange 690m to the East. Smithy Briggs farm 415m to the South West. Burton Constable Hall 1550m to the South West. Moat Farm 1500m to the East. High Fosham 1920m to the North. Low Fosham 900m to the North East. Swiss Cottage 660m to the South West. **Site of Special Scientific Interest:** Lambwath Meadows 2,350m to the North East and 2,500m to the North. Humber Estuary 10,000m to the South West. **Special Protection Areas:** Hornsea Mere 9,500m to the North. Humber Estuary 10,000m to the South West. **Wildlife Sites:** Lambwath stream – 2,450m to the North. The Moors 1675m to the North West. Mill Avenue – 900m to the West. Smithy Bridge Plantation 350m to the West. Brickfield Plantation 700m to the West. **Watercourses:** L Dike stream 200m to the South. L Dike stream 300m to the North. Lambwath stream 2,450m to the North. Lake at Burton Constable Hall 2,100m to the South West. Pond at West Newton 500m to the North. Norwood drain 300m to the North.	Air – Prevailing winds from south west (average statistics from the Met Office)	Site location is within rural area where local receptors are very few. Flare equipment to be agreed by Environment Agency to ensure compliance prior to use. Monitoring of flare combustion temperature to be undertaken during periods of flaring. Cold venting of gases to atmosphere is prohibited. Flare equipment to be built according to manufacturer's and industry standards. Flare equipment to be tested for leaks prior to delivery / use as required by manufacturer / written procedures. Breaking containment of Flare equipment is to be kept to a minimum. Flare equipment to be cleaned / purged where possible prior to breaking containment. Regular maintenance and inspections are to be conducted as directed by the manufacturer / written procedures. An Ecological report was conducted prior to operations to assess impact on local wildlife and habitat. Local residents informed of planned operations via liaison committee meetings. Records will be kept of complaints and action taken to resolve complaints if required. Authorities to be notified of the operation prior to commencement. Odour Management Plan to be in place, distributed and adhered to by site personnel.	Odorous emissions are present when combustion of gases occurs. Odorous emissions may be released during flaring of natural gas.	Complaints of odours / smells in vicinity of local receptors.	Not significant if managed correctly.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
005	Storage / use / transfer and decanting of odorous products during operations.	**Local Residents:** West Newton village 700m to the North. Flinton village 1,900m to the South East. Old Farm Cottages 580m to the North. West Newton Grange 690m to the East. Smithy Briggs farm 415m to the South West. Burton Constable Hall 1550m to the South West. Moat Farm 1500m to the East. High Fosham 1920m to the North. Low Fosham 900m to the North East. Swiss Cottage 660m to the South West. **Site of Special Scientific Interest:** Lambwath Meadows 2,350m to the North East and 2,500m to the North. Humber Estuary 10,000m to the South West. **Special Protection Areas:** Hornsea Mere 9,500m to the North. Humber Estuary 10,000m to the South West. **Wildlife Sites:** Lambwath stream – 2,450m to the North. The Moors 1675m to the North West. Mill Avenue – 900m to the West. Smithy Bridge Plantation 350m to the West. Brickfield Plantation 700m to the West. **Watercourses:** L Dike stream 200m to the South. L Dike stream 300m to the North. Lambwath stream 2,450m to the North. Lake at Burton Constable Hall 2,100m to the South West. Pond at West Newton 500m to the North. Norwood drain 300m to the North.	Air – Prevailing winds from south west (average statistics from the Met Office)	Site location is within rural area where local receptors are very few. Products known to emit odour or products that may emit odour when reacting with other products will be substituted where possible, for alternative non-odorous products which are deemed safe and effective. Chemicals / oils are to be segregated. Odorous chemicals / oils are to be stored in the dedicated COSHH store on site. Quantities of odorous chemicals / oils are to be kept to a minimum where possible. Containers are to be sealed when not in use. Containers are to be checked prior to / on delivery for signs of damage or leaks. Damaged / leaking containers are to be segregated and used as a priority where possible. Containers are to be checked periodically per shift for signs of damage / leaks. During transfer / decanting of odorous chemicals / oils the following procedures are to be undertaken: • Containers are to be sealed when not in use; • Spillage pads / containers are to be used to ensure any spillages are contained and can be remediated effectively and efficiently; • Avoid direct sunlight where possible; and • Reduce evaporation rate by eliminating air flow and surface area. An Ecological report was conducted prior to operations to assess impact on local wildlife and habitat. Local residents informed of planned operations via liaison committee meetings. Records will be kept of complaints and action taken to resolve complaints if required. Authorities to be notified of the operation prior to commencement. Odour Management Plan to be in place, distributed and adhered to by site personnel.	Odorous emissions may be released during transfer / decanting of chemicals / oils. Transfer / decanting of chemicals / oils will be kept to a minimum – at end of operations or essential maintenance work only. Breaking of containment expected to be at end of operations only. N_2 Purging to flare will be performed where practicable to minimise release	Complaints of odours / smells in vicinity of local receptors. Will not last for more than 60 minutes.	Not significant if managed correctly.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
006	Release of odour from storage of raw materials.	**Local Residents:** West Newton village 700m to the North. Flinton village 1,900m to the South East. Old Farm Cottages 580m to the North. West Newton Grange 690m to the East. Smithy Briggs farm 415m to the South West. Burton Constable Hall 1550m to the South West. Moat Farm 1500m to the East. High Fosham 1920m to the North. Low Fosham 900m to the North East. Swiss Cottage 660m to the South West. **Site of Special Scientific Interest:** Lambwath Meadows 2,350m to the North East and 2,500m to the North. Humber Estuary 10,000m to the South West. **Special Protection Areas:** Hornsea Mere 9,500m to the North. Humber Estuary 10,000m to the South West. **Wildlife Sites:** Lambwath stream – 2,450m to the North. The Moors 1675m to the North West. Mill Avenue – 900m to the West. Smithy Bridge Plantation 350m to the West. Brickfield Plantation 700m to the West. **Watercourses:** L Dike stream 200m to the South. L Dike stream 300m to the North. Lambwath stream 2,450m to the North. Lake at Burton Constable Hall 2,100m to the South West. Pond at West Newton 500m to the North. Norwood drain 300m to the North.	Air – Prevailing winds from south west (average statistics from the Met Office)	Site location is within rural area where local receptors are very few. Use of raw materials that are less likely to cause odour problems. Quantity of materials to be planned to ensure that orders of biodegradable materials will be limited and excess quantities kept to a minimum. Materials to be managed, stored and handled correctly by competent personnel. Daily inspections of materials / storage area to identify potential problems that may cause odorous emissions. An Ecological report was conducted prior to operations to assess impact on local wildlife and habitat. Local residents informed of planned operations via liaison committee meetings. Records will be kept of complaints and action taken to resolve complaints if required. Authorities to be notified of the operation prior to commencement. Odour Management Plan to be in place, distributed and adhered to by site personnel.	Odorous emissions may be released from decaying materials. Raw materials used during the operation will be kept to a minimum. Due to the short time period for the operation it is expected that there is insufficient time for any raw materials to decompose / omit odours.	Complaints of odours / smells in vicinity of local receptors.	Not significant.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
007	Release of odour from site septic tanks and waste skips.	**Local Residents:** West Newton village 700m to the North. Flinton village 1,900m to the South East. Old Farm Cottages 580m to the North. West Newton Grange 690m to the East. Smithy Briggs farm 415m to the South West. Burton Constable Hall 1550m to the South West. Moat Farm 1500m to the East. High Fosham 1920m to the North. Low Fosham 900m to the North East. Swiss Cottage 660m to the South West. **Site of Special Scientific Interest:** Lambwath Meadows 2,350m to the North East and 2,500m to the North. Humber Estuary 10,000m to the South West. **Special Protection Areas:** Hornsea Mere 9,500m to the North. Humber Estuary 10,000m to the South West. **Wildlife Sites:** Lambwath stream – 2,450m to the North. The Moors 1675m to the North West. Mill Avenue – 900m to the West. Smithy Bridge Plantation 350m to the West. Brickfield Plantation 700m to the West. **Watercourses:** L Dike stream 200m to the South. L Dike stream 300m to the North. Lambwath stream 2,450m to the North. Lake at Burton Constable Hall 2,100m to the South West. Pond at West Newton 500m to the North. Norwood drain 300m to the North.	Air – Prevailing winds from south west (average statistics from the Met Office)	Site location is within rural area where local receptors are very few. Tanks and pipework to be built according to manufacturer's and industry standards. Tanks and pipework to be tested for leaks prior to delivery as identified by manufacturer and industry standards. Breaking containment of tanks and pipework systems is to be kept to a minimum. Tanks and pipework to be cleaned where possible prior to breaking containment. Tanks and skips to be self-contained / enclosed to prevent emissions. Skips to be clearly marked to ensure that waste is kept segregated and cross contamination does not occur. Tanks checked prior to use to ensure complete integrity. Tanks and skips to be monitored and emptied daily / as required. Site HSE Advisor and site waste contractor to complete daily visual checks of tanks and skips. Regular maintenance and inspections are to be conducted as directed by the manufacturer / written procedures. An Ecological report was conducted prior to operations to assess impact on local wildlife and habitat. Local residents informed of planned operations via liaison committee meetings. Records will be kept of complaints and action taken to resolve complaints if required. Authorities to be notified of the operation prior to commencement. Odour Management Plan to be in place, distributed and adhered to by site personnel.	Odorous emissions may be released during disassembling of the pipework and tanks. Breaking containment of tanks / pipework will be kept to a minimum – at end of operations or essential maintenance work only. Breaking of containment expected to be at end of operations only. Odorous emissions may be released from breakdown of refuse in skips if left over a period of time. Skips will be monitored and emptied frequently to remove the possibility of odorous emissions occurring. Septic tank pump-out will cause vent to atmosphere from suction tanker for short durations (<30mins). This is a temporary low velocity and low volume emission.	Complaints of odours / smells in vicinity of local receptors. Will not last for more than 30 minutes.	Not significant.

H1 – Annex A – Table 2 Assessment of Noise and Vibration Risks

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
001	Noise and vibration from transportation vehicles accessing and egressing site. Noise from vehicle engines and generators on site. Noise from vehicle reversing alarms. Noise from loading and unloading of vehicles.	**Local Residents:** West Newton village 700m to the North. Flinton village 1,900m to the South East. Old Farm Cottages 580m to the North. West Newton Grange 690m to the East. Smithy Briggs farm 415m to the South West. Burton Constable Hall 1550m to the South West. Moat Farm 1500m to the East. High Fosham 1920m to the North. Low Fosham 900m to the North East. Swiss Cottage 660m to the South West. **Site of Special Scientific Interest:** Lambwath Meadows 2,350m to the North East and 2,500m to the North. Humber Estuary 10,000m to the South West. **Special Protection Areas:** Hornsea Mere 9,500m to the North. Humber Estuary 10,000m to the South West. **Wildlife Sites:** Lambwath stream – 2,450m to the North. The Moors 1675m to the North West. Mill Avenue – 900m to the West. Smithy Bridge Plantation 350m to the West. Brickfield Plantation 700m to the West. **Watercourses:** L Dike stream 200m to the South. L Dike stream 300m to the North. Lambwath stream 2,450m to the North. Lake at Burton Constable Hall 2,100m to the South West. Pond at West Newton 500m to the North. Norwood drain 300m to the North.	Atmosphere and ground vibrations.	Site location is within rural area where local receptors are very few. Noise limits set by the planning authority shall not be breached. Transport restrictions set by the planning authority shall not be breached. Vehicle loads and transportation to be planned to reduce quantity of deliveries / collections. Vehicles are to be serviced and maintained to manufacturer's / industry standards. Drivers are to receive training / induction on driving techniques and site rules. Directional / white noise reversing alarms are to be fitted to site vehicles. Loading / unloading operations will be planned where possible during day light hours. Noise monitoring to be conducted prior to and during operations. Sound screens to be erected if required from sound survey results. Trained operators to load / unload vehicles using MHE plant equipment. Equipment when not in use to be switched off. An Ecological report was conducted prior to operations to assess impact on local wildlife and habitat. Local residents informed of planned operations via liaison committee meetings. Records will be kept of complaints and action taken to resolve complaints if required. Authorities to be notified of the operation prior to commencement.	Vehicle movements will be limited in compliance with planning authority conditions.	Complaints of noise in vicinity of local receptors. Duration of planned operations is temporary. Due to location, noise levels may increase for the duration of operations.	Low if management techniques are effective.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
002	Noise from drilling operations. Includes noise levels from drilling rig, site plant equipment, generators and movement of equipment around site. Vibration from drilling operation and site vehicles.	**Local Residents:** West Newton village 700m to the North. Flinton village 1,900m to the South East. Old Farm Cottages 580m to the North. West Newton Grange 690m to the East. Smithy Briggs farm 415m to the South West. Burton Constable Hall 1550m to the South West. Moat Farm 1500m to the East. High Fosham 1920m to the North. Low Fosham 900m to the North East. Swiss Cottage 660m to the South West. **Site of Special Scientific Interest:** Lambwath Meadows 2,350m to the North East and 2,500m to the North. Humber Estuary 10,000m to the South West. **Special Protection Areas:** Hornsea Mere 9,500m to the North. Humber Estuary 10,000m to the South West. **Wildlife Sites:** Lambwath stream – 2,450m to the North. The Moors 1675m to the North West. Mill Avenue – 900m to the West. Smithy Bridge Plantation 350m to the West. Brickfield Plantation 700m to the West. **Watercourses:** L Dike stream 200m to the South. L Dike stream 300m to the North. Lambwath stream 2,450m to the North. Lake at Burton Constable Hall 2,100m to the South West. Pond at West Newton 500m to the North. Norwood drain 300m to the North.	Atmosphere and ground vibrations.	Site location is within rural area where local receptors are very few. Noise limits set by the planning authority shall not be breached. Vehicles / equipment are to be serviced and maintained to manufacturer's / industry standards. Drivers / Operators of plant equipment are to receive training / induction on driving, operating techniques and site rules. Vehicle reversing alarms are to be directional / white noise. Loading / unloading operations will be planned where possible during day light hours. Trained operators to load / unload vehicles using MHE plant equipment. Equipment when not in use to be switched off. Noise monitoring to be conducted during operations. Sound screens to be erected if required from sound survey results. An Ecological report was conducted prior to operations to assess impact on local wildlife and habitat. Local residents informed of planned operations via liaison committee meetings. Records will be kept of complaints and action taken to resolve complaints if required. Authorities to be notified of the operation prior to commencement.	Drilling and well test phase – 24 hour operation – noise and vibration may occasionally reach local habitants.	Complaints of noise in vicinity of local receptors. Duration of planned operations is temporary. Due to rural location, noise levels may increase for the duration of operations.	Low if management techniques are effective.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
003	Noise from flaring.	**Local Residents:** West Newton village 700m to the North. Flinton village 1,900m to the South East. Old Farm Cottages 580m to the North. West Newton Grange 690m to the East. Smithy Briggs farm 415m to the South West. Burton Constable Hall 1550m to the South West. Moat Farm 1500m to the East. High Fosham 1920m to the North. Low Fosham 900m to the North East. Swiss Cottage 660m to the South West. **Site of Special Scientific Interest:** Lambwath Meadows 2,350m to the North East and 2,500m to the North. Humber Estuary 10,000m to the South West. **Special Protection Areas:** Hornsea Mere 9,500m to the North. Humber Estuary 10,000m to the South West. **Wildlife Sites:** Lambwath stream – 2,450m to the North. The Moors 1675m to the North West. Mill Avenue – 900m to the West. Smithy Bridge Plantation 350m to the West. Brickfield Plantation 700m to the West. **Watercourses:** L Dike stream 200m to the South. L Dike stream 300m to the North. Lambwath stream 2,450m to the North. Lake at Burton Constable Hall 2,100m to the South West. Pond at West Newton 500m to the North. Norwood drain 300m to the North.	Atmosphere.	Site location is within rural area where local receptors are very few. Flare stack to be constructed and tested in accordance with manufacturer's / industry standards. Regular maintenance and inspections are to be conducted as directed by the manufacturer / written procedures. Flare stack to be monitored and controlled at all times. Perimeter safe zone established around flare stack. Due to the potential risk from flaring of natural gas, a dispersion modelling assessment of the impact of gas flaring at the West Newton B well site on local air quality has been commissioned by Rathlin Energy (UK) Limited. An Ecological report was conducted prior to operations to assess impact on local wildlife and habitat. Local residents informed of planned operations via liaison committee meetings. Records will be kept of complaints and action taken to resolve complaints if required. Authorities to be notified of the operation prior to commencement.	Well testing will be conducted over a period of up to 10 days (24 hours). During well testing noise will be produced from the flaring of gases. Noise generated will depend on the volume of subsurface gases released from the formation.	Complaints of noise in vicinity of local receptors. Duration of planned operations is expected not to exceed 10 days. Due to rural location, noise levels may increase for the duration of operations.	Medium.

H1 – Annex A – Table 3 Assessment of Fugitive Emissions Risks

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
001	Emissions to Air. Methane emissions from the wellbore and mud circulation.	**Local Residents:** West Newton village 700m to the North. Flinton village 1,900m to the South East. Old Farm Cottages 580m to the North. West Newton Grange 690m to the East. Smithy Briggs farm 415m to the South West. Burton Constable Hall 1550m to the South West. Moat Farm 1500m to the East. High Fosham 1920m to the North. Low Fosham 900m to the North East. Swiss Cottage 660m to the South West. **Site of Special Scientific Interest:** Lambwath Meadows 2,350m to the North East and 2,500m to the North. Humber Estuary 10,000m to the South West. **Special Protection Areas:** Hornsea Mere 9,500m to the North. Humber Estuary 10,000m to the South West. **Wildlife Sites:** Lambwath stream – 2,450m to the North. The Moors 1675m to the North West. Mill Avenue – 900m to the West. Smithy Bridge Plantation 350m to the West. Brickfield Plantation 700m to the West. **Watercourses:** L Dike stream 200m to the South. L Dike stream 300m to the North. Lambwath stream 2,450m to the North. Lake at Burton Constable Hall 2,100m to the South West. Pond at West Newton 500m to the North. Norwood drain 300m to the North.	Air – vapours carried on the wind.	Site location is within rural area where local receptors are very few. The well is constructed to industry standards / best available techniques and reviewed by independent well examiner. Adequate mud weight / suspension fluid weight, well control equipment and procedures in place. Competent Site Supervisor who holds a certified in date well control certificate is to be present during operations. Use of competent drilling fluids / suspension fluids management personnel. Formation Integrity Tests (FIT) conducted on casing shoes. Cementing best practices utilised. Integrity of Well Cellar checked prior to drilling and well testing. Flare stack to be installed to divert methane emissions from the wellbore to the stack to be ignited in a controlled process. Training on environmental awareness and emergency procedures for site personnel. Emergency procedures tested prior to commencement of operations and on a regular basis thereafter. Safe working procedures are documented and widely known by site personnel. Gas monitoring systems provided to ensure early detection of gases from the wellbore and mud circulation system and managed by competent personnel. Authorities to be notified of the operation prior to commencement. This includes notification to the emergency services and the local Fire and Rescue service will adopt a major accident plan.	Methane emissions from the wellbore could reach receptors but management reactions, well control and emergency shutdown procedures should prevent this from occurring. Methane emissions from the mud circulation system are monitored constantly and if detected on site procedures should prevent the release of methane.	Potential for methane to be dispersed beyond the site perimeter.	Low if management techniques, monitoring, well control and emergency shutdown procedures are followed.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
002	Emissions to Air. CO_2 emissions from liquid CO_2 injection during well test operations.	**Local Residents:** West Newton village 700m to the North. Flinton village 1,900m to the South East. Old Farm Cottages 580m to the North. West Newton Grange 690m to the East. Smithy Briggs farm 415m to the South West. Burton Constable Hall 1550m to the South West. Moat Farm 1500m to the East. High Fosham 1920m to the North. Low Fosham 900m to the North East. Swiss Cottage 660m to the South West. **Site of Special Scientific Interest:** Lambwath Meadows 2,350m to the North East and 2,500m to the North. Humber Estuary 10,000m to the South West. **Special Protection Areas:** Hornsea Mere 9,500m to the North. Humber Estuary 10,000m to the South West. **Wildlife Sites:** Lambwath stream – 2,450m to the North. The Moors 1675m to the North West. Mill Avenue – 900m to the West. Smithy Bridge Plantation 350m to the West. Brickfield Plantation 700m to the West. **Watercourses:** L Dike stream 200m to the South. L Dike stream 300m to the North. Lambwath stream 2,450m to the North. Lake at Burton Constable Hall 2,100m to the South West. Pond at West Newton 500m to the North. Norwood drain 300m to the North.	Air – vapours carried on the wind. Atmosphere.	Site location is within rural area where local receptors are very few. The well is constructed to industry standards / best available techniques and reviewed by independent well examiner. Adequate mud weight / suspension fluid weight, well control equipment and procedures in place. Competent Site Supervisor who holds a certified in date well control certificate is to be present during operations. Use of competent drilling fluids / suspension fluids management personnel. Formation Integrity Tests (FIT) conducted on casing shoes. Cementing best practices utilised. Integrity of Well Cellar checked prior to drilling and well testing. Flare stack to be installed to divert CO_2 emissions from the wellbore to the stack to be vented in a controlled process. Training on environmental awareness and emergency procedures for site personnel. Emergency procedures tested prior to commencement of operations and on a regular basis thereafter. Safe working procedures are documented and widely known by site personnel. Gas monitoring systems provided to ensure early detection of gases from the wellbore and mud circulation system and managed by competent personnel. Authorities to be notified of the operation prior to commencement. This includes notification to the emergency services and the local Fire and Rescue service will adopt a major accident plan.	CO_2 emissions from the wellbore could reach receptors but management reactions, well control and emergency shutdown procedures should prevent this from occurring. CO_2 emissions from the wellbore and well test equipment are monitored constantly and if detected on site procedures should prevent the uncontrolled release of CO_2.	Potential for CO_2 to be dispersed beyond the site perimeter.	Low if management techniques, monitoring, well control and emergency shutdown procedures are followed.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
003	Emissions to Air. VOC's from vehicles and site equipment exhaust systems. Fume emissions from chemicals used during operations.	**Local Residents:** West Newton village 700m to the North. Flinton village 1,900m to the South East. Old Farm Cottages 580m to the North. West Newton Grange 690m to the East. Smithy Briggs farm 415m to the South West. Burton Constable Hall 1550m to the South West. Moat Farm 1500m to the East. High Fosham 1920m to the North. Low Fosham 900m to the North East. Swiss Cottage 660m to the South West. **Site of Special Scientific Interest:** Lambwath Meadows 2,350m to the North East and 2,500m to the North. Humber Estuary 10,000m to the South West. **Special Protection Areas:** Hornsea Mere 9,500m to the North. Humber Estuary 10,000m to the South West. **Wildlife Sites:** Lambwath stream – 2,450m to the North. The Moors 1675m to the North West. Mill Avenue – 900m to the West. Smithy Bridge Plantation 350m to the West. Brickfield Plantation 700m to the West. **Watercourses:** L Dike stream 200m to the South. L Dike stream 300m to the North. Lambwath stream 2,450m to the North. Lake at Burton Constable Hall 2,100m to the South West. Pond at West Newton 500m to the North. Norwood drain 300m to the North.	Air – vapours carried on the wind.	Site location is within rural area where local receptors are very few. Vehicle loads and transportation to be planned to reduce quantity of deliveries / collections. Vehicles are to be serviced and maintained to manufacturer's / industry standards. Regular maintenance and inspections are to be conducted as directed by the manufacturer / written procedures. Drivers are to receive training / induction on driving techniques and site rules. Induction on environmental awareness for site personnel. Chemicals are to be stored correctly on site and containers sealed / closed when not in use. Competent personnel only to store / use chemicals. Equipment when not in use to be switched off. Adequate and suitable spillage kits to be available on site / transport vehicles. Air quality monitoring to be conducted prior to and during operations. An Ecological report was conducted prior to operations to assess impact on local wildlife and habitat. Local residents informed of planned operations via liaison committee meetings. Records will be kept of complaints and action taken to resolve complaints if required. Authorities to be notified of the operation prior to commencement.	Emissions from vehicles and site equipment exhaust systems will occur throughout the operation. Emissions from chemicals will be minor and infrequent.	Complaints of odours / smells in vicinity of local receptors.	Low if management techniques, planning and procedures are followed.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
004	Emissions to Air. VOC's from tanks / pipework.	**Local Residents:** West Newton village 700m to the North. Flinton village 1,900m to the South East. Old Farm Cottages 580m to the North. West Newton Grange 690m to the East. Smithy Briggs farm 415m to the South West. Burton Constable Hall 1550m to the South West. Moat Farm 1500m to the East. High Fosham 1920m to the North. Low Fosham 900m to the North East. Swiss Cottage 660m to the South West. **Site of Special Scientific Interest:** Lambwath Meadows 2,350m to the North East and 2,500m to the North. Humber Estuary 10,000m to the South West. **Special Protection Areas:** Hornsea Mere 9,500m to the North. Humber Estuary 10,000m to the South West. **Wildlife Sites:** Lambwath stream – 2,450m to the North. The Moors 1675m to the North West. Mill Avenue – 900m to the West. Smithy Bridge Plantation 350m to the West. Brickfield Plantation 700m to the West. **Watercourses:** L Dike stream 200m to the South. L Dike stream 300m to the North. Lambwath stream 2,450m to the North. Lake at Burton Constable Hall 2,100m to the South West. Pond at West Newton 500m to the North. Norwood drain 300m to the North.	Air – vapours carried on the wind.	Site location is within rural area where local receptors are very few. Tanks and pipework to be built according to manufacturer's and industry standards. Tanks and pipework to be tested for leaks prior to delivery / use as required by manufacturer / written procedures. Breaking containment of tanks and pipework systems is to be kept to a minimum. Tanks and pipework to be cleaned where possible prior to breaking containment. Regular maintenance and inspections as directed by manufacturer / written procedures. An Ecological report was conducted prior to operations to assess impact on local wildlife and habitat. Local residents informed of planned operations via liaison committee meetings. Records will be kept of complaints and action taken to resolve complaints if required. Authorities to be notified of the operation prior to commencement.	Emissions may be released during breaking containment of the tanks / pipework. Breaking containment of tanks / pipework will be kept to a minimum – at end of operations or essential maintenance work only. Breaking of containment expected to be at end of operations only.	Complaints of odours / smells in vicinity of local receptors. Will not last for more than 60 minutes.	Low if management techniques, planning and procedures are followed.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
005	Emissions to Air. Dust and mud generated by vehicles accessing / egressing and traversing the site.	**Local Residents:** West Newton village 700m to the North. Flinton village 1,900m to the South East. Old Farm Cottages 580m to the North. West Newton Grange 690m to the East. Smithy Briggs farm 415m to the South West. Burton Constable Hall 1550m to the South West. Moat Farm 1500m to the East. High Fosham 1920m to the North. Low Fosham 900m to the North East. Swiss Cottage 660m to the South West. **Site of Special Scientific Interest:** Lambwath Meadows 2,350m to the North East and 2,500m to the North. Humber Estuary 10,000m to the South West. **Special Protection Areas:** Hornsea Mere 9,500m to the North. Humber Estuary 10,000m to the South West. **Wildlife Sites:** Lambwath stream – 2,450m to the North. The Moors 1675m to the North West. Mill Avenue – 900m to the West. Smithy Bridge Plantation 350m to the West. Brickfield Plantation 700m to the West. **Watercourses:** L Dike stream 200m to the South. L Dike stream 300m to the North. Lambwath stream 2,450m to the North. Lake at Burton Constable Hall 2,100m to the South West. Pond at West Newton 500m to the North. Norwood drain 300m to the North.	Air – dust carried by the wind to local receptors.	Site location is within rural area where local receptors are very few. Operations to be planned / designed to minimise transport and handling operations. Filters to be installed for building vents. Spillages to be remediated immediately using vacuum cleaners / pumps and not to be washed down where possible. Only one point of access from the public highway is to be constructed to manage vehicle access and control of mud deposits / dust suppression. Vehicles are to drive on approved roads and follow site traffic management system. A wheel washing facility is to be made available for vehicles prior to exiting site. Roads to / from the site are monitored for mud deposits. A road sweeping contractor has been arranged for road cleaning as required. Avoid certain activities that may present dust if high winds occur. Daily monitoring of wind / weather forecasts. Operations to be conducted inside buildings / cabins / stores where possible. Conveyors used for separation of mud cuttings enclosed within rig infrastructure. The access / egress route to the site is a surface roadway and constructed to industry standards. Planting of grass, trees or hydro-seeding to assist in the suppression of dust generated from site bunds and open areas. An Ecological report was conducted prior to operations to assess impact on local wildlife and habitat. Local residents informed of planned operations via liaison committee meetings. Records will be kept of complaints and action taken to resolve complaints if required. Authorities to be notified of the operation prior to commencement.	Dust could potentially reach local receptors during strong winds which it could perhaps for 25 days a year. Management actions and site procedures should prevent this happening.	Nuisance – dust on cars, clothing, properties etc. Nuisance – mud on local highway.	Low if management techniques, planning and procedures are followed.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
006	Litter. Litter generated on site.	**Local Residents:** West Newton village 700m to the North. Flinton village 1,900m to the South East. Old Farm Cottages 580m to the North. West Newton Grange 690m to the East. Smithy Briggs farm 415m to the South West. Burton Constable Hall 1550m to the South West. Moat Farm 1500m to the East. High Fosham 1920m to the North. Low Fosham 900m to the North East. Swiss Cottage 660m to the South West. **Site of Special Scientific Interest:** Lambwath Meadows 2,350m to the North East and 2,500m to the North. Humber Estuary 10,000m to the South West. **Special Protection Areas:** Hornsea Mere 9,500m to the North. Humber Estuary 10,000m to the South West. **Wildlife Sites:** Lambwath stream – 2,450m to the North. The Moors 1675m to the North West. Mill Avenue – 900m to the West. Smithy Bridge Plantation 350m to the West. Brickfield Plantation 700m to the West. **Watercourses:** L Dike stream 200m to the South. L Dike stream 300m to the North. Lambwath stream 2,450m to the North. Lake at Burton Constable Hall 2,100m to the South West. Pond at West Newton 500m to the North. Norwood drain 300m to the North.	Air – litter carried by the wind to local receptors.	Litter fences to be erected around site. Provide adequate suitable refuse receptacles for both inside and outside working areas. Outdoor receptacles to be provided with lids. Training on environmental awareness and site waste management for site personnel. Litter to be cleared at end of each day / shift. Skips to be monitored and removed / emptied when required by authorised contractor.	Litter could potentially reach local receptors during strong winds which it could perhaps for 25 days a year. Management actions and site procedures should prevent this happening.	Nuisance – Litter from site may be blown to local receptors. Complaints from local residents if appropriate techniques are not adopted and maintained.	Low if management techniques, planning and procedures are followed.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
007	Emissions to Water. Run off from site operations.	**Watercourses:** L Dike stream 200m to the South. L Dike stream 300m to the North. Lambwath stream 2,450m to the North. Lake at Burton Constable Hall 2,100m to the South West. Pond at West Newton 500m to the North. Norwood drain 300m to the North.	Flow by gravity.	An impermeable membrane over the whole of the working pad area and under the site perimeter ditch will be correctly installed during the construction of the wellsite. The impermeable membrane ensures that contamination that may occur from accidents on the site surface does not percolate to the subsurface below the site. Water from surface run off is collected in the site perimeter ditch and can be used in site operations or tested for contamination prior to being removed from site for onward disposal to an authorised licenced facility by an authorised licenced waste carrier. Site perimeter ditches are monitored and procedures are in place to remove excess surface run off water as required. Checks of the impermeable membrane are conducted periodically to ensure that complete containment of the site perimeter ditch is maintained. An Ecological report was conducted prior to operations to assess impact on local wildlife and habitat. Local residents informed of planned operations via liaison committee meetings. Records will be kept of complaints and action taken to resolve complaints if required. Authorities to be notified of the operation prior to commencement.	Unchecked, ditches could overflow and run-off could reach localised receptors but management actions should prevent this from happening.	Pollution of local surface or groundwater.	Low if management techniques, planning and procedures are followed.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
008	Emissions to Water. Unauthorised discharge / failure of equipment from site oil-water separator.	**Watercourses:** L Dike stream 200m to the South. L Dike stream 300m to the North. Lambwath stream 2,450m to the North. Lake at Burton Constable Hall 2,100m to the South West. Pond at West Newton 500m to the North. Norwood drain 300m to the North.	Flow by gravity.	Surface Water Management Plan is to be in place prior to installation of oil-water separator. Authorised, trained and competent personnel only to undertake discharge to surface water operations. Access to oil-water separator and flow valves will be restricted to authorised personnel only. Oil-water separator and flow valves will be secured when not in use. Oil-water separator maintenance program to be conducted in accordance with manufacturers guidelines.	Management actions and site procedures should prevent this happening	Pollution of local surface or groundwater.	Low if management techniques, planning and procedures are followed.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
009	Pests. Flies from refuse accumulated on site. Rats / mice from surrounding area. Wasps accumulating around materials used during operations.	**Local Residents:** West Newton village 700m to the North. Flinton village 1,900m to the South East. Old Farm Cottages 580m to the North. West Newton Grange 690m to the East. Smithy Briggs farm 415m to the South West. Burton Constable Hall 1550m to the South West. Moat Farm 1500m to the East. High Fosham 1920m to the North. Low Fosham 900m to the North East. Swiss Cottage 660m to the South West. **Site of Special Scientific Interest:** Lambwath Meadows 2,350m to the North East and 2,500m to the North. Humber Estuary 10,000m to the South West. **Special Protection Areas:** Hornsea Mere 9,500m to the North. Humber Estuary 10,000m to the South West. **Wildlife Sites:** Lambwath stream – 2,450m to the North. The Moors 1675m to the North West. Mill Avenue – 900m to the West. Smithy Bridge Plantation 350m to the West. Brickfield Plantation 700m to the West. **Watercourses:** L Dike stream 200m to the South. L Dike stream 300m to the North. Lambwath stream 2,450m to the North. Lake at Burton Constable Hall 2,100m to the South West. Pond at West Newton 500m to the North. Norwood drain 300m to the North.	Airborne / ground transportation.	Refuse to be stored in enclosed skips / receptacles. Refuse to be monitored and removed when skips are full. Skips and refuse receptacles to be checked daily to ensure integrity. Food waste to be stored separately in enclosed skips and removed off site for disposal as required. Buildings / cabins / stores to be cleaned daily. Housekeeping programme to be established and implemented for all site personnel. Induction on environmental awareness / housekeeping practices for site personnel. Sacks / containers to be monitored for leaks / spills. Identification of split sacks / damaged containers to be addressed immediately and contents repackaged / or used as a prioritised item. Monitoring of susceptible areas by site HSE Advisor. Pest control techniques to be established and implemented by competent contract company. Litter to be cleared at end of each day / shift. An Ecological report was conducted prior to operations to assess impact on local wildlife and habitat. Local residents informed of planned operations via liaison committee meetings. Records will be kept of complaints and action taken to resolve complaints if required. Authorities to be notified of the operation prior to commencement.	Wastes left unattended could result in problems off site. Sacks / containers damaged through handling / use can result in accumulation of pests and problems off site.	Potential for spreading of disease and adverse health impacts on vulnerable people.	Low if management techniques, planning and procedures are followed.

H1 – Annex A – Table 4 Assessment of Visible Plume Risks

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
001	Emissions to Air. Plume emissions from flaring operation.	**Local Residents:** West Newton village 700m to the North. Flinton village 1,900m to the South East. Old Farm Cottages 580m to the North. West Newton Grange 690m to the East. Smithy Briggs farm 415m to the South West. Burton Constable Hall 1550m to the South West. Moat Farm 1500m to the East. High Fosham 1920m to the North. Low Fosham 900m to the North East. Swiss Cottage 660m to the South West. **Site of Special Scientific Interest:** Lambwath Meadows 2,350m to the North East and 2,500m to the North. Humber Estuary 10,000m to the South West. **Special Protection Areas:** Hornsea Mere 9,500m to the North. Humber Estuary 10,000m to the South West. **Wildlife Sites:** Lambwath stream – 2,450m to the North. The Moors 1675m to the North West. Mill Avenue – 900m to the West. Smithy Bridge Plantation 350m to the West. Brickfield Plantation 700m to the West. **Watercourses:** L Dike stream 200m to the South. L Dike stream 300m to the North. Lambwath stream 2,450m to the North. Lake at Burton Constable Hall 2,100m to the South West. Pond at West Newton 500m to the North. Norwood drain 300m to the North.	Dispersion by wind.	Flare stack designed and constructed to industry standards / best available techniques. Flare stack and pipework to be operated and maintained to industry standards. Flare stack to be tested prior to operational use. A leak test will be undertaken for the flare and associated pipework prior to operation. Monitoring procedures established to include monitoring of the gas entering the flare. Flare stack will be monitored constantly during its operation. Procedures established and communicated to operational personnel should the flow rate of gas exceed or fall below the flares flow range. Gas from the well is expected to be extracted using the natural pressure within the well. An Ecological report was conducted prior to operations to assess impact on local wildlife and habitat. Local residents informed of planned operations via liaison committee meetings. Records will be kept of complaints and action taken to resolve complaints if required. Authorities to be notified of the operation prior to commencement.	Regular observations over the operational timeframe expected to be 10 days of operational flaring including a variety of meteorological conditions.	Nuisance – reduced Low visibility. Due to rural location of site, impact on main travel routes and sensitive receptors fairly low.	Low if management techniques, planning, BAT and procedures are followed.

H1 – Annex A – Table 5 Assessment of Possible Source of Accidents

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
001	Transferring substances. (e.g. loading or unloading vessels).	**Watercourses:** L Dike stream 200m to the South. L Dike stream 300m to the North. Lambwath stream 2,450m to the North. Lake at Burton Constable Hall 2,100m to the South West. Pond at West Newton 500m to the North. Norwood drain 300m to the North.	Cracks or splits in poor impermeable membrane and through the ground.	An impermeable membrane over the whole of the working pad area and under the site perimeter ditch correctly installed during construction of the wellsite. Site perimeter ditch monitored and procedures in place to test and remove excess surface run off water as required. Drip trays to be utilised. Site / vehicle spillage kits to be readily available. Spillages to be remediated immediately using vacuum cleaners / pumps and not to be washed down where possible. Trained operators to carry out loading / unloading operations. Specific areas identified for loading / unloading operations. Safe working procedures / toolbox talks to be conducted prior to operations commencing. Authorised personnel only to be in working area. Operation / task to be planned and communicated to site personnel. Training on environmental awareness for site personnel during site induction. Local residents informed of planned operations via liaison committee meetings. Records will be kept of complaints and action taken to resolve complaints if required. Authorities to be notified of the operation prior to commencement. Emergency response plan established / tested.	Unchecked, ditches could overflow and run-off could reach localised receptors but management actions should prevent this from happening.	Pollution of local surface or groundwater.	Low if management techniques, planning and procedures are followed.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
002	Plant or equipment failure.	**Local Residents:** West Newton village 700m to the North. Flinton village 1,900m to the South East. Old Farm Cottages 580m to the North. West Newton Grange 690m to the East. Smithy Briggs farm 415m to the South West. Burton Constable Hall 1550m to the South West. Moat Farm 1500m to the East. High Fosham 1920m to the North. Low Fosham 900m to the North East. Swiss Cottage 660m to the South West. **Site of Special Scientific Interest:** Lambwath Meadows 2,350m to the North East and 2,500m to the North. Humber Estuary 10,000m to the South West. **Special Protection Areas:** Hornsea Mere 9,500m to the North. Humber Estuary 10,000m to the South West. **Wildlife Sites:** Lambwath stream – 2,450m to the North. The Moors 1675m to the North West. Mill Avenue – 900m to the West. Smithy Bridge Plantation 350m to the West. Brickfield Plantation 700m to the West. **Watercourses:** L Dike stream 200m to the South. L Dike stream 300m to the North. Lambwath stream 2,450m to the North. Lake at Burton Constable Hall 2,100m to the South West. Pond at West Newton 500m to the North. Norwood drain 300m to the North.	Cracks or splits in poor impermeable membrane and through the ground. Air – vapours carried on the wind.	An impermeable membrane over the whole of the working pad area and under the site perimeter ditch correctly installed during construction of the wellsite. Site perimeter ditch monitored and procedures in place to test and remove excess surface run off water as required. Regular maintenance and inspections are to be conducted on plant and equipment as directed by the manufacturer / written procedures. Safety critical spares readily available. Competent trained personnel only to operate plant or equipment. Local residents informed of planned operations via liaison committee meetings. Records will be kept of complaints and action taken to resolve complaints if required. Authorities to be notified of the operation prior to commencement. Emergency response plan established / tested.	Management actions and site procedures should prevent this happening.	Pollution of local surface or groundwater. Emissions to air.	Low if management techniques, planning and procedures are followed.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
003	Overfilling vessels.	**Watercourses:** L Dike stream 200m to the South. L Dike stream 300m to the North. Lambwath stream 2,450m to the North. Lake at Burton Constable Hall 2,100m to the South West. Pond at West Newton 500m to the North. Norwood drain 300m to the North.	Cracks or splits in poor impermeable membrane and through the ground.	An impermeable membrane over the whole of the working pad area and under the site perimeter ditch correctly installed during construction of the wellsite. Site perimeter ditch monitored and procedures in place to test and remove excess surface run off water as required. Drip trays to be utilised. Site spillage kits to be readily available. Spillages to be remediated immediately using vacuum cleaners / pumps and not to be washed down where possible. Trained operators to carry out filling operations. Specific areas identified for filling operations. Safe working procedures / toolbox talks to be conducted prior to operations commencing. Authorised personnel only to be in working area. Operation / task to be planned and communicated. Training on environmental awareness for site personnel during site induction. Local residents informed of planned operations via liaison committee meetings. Records will be kept of complaints and action taken to resolve complaints if required. Authorities to be notified of the operation prior to commencement. Emergency response plan established / tested.	Unchecked, ditches could overflow and run-off could reach localised receptors but management actions should prevent this from happening.	Pollution of local surface or groundwater.	Low if management techniques, planning and procedures are followed.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
004	Containment failure. (e.g. over pressure of vessels and pipework).	**Local Residents:** West Newton village 700m to the North. Flinton village 1,900m to the South East. Old Farm Cottages 580m to the North. West Newton Grange 690m to the East. Smithy Briggs farm 415m to the South West. Burton Constable Hall 1550m to the South West. Moat Farm 1500m to the East. High Fosham 1920m to the North. Low Fosham 900m to the North East. Swiss Cottage 660m to the South West. **Site of Special Scientific Interest:** Lambwath Meadows 2,350m to the North East and 2,500m to the North. Humber Estuary 10,000m to the South West. **Special Protection Areas:** Hornsea Mere 9,500m to the North. Humber Estuary 10,000m to the South West. **Wildlife Sites:** Lambwath stream – 2,450m to the North. The Moors 1675m to the North West. Mill Avenue – 900m to the West. Smithy Bridge Plantation 350m to the West. Brickfield Plantation 700m to the West. **Watercourses:** L Dike stream 200m to the South. L Dike stream 300m to the North. Lambwath stream 2,450m to the North. Lake at Burton Constable Hall 2,100m to the South West. Pond at West Newton 500m to the North. Norwood drain 300m to the North.	Cracks or splits in poor impermeable membrane and through the ground. Air – vapours carried on the wind.	An impermeable membrane over the whole of the working pad area and under the site perimeter ditch correctly installed during construction of the wellsite. Site perimeter ditch monitored and procedures in place to test and remove excess surface run off water as required. Equipment / pipework to be tested prior to operational use. Checks of the impermeable membrane are conducted periodically to ensure that complete containment of the site is maintained. Regular maintenance and inspections are to be conducted as directed by the manufacturer / written procedures. Competent trained personnel only to operate plant or equipment. Safe working procedures / toolbox talks to be conducted prior to operations commencing. Authorised personnel only to be in working area. Operation / task to be planned and communicated. Training on environmental awareness for site personnel during site induction. Local residents informed of planned operations via liaison committee meetings. Records will be kept of complaints and action taken to resolve complaints if required. Authorities to be notified of the operation prior to commencement. Emergency response plan established / tested.	Management actions and procedures should prevent this happening.	Pollution of local surface or groundwater. Emissions to air.	Low if management techniques, planning and procedures are followed.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
005	Making the wrong connection in drains or other systems.	**Local Residents:** West Newton village 700m to the North. Flinton village 1,900m to the South East. Old Farm Cottages 580m to the North. West Newton Grange 690m to the East. Smithy Briggs farm 415m to the South West. Burton Constable Hall 1550m to the South West. Moat Farm 1500m to the East. High Fosham 1920m to the North. Low Fosham 900m to the North East. Swiss Cottage 660m to the South West. **Site of Special Scientific Interest:** Lambwath Meadows 2,350m to the North East and 2,500m to the North. Humber Estuary 10,000m to the South West. **Special Protection Areas:** Hornsea Mere 9,500m to the North. Humber Estuary 10,000m to the South West. **Wildlife Sites:** Lambwath stream – 2,450m to the North. The Moors 1675m to the North West. Mill Avenue – 900m to the West. Smithy Bridge Plantation 350m to the West. Brickfield Plantation 700m to the West. **Watercourses:** L Dike stream 200m to the South. L Dike stream 300m to the North. Lambwath stream 2,450m to the North. Lake at Burton Constable Hall 2,100m to the South West. Pond at West Newton 500m to the North. Norwood drain 300m to the North.	Cracks or splits in poor impermeable membrane and through the ground. Air – vapours and carried on the wind.	An impermeable membrane over the whole of the working pad area and under the site perimeter ditch correctly installed during construction of the wellsite. Site perimeter ditch monitored and procedures in place to test and remove excess surface run off water as required. Competent trained personnel only to connect pipework, equipment, engineering systems. Safe working procedures / toolbox talks to be conducted prior to operations commencing. Equipment / pipework to be tested prior to commencement of operations. Authorised personnel only to be in working area. Operation / task to be planned and communicated to all personnel involved in the operation. Permit to Work System to be utilised for work associated with pressure systems, work deemed high risk. Emergency response plan established / tested.	Management actions and procedures should prevent this happening.	Pollution of local surface or groundwater. Emissions to air.	Low if management techniques, planning and procedures are followed.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
006	Poor storage arrangements of hazardous substances.	**Local Residents:** West Newton village 700m to the North. Flinton village 1,900m to the South East. Old Farm Cottages 580m to the North. West Newton Grange 690m to the East. Smithy Briggs farm 415m to the South West. Burton Constable Hall 1550m to the South West. Moat Farm 1500m to the East. High Fosham 1920m to the North. Low Fosham 900m to the North East. Swiss Cottage 660m to the South West. **Site of Special Scientific Interest:** Lambwath Meadows 2,350m to the North East and 2,500m to the North. Humber Estuary 10,000m to the South West. **Special Protection Areas:** Hornsea Mere 9,500m to the North. Humber Estuary 10,000m to the South West. **Wildlife Sites:** Lambwath stream – 2,450m to the North. The Moors 1675m to the North West. Mill Avenue – 900m to the West. Smithy Bridge Plantation 350m to the West. Brickfield Plantation 700m to the West. **Watercourses:** L Dike stream 200m to the South. L Dike stream 300m to the North. Lambwath stream 2,450m to the North. Lake at Burton Constable Hall 2,100m to the South West. Pond at West Newton 500m to the North. Norwood drain 300m to the North.	Cracks or splits in poor impermeable membrane and through the ground. Air – vapours and plumes carried on the wind.	An impermeable membrane over the whole of the working pad area and under the site perimeter ditch correctly installed during construction of the wellsite. Site perimeter ditch monitored and procedures in place to test and remove excess surface run off water as required. Hazardous substances to be stored in dedicated COSHH store on site in accordance with current regulations. COSHH Assessments in place for hazardous items. Personnel to be trained in safe handling / use of hazardous items (COSHH Awareness etc.). COSHH items to be segregated within the store in line with current regulations. Material Safety Data Sheets (MSDS) to be readily available for each hazardous item. Copy of MSDS and a list and location of hazardous substances to be communicated to Fire & Rescue Service and copy held at Security Office as part of Emergency Response Plan. Authorities to be notified of the operation prior to commencement. Emergency response plan established / tested.	Management actions and procedures should prevent this happening.	Pollution of local surface or groundwater. Emissions to air.	Low if management techniques, planning and procedures are followed.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
007	Fires or failure to contain fire water.	**Local Residents:** West Newton village 700m to the North. Flinton village 1,900m to the South East. Old Farm Cottages 580m to the North. West Newton Grange 690m to the East. Smithy Briggs farm 415m to the South West. Burton Constable Hall 1550m to the South West. Moat Farm 1500m to the East. High Fosham 1920m to the North. Low Fosham 900m to the North East. Swiss Cottage 660m to the South West. **Site of Special Scientific Interest:** Lambwath Meadows 2,350m to the North East and 2,500m to the North. Humber Estuary 10,000m to the South West. **Special Protection Areas:** Hornsea Mere 9,500m to the North. Humber Estuary 10,000m to the South West. **Wildlife Sites:** Lambwath stream – 2,450m to the North. The Moors 1675m to the North West. Mill Avenue – 900m to the West. Smithy Bridge Plantation 350m to the West. Brickfield Plantation 700m to the West. **Watercourses:** L Dike stream 200m to the South. L Dike stream 300m to the North. Lambwath stream 2,450m to the North. Lake at Burton Constable Hall 2,100m to the South West. Pond at West Newton 500m to the North. Norwood drain 300m to the North.	Cracks or splits in poor impermeable membrane and through the ground. Air – vapours and plumes carried on the wind.	Fire risk assessment to be conducted by HSE Site Advisor. Fire awareness training / site induction for personnel. Waste management and housekeeping procedures established and communicated. No sources of ignition are allowed on working pad of the site unless authorised and permit to work is in place. Hazardous materials stored in dedicated COSHH store. All buildings, stores, cabins, toilets and restrooms are to have fire detection equipment in place and tested on a regular basis. Smoking area is established outside of the working pad and means of tobacco extinguishment provided. Fire points, extinguishers and a fire water tank located around the site. Fire trained personnel to be available throughout the operation. Fire evacuation and test to be conducted prior to and during the operation. AFFF foam to be available on site for use in firefighting. Local Fire & Rescue Service to be notified of operations. A review / visit of the site may be undertaken by the Fire & Rescue Service and emergency response plans and actions discussed and agreed. Copy of MSDS and a list and location of hazardous substances, firefighting equipment, spillage kits water tank to be communicated to Fire & Rescue Service and copy held at Security Office as part of Emergency Response Plan. Containment of fire water / AFFF foam used in the event of firefighting measures will be contained within the site / perimeter ditch and removed by specialised contractor. Emergency response plan both on and off site established / tested. Emergency telephone number located on information board at site entrance. The site is not in a Flood Risk Area.	Management actions and procedures should prevent this happening.	Pollution of local surface or groundwater. Emissions to air.	Low if management techniques, planning and procedures are followed.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
008	Incompatible substances coming into contact.	**Local Residents:** West Newton village 700m to the North. Flinton village 1,900m to the South East. Old Farm Cottages 580m to the North. West Newton Grange 690m to the East. Smithy Briggs farm 415m to the South West. Burton Constable Hall 1550m to the South West. Moat Farm 1500m to the East. High Fosham 1920m to the North. Low Fosham 900m to the North East. Swiss Cottage 660m to the South West. **Site of Special Scientific Interest:** Lambwath Meadows 2,350m to the North East and 2,500m to the North. Humber Estuary 10,000m to the South West. **Special Protection Areas:** Hornsea Mere 9,500m to the North. Humber Estuary 10,000m to the South West. **Wildlife Sites:** Lambwath stream – 2,450m to the North. The Moors 1675m to the North West. Mill Avenue – 900m to the West. Smithy Bridge Plantation 350m to the West. Brickfield Plantation 700m to the West. **Watercourses:** L Dike stream 200m to the South. L Dike stream 300m to the North. Lambwath stream 2,450m to the North. Lake at Burton Constable Hall 2,100m to the South West. Pond at West Newton 500m to the North. Norwood drain 300m to the North.	Cracks or splits in poor impermeable membrane and through the ground. Air – vapours and plumes carried on the wind.	An impermeable membrane over the whole of the working pad area and under the site perimeter ditch correctly installed during construction of the wellsite. Site perimeter ditch monitored and procedures in place to test and remove excess surface run off water as required. Segregation of incompatible substances. Hazardous substances to be stored in dedicated COSHH store on site in accordance with current regulations. COSHH Assessments in place for hazardous items. Personnel to be trained in safe handling / use of hazardous items (COSHH Awareness etc.). COSHH items to be segregated within the COSHH store in line with current regulations. Material Safety Data Sheets (MSDS) to be readily available for each hazardous item. Copy of MSDS and a list and location of hazardous substances to be communicated to Fire & Rescue Service and copy held at Security Office as part of Emergency Response Plan. Emergency response plan established / tested.	Management actions and procedures should prevent this happening.	Pollution of local surface or groundwater. Emissions to air.	Low if management techniques, planning and procedures are followed.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
009	Unwanted reactions and/or runaway reactions.	**Local Residents:** West Newton village 700m to the North. Flinton village 1,900m to the South East. Old Farm Cottages 580m to the North. West Newton Grange 690m to the East. Smithy Briggs farm 415m to the South West. Burton Constable Hall 1550m to the South West. Moat Farm 1500m to the East. High Fosham 1920m to the North. Low Fosham 900m to the North East. Swiss Cottage 660m to the South West. **Site of Special Scientific Interest:** Lambwath Meadows 2,350m to the North East and 2,500m to the North. Humber Estuary 10,000m to the South West. **Special Protection Areas:** Hornsea Mere 9,500m to the North. Humber Estuary 10,000m to the South West. **Wildlife Sites:** Lambwath stream – 2,450m to the North. The Moors 1675m to the North West. Mill Avenue – 900m to the West. Smithy Bridge Plantation 350m to the West. Brickfield Plantation 700m to the West. **Watercourses:** L Dike stream 200m to the South. L Dike stream 300m to the North. Lambwath stream 2,450m to the North. Lake at Burton Constable Hall 2,100m to the South West. Pond at West Newton 500m to the North. Norwood drain 300m to the North.	Cracks or splits in poor impermeable membrane and through the ground. Air – vapours and plumes carried on the wind.	An impermeable membrane over the whole of the working pad area and under the site perimeter ditch correctly installed during construction of the wellsite. Site perimeter ditch monitored and procedures in place to test and remove excess surface run off water as required. Emergency shutdown procedures to be established and tested prior to and during operations. Competent trained personnel to conduct operations. Safe working procedures / toolbox talks to be conducted prior to operations commencing.. Operation / task to be planned and communicated. Training on environmental awareness for site personnel during site induction. Local residents informed of planned operations via liaison committee meetings. Authorities to be notified of the operation prior to commencement. Emergency response plan established / tested.	Management actions and procedures, with use of QA and applicable standards will prevent this happening.	Pollution of local surface or groundwater. Emissions to air.	Low if management techniques, planning and procedures are followed.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
010	Emission of an effluent before adequately checking its composition.	**Local Residents:** West Newton village 700m to the North. Flinton village 1,900m to the South East. Old Farm Cottages 580m to the North. West Newton Grange 690m to the East. Smithy Briggs farm 415m to the South West. Burton Constable Hall 1550m to the South West. Moat Farm 1500m to the East. High Fosham 1920m to the North. Low Fosham 900m to the North East. Swiss Cottage 660m to the South West. **Site of Special Scientific Interest:** Lambwath Meadows 2,350m to the North East and 2,500m to the North. Humber Estuary 10,000m to the South West. **Special Protection Areas:** Hornsea Mere 9,500m to the North. Humber Estuary 10,000m to the South West. **Wildlife Sites:** Lambwath stream – 2,450m to the North. The Moors 1675m to the North West. Mill Avenue – 900m to the West. Smithy Bridge Plantation 350m to the West. Brickfield Plantation 700m to the West. **Watercourses:** L Dike stream 200m to the South. L Dike stream 300m to the North. Lambwath stream 2,450m to the North. Lake at Burton Constable Hall 2,100m to the South West. Pond at West Newton 500m to the North. Norwood drain 300m to the North.	Cracks or splits in poor impermeable membrane and through the ground. Air – vapours and plumes carried on the wind.	An impermeable membrane over the whole of the working pad area and under the site perimeter ditch correctly installed during construction of the wellsite. Site perimeter ditch monitored and procedures in place to test and remove excess surface run off water as required. Competent trained personnel to conduct operations. Safe working procedures / toolbox talks to be conducted prior to operations commencing.. Operation / task to be planned and communicated. Substance to be tested prior to removal from site or at licenced waste facility by competent trained personnel. Authorities to be notified of the operation prior to commencement. Emergency response plan established / tested.	Management actions and procedures will prevent this happening.	Pollution of local surface or groundwater. Emissions to air.	Low if management techniques, planning and procedures are followed.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
011	Vandalism.	**Local Residents:** West Newton village 700m to the North. Flinton village 1,900m to the South East. Old Farm Cottages 580m to the North. West Newton Grange 690m to the East. Smithy Briggs farm 415m to the South West. Burton Constable Hall 1550m to the South West. Moat Farm 1500m to the East. High Fosham 1920m to the North. Low Fosham 900m to the North East. Swiss Cottage 660m to the South West. **Site of Special Scientific Interest:** Lambwath Meadows 2,350m to the North East and 2,500m to the North. Humber Estuary 10,000m to the South West. **Special Protection Areas:** Hornsea Mere 9,500m to the North. Humber Estuary 10,000m to the South West. **Wildlife Sites:** Lambwath stream – 2,450m to the North. The Moors 1675m to the North West. Mill Avenue – 900m to the West. Smithy Bridge Plantation 350m to the West. Brickfield Plantation 700m to the West. **Watercourses:** L Dike stream 200m to the South. L Dike stream 300m to the North. Lambwath stream 2,450m to the North. Lake at Burton Constable Hall 2,100m to the South West. Pond at West Newton 500m to the North. Norwood drain 300m to the North.	Various – acts of vandalism may cause fires, loss of containment from containers, damage to site equipment, etc.	An impermeable membrane over the whole of the working pad area and under the site perimeter ditch correctly installed during construction of the wellsite. Site perimeter ditch monitored and procedures in place to test and remove excess surface run off water as required. Site security risk assessment to be conducted prior to operations commencing. Security fence to be established around site perimeter. Security officers from specialist security company to be contracted to provide 24 hour security during operations. Security procedures established and communicated to Site Security Officers to cover unauthorised access, vandalism, protestors, theft, emergency response actions etc. Due to rural location, mobile security patrols to visit site regularly throughout periods of quiet / darkness. Site personnel to be aware of possible unauthorised personnel on site and the actions to take if such personnel discovered. When not in use, equipment is to be shut down and isolated. Hazardous materials are to be stored in locked COSHH store when not in use. Emergency communications to be established between operational personnel and site security. Emergency response plan both on and off site established / tested. Authorities to be notified of the operation prior to commencement.	Management actions and procedures should prevent this happening.	Pollution of local surface or groundwater. Emissions to air.	Low if management techniques, planning and procedures are followed.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
012	Flooding.	**Local Residents:** West Newton village 700m to the North. Flinton village 1,900m to the South East. Old Farm Cottages 580m to the North. West Newton Grange 690m to the East. Smithy Briggs farm 415m to the South West. Burton Constable Hall 1550m to the South West. Moat Farm 1500m to the East. High Fosham 1920m to the North. Low Fosham 900m to the North East. Swiss Cottage 660m to the South West. **Site of Special Scientific Interest:** Lambwath Meadows 2,350m to the North East and 2,500m to the North. Humber Estuary 10,000m to the South West. **Special Protection Areas:** Hornsea Mere 9,500m to the North. Humber Estuary 10,000m to the South West. **Wildlife Sites:** Lambwath stream – 2,450m to the North. The Moors 1675m to the North West. Mill Avenue – 900m to the West. Smithy Bridge Plantation 350m to the West. Brickfield Plantation 700m to the West. **Watercourses:** L Dike stream 200m to the South. L Dike stream 300m to the North. Lambwath stream 2,450m to the North. Lake at Burton Constable Hall 2,100m to the South West. Pond at West Newton 500m to the North. Norwood drain 300m to the North.	Spreading of materials outside of site boundary. Damage to site equipment from the effects of flooding.	A hydrogeological risk assessment has been conducted by an independent company.	None.	None.	None.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
013	Spillage from haulage vehicles and plant equipment.	**Local Residents:** West Newton village 700m to the North. Flinton village 1,900m to the South East. Old Farm Cottages 580m to the North. West Newton Grange 690m to the East. Smithy Briggs farm 415m to the South West. Burton Constable Hall 1550m to the South West. Moat Farm 1500m to the East. High Fosham 1920m to the North. Low Fosham 900m to the North East. Swiss Cottage 660m to the South West. **Site of Special Scientific Interest:** Lambwath Meadows 2,350m to the North East and 2,500m to the North. Humber Estuary 10,000m to the South West. **Special Protection Areas:** Hornsea Mere 9,500m to the North. Humber Estuary 10,000m to the South West. **Wildlife Sites:** Lambwath stream – 2,450m to the North. The Moors 1675m to the North West. Mill Avenue – 900m to the West. Smithy Bridge Plantation 350m to the West. Brickfield Plantation 700m to the West. **Watercourses:** L Dike stream 200m to the South. L Dike stream 300m to the North. Lambwath stream 2,450m to the North. Lake at Burton Constable Hall 2,100m to the South West. Pond at West Newton 500m to the North. Norwood drain 300m to the North.	Via water surface drainage system. Cracks or splits in poor impermeable membrane and through the ground. Air – vapours and plumes carried on the wind.	An impermeable membrane over the whole of the working pad area and under the site perimeter ditch correctly installed during construction of the wellsite. Site perimeter ditch monitored and procedures in place to test and remove excess surface run off water as required. Vehicles to be serviced and maintained to manufacturer's / industry standards. Regular maintenance and inspections are to be conducted as directed by the manufacturer / written procedures. Drivers are to receive training / induction on driving techniques and site rules Drip trays to be utilised. Site / vehicle spillage kits to be readily available. Spillages to be remediated immediately using vacuum cleaners / pumps and not to be washed down where possible. Training on environmental awareness for site personnel during site induction. Record and investigate complaints, pollution incidents or breaches of permit conditions and the actions taken to rectify complaints and prevent further occurrences. Authorities to be notified of the operation prior to commencement. Emergency response plan established / tested	Management actions and procedures should prevent this happening.	Pollution of local surface or groundwater. Emissions to air.	Low if management techniques, planning and procedures are followed.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
014	Accidents resulting from operations carried out without a structured management system in place.	**Local Residents:** West Newton village 700m to the North. Flinton village 1,900m to the South East. Old Farm Cottages 580m to the North. West Newton Grange 690m to the East. Smithy Briggs farm 415m to the South West. Burton Constable Hall 1550m to the South West. Moat Farm 1500m to the East. High Fosham 1920m to the North. Low Fosham 900m to the North East. Swiss Cottage 660m to the South West. **Site of Special Scientific Interest:** Lambwath Meadows 2,350m to the North East and 2,500m to the North. Humber Estuary 10,000m to the South West. **Special Protection Areas:** Hornsea Mere 9,500m to the North. Humber Estuary 10,000m to the South West. **Wildlife Sites:** Lambwath stream – 2,450m to the North. The Moors 1675m to the North West. Mill Avenue – 900m to the West. Smithy Bridge Plantation 350m to the West. Brickfield Plantation 700m to the West. **Watercourses:** L Dike stream 200m to the South. L Dike stream 300m to the North. Lambwath stream 2,450m to the North. Lake at Burton Constable Hall 2,100m to the South West. Pond at West Newton 500m to the North. Norwood drain 300m to the North.	Via water surface drainage system. Cracks or splits in poor impermeable membrane and through the ground. Air – vapours and plumes carried on the wind.	Structured management system in place, distributed and adhered to by personnel involved in operations.	Management actions and procedures should prevent this happening.	Pollution of local surface or groundwater. Emissions to air.	Low if management techniques, planning and procedures are followed.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
015	Leaks from vehicle fluids resulting from vehicle accidents.	**Local Residents:** West Newton village 700m to the North. Flinton village 1,900m to the South East. Old Farm Cottages 580m to the North. West Newton Grange 690m to the East. Smithy Briggs farm 415m to the South West. Burton Constable Hall 1550m to the South West. Moat Farm 1500m to the East. High Fosham 1920m to the North. Low Fosham 900m to the North East. Swiss Cottage 660m to the South West. **Site of Special Scientific Interest:** Lambwath Meadows 2,350m to the North East and 2,500m to the North. Humber Estuary 10,000m to the South West. **Special Protection Areas:** Hornsea Mere 9,500m to the North. Humber Estuary 10,000m to the South West. **Wildlife Sites:** Lambwath stream – 2,450m to the North. The Moors 1675m to the North West. Mill Avenue – 900m to the West. Smithy Bridge Plantation 350m to the West. Brickfield Plantation 700m to the West. **Watercourses:** L Dike stream 200m to the South. L Dike stream 300m to the North. Lambwath stream 2,450m to the North. Lake at Burton Constable Hall 2,100m to the South West. Pond at West Newton 500m to the North. Norwood drain 300m to the North.	Via water surface drainage system. Cracks or splits in poor impermeable membrane and through the ground. Air – vapours and plumes carried on the wind.	An impermeable membrane over the whole of the working pad area and under the site perimeter ditch correctly installed during construction of the wellsite. Site perimeter ditch monitored and procedures in place to test and remove excess surface run off water as required. Vehicles to be serviced and maintained to manufacturer's / industry standards. Regular maintenance and inspections to be conducted as directed by the manufacturer / written procedures. Drivers are to receive training / induction on driving techniques and site rules Drip trays to be utilised. Site / vehicle spillage kits to be readily available. Spillages to be remediated immediately using vacuum cleaners / pumps and not to be washed down where possible. Induction on environmental awareness for site personnel. Personnel to receive site induction. Record and investigate complaints, pollution incidents or breaches of permit conditions and the actions taken to rectify complaints and prevent further occurrences. Authorities to be notified of the operation prior to commencement. Emergency response plan established / tested	Management actions and procedures should prevent this happening.	Pollution of local surface or groundwater. Emissions to air.	Low if management techniques, planning and procedures are followed.

H1 – Annex D – Table 1 Discharges to Surface Water Assessment

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
001	Overflow of site perimeter ditches.	**Watercourses:** L Dike stream 200m to the South. L Dike stream 300m to the North. Lambwath stream 2,450m to the North. Lake at Burton Constable Hall 2,100m to the South West. Pond at West Newton 500m to the North. Norwood drain 300m to the North.	Surface run-off / percolation into subsurface. Cracks or splits in poor impermeable membrane and through the ground. Field or roadside drainage ditches. Soaking into adjacent ground	Water produced and/or used within the activity is re-used where possible within the operation for well control, cementing operations, and drilling operations. Waste water is contained within the site boundary via storage tanks. Surface run- off water is contained within the impermeable membrane and perimeter ditch catchment. Surface run-off water to be discharged to surface water through installed Class 1 Oil–water Separator. Environment Agency Permit to be in place prior to any discharge to surface water. Levels in the ditches monitored by the Site Supervisor, HSE Adviser or Security Officer. Liner condition (where exposed to sunlight) is regularly inspected. Plastic welds are QA checked and pressure tested during construction. Damming points are identified to prevent migration should overflow occur	Low – management controls and monitoring will prevent overspill.	Pollution of surface water, groundwater or land contamination.	Insignificant.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
002	Discharge of contaminated water within the site perimeter ditch.	**Watercourses:** L Dike stream 200m to the South. L Dike stream 300m to the North. Lambwath stream 2,450m to the North. Lake at Burton Constable Hall 2,100m to the South West. Pond at West Newton 500m to the North. Norwood drain 300m to the North.	Discharge of contaminated water from faulty, poorly maintained or unserviceable Oil-water Separator. Damage and unauthorised discharge from acts of vandalism and/or unauthorised personnel.	Discharge operations are to be in accordance with the Environment Agency issued West Newton B environmental permit and the Rathlin Energy Surface water Management Plan. Only water processed through the installed Class 1 Oil–water Separator is to be discharged. Water is to be analysed prior to discharge to ensure that hydrocarbons are not present and that the pH range is acceptable (6.5 – 9.5). Only clean uncontaminated water is to be discharged to surface water. Water containing hydrocarbons or with a pH range outside of the acceptable standard is to be classified as contaminated and a detailed analysis of the sample will be undertaken by an Environment Agency approved MCERTS laboratory. Contaminated water is to be removed from site using a licenced waste carrier and the waste is transported to a licenced waste facility for reuse / recycling or disposal. The Oil-water Separator is to be maintained and serviced in accordance with manufacturer's guidelines. Only competent personnel are to operate, maintain, repair or service the Oil-water Separator. Faults within the Oil-water Separator are to be reported to Senior Management. Discharge operations are to cease if faults occur within the Oil-water Separator or there is a requirement for servicing or maintenance. Access to the Oil-water Separator is controlled. Specialised tools and equipment are required to operate the Oil-water Separator.	Low – processing water through the Oil-water Separator and analysing of water prior to discharge will ensure that contaminated water is not discharged. Management controls for the operation, maintenance, servicing and repair of the Oil-water Separator will prevent discharge of contaminated water. Controlled access and security of tools and equipment will prevent unauthorised access and vandalism.	Pollution of surface water, groundwater or land contamination.	Insignificant.

H1 – Annex F – Table 1 Assessment of Air Emission Risks

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
001	Greenhouse gas emissions from site power generation.	**Local Residents:** West Newton village 700m to the North. Flinton village 1,900m to the South East. Old Farm Cottages 580m to the North. West Newton Grange 690m to the East. Smithy Briggs farm 415m to the South West. Burton Constable Hall 1550m to the South West. Moat Farm 1500m to the East. High Fosham 1920m to the North. Low Fosham 900m to the North East. Swiss Cottage 660m to the South West. **Site of Special Scientific Interest:** Lambwath Meadows 2,350m to the North East and 2,500m to the North. Humber Estuary 10,000m to the South West. **Special Protection Areas:** Hornsea Mere 9,500m to the North. Humber Estuary 10,000m to the South West. **Wildlife Sites:** Lambwath stream – 2,450m to the North. The Moors 1675m to the North West. Mill Avenue – 900m to the West. Smithy Bridge Plantation 350m to the West. Brickfield Plantation 700m to the West. **Watercourses:** L Dike stream 200m to the South. L Dike stream 300m to the North. Lambwath stream 2,450m to the North. Lake at Burton Constable Hall 2,100m to the South West. Pond at West Newton 500m to the North. Norwood drain 300m to the North.	Air – Prevailing winds from south west (average statistics from the Met Office). Atmosphere.	Power generation is provided by drilling rig generators and / or standalone generators. Generators are operated on gas oil supplied from external double skinned bunded fuel tanks. During drilling operations, the generators may be operated for 24 hours per day. This will be dependent upon power demand and operational activities. Generators are maintained and serviced in line with manufacturer's guidelines thus ensuring that they operate efficiently and minimising emissions, noise and vibration. Service and maintenance regimes are implemented and adhered to and all work is carried out by a competent trained electrician / mechanic. Generators supplied within the rig structure respond to power demand and the working load and output varies during the operations being conducted. When power is not required generators are switched off to reduce emissions, fuel usage, noise, vibration and wear and tear on the equipment.	Air quality not significantly affected. Make regular observations over the period of operation.	Impact on global warming but deemed insignificant.	Insignificant.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
002	Greenhouse gas emissions from flaring of natural gas during well test operations.	**Local Residents:** West Newton village 700m to the North. Flinton village 1,900m to the South East. Old Farm Cottages 580m to the North. West Newton Grange 690m to the East. Smithy Briggs farm 415m to the South West. Burton Constable Hall 1550m to the South West. Moat Farm 1500m to the East. High Fosham 1920m to the North. Low Fosham 900m to the North East. Swiss Cottage 660m to the South West. **Site of Special Scientific Interest:** Lambwath Meadows 2,350m to the North East and 2,500m to the North. Humber Estuary 10,000m to the South West. **Special Protection Areas:** Hornsea Mere 9,500m to the North. Humber Estuary 10,000m to the South West. **Wildlife Sites:** Lambwath stream – 2,450m to the North. The Moors 1675m to the North West. Mill Avenue – 900m to the West. Smithy Bridge Plantation 350m to the West. Brickfield Plantation 700m to the West. **Watercourses:** L Dike stream 200m to the South. L Dike stream 300m to the North. Lambwath stream 2,450m to the North. Lake at Burton Constable Hall 2,100m to the South West. Pond at West Newton 500m to the North. Norwood drain 300m to the North.	Air – Prevailing winds from south west (average statistics from the Met Office) Atmosphere	In the event that natural gas is encountered during the well testing operation, it will be flowed to surface through the wellbore into fluid separation equipment, from which the petroleum is separated from produced fluids (formation water). Once separated, the gas is diverted via temporary pipework to a ground flare for incineration. Due to the potential risk from flaring of natural gas, a dispersion modelling assessment of the impact of gas flaring at the West Newton B wellsite on local air quality has been commissioned by Rathlin Energy.	Air quality not significantly affected from modelling assessment. Make regular observations over the period of operation. It is stated within the conclusion of the report that “For the nearest locations of human habitation and the closest nature conservation sites the impact of flaring or cold venting on air quality is around or below the level at which ambient impact would be considered insignificant based on Environment Agency assessment criteria.”	Impact on global warming but deemed insignificant.	Insignificant.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
003	Greenhouse gas emissions from controlled venting of CO_2 during well test operations.	**Local Residents:** West Newton village 700m to the North. Flinton village 1,900m to the South East. Old Farm Cottages 580m to the North. West Newton Grange 690m to the East. Smithy Briggs farm 415m to the South West. Burton Constable Hall 1550m to the South West. Moat Farm 1500m to the East. High Fosham 1920m to the North. Low Fosham 900m to the North East. Swiss Cottage 660m to the South West. **Site of Special Scientific Interest:** Lambwath Meadows 2,350m to the North East and 2,500m to the North. Humber Estuary 10,000m to the South West. **Special Protection Areas:** Hornsea Mere 9,500m to the North. Humber Estuary 10,000m to the South West. **Wildlife Sites:** Lambwath stream – 2,450m to the North. The Moors 1675m to the North West. Mill Avenue – 900m to the West. Smithy Bridge Plantation 350m to the West. Brickfield Plantation 700m to the West. **Watercourses:** L Dike stream 200m to the South. L Dike stream 300m to the North. Lambwath stream 2,450m to the North. Lake at Burton Constable Hall 2,100m to the South West. Pond at West Newton 500m to the North. Norwood drain 300m to the North.	Air – Prevailing winds from south west (average statistics from the Met Office) Atmosphere	In the event that Liquid CO_2 injection is used during the well testing operation, CO_2 gas will be flowed to surface through the wellbore into fluid separation equipment, from which the CO_2 gas is separated from produced fluids (formation water). Once separated, the CO_2 gas is diverted via temporary pipework to a ground flare for controlled venting to atmosphere.	Emissions of CO_2 gas will occur if Liquid CO_2 injection is undertaken during the well testing operation.	Impact on global warming but deemed insignificant.	Insignificant.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
004	Greenhouse gas emissions from vehicles and site equipment during construction / drilling / well test and restoration operations..	**Local Residents:** West Newton village 700m to the North. Flinton village 1,900m to the South East. Old Farm Cottages 580m to the North. West Newton Grange 690m to the East. Smithy Briggs farm 415m to the South West. Burton Constable Hall 1550m to the South West. Moat Farm 1500m to the East. High Fosham 1920m to the North. Low Fosham 900m to the North East. Swiss Cottage 660m to the South West. **Site of Special Scientific Interest:** Lambwath Meadows 2,350m to the North East and 2,500m to the North. Humber Estuary 10,000m to the South West. **Special Protection Areas:** Hornsea Mere 9,500m to the North. Humber Estuary 10,000m to the South West. **Wildlife Sites:** Lambwath stream – 2,450m to the North. The Moors 1675m to the North West. Mill Avenue – 900m to the West. Smithy Bridge Plantation 350m to the West. Brickfield Plantation 700m to the West. **Watercourses:** L Dike stream 200m to the South. L Dike stream 300m to the North. Lambwath stream 2,450m to the North. Lake at Burton Constable Hall 2,100m to the South West. Pond at West Newton 500m to the North. Norwood drain 300m to the North.	Air – Prevailing winds from south west (average statistics from the Met Office) Atmosphere	Vehicle loads and transportation to be planned to reduce quantity of deliveries / collections. Vehicles are to be serviced and maintained to manufacturer's / industry standards. Regular maintenance and inspections are to be conducted as directed by the manufacturer / written procedures. Drivers are to receive training / induction on driving techniques and site rules. Vehicles when not in use to be switched off. Ambient air quality monitoring will be undertaken to establish Ambient air quality baseline and during flaring activities. Local residents informed of planned operations via liaison committee meetings.	Emissions from vehicles and site equipment exhaust systems will occur throughout the operation.	Impact on global warming but deemed insignificant.	Insignificant.

H1 – Annex G – Table 1 Assessment of Disposal or Recovery of Waste Produced on Site Risks

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
001	Formation Water from Drilling Operations.	Licenced Waste Facility. Along traffic route.	Transportation from site by road to Licenced Waste Facility.	Formation water is water that occurs naturally within the pores of the rock. During drilling and well testing operations, formation water may be encountered. Formation water during drilling will be mixed with the drilling mud and circulated to surface. Mud volumes are continually monitored and will identify if significant ingress of formation water occurs, although the hydrostatic weight of the drilling mud should prevent such an occurrence. If formation water is encountered, it will be separated at surface and transferred to storage tanks ($60m^3$) for subsequent offsite disposal via a licenced facility. The formation water is classed as non-hazardous. Transportation from site to the waste facility will be by a licenced waste carrier in road tankers. A licenced waste contractor will be onsite during the operation to ensure that handling, storage, documentation and onward disposal of generated wastes is in compliance with current regulations. Vehicles used for transportation are to be serviced and maintained in accordance with manufacturers / legislation. Vehicle spillage kits are to be carried during transportation of wastes. Vehicles are to adhere to approved traffic routes as outlined by planning authority / client. An audit of the nominated Licenced Waste Carrier is to be undertaken prior to operations commencing. A physical audit of the transportation of waste is to be undertaken to ensure that the waste is transported to the approved final destination.	Management actions and procedures should prevent this happening.	Possible pollution of traffic route if vehicle involved in accident. Fly-Tipping of wastes if not delivered to licenced facility.	Low if management techniques, planning and procedures are followed.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
002	Fresh Water Drilling Muds and Waste from Drilling Operations.	Licenced Waste Facility. Along traffic route.	Transportation from site by road to Licenced Waste Facility.	The purpose of drilling muds during drilling operations is twofold. Firstly, it provides for the circulating to surface drill cuttings, as the drilling bit cuts through rock formation. Secondly, the drilling fluid provides primary well control, the hydrostatic weight of the drilling fluid being slightly higher than formation pressure, thus containing any hydrocarbon or water-bearing pressure within the wellbore. Drilling muds used in the drilling and construction of the well are water based. Water based drilling muds are considered non-hazardous wastes. Wastes transported within the drilling mud are removed at surface and the drilling mud is reused and replaced back into the wellbore using a closed loop system. The closed loop system reduces the amount of drilling mud used during the operation. Drilling muds (when redundant) and waste are removed from the borehole and stored in an open tank (10.45m x 3.05m x 3.05m) at surface and removed by a licenced waste carrier to a licenced waste facility. Transportation from site to the licenced waste facility is by a licenced waste carrier in road tankers. A licenced waste contractor will be onsite during the operation to ensure that handling, storage, documentation and onward disposal of generated wastes is in compliance with current regulations. Vehicles used for transportation are to be serviced and maintained in accordance with manufacturers / legislation. Vehicle spillage kits are to be carried during transportation of wastes. Vehicles are to adhere to approved traffic routes as outlined by planning authority / client. An audit of the Licenced Waste Carrier is to be undertaken prior to operations commencing. A physical audit of the transport of waste is to be undertaken to ensure that the waste is transported to the approved final destination.	Management actions and procedures should prevent this happening.	Possible pollution of traffic route if vehicle involved in accident. Fly-Tipping of wastes if not delivered to licenced facility.	Low if management techniques, planning and procedures are followed.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
003	Chloride Containing Drilling Muds and Waste from Drilling Operations.	Licenced Waste Facility. Along traffic route.	Transportation from site by road to Licenced Waste Facility.	The purpose of drilling muds during drilling operations is twofold. Firstly, it provides for the circulating to surface drill cuttings, as the drilling bit cuts through rock formation. Secondly, the drilling fluid provides primary well control, the hydrostatic weight of the drilling fluid being slightly higher than formation pressure, thus containing any hydrocarbon or water-bearing pressure within the wellbore. Water based drilling muds containing chloride are used in the drilling and construction of the well for the lower sections of the well. Water based drilling muds containing chloride are considered non-hazardous wastes. Wastes transported within the drilling mud are removed at surface and the drilling mud is reused and replaced back into the wellbore using a closed loop system. The closed loop system reduces the amount of drilling mud used during the operation. Drilling muds (when redundant) and waste are removed from the borehole and stored in an open tank (10.45m x 3.05m x 3.05m) at surface and removed from site by a licenced waste carrier to a licenced waste facility. Transportation from site to the licenced waste facility is by a licenced waste carrier in road bulk haulage vehicles. A licenced waste contractor will be onsite during the operation to ensure that handling, storage, documentation and onward disposal of generated wastes is in compliance with current regulations. Vehicles used for transportation are to be serviced and maintained in accordance with manufacturers / legislation. Vehicle spillage kits are to be carried during transportation of wastes. Vehicles are to adhere to approved traffic routes as outlined by planning authority / client. An audit of the Licenced Waste Carrier is to be undertaken prior to operations commencing. A physical audit of the transport of waste is to be undertaken to ensure that the waste is transported to the approved final destination.	Management actions and procedures should prevent this happening.	Possible pollution of traffic route if vehicle involved in accident. Fly-Tipping of wastes if not delivered to licenced facility.	Low if management techniques, planning and procedures are followed.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
004	Waste Clays and Sands from Conductor Settings.	Licenced Waste Facility. Along traffic route.	Transportation from site by road to Licenced Waste Facility.	Clays and sands are extracted from the borehole during the initial drilling of the borehole (conductor setting). A conventional waterwell drilling rig will be mobilised to the wellsite to drill the surface conductor. The drilling of the surface conductor is drilled conventionally using air. Once this section of the borehole is drilled, steel casing is run into the hole and cemented back to surface. The surface conductor casing serves as a support during drilling operations, to flowback returns during drilling and cementing of the surface casing and to prevent collapse of the loose soil near the surface. The purpose of the surface casing is to isolate freshwater zones within the borehole so that they cannot be contaminated during drilling and completion operations. Due to the environmental concerns of drilling through freshwater zones, strict regulations can include regulation of the casing depth and cement quality used. Clays and sand are deposited at surface in an open tank (10.45m x 3.05m x 3.05m) for storage and onward disposal to a licenced waste facility. Clays and sands cannot be reused during the drilling operation. Waste clays and sand are classed as non-hazardous. Transportation from site to the licenced waste facility is by a licenced waste carrier in road bulk haulage vehicles. A licenced waste contractor will be onsite during the operation to ensure that handling, storage, documentation and onward disposal of generated wastes is in compliance with current regulations. Vehicles used for transportation are to be serviced and maintained in accordance with manufacturers / legislation. Vehicles are to adhere to approved traffic routes as outlined by planning authority / client. An audit of the Licenced Waste Carrier is to be undertaken prior to operations commencing. A physical audit of the transport of waste is to be undertaken to ensure that the waste is transported to the approved final destination.	Management actions and procedures should prevent this happening.	Possible pollution of traffic route if vehicle involved in accident. Fly-Tipping of wastes if not delivered to licenced facility.	Low if management techniques, planning and procedures are followed.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
005	Rock Cuttings from Water Based Drilling Operations.	Licenced Waste Facility. Along traffic route.	Transportation from site by road to Licenced Waste Facility.	The process of drilling through rock formation results in cuttings (rock chippings) being circulated to surface with the drilling muds, where they are separated and collected in steel open top tanks (10.45m x 3.05m x 3.05m) for subsequent offsite recycling or disposal to a licenced waste facility. The drilling mud used in the process, is a water based mud and the cuttings are classified as non-hazardous. The exploratory borehole is drilled and constructed using water based mud. Rock cuttings from water based drilling operations are classed as non-hazardous. Transportation from site to the licenced waste facility is by a licenced waste carrier in road bulk haulage vehicles. A licenced waste contractor will be onsite during the operation to ensure that handling, storage, documentation and onward disposal of generated wastes is in compliance with current regulations. Vehicles used for transportation are to be serviced and maintained in accordance with manufacturers / legislation. Vehicle spillage kits are to be carried during transportation of wastes. Vehicles are to adhere to approved traffic routes as outlined by planning authority / client. An audit of the nominated Licenced Waste Carrier is to be undertaken prior to operations commencing. A physical audit of the transportation of waste is to be undertaken to ensure that the waste is transported to the approved final destination.	Management actions and procedures should prevent this happening.	Possible pollution of traffic route if vehicle involved in accident. Fly-Tipping of wastes if not delivered to licenced facility.	Low if management techniques, planning and procedures are followed.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
006	Rock Cuttings from Salt Saturated and KCL Drilling Operations.	Licenced Waste Facility. Along traffic route.	Transportation from site by road to Licenced Facility.	The process of drilling through rock formation results in cuttings (rock chippings) being circulated to surface with the drilling muds, where they are separated and collected in steel open top tanks (10.45m x 3.05m x 3.05m) for subsequent offsite recycling or disposal to a licenced waste facility. The drilling mud used in the process, is water based mud and classified as non-hazardous. The exploratory borehole is drilled and constructed using water based mud. Rock cuttings from water based drilling operations are classed as non-hazardous. Transportation from site to the licenced waste facility is by a licenced waste carrier in road bulk haulage vehicles. A licenced waste contractor will be onsite during the operation to ensure that handling, storage, documentation and onward disposal of generated wastes is in compliance with current regulations. Vehicles used for transportation are to be serviced and maintained in accordance with manufacturers / legislation. Vehicle spillage kits are to be carried during transportation of wastes. Vehicles are to adhere to approved traffic routes as outlined by planning authority / client. An audit of the nominated Licenced Waste Carrier is to be undertaken prior to operations commencing. A physical audit of the transportation of waste is to be undertaken to ensure that the waste is transported to the approved final destination.	Management actions and procedures should prevent this happening.	Possible pollution of traffic route if vehicle involved in accident. Fly-Tipping of wastes if not delivered to licenced facility.	Low if management techniques, planning and procedures are followed.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
007	Chloride Containing Drilling Muds and Waste Well Suspension Fluid.	Licenced Waste Facility. Along traffic route.	Transportation from site by road to Licenced Facility.	Drilling mud used during construction of the deeper sections of the wellbore was a salt saturated water based mud system. It is anticipated that a certain amount of salt saturated drilling mud will return to surface during any well remediation or flow testing operations through displacement. The salt saturated drilling mud will return to surface together with the suspension brine. Drilling muds displaced both by the increased brine weight and cementing operation will return to surface where it will be stored in steel open top tanks (10.45m x 3.05m x 3.05m) for subsequent reuse or offsite disposal to a licenced waste facility. Suspension fluids used in the wellbore is brine. During well remediation operations the wellbore suspension fluid will be turned over to heavier weighted brine. Brine displaced both by the increased brine weight and cementing operation will return to surface where it will be stored in steel open top tanks (10.45m x 3.05m x 3.05m) for subsequent reuse or offsite disposal to a licenced waste facility. Transportation from site to the licenced waste facility is by a licenced waste carrier in road bulk haulage vehicles. A licenced waste contractor will be onsite during the operation to ensure that handling, storage, documentation and onward disposal of generated wastes is in compliance with current regulations. Vehicles used for transportation are to be serviced and maintained in accordance with manufacturers / legislation. Vehicle spillage kits are to be carried during transportation of wastes. Vehicles are to adhere to approved traffic routes as outlined by planning authority / client. An audit of the nominated Licenced Waste Carrier is to be undertaken prior to operations commencing. A physical audit of the transportation of waste is to be undertaken to ensure that the waste is transported to the approved final destination.	Management actions and procedures should prevent this happening.	Possible pollution of traffic route if vehicle involved in accident. Fly-Tipping of wastes if not delivered to licenced facility.	Low if management techniques, planning and procedures are followed.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
008	Cement from Cementing Operations.	Licenced Waste Facility. Along traffic route.	Transportation from site by road to Licenced Facility.	Cement returns are anticipated at surface during drilling operations, maintenance and abandonment operations. It is not possible to reuse cement that returns to surface and, therefore, the cement will be stored on site in a skip (3.75m x 1.75m x 1.26m) for subsequent offsite disposal to a licenced waste facility. Cement waste is classed as non-hazardous. Transportation from site to the licenced waste facility is by a licenced waste carrier in road bulk haulage vehicles. A licenced waste contractor will be onsite during the operation to ensure that handling, storage, documentation and onward disposal of generated wastes is in compliance with current regulations. Vehicles used for transportation are to be serviced and maintained in accordance with manufacturers / legislation. Vehicle spillage kits are to be carried during transportation of wastes. Vehicles are to adhere to approved traffic routes as outlined by planning authority / client. An audit of the nominated Licenced Waste Carrier is to be undertaken prior to operations commencing. A physical audit of the transportation of waste is to be undertaken to ensure that the waste is transported to the approved final destination.	Management actions and procedures should prevent this happening.	Possible pollution of traffic route if vehicle involved in accident. Fly-Tipping of wastes if not delivered to licenced facility.	Low if management techniques, planning and procedures are followed.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
009	Formation Water including Oil and Condensate from Flow Testing.	Licenced Waste Facility. Along traffic route.	Transportation from site by road to Licenced Facility.	Formation water is water that occurs naturally within the pores of the rock. In the event that natural gas is encountered during the well testing operation, it will be flowed to surface through the wellbore into fluid separation equipment, from which the petroleum is separated from produced fluids (formation water). Once separated, produced fluid is transferred to cylindrical closed storage tank (210m^3) for subsequent offsite disposal via a licenced waste facility. The separated gas is diverted via temporary pipework to a ground flare for incineration. The formation water will be tested prior to removal from site. The formation water will be classed as non-hazardous if Normally Occurring Radioactive Material (NORM) levels are not present. If NORM is detected within the formation water it will be classed within the scope of the Radiation Regulations and arrangements will be made for offsite treatment / disposal under the regulations. Transportation from site to the licenced waste facility is by a licenced waste carrier in road bulk haulage vehicles. A licenced waste contractor will be onsite during the operation to ensure that handling, storage, documentation and onward disposal of generated wastes is in compliance with current regulations. Vehicles used for transportation are to be serviced and maintained in accordance with manufacturers / legislation. Vehicle spillage kits are to be carried during transportation of wastes. Vehicles are to adhere to approved traffic routes as outlined by planning authority / client. An audit of the nominated Licenced Waste Carrier is to be undertaken prior to operations commencing. A physical audit of the transportation of waste is to be undertaken to ensure that the waste is transported to the approved final destination.	Management actions and procedures should prevent this happening.	Possible pollution of traffic route if vehicle involved in accident. Fly-Tipping of wastes if not delivered to licenced facility.	Low if management techniques, planning and procedures are followed.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
010	Spent Hydrochloric Acid from Acid Wash and Squeeze Operations.	Licenced Waste Facility. Along traffic route.	Transportation from site by road to Licenced Facility.	Hydrochloric acid is used during well clean up and flow testing operations. The acid is used to expand existing channels within the rock formation to aid petroleum products to flow to surface. Hydrochloric acid used during well clean up and flow testing operations will be reverse circulated to surface where it is stored in tanks (1m^3 IBC's) for subsequent offsite disposal to a licenced waste facility. Transportation from site to the licenced waste facility is by a licenced waste carrier in road bulk haulage vehicles. A licenced waste contractor will be onsite during the operation to ensure that handling, storage, documentation and onward disposal of generated wastes is in compliance with current regulations. Vehicles used for transportation are to be serviced and maintained in accordance with manufacturers / legislation. Vehicle spillage kits are to be carried during transportation of wastes. Vehicles are to adhere to approved traffic routes as outlined by planning authority / client. An audit of the nominated Licenced Waste Carrier is to be undertaken prior to operations commencing. A physical audit of the transportation of waste is to be undertaken to ensure that the waste is transported to the approved final destination.	Management actions and procedures should prevent this happening.	Possible pollution of traffic route if vehicle involved in accident. Fly-Tipping of wastes if not delivered to licenced facility.	Low if management techniques, planning and procedures are followed.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
011	Oil and Condensate from Flow Testing.	Licenced Waste Facility. Along traffic route.	Transportation from site by road to Licenced Facility.	During well testing operations, formation water will be produced, together with the potential for oil, gas and condensate. Any oil produced during well testing operations will be separated from the formation water on surface and transferred to a storage tank for subsequent offsite sale should the quantities of oil be sufficient. If the quantities of oil are not sufficient then the oil will be disposed of through a licenced waste facility. Any condensate produced during well testing operations will be separated from the formation water on surface and transferred to a storage tank for subsequent offsite sale should the quantities of condensate be sufficient. If the quantities of condensate are not sufficient then the condensate will be disposed of through a licenced waste facility. The expected quantity of waste oil and condensate is expected to be approximately 1 tonne. Transportation from site to the licenced waste facility is by a licenced waste carrier in road bulk haulage vehicles. A licenced waste contractor will be onsite during the operation to ensure that handling, storage, documentation and onward disposal of generated wastes is in compliance with current regulations. Vehicles used for transportation are to be serviced and maintained in accordance with manufacturers / legislation. Vehicle spillage kits are to be carried during transportation of wastes. Vehicles are to adhere to approved traffic routes as outlined by planning authority / client. An audit of the nominated Licenced Waste Carrier is to be undertaken prior to operations commencing. A physical audit of the transportation of waste is to be undertaken to ensure that the waste is transported to the approved final destination.	Management actions and procedures should prevent this happening.	Possible pollution of traffic route if vehicle involved in accident. Fly-Tipping of wastes if not delivered to licenced facility.	Low if management techniques, planning and procedures are followed.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
012	Run-off Water from Site Surface.	Licenced Waste Facility. Along traffic route.	Transportation from site by road to Licenced Facility.	The wellsite design incorporates a Bentomat impermeable membrane, which does not permit surface water to penetrate the underlying subsoil's. Surface water percolates through the site stone and migrates along the surface of the impermeable membrane and into a containment ditch for subsequent reuse or offsite disposal to a licenced waste facility. Surface water is mainly rainfall (precipitation), however, the impermeable membrane exists to protect against pollution from oil spillages and, therefore, has the potential to contain oils. When levels of surface run-off water contained within the ditch are high, arrangements are made for the water within the ditch to be discharged to surface water via a Class 1 Interceptor or transferred to a road haulage tanker for subsequent offsite disposal via a licenced waste facility during periods of operations. The containment ditch is constantly monitored by the Site HSE Advisor and the site waste contractor for signs of contamination. If signs of contamination are present within the water, attempts at site will be made to remove the contamination (i.e. use of hydro-sorb pads to remove oil contamination) and tests will be conducted at site or the licenced waste facility to identify the best route to be undertaken for recycling. A licenced waste contractor will be onsite during the operation to ensure that handling, storage, documentation and onward disposal of generated wastes is in compliance with current regulations. Vehicles used for transportation are to be serviced and maintained in accordance with manufacturers / legislation. Vehicle spillage kits are to be carried during transportation of wastes. Vehicles are to adhere to approved traffic routes as outlined by planning authority / client. An audit of the nominated Licenced Waste Carrier is to be undertaken prior to operations commencing. A physical audit of the transportation of waste is to be undertaken to ensure that the waste is transported to the approved final destination.	Management actions and procedures should prevent this happening.	Possible pollution of traffic route if vehicle involved in accident. Fly-Tipping of wastes if not delivered to licenced facility.	Low if management techniques, planning and procedures are followed.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
013	Accommodation Waste Water and Sewage.	Licenced Waste Facility. Along traffic route.	Transportation from site by road to Licenced Facility.	Waste water and foul waste is generated on site in the accommodation units. Waste water and foul waste is collected using independent under cabin storage tanks where it is stored for subsequent offsite disposal to a licenced waste facility. Levels of waste within the tanks are monitored daily and arrangements are made for the removal and off-site disposal of waste when the level of waste is near capacity of the tanks. A licenced waste contractor will be onsite during the operation to ensure that handling, storage, documentation and onward disposal of generated wastes is in compliance with current regulations. Transportation from site to the licenced waste facility is by a licenced waste carrier in road bulk haulage vehicles. Vehicles used for transportation are to be serviced and maintained in accordance with manufacturers / legislation. Vehicle spillage kits are to be carried during transportation of wastes. Vehicles are to adhere to approved traffic routes as outlined by planning authority / client. An audit of the nominated Licenced Waste Carrier is to be undertaken prior to operations commencing. A physical audit of the transportation of waste is to be undertaken to ensure that the waste is transported to the approved final destination.	Management actions and procedures will prevent this happening.	Possible pollution of traffic route if vehicle involved in accident. Fly-Tipping of wastes if not delivered to licenced facility.	Low if management techniques, planning and procedures are followed.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
014	Fuel Oil Spill from Power Generation.	Licenced Waste Facility. Along traffic route.	Transportation from site by road to Licenced Facility.	Fuel oil is used to fuel the rig, associated rig equipment and electricity generation. A double skinned fuel bowser is used to store the fuel oil. Spillage of fuel oil is anticipated to be very low and will be prevented using drip trays and protective matting during refuelling. Although the site is sealed using Bentomat membrane, oil and oily waste is stored and handled as though it were not. This gives an additional layer of protection. The expected quantity of waste fuel oil is expected to be approximately 0.1 tonne. A licenced waste contractor will be onsite during the operation to ensure that handling, storage, documentation and onward disposal of generated wastes is in compliance with current regulations. Transportation from site to the licenced waste facility is by a licenced waste carrier in road bulk haulage vehicles. Vehicles used for transportation are to be serviced and maintained in accordance with manufacturers / legislation. Vehicle spillage kits are to be carried during transportation of wastes. Vehicles are to adhere to approved traffic routes as outlined by planning authority / client. An audit of the nominated Licenced Waste Carrier is to be undertaken prior to operations commencing. A physical audit of the transportation of waste is to be undertaken to ensure that the waste is transported to the approved final destination.	Management actions and procedures should prevent this happening.	Possible pollution of traffic route if vehicle involved in accident. Fly-Tipping of wastes if not delivered to licenced facility.	Low if management techniques, planning and procedures are followed.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
015	Engine, Gear and Lubricating Oils from Mobile Plant.	Licenced Waste Facility. Along traffic route.	Transportation from site by road to Licenced Facility.	Low volumes of engine oils, gear oils and lubricating oils are used to service the rig and associated equipment. Oils will be stored on bunded trays. Waste oils will be collected and stored on site within bunded trays for subsequent offsite recycling or disposal via a licenced waste facility. Although the site is sealed using Bentomat membrane, oil and oily waste is stored and handled as though it were not. This gives an additional layer of protection. A licenced waste contractor will be onsite during the operation to ensure that handling, storage, documentation and onward disposal of generated wastes is in compliance with current regulations. Transportation from site to the licenced waste facility is by a licenced waste carrier in road bulk haulage vehicles. Vehicles used for transportation are to be serviced and maintained in accordance with manufacturers / legislation. Vehicle spillage kits are to be carried during transportation of wastes. Vehicles are to adhere to approved traffic routes as outlined by planning authority / client. An audit of the nominated Licenced Waste Carrier is to be undertaken prior to operations commencing. A physical audit of the transportation of waste is to be undertaken to ensure that the waste is transported to the approved final destination.	Management actions and procedures should prevent this happening.	Possible pollution of traffic route if vehicle involved in accident. Fly-Tipping of wastes if not delivered to licenced facility.	Low if management techniques, planning and procedures are followed.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
016	Hydraulic Oils from Mobile Plant.	Licenced Waste Facility. Along traffic route.	Transportation from site by road to Licenced Facility.	Low volumes of Hydraulic oils are used to service the rig and associated equipment. Oils will be stored on bunded trays. Waste oils will be collected and stored on site within bunded trays for subsequent offsite recycling or disposal via a licenced waste facility. The expected quantity of waste hydraulic oils is expected to be approximately 1 tonne. Although the site is sealed using Bentomat membrane, oil and oily waste is stored and handled as though it were not. This gives an additional layer of protection. A licenced waste contractor will be onsite during the operation to ensure that handling, storage, documentation and onward disposal of generated wastes is in compliance with current regulations. Transportation from site to the licenced waste facility is by a licenced waste carrier in road bulk haulage vehicles. Vehicles used for transportation are to be serviced and maintained in accordance with manufacturers / legislation. Vehicle spillage kits are to be carried during transportation of wastes. Vehicles are to adhere to approved traffic routes as outlined by planning authority / client. An audit of the nominated Licenced Waste Carrier is to be undertaken prior to operations commencing. A physical audit of the transportation of waste is to be undertaken to ensure that the waste is transported to the approved final destination.	Management actions and procedures should prevent this happening.	Possible pollution of traffic route if vehicle involved in accident. Fly-Tipping of wastes if not delivered to licenced facility.	Low if management techniques, planning and procedures are followed.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
017	Oil Rags / Absorbents from Mobile Plant Maintenance.	Licenced Waste Facility. Along traffic route.	Transportation from site by road to Licenced Facility.	Oil rags and absorbent materials used during plant maintenance and for spillages within the site will be stored on site in steel drums (209 litres) prior to disposal offsite by a licenced waste contractor. Oil rags and absorbent materials will be removed from site at the end of operations or when quantities held permit a practical economic and environmental operation. The expected quantity of waste oil rags and absorbents is expected to be approximately 1 tonne. A licenced waste contractor will be onsite during the operation to ensure that handling, storage, documentation and onward disposal of generated wastes is in compliance with current regulations. Transportation from site to the licenced waste facility is by a licenced waste carrier in road bulk haulage vehicles. Vehicles used for transportation are to be serviced and maintained in accordance with manufacturers / legislation. Vehicle spillage kits are to be carried during transportation of wastes. Vehicles are to adhere to approved traffic routes as outlined by planning authority / client. An audit of the nominated Licenced Waste Carrier is to be undertaken prior to operations commencing. A physical audit of the transportation of waste is to be undertaken to ensure that the waste is transported to the approved final destination.	Management actions and procedures will prevent exposure.	Possible pollution of traffic route if vehicle involved in accident. Fly-Tipping of wastes if not delivered to licenced facility.	Low if management techniques, planning and procedures are followed.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
018	Waste Filters from Mobile Plant Maintenance.	Licenced Waste Facility. Along traffic route.	Transportation from site by road to Licenced Facility.	Waste oil filters from mobile plant maintenance will be stored on site in steel drums (209 litres) prior to disposal offsite by a licenced waste contractor. Waste oil filters will be removed from site at the end of operations or when quantities held permit a practical economic and environmental operation. A licenced waste contractor will be onsite during the operation to ensure that handling, storage, documentation and onward disposal of generated wastes is in compliance with current regulations. Transportation from site to the licenced waste facility is by a licenced waste carrier in road bulk haulage vehicles. Vehicles used for transportation are to be serviced and maintained in accordance with manufacturers / legislation. Vehicle spillage kits are to be carried during transportation of wastes. Vehicles are to adhere to approved traffic routes as outlined by planning authority / client. An audit of the nominated Licenced Waste Carrier is to be undertaken prior to operations commencing. A physical audit of the transportation of waste is to be undertaken to ensure that the waste is transported to the approved final destination.	Management actions and procedures will prevent exposure.	Possible pollution of traffic route if vehicle involved in accident. Fly-Tipping of wastes if not delivered to licenced facility.	Low if management techniques, planning and procedures are followed.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
019	Paper and Cardboard from Office Routines.	Licenced Waste Facility. Along traffic route.	Transportation from site by road to Licenced Facility.	Waste generated from the office accommodation units will be paper and cardboard and will be segregated and stored on site in 8 yard enclosed maxi skips (3.66m x 1.68m x 1.22m) for subsequent offsite recycling via a licenced waste facility. Use of enclosed skips will ensure that waste can be contained within the site boundary. The expected quantity of waste paper and cardboard is expected to be approximately 1 tonne. A licenced waste contractor will be onsite during the operation to ensure that handling, storage, documentation and onward disposal of generated wastes is in compliance with current regulations. Transportation from site to the licenced waste facility is by a licenced waste carrier in road bulk haulage vehicles. Vehicles used for transportation are to be serviced and maintained in accordance with manufacturers / legislation. Vehicle spillage kits are to be carried during transportation of wastes. Vehicles are to adhere to approved traffic routes as outlined by planning authority / client. An audit of the nominated Licenced Waste Carrier is to be undertaken prior to operations commencing. A physical audit of the transportation of waste is to be undertaken to ensure that the waste is transported to the approved final destination.	Management actions and procedures will prevent exposure.	Possible pollution of traffic route if vehicle involved in accident. Fly-Tipping of wastes if not delivered to licenced facility.	Low if management techniques, planning and procedures are followed.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
020	Canteen Waste.	Licenced Waste Facility. Along traffic route.	Transportation from site by road to Licenced Facility.	Canteen waste generated on site will be stored on site in closed skips for subsequent offsite disposal to a licenced waste facility. Canteen waste will comprise of food packaging, food waste, plastic containers, paper, cardboard etc. Waste generated from the canteen waste will be segregated and stored on site in 8 yard enclosed maxi skips (3.66m x 1.68m x 1.22m) for subsequent offsite recycling via a licenced waste facility. Use of enclosed skips will ensure that waste can be contained within the site boundary. A licenced waste contractor will be onsite during the operation to ensure that handling, storage, documentation and onward disposal of generated wastes is in compliance with current regulations. Transportation from site to the licenced waste facility is by a licenced waste carrier in road bulk haulage vehicles. Vehicles used for transportation are to be serviced and maintained in accordance with manufacturers / legislation. Vehicle spillage kits are to be carried during transportation of wastes. Vehicles are to adhere to approved traffic routes as outlined by planning authority / client. An audit of the nominated Licenced Waste Carrier is to be undertaken prior to operations commencing. A physical audit of the transportation of waste is to be undertaken to ensure that the waste is transported to the approved final destination.	Management actions and procedures will prevent exposure.	Possible pollution of traffic route if vehicle involved in accident. Fly-Tipping of wastes if not delivered to licenced facility.	Low if management techniques, planning and procedures are followed.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
021	Packaging from Delivered Products.	Licenced Waste Facility. Along traffic route.	Transportation from site by road to Licenced Facility.	Wood used in the packaging of equipment, including pallets and dunnage, will be stored on site for subsequent reuse or offsite recycling via a licenced waste facility. Where possible, packaging used for transportation of goods will be returned to the manufacturing supplier with the delivery vehicle. Waste generated from packaging will be segregated and stored on site in 8 yard skips (3.66m x 1.68m x 1.22m) for subsequent offsite recycling via a licenced waste facility. A licenced waste contractor will be onsite during the operation to ensure that handling, storage, documentation and onward disposal of generated wastes is in compliance with current regulations. Transportation from site to the licenced waste facility is by a licenced waste carrier in road bulk haulage vehicles. Vehicles used for transportation are to be serviced and maintained in accordance with manufacturers / legislation. Vehicle spillage kits are to be carried during transportation of wastes. Vehicles are to adhere to approved traffic routes as outlined by planning authority / client. An audit of the nominated Licenced Waste Carrier is to be undertaken prior to operations commencing. A physical audit of the transportation of waste is to be undertaken to ensure that the waste is transported to the approved final destination.	Management actions and procedures will prevent exposure.	Possible pollution of traffic route if vehicle involved in accident. Fly-Tipping of wastes if not delivered to licenced facility.	Low if management techniques, planning and procedures are followed.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
022	Metal from Engineering Works.	Licenced Waste Facility. Along traffic route.	Transportation from site by road to Licenced Facility.	Waste metal generated on site through minor engineering works and packaging will be stored on site for subsequent reuse or offsite recycling via a licenced waste facility. Waste metal generated from engineering works will be segregated and stored on site in 8 yard skips (3.66m x 1.68m x 1.22m) for subsequent offsite recycling via a licenced waste facility. A licenced waste contractor will be onsite during the operation to ensure that handling, storage, documentation and onward disposal of generated wastes is in compliance with current regulations. Transportation from site to the licenced waste facility is by a licenced waste carrier in road bulk haulage vehicles. Vehicles used for transportation are to be serviced and maintained in accordance with manufacturers / legislation. Vehicle spillage kits are to be carried during transportation of wastes. Vehicles are to adhere to approved traffic routes as outlined by planning authority / client. An audit of the nominated Licenced Waste Carrier is to be undertaken prior to operations commencing. A physical audit of the transportation of waste is to be undertaken to ensure that the waste is transported to the approved final destination.	Management actions and procedures will prevent exposure.	Possible pollution of traffic route if vehicle involved in accident. Fly-Tipping of wastes if not delivered to licenced facility.	Low if management techniques, planning and procedures are followed.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
023	Emissions from controlled venting of CO_2 during well test operations.	**Local Residents:** West Newton village 700m to the North. Flinton village 1,900m to the South East. Old Farm Cottages 580m to the North. West Newton Grange 690m to the East. Smithy Briggs farm 415m to the South West. Burton Constable Hall 1550m to the South West. Moat Farm 1500m to the East. High Fosham 1920m to the North. Low Fosham 900m to the North East. Swiss Cottage 660m to the South West. **Site of Special Scientific Interest:** Lambwath Meadows 2,350m to the North East and 2,500m to the North. Humber Estuary 10,000m to the South West. **Special Protection Areas:** Hornsea Mere 9,500m to the North. Humber Estuary 10,000m to the South West. **Wildlife Sites:** Lambwath stream – 2,450m to the North. The Moors 1675m to the North West. Mill Avenue – 900m to the West. Smithy Bridge Plantation 350m to the West. Brickfield Plantation 700m to the West. **Watercourses:** L Dike stream 200m to the South. L Dike stream 300m to the North. Lambwath stream 2,450m to the North. Lake at Burton Constable Hall 2,100m to the South West. Pond at West Newton 500m to the North. Norwood drain 300m to the North.	Air – Prevailing winds from south west (average statistics from the Met Office) Atmosphere	In the event that Liquid CO_2 injection is used during the well testing operation, CO_2 gas will be flowed to surface through the wellbore into fluid separation equipment, from which the CO_2 gas is separated from produced fluids (formation water). Once separated, the CO_2 gas is diverted via temporary pipework to a ground flare for controlled venting to atmosphere.	Emissions of CO_2 gas will occur if Liquid CO_2 injection is undertaken during the well testing operation.	Impact on global warming but deemed insignificant.	Insignificant.

H1 – Annex G – Disposal or Recovery of Waste Produced on Site

Waste Stream No.	Description of Waste Stream	Amount produced tonne / year	Nature of Waste	Disposal or recovery option	Impact Score
001	Formation Water from Drilling Operations.	Undefined	Non-haz (2)	D4 (15)	
002	Fresh Water Drilling Muds and Waste from Drilling Operations.	416	Non-haz (2)	R3 (2)	1,664
003	Chloride Containing Drilling Muds and Waste from Drilling Operations.	914	Non-haz (2)	R3 (2)	3,656
004	Waste Clays and Sands from Conductor Setting Cuttings.	48	Non-haz (2)	R3 (2)	192
005	Rock Cuttings from Water Based Drilling Operations.	132	Non-haz (2)	R3 (2)	528
006	Rock Cuttings from Salt Saturated and KCL Drilling Operations.	202	Non-haz (2)	R3 (2)	808
007	Chloride Containing Drilling Muds and Waste Well Suspension Fluid	232	Non-haz (2)	R3 (2)	928
008	Cement from Cementing Operations.	50	Non-haz (2)	R5 (3)	300
009	Formation Water including Oil and Condensate from Flow Testing.	16 (per test)	Non-haz (2)	D4 (15)	480
010	Spent Hydrochloric Acid from Acid Wash and Squeeze Operations.	11 (per squeeze)	Non-haz (2)	R6 (4)	88
011	Oil and Condensate from Flow Testing.	1	Hazardous (10)	R9 (4)	40
012a	Run-off Water from Site Surface.	800	Hazardous (10)	D4 (15)	120,000
012b	Run-off Water from Site Surface.	1,700	Non-haz (2)	D6 (15)	51,000
013	Accommodation Waste Water and Sewage.	1,000	Hazardous (10)	D4 (15)	150,000
014	Fuel Oil Spill from Power Generation.	0.1	Hazardous (10)	R9 (4)	4
015	Engine, Gear and Lubricating Oils from Mobile Plant.	2	Hazardous (10)	R9 (4)	80
016	Hydraulic Oils from Mobile Plant.	1	Hazardous (10)	R9 (4)	40
017	Oil Rags / Absorbents from Mobile Plant Maintenance.	1	Hazardous (10)	R9 (4) + R4 (4)	40
018	Waste Filters from Mobile Plant Maintenance	0.25	Hazardous (10)	R9 (4) + R4 (4)	10
019	Paper and Cardboard from Office routines.	3	Non-haz (2)	R5 (3)	18
020	Canteen Waste.	6	Non-haz (2)	R5 (3)	36
021	Packaging from Delivered Products.	6	Non-haz (2)	R5 (3)	36
022	Metal from Engineering Works.	8	Non-haz (2)	R4 (3)	48
023	Carbon Dioxide (gas) from Well Test Operations.	6.7	Non-haz (2)	D10 (20)	268

Total = 330,264

H1 – Annex H –Assessment of Global Warming Risks

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
001	Greenhouse gas emissions from site power generation.	Atmosphere.	Air.	Power generation is provided on site by drilling rig generators and / or standalone generators. Generators are powered / operated using gas oil supplied from external bunded fuel tanks located within the site boundary. During drilling operations, the generators are usually operated 24 hours per day, thus ensuring power supply is not interrupted and the safety systems required on site ensure that the integrity and safety of the wellbore is maintained. Generators are maintained and serviced in line with manufacturer's guidelines thus ensuring that they operate efficiently and minimising emissions, noise and vibration. Service and maintenance regimes are implemented and adhered to and all work is carried out by a competent trained electrician. Generators supplied within the rig structure respond to power demand and do not run at full working load during the operations. When power is not required generators are switched off / on standby to reduce emissions, fuel usage, noise, vibration and wear and tear on the equipment.	Greenhouse gas emissions are released during operation of site generators.	Global warming and effects associated with it.	Not significant.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
002	Greenhouse gas emissions from flaring of natural gas during well test operations.	Atmosphere.	Air.	In the event that natural gas is encountered during the well testing operation, it will be flowed to surface through the wellbore into fluid separation equipment, from which the petroleum is separated from produced fluids (formation water). Once separated, the gas is diverted via temporary pipework to a ground flare for incineration. Due to the potential risk from flaring of natural gas, a dispersion modelling assessment of the impact of gas flaring at the West Newton B well site on local air quality has been commissioned by Rathlin Energy (UK) Limited.	Air quality not significantly affected from modelling assessment. Make regular observations over the period of operation. It is stated within the conclusion of the report that “For the nearest locations of human habitation and the closest nature conservation sites the impact of flaring or cold venting on air quality is around or below the level at which ambient impact would be considered insignificant based on Environment Agency assessment criteria.”	Impact on global warming but deemed insignificant from modelling assessment.	Not significant.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
003	Greenhouse gas emissions from controlled venting of CO2 during well test operations.	Atmosphere.	Air – Prevailing winds from south west (average statistics from the Met Office) Atmosphere	In the event that Liquid CO2 injection is used during the well testing operation, CO2 gas will be flowed to surface through the wellbore into fluid separation equipment, from which the CO2 gas is separated from produced fluids (formation water). Once separated, the CO2 gas is diverted via temporary pipework to a ground flare for controlled venting to atmosphere.	Emissions of CO2 gas will occur if Liquid CO2 injection is undertaken during the well testing operation.	Impact on global warming but deemed insignificant.	Insignificant.

ID	Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
004	Greenhouse gas emissions from vehicles and site equipment during construction / drilling / well test and restoration operations..	Atmosphere.	Air – Prevailing winds from south west (average statistics from the Met Office)	Vehicle loads and transportation to be planned to reduce quantity of deliveries / collections. Vehicles are to be serviced and maintained to manufacturer's / industry standards. Regular maintenance and inspections are to be conducted as directed by the manufacturer / written procedures. Drivers are to receive training / induction on driving techniques and site rules. Vehicles when not in use to be switched off. Ambient air quality monitoring will be undertaken to establish Ambient air quality baseline and during flaring activities. Local residents informed of planned operations via liaison committee meetings.	Emissions from vehicles and site equipment exhaust systems will occur throughout the operation.	Impact on global warming but deemed insignificant.	Insignificant.

H1 – Annex H – Table A - Global Warming Potential

Serial No.	Activity	Substance	Chemical Formula	Atmospheric lifetime (yrs)	Global Warming Potential (GWP)	Direct / Indirect Release	Released Mass Per Operation (Tonnes)	Global Warming Potential of Emissions (Released Mass x GWP)
001	Power Generation	Carbon Dioxide	CO_2	Variable	1	Direct	558	558
002	Flaring	Carbon Dioxide	CO_2	Variable	1	Direct	2515	2515
003	Flaring	Methane	CH_4	12.3	21	Direct	16.17	339.57
004	Flaring	Nitrous Oxide	N_2O	120	310	Direct	0.07	21.7
005	Liquid CO_2 Injection	Carbon Dioxide	CO_2	Variable	1	Direct	6	6

Environmental Risk Assessment - West Newton Exploratory Operations

H1 – Annex H – Table B1 – Energy Sources, Conversion Efficiency and Emission Factors

Serial No.	Energy Source	Location of Emission	Delivered to Primary Conversion Factor	CO2 Factor (t/mwh, primary)
001	Gas Oil	Direct	1	0.250

Environmental Risk Assessment - West Newton Exploratory Operations

H1 – Annex H – Table B2 – Energy Emission Factors

Serial No.	Fuel	MWh	Delivered to Primary Conversion Factor	t/MWh	Carbon Dioxide Emissions (MWh x Delivered to Primary Conversion Factor x t/MWh)
001	Gas Oil	2232	1	0.250	2232 X 1 x 0.250 = 558 Tonnes Carbon Dioxide emissions