

INEOS Shale

Environmental Impact Assessment Screening Report

Land to the
south of Dinnington Road, Woodsetts,
Rotherham
PEDL 304

July 2017

Contents

1	Introduction	1
1.1	Requirement for EIA	1
2	Site and Proposed Development	3
2.1	Site Context	3
2.2	Proposed Development	3
3	Screening Assessment.....	9
3.1	Introduction	9
3.2	Schedule 1 Projects	9
3.3	Schedule 2 Projects	9
3.4	Schedule 3	10
3.5	Consideration of Cumulative Effects	11
3.6	Planning Practice Guidance	12
3.7	Review of Screening Criteria	12
4	Conclusion.....	26

Appendix 1 Site Location Plan

Appendix 2 Designation Plan

Appendix 3 Summary of Mitigation Measures

1 Introduction

This report has been prepared in support of a request to Rotherham Metropolitan Borough Council (“**RMBC**”) to adopt a screening opinion to determine whether INEOS Upstream Limited's (“**INEOS**”) application for a temporary planning permission to drill a vertical core well to explore for shale gas (“**Proposed Development**”) on land located approximately 0.4 km to the west of the settlement of Woodsetts, Rotherham (“**site**”) constitutes Environmental Impact Assessment (“**EIA**”) development. RMBC is the Relevant Planning Authority (“**RPA**”) for the site.

This report reflects the requirements of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017¹ (“**EIA Regulations**”) and in accordance with Regulation 6 (2) of the EIA Regulations, this report contains:

- A plan sufficient to identify the land;
- A description of the development, including in particular:
 - A description of the physical characteristics of the development and, where relevant, of demolition works;
 - A description of the location of the development, with particular regard to the environmental sensitivity of geographical areas likely to be affected;
- A description of the aspects of the environment likely to be significantly affected by the development;
- To the extent the information is available, a description of any likely significant effects of the proposed development on the environment resulting from:
 - The expected residues and emissions and the production of waste, where relevant; and
 - The use of natural resources, in particular, soil, land, water and biodiversity; and
- Such other information or representations as the person making the request may wish to provide or make, including any features of the proposed development or any measures envisaged to avoid or prevent what might otherwise have been significant adverse effects on the environment.

1.1 Requirement for EIA

In order to determine whether the Proposed Development is ‘EIA development’, regard must be had by the RPA to the EIA Regulations and supporting Planning Practice Guidance (“**PPG**”)².

EIA development falls into two Schedules of the EIA Regulations. EIA is mandatory for developments listed within Schedule 1. Schedule 2 developments require EIA if they would be *“likely to have significant effects on the environment by virtue of factors such as its nature, size or location”*.

In deciding whether a Schedule 2 development is EIA development, Regulation 5(4) states:

“Where a relevant planning authority or the Secretary of State has to decide under these Regulations whether Schedule 2 development is EIA development, the relevant planning authority

¹ SI 2017/571 the Town and Country Planning (Environmental Impact Assessment) (Amendment) Regulations 2017

² DCLG, 2015, online access:

<http://planningguidance.planningportal.gov.uk/blog/guidance/environmental-impact-assessment/>

or Secretary of State must take into account in making that decision

- *Any information provided by the applicant;*
- *The results of any relevant EU environmental assessment which are reasonably available to the relevant planning authority or the Secretary of State*
- *Such of the selection criteria set out in Schedule 3 as are relevant to the development.”*

In order to allow the RPA to determine the need for EIA, this report provides a description of the site and Proposed Development, a review of the EIA screening criteria based on the EIA Regulations and the PPG, a completed EIA Screening Checklist, a site location plan in Appendix 1, a designation plan in Appendix 2 and a summary of embedded mitigation measures within Appendix 3.

2 Site and Proposed Development

2.1 Site Context

The address of the site is land to the south of Dinnington Road, Woodsetts. The site is located approximately 0.4 km to the west of the village of Woodsetts, 1.6 km to the southeast of North Anston, 1.9 km to the east of South Anston and 2.3 km north of Shireoaks. The town of Worksop is located approximately 5.6 km to the southeast of the site. The closest residential properties to the site are the houses located on Berne Square, approximately 425 m northeast of the site. Woodsetts Primary School is located approximately 820 m east of the site.

The site is currently agricultural land. It is anticipated that the core well site would be approximately 1.2 hectares (the proposed access (approximately 700 m), via an existing field entrance and track connecting the site to Dinnington Road would be in addition to this). The site location plan presented in Appendix 1 illustrates the land holding currently being considered within which the core well site would be located. For the purpose of this report this entire land holding is referred to as “the site”, though the “core well site” (the Proposed Development excluding the access track) would not cover the entirety of this area. The proposed site access from the public highway is also illustrated in the plan.

2.2 Proposed Development

The Proposed Development will comprise five phases:

- Stage 1: Site Development and Establishment – approximately three months
- Stage 2: Drilling, Coring and Suspension – approximately five months
- Stage 3: Maintenance of the Suspended Well Site – retained until restoration, up to five year extent of the application
- Stage 3a: Possible Work over of Suspended Well – up to one month
- Stage 4: Undertaking Listening Well Operations – up to five weeks as required
- Stage 5: Decommissioning and Restoration – approximately two months

The overall duration of the Proposed Development would be a maximum of five years which accords with the length of INEOS’ initial Petroleum Exploration and Development Licence (“**PEDL**”) term, as awarded by the Oil and Gas Authority. After five years the site will be restored to its existing use.

Stage 1 – Site Development and Establishment

Activities during Stage 1 would include:

- **Mobilisation:** Any necessary pre-commencement surveys would be undertaken, including geotechnical surveys, site investigation surveys, road condition surveys and environmental surveys. The construction plant, including generators, site offices, welfare cabins and stores would be brought to site and site personnel would be inducted. The construction compound would be fenced for security and to delineate the proposals.
- **Access tracks:** The junction to the adopted highway would be created / improved ensuring that visibility splays provide safe access and egress from the site and any necessary passing places are installed. The access track would be lined with a geotextile membrane and covered with aggregate to prevent damage to the underlying soil during site construction and subsequent site works. An area for

parking on the core well site would also be developed to ensure all necessary vehicles were within the site boundary.

- **Site Clearance:** The core well site would cover an area approximately 120 m x 100 m. Vegetation would be carefully removed from the site subject to any ecological considerations relating to timing and method of working. The topsoil would be removed (approximately top 300 mm) and any subsoil necessary to create a level site surface. Screening bunds would be created within the perimeter of the site (approximately 2 m high) ensuring appropriate storage of this soil for restoration of the site and to act as visual and noise screening. The site hardstanding area (drill pad) would be constructed within the central site area.
- **Site Development and Lining:** A liner would be installed across the core well site and up to the foot of the earth bunds. The geotextile and high density polyethylene (HDPE) liners would be laid over this area by licensed contractors to ensure an impermeable site lining, preventing any potential spills or surface water from percolating through the site floor into the underlying soil. These liners would be anchored in place, and the integrity of the liner tested. Any subsequent perforations of the liner would be heat sealed to the surrounding material (borehole casing). The liner would be covered by sub-base and aggregate to at least 450 mm below the finished site surface.
- **Development of drainage:** A perimeter water storage pipe (900 mm or similar) would be laid within a ditch at the foot of the topsoil bunds, feeding to a sump. All surface runoff from the core well site would therefore be retained on the site and removed by a licensed waste contractor. Drainage from the central rig area would feed into a separate bunded tank for removal and treatment by a licensed waste contractor.
- **Development of site accommodation:** Cabins would be placed on the perimeter of the core well site, over the top of the perimeter water storage pipe trench. These would be stacked up to two cabins high to provide further screening as appropriate.
- **Installation of monitoring boreholes:** Groundwater monitoring boreholes would be installed towards the edge of the core well site, in locations and to depths to be agreed with the Environment Agency. These would be installed under permitted development rights and do not form part of this planning application.
- **Construction of Well Cellar:** A well cellar would be excavated to form a containment area from which the well would be drilled. This is constructed from a reinforced concrete ring approximately 2.5 m diameter and 3 m deep. The impermeable membrane would be incorporated into the cellar construction to maintain the integrity of the core well site.
- **Installation of Conductor/ Surface Casing:** A Conductor/ Surface drill rig or auger of up to 32 m, plus associated casing and drill fluids (water and additives) would be mobilised to site. This would drill the upper section of the well, and install the upper strings of casing to approximately 610 m (2,000 ft.). This would isolate mine workings in the Westphalian coal measures and aquifers. It would drill with water based fluids, approved by the Environment Agency for use in the well. The rig would be operational for 24 hours a day, for approximately 3 weeks and would then be demobilised.

- **Demobilisation:** The soil bunds would be covered with a grass seeded geotextile blanket for stability and to minimise the visual impact of the bunds, and security measures and lighting would be established around the core well site. Permanent lighting would be angled to light the site floor, entrance and cabins only and would be shielded and low intensity to reduce light spill. Construction equipment would then be demobilised in preparation for mobilising the main drilling rig and equipment.

Activities in Stage 1 would take place over approximately three months, working 0700 - 1900 Monday to Friday and 0700 – 1300 on Saturday, with no working on Sunday or Bank Holidays unless in an emergency or agreed otherwise with the RPA. 24 hour working would be required during the installation of the conductor and surface casing (approximately three weeks).

Stage 2 – Drilling, Coring and Suspension

Activities during Stage 2 would include:

- **Mobilisation:** The drill rig and associated equipment including drill pipe, drill water and mud pumps would be brought to site. Temporary mobile lighting would be installed (<9 m mobile towers) to provide additional lighting to the drill floor as needed.
- **Drilling, Coring and Testing:** The well would be drilled up to approximately 2,805 m (9,200 ft) using a drill rig of maximum 60 m rig height, and cased using steel casing cemented in place. The rig and ancillary equipment including pumps would be selected to be appropriate for the site and proposed well and to ensure that environmental impacts associated with drilling (in particular, noise levels generated) would be acceptable at the site. Cores of the target formations and sidewall cores would be removed using standard wireline coring equipment and the well would be logged during drilling. The cores would be sent from site for tests in a laboratory to identify the geological characteristics of the core and its gas-producing properties. There will be no flow testing of the well (i.e. no gas will be flowed to surface for metering). A pressure transient test³ (PTT) will be undertaken following the drilling; the five month duration for both activities assumes this activity follows immediately after the core well drilling is completed. There is potential there could be a short period after the drilling rig has been removed from site prior to the PTT starting. The purpose of the PTT is to establish the reservoir properties such as whether the target zone is over-pressured (which is encouraging for shale gas extraction). For the PTT, the main (60 m) rig would be removed and a workover rig (or similar) of a maximum 32 m height will be brought onto site, with ancillary equipment including a cement unit. The cased well would be perforated and a packer⁴ lowered into the well from the workover rig. A maximum of 10 m³ potassium chloride (salt)⁵ (KCl) solution (2-4 %) would be squeezed into the formation (approximately 25 cm) at the target zone at pressure. This would take a maximum of two hours. The PTT test area would be closed off using valves and pressure within the isolated area monitored for a period of up to two weeks. At the end of two weeks, the plug would be removed. A small quantity of the KCl solution within the wellbore could return to

³ This test is also referred to in industry as a Diagnostic Formation Injection Test (DFIT), leak off test, formation propagation test, formation injectability test and pressure test.

⁴ A packer is a device that can be run into a wellbore with a smaller initial outside diameter that then expands externally to seal the wellbore

⁵ KCl is a “sodium free” salt also used in food, fertilisers and medical applications.

surface, and any that does return would be stored for removal by a licensed waste contractor. This process could be repeated for up to two additional target zones (making up a total testing period of up to two months).

- **Suspension of the Well:** Following completion of the PTT, the well would be suspended using the drilling rig. Suspension would take approximately two to three days and be undertaken according to Oil and Gas UK Guidelines. This would involve at least two mechanical plugs set into the casing, above the levels of the PTT. The plugs would be pressure tested to ensure the integrity of the suspended well. A blind flange, well monitoring pressure gauge and valves will be fitted to the wellhead. The suspended well would be protected by a steel wellhead protection cage (approximately 2m x 2m x 2m) over the wellhead.
- **Demobilisation:** The workover rig and ancillary equipment would be removed from site in preparation for Stage 3, and waste from the drilling and coring process (for example drill cuttings and waste drill muds) would be removed from site by a licensed contractor for treatment and disposal or reuse.

Standard well safety equipment would be present on site during drilling, including a blow-out preventer, vent for emergency venting of gas encountered and methane monitoring. An emergency plan would be in place as well as standard pollution prevention measures including bunding, spill kits and training of staff. Operations on the site would follow the environmental permit conditions as issued by the Environment Agency.

All drill muds would be chosen to be appropriate for the anticipated geology and would be compliant with the Environment Agency's published Waste Management Plan WMP3 and permitted by the Environment Agency in advance of use.

Activities in Stage 2 would take place over approximately five months. Drilling (and mobilisation and demobilisation) and the PTT and well suspension would be required to take place over 24 hours to maintain the stability of the well and minimise the drilling period. Routine deliveries would only take place 0700 - 1900 Monday to Friday and 0700 – 1300 on Saturday, with no working on Sunday or Bank Holidays unless in an emergency or agreed otherwise with the RPA.

Stage 3 – Maintenance of the Suspended Well Site

Once the suspended well is in place, routine visits to the core well site would be made for maintenance. These checks would include:

- Integrity of pipework and site surface;
- Integrity of fencing and security arrangements;
- Site drainage and containment, including tanks; and
- Wellhead structure and pressure monitoring.

The core well site would be unmanned once the well is suspended, but site security including CCTV would remain.

Maintenance visits would take place 0700 - 1900 Monday to Friday and 0700 – 1300 on Saturday, with no working on Sunday or Bank or Public Holidays, unless in an emergency or agreed otherwise with the RPA.

Stage 3a – Possible Workover of the Suspended Well

This stage is included as a contingency and would only be required if the well required to be re-entered for maintenance or similar. However, planning permission will be requested for the potential to undertake these operations to allow a rapid deployment of the rig if required. If required, this would be a maximum of 32 m tall and could be on site for up to a month, including mobilisation / demobilisation. It is not intended for there to be any night-time or weekend working during workovers, unless agreed with the RPA separately, or in an emergency. Appropriate screening would be provided as necessary and there would be a requirement for lighting, generators and other low-level site equipment. The RPA would be informed in advance of any workover taking place.

Stage 4 – Undertaking Listening Well Operations

Activities during Stage 4 would only take place to undertake baseline monitoring or when another well is hydraulically fractured, subject to such a consent for that separate activity being granted within the period of planning consent for this well. Activities would include:

- Mobilisation of wireline truck or workover rig (maximum 32 m), mobile crane (approximate 50 m maximum height), mast, elevated work platform and temporary welfare facilities.
- Placement of a string of geophones (small seismic receivers) run on wireline inside the reservoir casing for the duration of the listening operations
- Demobilisation

Stage 4 operations would last for a maximum of five weeks and would result in no perceptible noise or vibration at the nearest receptors. There would be no introduction of any chemicals into the well, or requirement to re-work the well using a rig. Operations would take place 0700 - 1900 Monday to Friday with no working on Saturday, Sunday or Bank/Public Holidays, unless in an emergency or agreed otherwise with the RPA

Stage 5 - Decommissioning and Restoration

Activities during Stage 5 would include:

- **Plugging and Decommissioning the Well:** Decommissioning of the well would be undertaken in accordance with Oil and Gas UK Guidelines on Well Abandonment and according to an abandonment plan to be agreed with the Environment Agency, Health and Safety Executive (HSE) and an independent Well Examiner. The wellhead would be removed and casing/ cement cut to 2 m below ground level to allow restoration of the site to agriculture. The 32 m (max) workover rig would be required during well abandonment for a short period during the two month decommissioning and restoration stage.
- **Removal of Residual Site Equipment and Site Surfacing:** Removal of residual equipment would take place within the existing site Heras fencing. The concrete pad and cellar would be broken for removal by a licensed waste contractor, and aggregate, drainage pipework and other infrastructure would be removed from the surface and reused where permitted. Any potentially contaminated equipment would be removed from the site prior to removal of the impermeable geotextile/ HDPE lining. All site equipment and infrastructure would be reused or recycled where possible, or alternatively removed from site by licensed waste contractors as appropriate.
- **Restoration of Ground:** The soils stored in bunds would be used to level and restore the core well site surface. Field drainage would be re-developed if required. The site would be reseeded and prepared for aftercare as agricultural

land. Access tracks and any road amendments (if required) would also be restored as agreed with the landowner and Highways Authority, or retained for continued use, subject to any necessary further planning consent.

- **Aftercare:** An aftercare plan would be put in place as a condition of planning consent, to ensure appropriate aftercare of the site as agricultural land. A monitoring plan as agreed with the Environment Agency would be followed as a condition of the Environmental Permit for the site.

Activities in Stage 5 (with the exception of decommissioning the well) would last approximately two months and take place 0700 - 1900 Monday to Friday and 0700 – 1300 on Saturday, with no working on Sunday or Bank Holidays unless in an emergency or agreed otherwise with the RPA. Decommissioning the well would take place on a 24 hour basis for up to two weeks. Aftercare would take place within the landowner's existing management schedule.

3 Screening Assessment

3.1 Introduction

The following should be considered in determining whether the Proposed Development constitutes EIA development:

- If the Proposed Development is of a type listed in Schedule 1;
- If not, whether:
 - it is listed in Schedule 2; and
 - any part of it is located within a sensitive area; or
 - it meets any of the relevant thresholds and criteria set out in Schedule 2; and / or
 - it would be likely to have significant effects on the environment.

These points are explored further in this section with reference to the EIA Regulations and supporting PPG.

3.2 Schedule 1 Projects

EIA is mandatory for projects listed in Schedule 1 of the EIA Regulations. Schedule 1 developments are large scale projects for which significant effects would be expected and comprise developments such as new airports and power stations.

In respect of the Proposed Development, Schedule 1, Paragraph 14 would only apply where *“Extraction of natural gas ... for commercial purposes where the amount extracted exceeds 500,000 cubic metres per day in the case of gas ...”*

The Proposed Development would not involve gas extraction and is therefore not of a type listed in Schedule 1.

3.3 Schedule 2 Projects

The development proposed is of a type listed in Schedule 2 development which depends on the location of the development (i.e. if it is within a sensitive area) and/or whether it meets any of the relevant thresholds or criteria in Column 2.

Sensitive Areas are defined in the EIA Regulations as:

- Sites of Special Scientific Interest (SSSI) and European Sites;
- National Parks, the Broads, and Areas of Outstanding Natural Beauty; and
- World Heritage Sites and Scheduled Monuments.

In certain cases, local designations which are not included in the definition of sensitive areas, but which are nonetheless environmentally sensitive, may also be relevant in determining whether an assessment is required. Furthermore, in considering the sensitivity of a particular location, regard should also be had to whether any national or internationally agreed environmental standards (e.g. air quality) are already being approached or exceeded.

The Proposed Development falls under Column 1 of Category 2, ‘Extractive Industry’, of Schedule 2 of the EIA Regulations of which sub-paragraphs 2(d) ‘deep drillings’ or 2(e) ‘surface industrial installations for the extraction of ... natural gas’ are relevant.

The Proposed Development is not located in a sensitive area and therefore the thresholds set out next to the relevant sub-paragraph of Column 1, Category 2, Schedule 2 of the EIA Regulations should be applied.

The threshold for a 'deep drilling' is likely to be an area exceeding 1 ha whilst the threshold for 'surface industrial installation' is an area exceeding 0.5 ha. The Proposed Development covers an area of more than 1 ha, and so exceeds both thresholds. However, it is below the indicative criteria and threshold of this type of development as set out in the PPG (see Section 3.6 of this report).

Therefore, when considering whether the Proposed Development is EIA development, the RPA must consider the selection criteria set out at Schedule 3 of the EIA Regulations.

3.4 Schedule 3

Schedule 3 of the EIA Regulations set out selection criteria which relate to specific matters, including: the characteristics of the development; the location of the development; and the types and characteristics of the potential impact. These factors should be taken into account as part of the screening process and are set out below:

3.4.1 Characteristics of development

- The size and design of the whole development;
- Cumulation with other existing development and/or approved development;
- The use of natural resources, in particular land, soil, water and biodiversity;
- The production of waste;
- Pollution and nuisances;
- The risk of major accidents and/or disasters relevant to the development concerned, including those caused by climate change, in accordance with scientific knowledge;
- The risks to human health (for example, due to water contamination or air pollution).

3.4.2 Location of development

- The environmental sensitivity of geographical areas likely to be affected by development must be considered, with particular regard to
 - The existing and approved land use;
 - The relative abundance, availability, quality and regenerative capacity of natural resources in the area and its underground; and
 - The absorption capacity of the natural environment, paying particular attention to the following areas
 - wetlands, riparian areas, river mouths;
 - coastal zones and the natural environment;
 - mountain and forest areas;
 - nature reserves and parks;
 - European sites and other areas classified or protected under national legislation;
 - Areas in which there has already been a failure to meet the environmental quality standards, laid down in Union legislation and relevant to the project, or in which it is considered that there is such a failure;
 - Densely populated areas;

- Landscapes and sites of historical, cultural or archaeological significance.

3.4.3 Types and characteristics of the potential Impact

- The likely significant effects of the development on the environment must be considered in relation to criteria set out in paras 3.4.1 and 3.4.2 above, with regard to the impact of the development on the factors specified in regulation 4(2), taking into account
 - The magnitude and spatial extent of the impact
 - The nature of the impact
 - The transboundary nature of the impact;
 - The intensity and complexity of the impact;
 - The probability of the impact;
 - The expected onset, duration, frequency and reversibility of the impact;
 - The cumulation of the impact with the impact of other existing and/or approved development; and
 - The possibility of effectively reducing the impact.

3.5 Consideration of Cumulative Effects

The EIA Regulations require consideration of a proposed development cumulatively with other development. Guidance contained in the PPG regarding EIA Screening includes the topic ‘*When should Cumulative Effects be Assessed?*’⁶ This states that:

“each application (or request for a screening opinion) should be considered on its own merits. There are occasions where other existing or approved development may be relevant in determining whether significant effects are likely as a consequence of a proposed development. The local planning authorities should always have regard to the possible cumulative effects arising from any existing or approved development.”

With regard to this proposal, there is one potentially cumulative scheme that has been identified. INEOS has submitted an application to seek planning consent for a similar vertical core well site on land adjacent to Common Road, Harthill, Rotherham which also lies within the area covered by PEDL 304. The site adjacent to Common Road lies approximately 4.8 km to the southwest of this site (approximately 8.4 km by road).

While it is currently not expected that both sites would conduct drilling operations at the same time, it is feasible that other stages of the overall development could be being carried out at one site while a different stage of that overall development was being carried out at the other. Given the interposing topography, the extent of the distance between the two sites and the temporary nature of the drilling operations, while it is possible (in the unlikely event that drilling were to be carried out simultaneously at both sites) that the drilling rig located on each might be capable of being seen from a single receptor, the cumulative visual impact arising from those simultaneous drilling operations would still be likely to be insignificant. The prospect of cumulative significant adverse traffic impact arising from these two sites if they were both to be drilled at the same time can also be discounted as the sections of local road network that are proposed to be used to access each site are different.

⁶ Paragraph: 024 Reference ID: 4-024-20140306

Taken together on a worst case basis the cumulative impact of the Proposed Development and the proposed development on land adjacent to Common Road, near Harthill would be likely to be insignificant.

EIA screening for any additional future sites would be required to take account of the same considerations, having regard to the prevailing environmental baseline conditions and developments that have previously been approved, or the applicant has in the planning stage, at the point in time when the exercise is carried out.

3.6 Planning Practice Guidance

Paragraphs 057 and 058 of PPG provide guidance to help determine whether significant effects are likely. In general, the more environmentally sensitive the location, the lower the threshold will be at which significant effects are likely. Table 1 sets out indicative criteria and thresholds identified in the PPG along with some of the issues that are most likely to need to be considered in determining the whether a development is likely to be EIA development.

Table 1: Planning Practice Guidance Indicative Screening Criteria

Development type	Indicative criteria and threshold	Key issues to consider
(d) Deep drilling, in particular: (i) geothermal drilling; (ii) drilling for the storage of nuclear waste material; (iii) drilling for water supplies; with the exception of drilling for investigating the stability of the soil.	Drilling operations involving development of a surface site of more than five hectares (ha).	Regard should be had to the likely wider impacts on surrounding hydrology and ecology.
(e) Surface industrial installations for the extraction of coal, petroleum, natural gas and ores, as well as bituminous shale.	Development of a site of 10 ha or more or where production is expected to be more than 100,000 tonnes of petroleum per year.	Scale of development, emissions to air, discharges to water, the risk of accident and the arrangements for transporting the fuel.

3.7 Review of Screening Criteria

Table 2 sets out a review of all of the above criteria and requirements and specifically addresses the Proposed Development at the site.

Table 2: Screening Assessment for Proposed Development at PEDL304 – Land south of Dinnington Road, Woodsetts, Rotherham

SCREENING CRITERIA	PROPOSED DEVELOPMENT
1. CHARACTERISTICS OF THE DEVELOPMENT	
(a) Size of the development	
Will the development as a whole be out of scale with the existing environment?	The Proposed Development is temporary and covers approximately 1.2 ha for the core well site plus additional area for the access track (approximately 0.6 ha). The Proposed Development is located on land currently in arable use. Throughout the five year period there will be short durations where the drilling and workover rigs and cranes will be on site (worst case being the <60 m mast height drilling rig on site for approximately three months). With the exception of these temporary periods, no features of the proposals would be unusual or prominent within an agricultural landscape.
Will the design of the development as a whole fit within the existing environment?	The Proposed Development is utilitarian in nature and, consequently, the scope for varying the design of the development is restricted. The design incorporates measures such as lighting and fencing that are necessary to satisfy health and safety requirements. However, the core well site is located against a backdrop of plantation woodland to the south to help reduce visual impacts of the development, particularly during the drilling stage.
Will it lead to further consequential development or works?	No. The Proposed Development would be a discrete proposal and includes all necessary works, including access. The proposal will include provisions for restoration back to the current use.
(b) Cumulation with other existing development and/or approved development	
Are there potential cumulative impacts with other existing development or development not yet begun but for which planning permission exists?	With regard to this proposal, there is one potentially cumulative scheme that has been identified. INEOS has submitted an application to seek planning consent for a similar vertical core well site on land adjacent to Common Road, Harthill Rotherham within PEDL 304. The proposed well site lies approximately 4.8 km to the southwest (approximately 8.4 km by road, and using separate road networks for access). Owing to the distance between the two sites, in theory, it is possible that the drilling rigs could be visible to some receptors at both sites at the same time. It is currently not expected that both sites would have drilling rigs on site simultaneously although some stages of the proposed development at each site could occur simultaneously. It is unlikely that the lower level plant and machinery of each site would be visible owing to topography and screening.. The same local road network would not be impacted by vehicles accessing the two different sites. EIA Screening for future sites would be required to take the same considerations into account, having regard for the future baseline in the area.
Should the application for this development be regarded as an integral part of a more substantial project? If so, can related developments which are subject to separate applications proceed independently?	No. The Proposed Development would be a discrete proposal and could proceed independently. Other similar proposal for vertical core wells are and will be brought forward for planning applications across the East Midlands. However, these are all independent, discrete projects and would be assessed on their own merits.
(c) Use of natural resources, in particular, land, soil, water and biodiversity	
Will construction or operation of the development use natural resources such as land, water, material or	Land take would be approximately 1.8 ha of agricultural land. This would be restored to agricultural use at the end of the proposed activities.

SCREENING CRITERIA	PROPOSED DEVELOPMENT
energy, especially any resources which are non-renewable or in short supply?	<p>Minor volumes of water would be required for site construction such as laying foundations and sanitary purposes. The drilling and PTT activities would use approximately 330 m³ of water. Water would be brought to site as required by road tankers.</p> <p>Top soil and subsoil would be stripped and stored separately in bunds within the core well site to help reduce visual impact. The construction of the core well site would require approximately 9,000 tonnes of aggregate to be brought to site by road. This would be removed upon restoration and reused where permitted. The Proposed Development would be entirely on land currently within agricultural use and would avoid the need to disturb Dewidales Wood and associated hedgerows to the south.</p> <p>On-site energy needs would be met through mobile diesel generators.</p>
(d) Production of waste	
Will the development produce wastes during construction or operation or decommissioning?	<p>Wastes from the proposals would include waste water and materials associated with drilling. Drilling mud and rock cuttings would be collected in tanks which would be located on the concrete pad and transported from the site by road for disposal at an authorised waste disposal facility. All waste water, including surface water run-off, would be contained on site and removed by tanker. Clean surface water will be collected separately from waste water and where appropriate it may be used within the site operations to reduce water consumption.</p> <p>All extractive wastes produced at site will be managed, in accordance with the Environment Agency's published Waste Management Plan. Given that this development is for a core well the production of naturally occurring radioactive material (NORM) is not expected.</p>
(e) Pollution and nuisances	
Will the development release any pollutants or any hazardous, toxic or noxious substances to air?	<p>On-site generators and the drilling rig (both diesel powered) would produce temporary, localised emissions to air, likely to include NO_x, SO_x, PM₁₀ and PM_{2.5}, CO and VOCs. Generators would be sized appropriately for site energy requirements and would be efficient, with emissions reduced as far as possible. These would be similar to generators on construction sites. Emissions from the rig would also be reduced through choice of an efficient rig appropriate for the site, with minimal emissions.</p> <p>Generators associated with site construction and drilling would be present on the site for less than eight months at any one time.</p> <p>Road traffic associated with the Proposed Development would also produce emissions to air during the temporary construction and drilling phases, similar to any construction site. There would be no operational flaring or venting during the proposed activities. The scale of the proposed activities is such that significant effects to air quality are not anticipated. There are no Air Quality Management Areas in the vicinity of Proposed Development.</p>

SCREENING CRITERIA	PROPOSED DEVELOPMENT
<p>Is there a potential risk from leachates or escape of wastes of other products/by-products that may constitute a contaminant in the environment?</p>	<p>Wastes from the Proposed Development would include waste water and materials associated with the drilling and PTT. Surface water would be retained within the site surface water drainage network and disposed of off-site by a licensed waste contractor. Drilling and PTT waste would be stored in bunded tanks on site and disposed of by licensed waste contractors.</p> <p>Drilling mud and rock cuttings would be collected in tanks located on the concrete pad and transported from site by road for disposal at an authorised waste disposal facility.</p> <p>It is anticipated that operations would be permitted under Standard Rules Permit (SR2015 No1) for a mining waste operation (the management of extractive wastes) specifically with regard to ground, groundwater and surface water protection. As outlined in Appendix 3 a number of embedded mitigation approaches have been included within the design to avoid impacts to surface water or groundwater.</p> <p>All extractive wastes produced at site will be managed under the Environment Agency's published Waste Management Plan WMP3. Given that this development is for a core well, the production of naturally occurring radioactive material (NORM) is not expected.</p>
<p>Will the development cause noise and vibration or release of light, heat, energy or electromagnetic radiation?</p>	<p>Noise during the construction and drilling phases would be temporary. An Environmental Report including a noise appraisal will be completed as part of the planning application. This will include detailed noise modelling using SoundPLAN software. Experience has shown that the noise assessment will be able to demonstrate accordance with the following assessment criteria:</p> <ul style="list-style-type: none"> • During site development and establishment stage the core well site will achieve a 65 dB LAeq criteria for construction noise (as a category A project under British Standard 5228: 2009 +A1:2014 "code of practice for noise and vibration control on construction and open sites"). This will be achieved through the application of best practice noise control during construction. • During the 24 hour drilling and coring operations, the core well site will accord with the daytime, evening and night time noise thresholds set out in Planning Practice Guidance (PPG) on Noise from Mineral Extraction. The night time noise of the project, which is considered likely to be the lowest threshold to be met, will not exceed 42 dB(A) LAeq,1h (free field). The daytime and evening baseline plus 10 dB(A) threshold will be targeted and the project will not exceed the regulatory limit of 55 dB(A) LAeq, 1h (free field). <p>Should the noise modelling identify effects above the criteria set out in the PPG on a regular basis, the scope of additional mitigation measures will be discussed with the Environmental Health Officer. One or more of the following mitigation measures will be used:</p> <ul style="list-style-type: none"> • maximising site layout to reduce noise impacts including the orientation and height of cabins and bunds; • orientating noise equipment away from receptors; • specification of low noise equipment (e.g. generators);

SCREENING CRITERIA	PROPOSED DEVELOPMENT
	<ul style="list-style-type: none"> • enclosing equipment to minimise noise emissions at source (e.g. enclosing drilling mud pumps); and • additional screening around the site boundary <p>INEOS recognise and expect that the planning application submitted will show how the proposals can achieve the PPG criteria, taking in to account embedded mitigation. INEOS will be targeting the lowest noise emissions that achieve compliance whether it is daytime, evening or night time. Based on industry precedent and current understanding of the site, INEOS is confident that the development will meet the regulatory thresholds and therefore have no significant noise impacts.</p> <p>Ground borne vibration is expected to be imperceptible at distances of greater than 20 m from the drill rig. The closest residential properties are approximately 425 m from site whilst Woodsetts Primary School is approximately 820 m from site. Ground-borne vibration from site activities at these receptors would not be perceptible.</p> <p>The effects of vibration HGV traffic using the access road (which runs parallel to properties on Bern Square, and is approximately 30 m from the houses at its closest point) are not likely to be significant, even if they are perceptible, as the numbers of HGVs are low in terms of causing vibration effects, and the access road surface will be maintained to avoid significant levels of vibration (vibration from roads tends to be an issue only when imperfections such as pot holes are allowed to develop).</p> <p>Lighting would be required within the core well site and on the rig. All lighting would be carefully directionally controlled to limit environmental effects. No significant effects are anticipated. Lighting would be designed carefully in accordance with relevant British Standards and Institute of Lighting Professionals (ILP) (2011) Guidance Notes for the Reduction of Obtrusive Light.</p>
Will the development lead to risks of contamination of land or water from releases of pollutants onto the ground or into surface waters, groundwater, coastal waters or the sea?	<p>There are no anticipated significant effects. The core well site will be lined using a geomembrane. This will prevent potential groundwater pollution from spillages and the handling of drilling fluids and cuttings. The core well site will be constructed using a central rig drainage system which will be segregated from the remainder of the core well site to prevent potential contamination of the surrounding surfaces in the event of a spillage. Following the drilling operations, the aggregate and concrete would be fully removed from the site before the impermeable liner is removed.</p> <p>The well design and site design have incorporated embedded mitigation measures to minimise the risk of, or avoid, contamination impacts to the surrounding environment. Assessment of similar developments has demonstrated that the proposed operations can be successfully undertaken without significant impacts to the ground or water environments.</p>
(f) Risk of major accidents and/or disasters, including those caused by climate change	
Will there be a risk of major accidents and/or disasters during construction or operation of the development which would have effects on people or the environment?	Whilst the risk of a major accident exists, standard safety measures would be implemented to ensure that such as risk is negligible. The health and safety risks of the proposals would be managed as required by the Borehole Sites & Regulations 1995, the Management of Health & Safety at Work Regulations 1992, the Construction (Design & Management) Regulations 2007, the

SCREENING CRITERIA	PROPOSED DEVELOPMENT
	Offshore Installations & Wells (Design & Construction etc.) Regulations 1996 and the Applicant's HSE Management System.
Will the development involve use, storage, transport, handling or production of substances or materials which could be harmful to people or the environment (flora, fauna, water supplies)?	<p>All chemicals, fuels and waste products from the proposals would be stored on site in suitable containers in accordance with regulations and best practice. All chemicals for use in the well would be compliant with the conditions of the Environment Agency's published Waste Management Plan WMP3 and permitted by the Environment Agency for this Proposed Development. Fuels for the on-site generators and rig would be stored in dedicated areas and in bunded tanks, and fuelling would be undertaken by competent staff in areas with appropriate bunding in case of drips or spills. Spill kits would be in place.</p> <p>Waste would be disposed of in appropriately licenced waste facilities. Significant effects are not anticipated</p>
(g) Risks to human health	
What are the risks to human health such as from water contamination or air pollution?	There are no anticipated significant effects. The core well site will be lined using a geomembrane. This will prevent potential groundwater pollution from spillages and the handling of drilling fluids and cuttings. The core well site will be constructed using a central rig drainage system which will be segregated from the remainder of the site to prevent potential contamination of the surrounding surfaces in the event of a spillage. Following the drilling operations, the aggregate and concrete would be fully removed from site before the impermeable liner is removed. Road traffic associated with the Proposed Development would also produce emissions to air during the temporary construction and drilling phases, similar to any construction site. There would be no operational flaring or venting during the proposed activities. The scale of the proposed activities is such that significant effects to air quality are not anticipated. There are no Air Quality Management Areas in the vicinity of the Proposed Development.
Other characteristics	
Potential physical changes (topography, land use, changes in water bodies etc.) from construction, operation or decommissioning of the development?	No significant physical changes are anticipated. The Proposed Development includes a programme of restoration and aftercare to return the core well site to its pre-development use.
2. LOCATION OF THE DEVELOPMENT	
(a) Existing and approved land use	
Are there existing or approved land uses on or around the location which could be affected by the development, e.g. residential, industry, commerce, recreation, public open space, community facilities, agriculture, forestry, tourism, mining or quarrying?	The site (land holding) is adjacent to an area of ancient/semi-natural woodland. Agricultural land, woodland, residences and villages are located in the wider areas surrounding the site. There are no known extant, unimplemented planning permissions on the site or on the surrounding area which could be affected.
Is the development located in a previously undeveloped area where there will be loss of greenfield land?	There would be no permanent loss of greenfield land associated with the development. The Proposed Development is temporary and includes a programme of restoration and aftercare.
(b) Relative abundance, availability, quality and regenerative capacity of natural resources in the area and its underground	
Are there any areas on or around the location which	The site is located within Total Catchment Zone 3 of a groundwater Source Protection Zone. The

SCREENING CRITERIA	PROPOSED DEVELOPMENT
<p>contain important, high quality or scarce resources which could be affected by the development?</p> <ul style="list-style-type: none"> • soil • land • groundwater resources • surface waters • biodiversity • forestry • agriculture • fisheries • tourism • minerals 	<p>nearest surface watercourse, Anston Brook, is located approximately 820 m south of the site. An unnamed field drain is located approximately 470 m north of the site; this drains to a pond located 670 m to the north, adjacent to Brands Farm. There is therefore a very limited risk of any direct effect upon the watercourse having regard to its distance as well as the measures in place to prevent any water leaving the site.</p> <p>The site is adjacent to Dewidales Wood, an ancient / semi-natural woodland to the south of the site, and within a wider landscape of agricultural land and scattered woodland. There would be no direct impact upon the ancient woodland and a buffer zone in accordance with <i>Ancient woodland and veteran trees: protecting them from development</i> (Forestry Commission and Natural England, 2015) will be incorporated into the project design.</p> <p>The surrounding area includes agriculture although the Proposed Development would not affect these activities. The temporary use of the agricultural field for the Proposed Development would have very little impact on the availability of best and most versatile agricultural land in the vicinity.</p>
(c) Absorption capacity of the natural environment	
<p>Are there any areas on or around the location which are protected under international or national or local legislation for their ecological, landscape, cultural or other value, which could be affected by the development?</p>	<p>There are no sites protected for historic or ecological purposes on the site.</p> <p>Lindrick Golf Course SSSI is located approximately 685 m south of the site. The SSSI is designated for its calcareous grassland / lowland wood habitat and invertebrates. Anston Stones Wood SSSI and LNR is located approximately 730 m southwest of the site and is designated for its calcareous grassland / lowland wood habitat.</p> <p>The site is within the Impact Risk Zones (IRZ's) for the SSSI mentioned above (Lindrick Golf Course SSSI and Anston Stones Wood SSSI). In accordance with the Natural England Guidance Document (SSSI Impact Risk Zones User Guidance, March 2016) a review of the project against the 'reasons for concern' for Oil and Gas exploration projects has been undertaken. It is considered that the proposed development parameters as described within this document do not present a risk of significant impacts in relation to the defined 'reasons for concern'.</p> <p>Woodsetts Pond LNR is located 2.2 km to the southeast of the site. The site includes a fishing pond and habitat suitable for reptiles and bats.</p> <p>Dewidales Wood located adjacent to the site (south) is ancient / semi-natural woodland, which is recorded as "known Interest outside protected sites" in the development plan. Lofties plantation is another ancient / semi-natural woodland is located 340 m to the south of the site.</p> <p>There are no known heritage assets on or directly adjacent to the site.</p> <p>The closest listed buildings (all within 1 km of the site) are located within Woodsetts and include Hoades Farmhouse (Grade II) located approximately 510 m to the northeast; Lindrick House (Grade II), approximately 675 m to the South; and Woodsetts House (Grade II), approximately 680 m to the northeast.</p>

SCREENING CRITERIA	PROPOSED DEVELOPMENT
	<p>Within 2 km, there are a total of eight listed buildings (all Grade II status).</p> <p>The Church of St. James, Listed Building I Grade is located approximately 2.3 km to the west. Dinnington Hall, Listed Building II* Grade, is located approximately 2.6 km northwest. Following a site visit, it is not considered likely these features would have intervisibility with the site and therefore there would not be significant impacts on them or their setting.</p> <p>Dead Man's Cave, Anston, a Scheduled Monument, is located approximately 1.5 km to the west. It is situated on the north side of a shallow gorge, lying above Anston Brook and the Brantcliffe-Dinnington railway line and just below the plateau. The cave has produced multi-temporal evidence. Excavations in the 1960s revealed Roman artefacts and also material dating from the later Upper Palaeolithic (radiocarbon dated to c.9850 years ago). The cave's main importance derives from its comparative rarity, considerable age, and its ability to shed light on the Palaeolithic era and use of the landscape. It is not considered given the orientation and existing setting of the Scheduled Monument that the Proposed Development would have significant impacts on this feature.</p> <p>The Proposed Development has been designed with regard for these nearby sensitivities. Ecological receptors would be protected by the pollution prevention measures built into the site, as well as the temporary nature of the Proposed Development. There would be no direct loss of any features which may be used by populations (i.e. Dewidales Wood is not directly impacted and a buffer would be implemented). Whilst it is not currently anticipated, there may be a need for some limited hedgerow removal or vegetation trimming in order to provide a safe site access. This will be managed to avoid impacts on breeding birds. The drilling rig would be up to 60 m high, with the workover rig and cranes being up to 32 m and 35-60 m high respectively. However, these would only be in place for a temporary period and would be screened by the surrounding landform. Therefore, there is not anticipated to be a significant impact on the setting of ecological, landscape or cultural heritage features.</p>
<p>Are there any other areas on or around the location which are important or sensitive for reasons of:</p> <ul style="list-style-type: none"> wetlands; riparian areas; river mouths; coastal zones and the marine environment; mountains and forest areas; nature reserves and parks; Special Protection Areas and Special Areas of Conservation, SSSIs, AONBs and National Parks; areas in which there has already been a failure to meet the environmental quality standards 	<p>See <i>Absorption capacity of the natural environment</i> above.</p> <p>There are a number of further caves in the vicinity of Anston Brook, with potential for further archaeological information, notably 'Fissure cave'. These, although are not 'scheduled', are part of an important and rare past landscape.</p> <p>There is also evidence of past activity and land use in close proximity to the site including a well that is marked in the vicinity of the site on the historic mapping (1851) as well as quarrying and a limekiln on Lindrick Common to the south (land now occupied by the Lindrick Golf Course) and a small quarry (borrow pit) approximately 100 m east of Rackford farm.</p> <p>No sensitive features have been identified within the footprint of the Project. Site design will be undertaken to avoid or minimise any impacts to features of archaeological or cultural significance in the wider area.</p>

SCREENING CRITERIA	PROPOSED DEVELOPMENT
<p>laid down in Union legislation and relevant to the project, or in which it is considered that there is such a failure;</p> <ul style="list-style-type: none"> • densely populated areas; • landscapes and sites of historical, cultural or archaeological significance. 	
<p>Are there any areas on or around the location which are used by protected, important or sensitive species of fauna or flora e.g. for breeding, nesting, foraging, resting, overwintering, migration, which could be affected?</p>	<p>Any direct disturbance caused by the Proposed Development (site establishment and decommissioning) would be temporary and would be within land currently in arable agricultural use. This habitat is of low ecological value although there is potential for ground nesting birds. All site clearance works will follow standard construction industry approaches to mitigating and managing potential impacts to breeding birds. Firstly, where possible, site clearance (or advanced habitat management) will be undertaken outside the breeding bird season. If this is not possible, a suitably qualified ecologist will assess the site before any works take place to confirm the presence or absence of nests.</p> <p>The site is currently in arable use and any features of biodiversity interest are likely to be located at field edges or within Dewidales Wood to the south and west of the site; the detailed design of the site layout will seek to minimise light spill into the woodland. There would be no direct impact upon the ancient woodland and a 30 m buffer zone in accordance with <i>Ancient woodland and veteran trees: protecting them from development</i> (Forestry Commission and Natural England, 2015) and protected species disturbance distances will be incorporated into the project design. There would be no direct impact on the hedgerows and boundary habitats connected to the ancient woodland as the access track will be offset from the field boundary to avoid the existing bridleway. Whilst not anticipated, limited hedgerow removal or trimming may be required to provide a suitable safe design for the site access.</p> <p>An Environmental Report containing an ecological assessment will be submitted with the planning application.</p>
<p>Are there any inland, coastal, marine or underground waters on or around the location which could be affected?</p>	<p>The site is located within Total Catchment Zone 3 of a groundwater Source Protection Zone. The nearest surface watercourse, Anston Brook, is located approximately 820 m south of the site. An unnamed field drain is located approximately 470 m north of the site; this drains to a pond located 670 m to the north, adjacent to Brands Farm.</p> <p>Pollution prevention measures in place on the site, and the retention of all water within the site (and its removal from the site for treatment prior to disposal) would ensure there would be no impact on surface water resources.</p>
<p>Are there any groundwater source protection zones or areas that contribute to the recharge of groundwater resources?</p>	<p>The site is located within the Total Catchment, Zone 3, of a groundwater Source Protection Zone. As above, measures put in place to ensure there is no release of water from the site will ensure there would be no impact on groundwater resources.</p>

SCREENING CRITERIA	PROPOSED DEVELOPMENT
Are there any areas or features of high landscape or scenic value on or around the location which could be affected?	Temporary effects on views from Grade II listed buildings (Hoades Farmhouse and Woodsetts House) are anticipated during the proposed development. The drilling rig could be up to 60 m high and the workover rig and cranes would be up to 32 m and 35-60 m respectively. However this would only be in place for short temporary periods and would be screened by woodland to the south and by bunds (and cabins during drilling) at the site boundary. An Environmental Report including a landscape and visual appraisal will be completed as part of the planning application.
Are there any routes or facilities on or around the location which are used by the public for access to recreation or other facilities, which could be affected?	<p>Woodsetts Bridleway 4 lies immediately to the south of the site and forms its southern boundary. Woodsetts BW4 runs in an east – west direction joining Anston Bridleway 23 (approximately 250 m west of the site) with Woodsetts Bridleway 3 (approximately 300 m to the east of the site). Woodsetts Bridleway 3 runs in a north – south direction and connects Dinnington Road to Woodsetts BW4 and Woodsetts Footpath 4. The existing agricultural site entrance from Dinnington Road (which would be used by the Proposed Development) is offset to the west of Woodsetts BW3. The proposed access track to the site will be offset from the Public Right of Way network so as to avoid direct impacts. Impacts on the users of these Public Right of Ways (PROW) (i.e. their amenity) would be reduced by the bunds at the site boundary and managed through standard procedures.</p> <p>The nearest adopted road to the site is Dinnington Road which, along with Woodsetts Road, will be used to access the site from the A57. Vehicle movements to and from the site will include deliveries of water, cement, drilling materials and other supplies to the site, and removal of fluids generated and waste for disposal. These transport movements would be made during the working day with all but essential deliveries being made during daylight hours. Only in exceptional circumstances which were operation or health and safety led, would deliveries be made at night.</p> <p>A Traffic Management Plan (TMP) will be prepared that will route vehicles along the most appropriate local roads so as to avoid more sensitive receptors wherever possible. Staff would be transported to site by a minibus to minimise private car use to site. During construction (Stage 1) for approximately half of the stage there would be fewer than 10 HGV (vehicles >7.5 tonnes) movements per day, equating to 5 HGVs entering and leaving the site. On up to 45 days there would be more than 10 HGV movements, including a short period of time (approximately 3 weeks) with between 50 and 60 HGV movements per day (5 per hour over a 12 hour day) when aggregate is brought to surface the core well site. During drilling, coring and PTT (Stage 2), or if a workover is required, again there would be fewer than 10 daily HGV movements for approximately half of the period, with only 2 – 3 days of between 50 and 60 HGV movements daily (5 per hour over a 12 hour day) to allow for mobilisation and demobilisation of drilling and testing equipment or the workover rig. This would include up to 50 movements of vehicles >44 tonnes (abnormal loads) as rigs are mobilised and demobilised. There would be no more than 6 of these movements daily. Stages 3 to 5 would have fewer associated traffic movements.</p>
Are there any transport routes on or around the location which are susceptible to congestion or which cause environmental problems, which could be affected?	As above. The low levels of traffic generated on a daily basis, short term nature of the most intensive activities and existence of a TMP, which is likely to include measures such as escort vehicles and traffic management personnel to facilitate the unimpeded movement of vehicles to site, would reduce the risk to nearby routes. To reduce impacts on wildlife the access tracks either use existing access points or are proposed within low value existing agricultural land.

SCREENING CRITERIA	PROPOSED DEVELOPMENT
Is the development in a location where it is likely to be highly visible to many people?	Significant effects on views are not anticipated. The drilling rig would be the most visible element during the Proposed Development at up to 60 m high. However this, like the smaller workover rig (32 m) and crane (35-60 m), would only be in place for a temporary period. The bunds around the site will limit views of the site. An Environmental Report including a landscape and visual appraisal will be completed as part of the planning application.
Are there any areas or features of historic or cultural importance on or around the location which could be affected?	There are no known heritage assets on or directly adjacent to the site. The closest listed buildings are located within Woodsetts (including the Grade II listed Hoades Farmhouse, Woodsetts House and Lindrick House). The nearest Scheduled Monument Dead Man's Cave, Anston, located 1.5 km to the west. Temporary effects on the views from Hoades Farmhouse and Woodsetts House are expected from the presence of the drilling rig (up to 60 m high) which is expected to be on-site for a period of approximately three months. There are not expected to be significant effects on the setting of the rest of these features. An Environmental Report including a cultural heritage and landscape and visual appraisal will be completed as part of the planning application.
Are there any areas on or around the location which are densely populated or built up, which could be affected?	The site is not located within an urban or densely populated area. The village of Woodsetts is located approximately 425 m to the northeast of the site at its closest point. Site traffic would access the site from the A57, through Woodsetts using Woodsetts Road and Dinnington Road. As detailed above, a TMP will be prepared that will route vehicles along the most appropriate local roads so as to avoid more sensitive receptors wherever possible and to control the timing of vehicle movements.
Are there any areas on or around the location which are already subject to pollution or environmental damage e.g. where existing legal environmental standards are exceeded, which could be affected?	There are no Air Quality Management Areas on or adjacent to the site or proposed access route from the M1.
Is the location of the development susceptible to earthquakes, subsidence, landslides, erosion, flooding or extreme or adverse climatic conditions e.g. temperature inversions, fogs, severe winds, which could cause the development to present environmental problems?	According to the Environment Agency website, the site does not lie within the Flood plain (i.e. land within Flood Zone 1). Appropriate consideration of flooding and drainage will be completed as part of the planning application. The site is not considered susceptible to any other hazards.
3. TYPE AND CHARACTERISTICS OF THE POTENTIAL IMPACT	
(a) Magnitude and spatial extent of the impact	
Will the effect extend over a large area?	No. This is confined to the core well site area (approximately 1.2 ha), access track (approximately 0.6 ha) and the land immediately adjoining.
Will many people be affected?	No. The nearest residential properties, which are part of the village of Woodsetts, are approximately 425 m from the site, although the access track and existing local road network to be used by the Proposed Development would be within 30 m of these properties.
(b) Nature of the impact	

SCREENING CRITERIA	PROPOSED DEVELOPMENT
What will be the nature of the impact?	Short term visual impact to the local area; an access road in close proximity to PRoW Woodsetts BW3, increase in HGV traffic movements on the local road network; the introduction of new noise sources to the area, particularly during stages 1 and 2.
(c) Transboundary nature of the impact	
Will there be any potential for transboundary impact? (n.b. Development which has a significant effect on the environment in another State is likely to be very rare. It is for the Secretary of State to check Environmental Statements to decide whether there is likely to be such an effect in each case).	No.
(d) Intensity and complexity of the impact	
Will there be a large change in environmental conditions?	No.
Will the effect be unusual in the area or particularly complex?	No.
Will many receptors other than people (fauna and flora, businesses, facilities) be affected?	This is considered to be unlikely as the site is relatively isolated and is currently in arable use. An Environmental Report containing assessments of potential impacts on noise, traffic and transport, ecology, landscape and visual, flooding and archaeology and cultural heritage will be submitted with the planning application.
Will valuable or scarce features or resources be affected?	No.
Is there a risk that environmental standards will be breached?	The proposals would be managed in accordance with the Borehole Sites & Regulations 1995, the Management of Health & Safety at Work Regulations 1992, the Construction (Design & Management) Regulations 2007, the Offshore Installations & Wells (Design & Construction etc.) Regulations 1996 and other relevant legislation. Environment Agency guidance on onshore oil and gas development (August 2016) will also be followed in relation to environmental permitting. The proposed core well will be undertaken in accordance with Standard Rules (SR 2015 No 1) for management of extractive waste, not including a waste facility, generated from onshore oil and gas prospecting activities including drilling, coring, PTT, acid wash and decommissioning for the production of oil or gas (using oil and water based drilling mud).
Is there a risk that protected sites, areas, and features will be affected?	This is considered to be unlikely and any impacts (for example, on species present within the nearby SSSI and LNR) would be controlled by measures built into the Proposed Development in relation to noise, emissions and disturbance. An Environmental Report containing assessments of potential impacts on noise, traffic and transport, ecology, landscape and visual, flooding, and archaeology and cultural heritage will be submitted with the planning application.
(e) Probability of the impact	
Is there a high probability of the effect occurring?	The effects of the Proposed Development can be clearly established and the probability of any effects determined with reasonable confidence. In addition, there are established and embedded mitigation and management techniques which will be used during the core well activities to reduce the probability of effects occurring. As with all development, It is likely that some environmental

SCREENING CRITERIA	PROPOSED DEVELOPMENT
	effects will occur, although the nature, duration and scale will be limited as described herein.
Is there a low probability of a potentially highly significant effect?	As above.
(f) Expected onset, duration, frequency and reversibility of the impact	
What will result in the onset of the impact?	Development will commence following the discharge of pre-commencement conditions attached to the planning permission and the issue of an environmental permit for a mining waste operation by the Environment Agency.
Will the effect continue for a long time?	Consent for the Proposed Development is sought for five years. However construction (Stage 1) would last a maximum of three months and drilling, coring and PTT (Stage 2) works, with the greatest potential environmental impact, would last a maximum of five months, with drilling itself lasting approximately three months). For the majority of the five year term, the well would be suspended (Stage 3) with only maintenance checks carried out.
Will the effect be permanent rather than temporary?	Both construction and drilling operations would be temporary. The extent of the planning application would be for five years with restoration of the site to its current use at the end of this period.
Will the impact be continuous rather than intermittent?	Intermittent. Construction and drilling, coring and PTT activities would be undertaken for two periods of up to three and five months respectively. It is intended that drilling will follow shortly after site construction; however this depends on rig availability. There could also be intermittent periods where a workover rig is required on site (e.g. for maintenance or during site abandonment). These would be for up to one month.
If intermittent, will it be frequent rather than rare?	Rare.
Will the impact be irreversible?	No.
Will it be difficult to avoid or reduce or repair or compensate for the effect?	No.
(g) Cumulation of the impact with the impact of other existing and/or approved development	
Will there be a cumulative impact arising from other existing and/or approved development?	No. There are no significant impacts expected to arise from either an existing or an approved development. INEOS has submitted an application to seek planning consent for a similar vertical core well site on land adjacent to Common Road, Harthill, Rotherham within PEDL 304. The proposed well site lies approximately 4.8 km to the southwest (approximately 8.4 km by road). Owing to the distance between the two sites, in theory, it is possible that the drilling rigs could be visible to some receptors at both sites at the same time. It is currently not expected that both sites would have drilling rigs on site simultaneously although some stages of the proposed development at each site could occur simultaneously. It is unlikely that the lower level plant and machinery of each site would be visible owing to topography and screening. The same local road network would not be impacted by vehicles accessing the two different sites. EIA Screening for future sites would be required to take the same considerations into account, having regard for the future baseline in the area.
(h) Possibility of effectively reducing the impact	
What is the possibility of the likely impacts arising from the Proposed Development being effectively	Mitigation measures which have been embedded within the design of the proposed development to effectively reduce or remove potential impacts from the development are set out in Appendix 3.

SCREENING CRITERIA	PROPOSED DEVELOPMENT
reduced?	

4 Conclusion

This screening assessment has considered whether the Proposed Development is likely to give rise to significant effects on the environment.

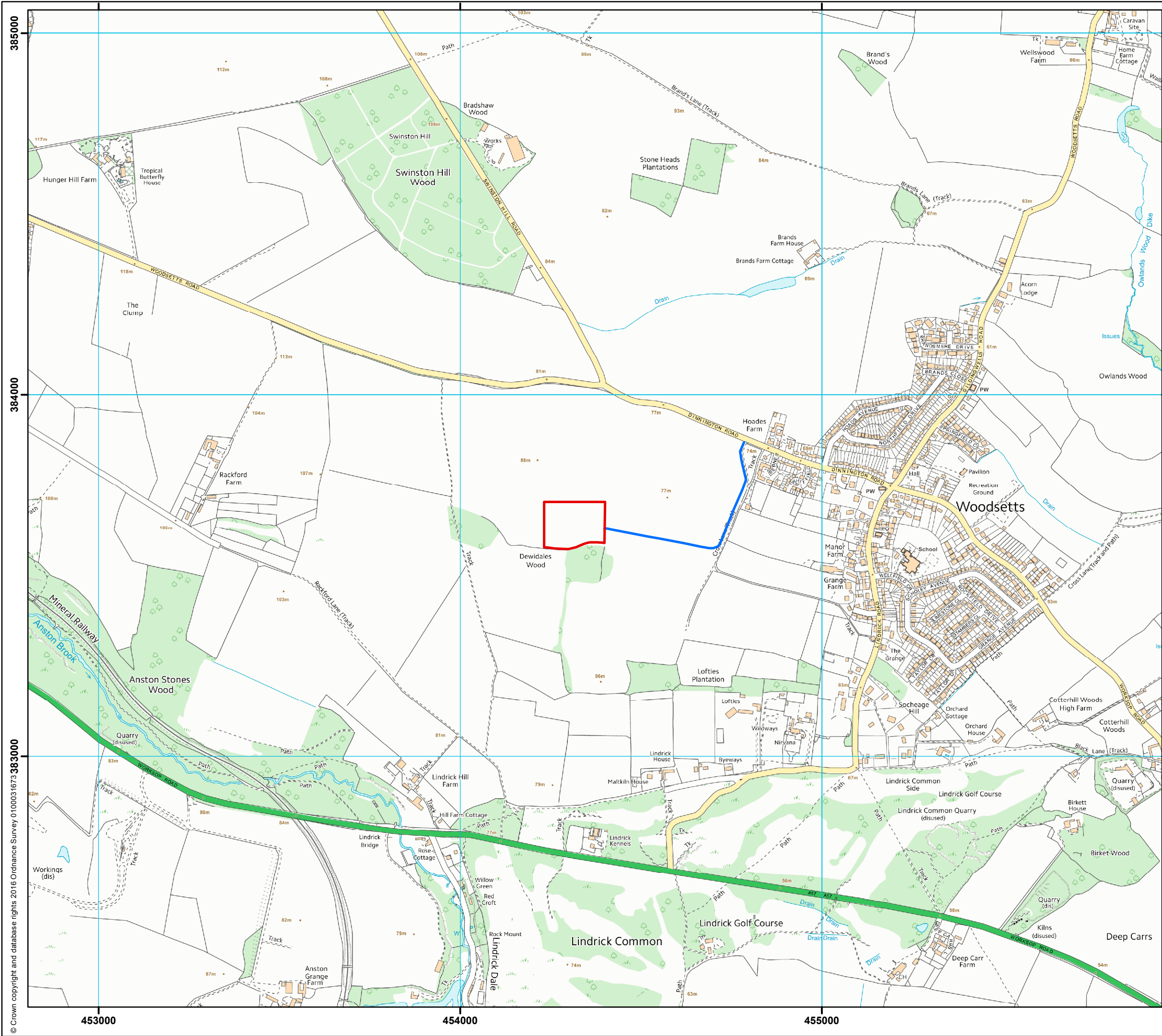
The Proposed Development falls under Schedule 2 of the EIA Regulations as its area exceeds the legislative area thresholds. However, it does not exceed indicative thresholds and criteria within the PPG and is not located in a sensitive area as defined by the EIA Regulations.

Table 2 sets out the baseline environmental conditions in the area on and adjacent to the Proposed Development. The potential exists for effects on ground and surface water, air quality, views and noise. However the site is located in an agricultural area with few adjacent sensitive receptors and therefore the potential for significant effects is considered to be unlikely. Standard proven mitigation measures will be employed as used on other similar types of development as set out in Appendix 3.

Accordingly, the screening assessment has identified that significant effects on the environment are not considered likely either alone or in combination with other development and therefore the Proposed Development should not be considered to constitute EIA development as defined by the EIA Regulations.

As outlined in this report, the future planning application would include an Environmental Report addressing the aspects of traffic, flooding, ecology, noise, landscape and visual effects, and cultural heritage. Given the scale of the Proposed Development this is considered appropriate to allow the RPA to consider the material matters pertaining to the future application.

Appendix 1
Site Location Plan



Site Location



Indicative Access Route



0 100 200 300 400 Meters

INEOS Shale

INEOS Shale
38 Hans Crescent, Knightsbridge
London, SW1X 0LZ
www.ineosshale.com

Project: PEDL 304/21 - East Midlands

Title: Site Location Plan
Land at the South of
Dinington Road, Woodsetts

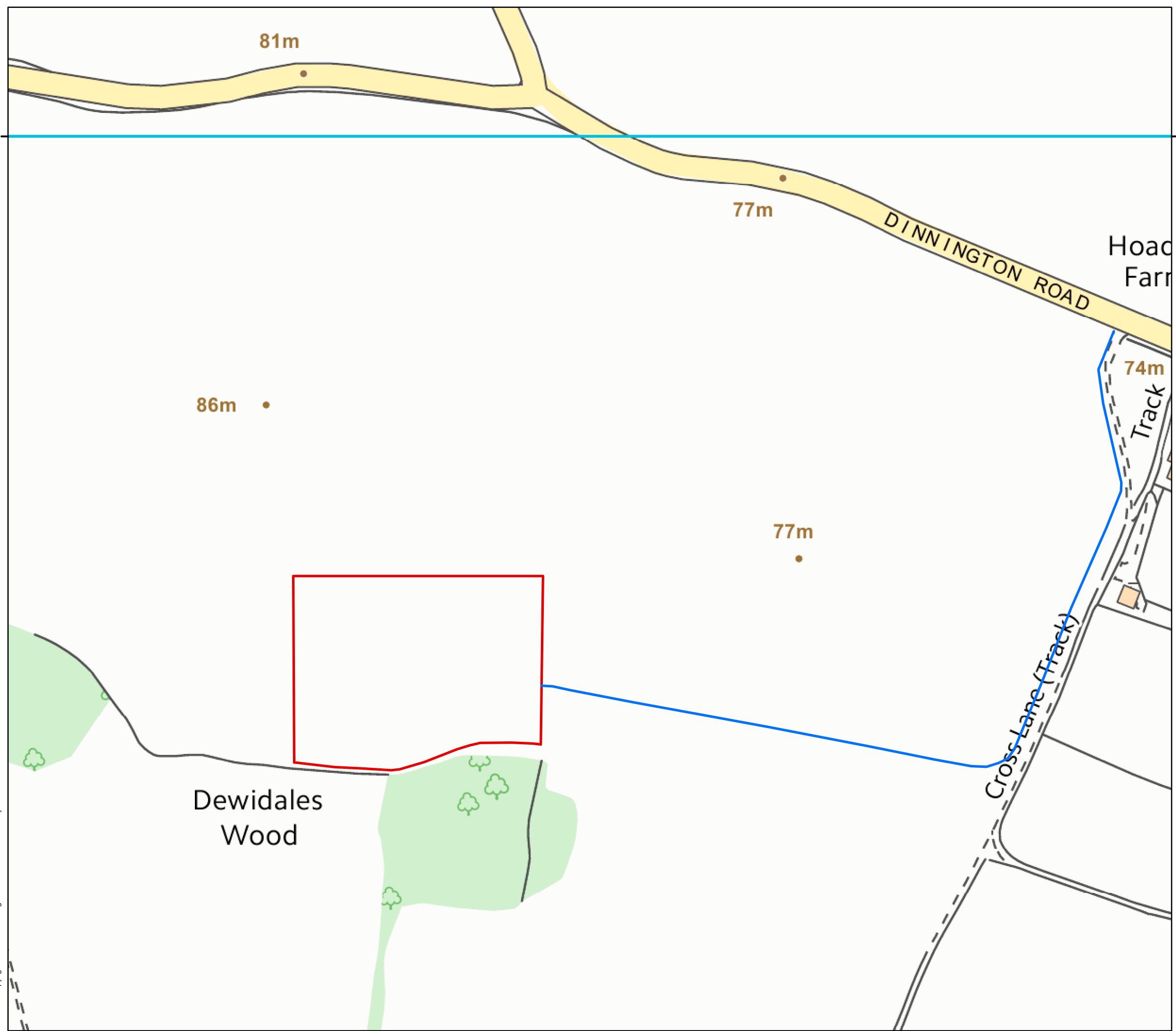
Date: 20/07/2017 Scale: 1:10,000 @A3 CRS: BNG



Drawn By: JB Checked By: LC Rev:


Plan No: P304-061

384000


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-  Indicative Access Route
-  Site Location



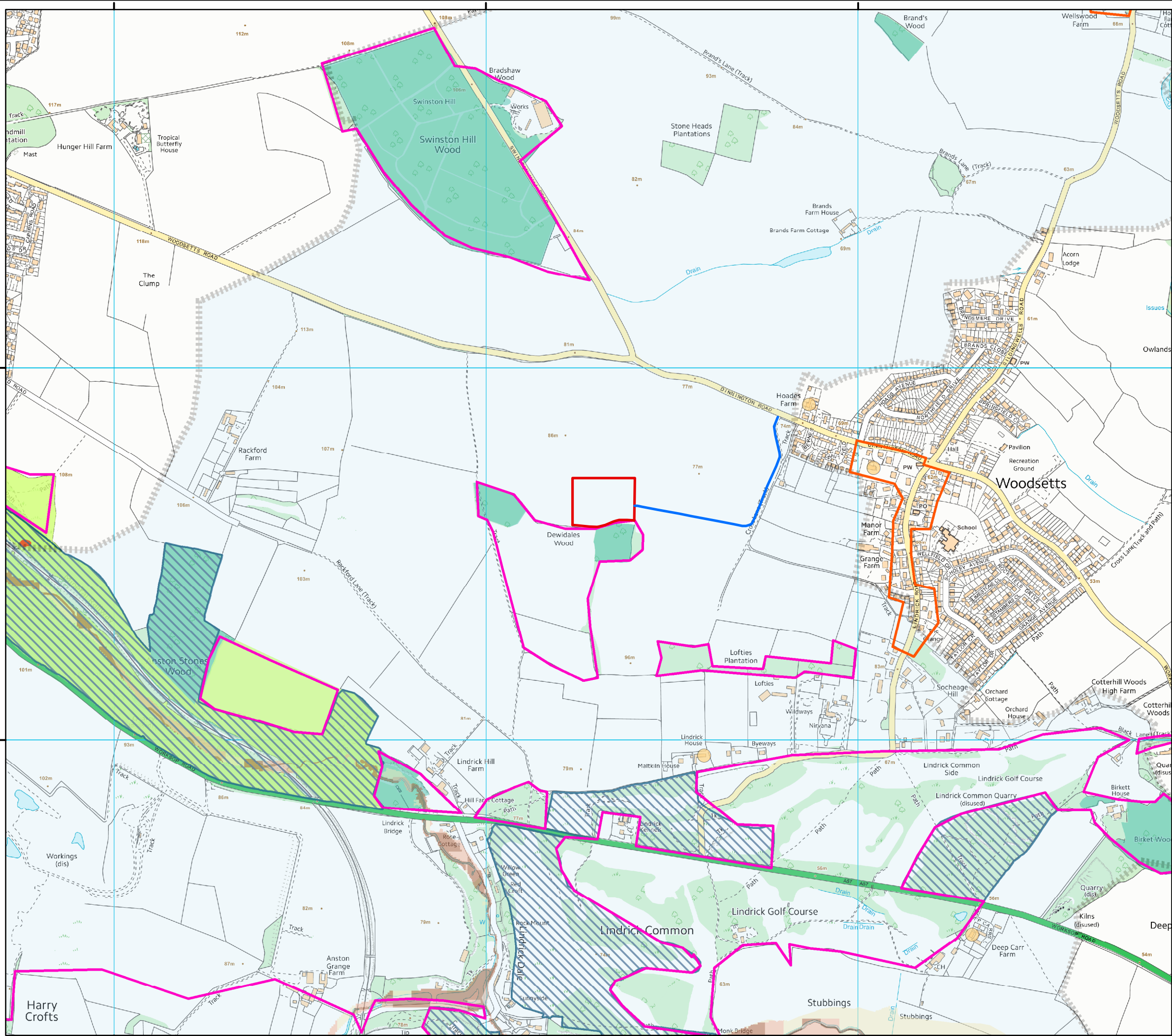
0 25 50 75 100 Metres



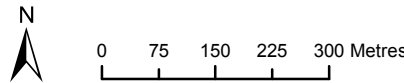
INEOS Shale
38 Hans Crescent, Knightsbridge
London, SW1X 0LZ
www.ineosshale.com

	Project:	PEDL 304/21 - East Midlands		
	Title:	Site Location Plan Land at the South of Dinnington Road, Woodsetts		
	Date: 20/07/2017	Scale: 1:2,500 @A3	CRS: BNG	
	Drawn By: JB	Checked By: LC	Rev:	
	Plan No:	P304-062		

Appendix 2
Designation Plan

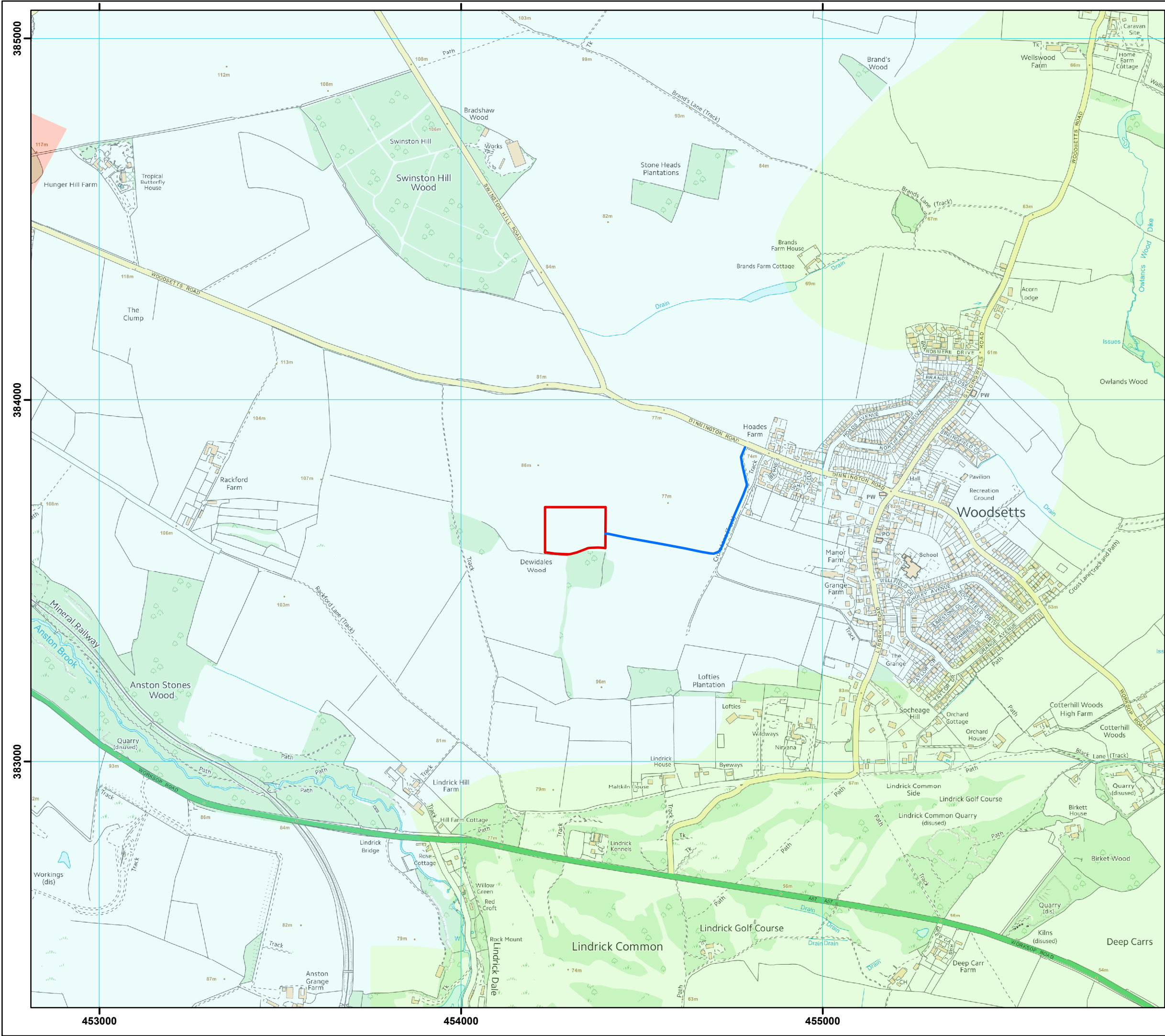


- Indicative Access Route
- Site Location
- Listed Buildings I Grade
- Listed Buildings II* Grade
- Listed Buildings II Grade
- Designated Conservation Area
- Known Interests Outside Protected Sites
- Area of High Landscape Value
- National Nature Reserves
- Sites of Special Scientific Interest
- Special Areas of Conservation
- Special Protection Areas
- Source Protection Zone
- Zone I - Inner Protection Zone
- Zone II - Outer Protection Zone
- Zone of Special Interest
- Risk of Flooding from Rivers and Sea
- High
- Medium
- Low
- Scheduled Monuments
- Country Parks
- Air Quality Management Areas
- Local Nature Reserves
- National Parks
- Ramsar
- Ancient Woodland

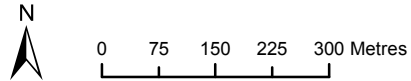


INEOS Shale
INEOS Shale
38 Hans Crescent, Knightsbridge
London, SW1X 0LZ
www.ineosshale.com

Project:	PEDL 304/21 - East Midlands		
Title:	Designation Plan 1 Land at the South of Dinington Road, Woodsetts		
Date: 20/07/2017	Scale: 1:10,000 @A3	CRS: BNG	
Drawn By: JB	Checked By: LC	Rev:	
Plan No:	P304-063		



- Indicative Access Route
- Site Location
- Agricultural Land Classification
 - Grade 1
 - Grade 2
 - Grade 3
 - Grade 4
 - Grade 5
 - Non Agricultural
 - Urban



INEOS Shale
INEOS Shale
38 Hans Crescent, Knightsbridge
London, SW1X 0LZ
www.ineosshale.com

Project: PEDL 304/21 - East Midlands

Title: Designation Plan 2
Land at the South of
Dinwington Road, Woodsetts

Date: 20/07/2017 Scale: 1:10,000 @A3 CRS: BNG

Drawn By: JB Checked By: LC Rev:

Plan No: P304-064

Appendix 3
Summary of Mitigation Measures

Introduction

The Screening Report refers to a number of mitigation measures which the applicant will adopt to reduce or avoid impacts to the surrounding environment from the Proposed Development. These range from physical barriers to working practices and controls which are embedded within the development proposals. These draw upon industry experiences and best practice. This embedded mitigation provides controls over well pad set up, drilling practices, monitoring and decommissioning and is an inherent part of the project proposal. This appendix summarises the key embedded mitigation.

Noise

The following embedded noise mitigation has been incorporated into the proposal:

- Positioning and rotating the rig to help mitigate drilling noise;
- Use of silencers or other noise attenuation equipment or enclosures on mud pumps and other noise generating equipment associated with drilling;
- Night-time vehicle movements would not be permitted except in case of emergency, and audible vehicle reversing alarms would not be used at night; and
- Regular maintenance would be undertaken to minimise noise generation.

The use of bunds and stacked cabins will also offer potential acoustic benefits.

Transport

A Traffic Management Plan will be prepared and agreed for the Proposed Development. This will include details of specific route management requirements, driver behaviour requirements and management measures and parking strategies for the site.

Ecology

Standard pre-construction surveys will be undertaken to confirm that there have been no changes to habitats or species identified and to allow any necessary mitigation measures, at that time, to be implemented. Based on the current understanding of the site and proposed development the following standard operating measures are also anticipated to be relevant:

<i>Item</i>	<i>Rationale</i>	<i>Mitigation</i>
Badger walkover.	To avoid potential disturbance of this species, during drilling activity and/or construction of access track.	Complete walkover immediately prior to commencement of site works. Surveys can be undertaken any time of the year. Implement a buffer zone away from the woodland. During site works cover up any excavated holes/trenches overnight to prevent badgers (and other mammals) becoming trapped.

<i>Item</i>	<i>Rationale</i>	<i>Mitigation</i>
Commuting, foraging and roosting bats.	To minimise disturbance of a European protected species.	Implement a buffer zone to keep construction works away from the woodland and hedgerows. Lighting design will follow BCT Guidance ⁷ and be directional and avoid illuminating the woodland and hedgerows.
Nesting bird check survey.	If nesting birds are present then any nest identified should be protected until the young have fledged.	Construction/site clearance works that effect nesting habitat should be carried out during winter to avoid the bird breeding season (March-August). If this is not possible then a survey to check for nesting birds (ground, tree and hedgerows) will be conducted immediately prior to works to confirm absence of nest or additional mitigation to avoid impact on breeding birds.

Landscape and Visual

The proposed mitigation embedded in the design of the Proposed Development include:

- maintaining a separation distance between the core well site and the nearest residential properties
- the presence of existing vegetation which will help to screen views.
- the avoidance of any notable landscape features.
- during Stages 1 to 5, the creation and maintenance of bunds from stripped topsoil and subsoil will further reduce the visibility of low-level ground works, equipment and other elements of the proposal.
- during the decommissioning and restoration stage of the proposal, the site will be restored to its original agricultural use and no permanent above-ground features will remain once the proposal is complete.

Surface Water and Flooding

The following provides a summary of embedded mitigation measures, relevant to the protection of surface water, which are either incorporated into the design or are standard construction or operational practices. These mitigation measures are designed to avoid or prevent potential impacts from occurring by controlling potential sources and pathways to water receptors. The proposal will also adhere to:

- Environment Agency Onshore Oil & Gas Sector Guidance;
- Guidance for Pollution Prevention (GPPs) for good practice, and;
- HSE Borehole Sites and Operations Regulations 1996.

During the proposed development, an INEOS HSE representative will monitor that operations proceed in accordance with these mitigation and management measures, for instance the site and surrounding area would be checked on a daily basis for visual signs of pollution (e.g. fuel oil, leakage from perimeter, noticeable silting).

⁷ Bat Conservation Trust. Bats and Lighting in the UK. Bats and the Built Environment Series.

Site Development and Establishment (Stage 1)

The measures set out in the table below would be required of any contractors undertaking construction work in relation to the proposal. In addition, the conductor / surface rig used at the end of Stage 1 would be subject to the mitigation measures to be implemented for the drilling and coring activities in Stage 2.

Stage 1 Surface Water Environmental Protection Measures

Aim	Measures built into Proposal
Prevent pollution of soil, groundwater or surface water from leaks from construction vehicles or on-site tanks	A triple-layered geotextile/ HDPE membrane would be laid between the site surface and soil by a qualified groundwork contractor under a Construction Quality Assurance Plan to make an impermeable site surface.
	All fuels, oils, lubricants and other chemicals would be stored in double-skinned tanks (or a bunded, impermeable area) to provide appropriate secondary containment and in accordance with recommended guidance and regulation (e.g. Control of Substances Hazardous to Health Regulations 2002 (COSHH) and Guidance for Pollution Prevention ⁸).
	All vehicles would be maintained regularly and would be subject to daily inspection at the start of the working day by plant operatives.
	Any equipment maintenance would take place in a designated area within the construction compound where reasonably practicable.
	Fuel and oil deliveries and any refuelling on-site would only be undertaken in appropriate impermeable areas, by competent persons. Double-skinned fuel tanks (or a bunded, impermeable area) would be used for refuelling trucks and pumps as well as fuel storage.
	Standing machinery and refuelling points would have drip trays placed underneath to prevent oil and fuel leaks causing pollution.
	Spill kits would be present on-site, and staff trained in spill response via contingency plans.
	On-site welfare facilities would be adequately designed and maintained, and all sanitary waste water and sewage would be removed from site by licensed waste contractors.
Prevent pollution of soil, groundwater or surface water from runoff from site surface	No water would be discharged from the site to the surrounding environment once the drainage system was in place. All water would be removed from site by a licensed waste contractor.
	Works would be undertaken in suitable weather conditions to prevent silting of watercourses (especially avoiding periods of high rainfall).
	Runoff from access tracks would be to the surrounding road / field drainage. Aggregate used on these would ensure sediment laden runoff was not produced.
Prevent pollution from other construction activities	Concrete mixing for the rig pad would be undertaken by a mixer unit, with the components of the concrete enclosed in the unit prior to and during mixing. The mixer would be used on the lined site only.
	Shutters would be used when concrete is poured, and no concrete would be used where there is standing water.
	Pumps would be used to keep excavations dry if needed.
	Method statements would be produced for all activities that could pose a risk to the water environment and would clearly state what mitigation measures and monitoring requirements should be in place prior to and while the activity is underway.
	Drilling of groundwater monitoring boreholes would comply with good practice for drilling water wells, as described in the Environment Agency's Guidance on the design and installation of groundwater quality monitoring points (Science Report SC020093).

⁸ <https://www.gov.uk/guidance/storing-oil-at-a-home-or-business>

<i>Aim</i>	<i>Measures built into Proposal</i>
Prevention of pollution of soil, groundwater or surface water from installing conductor and monitoring boreholes	Borehole design and operation (for example, fluids to be used) would be approved by Environment Agency (via Environmental Permit), Oil and Gas Authority, HSE, Coal Authority and an accredited Independent Well Examiner prior to drilling.
	Only air and water based fluids would be used as drilling fluids to install the conductor/ surface casing and monitoring boreholes. All fluids proposed would be approved by the Environment Agency.
	Drilling would not take place within source protection zones (SPZ) 1 or 2, as defined in the Environment Agency's Groundwater protection: principles and practice (pp. 23-24).
	Once installed the cellar and conductor/ surface casing would be checked to ensure there are no leaks to the environment.
	Drilling of groundwater monitoring boreholes would comply with good practice for drilling water wells, as described in the Environment Agency's Guidance on the design and installation of groundwater quality monitoring points (Science Report SC020093).
Prevent pollution of watercourses through engineering works	The Environment Agency permits engineering works in the water environment where required, through Flood Risk Activity permits. The site is located over 800 m from the nearest watercourse, and good practice to prevent silting and dust would prevent harm to the watercourse as a result of engineering works. A Flood Risk Activity permit is not required at this site.
Monitoring	The site will be subject to an Environmental Monitoring Plan to be agreed with the Environment Agency. The area around the site (soils, field drains etc.) would be checked daily for visual signs of pollution (e.g. fuel oil, noticeable silting).
	An Environmental Clerk of Works would be present during Stage 1 to oversee the enabling works and construction and ensure operations proceed in accordance with management plans and planning conditions.
	Mitigation measures put in place (e.g. impermeable membrane, drainage system etc.), would be inspected regularly and suitably maintained to ensure they remain fully operational and effective. Where failures or shortfalls within mitigation measures were noted, these would be recorded, action identified and undertaken within a suitable timeframe.

Drilling, Coring and Suspension (Stage 2)

A number of environmental protection measures present for Stage 2 will have been established during Stage 1. In addition, the following environmental design and management measures relevant to the protection of surface water will be incorporated during Stage 2. These will also be relevant and adopted for any other stage requiring rig activity on site (i.e. Stage 3a, Stage 4 and Stage 5).

Stage 2 Surface Water Environmental Protection Measures

<i>Aim</i>	<i>Measures built into Proposal</i>
Preventing pollution of soil, groundwater or surface water from leaks from construction vehicles or on-site tanks	The geomembrane and "closed loop" drainage system would be maintained to ensure all liquids remained on the site for removal by a licensed waste contractor, and treatment prior to disposal if required.
	Frequent checking of integrity of site surface and drainage system.
	Cement mixing for well cement would take place in truck-mounted silos on the concrete hardstanding area.
	Rigs would be refuelled from dedicated tanks, which would be filled directly from fuel tankers that deliver to the site. This would be undertaken in the hardstanding area to ensure any spillage would drain to the impermeable cellar rather than the perimeter drainage pipe.

<i>Aim</i>	<i>Measures built into Proposal</i>
	Drilling fluids (muds) would be stored in a mud tank with a closed-loop system to prevent leakage.
	Water for the drilling process would be contained within a closed-loop system with any potential excess water from the drilling process being transported off site in suitable tankers by a licensed contractor.
INEOS Safety Health and Environment (SHE) representative will ensure operations proceed in accordance with management plans and planning conditions	The area surrounding the site would be checked daily for visual signs of pollution (e.g. fuel oil, leakage from perimeter, noticeable silting) in accordance with the Environmental Monitoring Plan to be agreed with the Environment Agency.

Maintenance of the Site (Stage 3)

During Stage 3 the impermeable site membrane and perimeter drainage system would be retained and frequently checked, to ensure their integrity.

A routine monitoring plan would be agreed with the Environment Agency as part of the Environmental Permit.

Decommissioning and Restoration (Stage 5)

Operations during Stage 5 would be similar to the construction operations at Stage 1 and the same protective measures would apply for appropriate activities. In addition, the protective measures in the table below would be followed.

Stage 5 Surface Water Environmental Protection Measures

<i>Aim</i>	<i>Measures built into Proposal</i>
Minimising soil damage during ground restoration works	The methods in the restoration and aftercare plan would be followed to prevent soil damage.
	Once the site surface membrane was removed, care would be taken to avoid pollution of soil, groundwater or surface water from fuel leaks or routine activities during ground restoration (as outlined for Stage 1 prior to laying the membrane).
	Aggregate and concrete (pad and cellar) would be fully removed from site before the impermeable liner was removed so any residual contamination would not be washed into soil.
Avoid pollution of aquifer during decommissioning	Measures would be taken when decommissioning the vertical core well to ensure there would be no inputs of pollutants to groundwater and that there was no subsequent leakage of groundwater, including any gas or other contaminants that this may contain, into the well or to other geological horizons.
Prevention of leaks of gas or suspension fluid from vertical core well once abandoned	The well has been designed in accordance with the Borehole Regulations reviewed by the HSE and by an independent third party well examiner to ensure wellbore integrity. During drilling each layer of casing will be tested as appropriate to the geological conditions and technical requirements, to confirm integrity.
	At decommissioning, two permanent barriers would be set within the wellbore to seal the well. These would be pressure tested and tagged to ensure integrity.

Aim	Measures built into Proposal
	Suspension/ decommissioning fluid would be brine.

Hydrogeology

The embedded mitigation measures relevant to hydrogeology include:

- Prevention of groundwater pollution from spillages and the handling/management of drilling fluids and cuttings.
- Prevention of the escape of drilling fluids, gas and formation fluids into groundwater by good well design.

The mitigation measures are design to avoid or prevent potential impacts from occurring by controlling the potential source of release of contaminants and prevent any released from reaching a pathway to a receptor.

Key elements include staged steel casing to seal off aquifer sections and flow paths that may be encountered. The well plans will include:

- Conductor casing, driven or fixed in place, to provide a stable surface platform from which to drill subsequent sections of the well-bore and to isolate the rest of the well from any shallow groundwater, unstable sands or gravels, or any abandoned coal mine workings. The surface conductor will be securely cemented into place with a full column of cement to surface, to provide a barrier to migration for all currently designated aquifer formations and the suspected coal mining depth zones.
- Surface casing, drilled with a non-hazardous water based drilling fluid, to seal off and isolate any coal workings that may be encountered. The surface casing may include a stage collar above the loss zone to ensure good quality cement above and below the loss zone to isolate it and to seal any underground flow paths.
- Intermediate casing, a second deeper section cased inside the primary (surface) casing, drilled with a non-hazardous water based drilling fluid and cemented to surface to seal any underground flow paths (further coal measures horizons) prior to encountering the formations of interest. Thus the upper potable groundwater units and mine zones will have double cased sealing to protect them.
- Reservoir casing set in the target zone of interest to provide a third sealing structure. The well would then be drilled to a total depth (approximately 2,800 m) and a liner installed. A Low Toxicity Invert Emulsion Oil Based Mud will be used to drill this section (Note: during detailed design, high performance highly inhibitive water based drilling fluids will be evaluated and may be used if suitable). Final depths will be confirmed during detailed well design but will adopt the principles above and be subject to third party review.

The following provides a summary of embedded mitigation measures, relevant to the protection of hydrogeology, which have either been incorporated into the design or are standard construction or operational practices. The proposal will also adhere to:

- UKOOG UK Onshore Shale Gas Well Guidelines for Well Design and Construction;
- Oil and Gas UK Well Life Cycle Integrity Guidelines.

- Oil and Gas UK Guidelines for Abandonment of Wells.
- Environment Agency Onshore Oil & Gas Sector Guidance;
- Guidance for Pollution Prevention (GPPs) for good practice, and;
- HSE Borehole Sites and Operations Regulations 1996.

During the Proposed Development, an INEOS HSE representative will monitor that operations proceed in accordance with these mitigation and management measures, for instance for instance the site and surrounding area would be checked on a daily basis for visual signs of pollution (e.g. fuel oil, leakage from perimeter, noticeable silting).

Site Development and Establishment (Stage 1)

Embedded mitigation relevant to protection of hydrogeology is summarised in the table below. In addition, the conductor / surface rig activities undertaken at the end of Stage 1 will be subject to the mitigation measures to be implemented for the drilling and coring activities in Stage 2. Measures in place to protect surface waters (above) will also protect hydrogeological interests.

Stage 1 Hydrogeology Environmental Protection Measures

<i>Aim</i>	<i>Measures built into Proposal</i>
Prevent soil damage during soil strip prior to laying of membrane/ development of access tracks	Site vehicles tracking on bare ground would have appropriate tyres to prevent damage.
	If large numbers of vehicle movements are needed on bare ground, temporary tracks or peat-boards would be used.
	Works would be undertaken in suitable weather conditions to prevent soil damage (especially avoiding periods of high rainfall).
	Bunding would ensure soils were stored appropriately, and kept separate from other construction activities.
	Vegetation removal would be minimised and carried out according to good practice. Works would be undertaken to minimise the area of soils exposed at any one time.
	Barriers and/or netting would be used to prevent vehicle movements in sensitive areas.

Drilling, Coring and Suspension (Stage 2)

Embedded mitigation relevant to protection of hydrogeology is summarised in the table below. These will also be relevant and adopted for any other stage requiring subsurface activity on site (i.e. Stage 3a, Stage 4 and Stage 5).

Stage 2 Hydrogeology Environmental Protection Measures

<i>Aim</i>	<i>Measures built into Proposal</i>
Preventing pollution of aquifer during drilling	Appropriate well design would be used, including casing and use of closed-loop mud system to allow gains and losses to be monitored. Any potential excess water or mud from the drilling process would be transported off site in suitable tankers.
	Drilling activities would be designed to ensure that there would be no inputs of pollutants to groundwater.
	Drilling fluids would be used in accordance with good practice as described in the Health and Safety Executive (HSE)'s guidance on 'The Offshore Installations and Wells (Design and Construction etc.) Regulations 1996' (DCR)) (in particular that they would be designed to prevent exchange of fluids between the borehole and any groundwater-bearing formation) and Borehole Sites Operations Regulations 1995.

Aim	Measures built into Proposal
	<p>In the case of principal and secondary aquifers (for which 'groundwater bodies' are defined for the purposes of the Water Framework Directive), air flush, water only or water-based fluids would be used.</p> <p>Drilling fluids would exclude hazardous substances as defined in paragraph 4 of Schedule 22 to the EPR 2016 and guidance published by the Joint Agencies Groundwater Directive Advisory Group (JAGDAG). Acceptable additives are listed in Annex 1 of WMP3. INEOS would gain the Environment Agency's prior agreement before any other additives were used.</p> <p>If karstic or highly fissured conditions were anticipated, INEOS would gain the Environment Agency's agreement to use any additives other than inert materials. In the event that there was a loss of circulation during drilling the operator would use only those materials listed in Annex 2 of WMP3 to manage the loss of circulation and would inform the Environment Agency as soon as practicable.</p> <p>Borehole design would be approved by Environment Agency, Oil and Gas Authority, HSE, and an accredited independent well examiner prior to drilling.</p> <p>Casing would be installed and cemented into the low permeability formation beneath the groundwater body once that formation was reached, in accordance with good drilling and casing installation practice, as described in HSE's 'The Offshore Installations and Wells (Design and Construction etc) Regulations 1996' guidance. The maximum depth defined for a groundwater body is taken to be 400 m. Should any formation that contains a groundwater body extend below this, the criteria described above for protecting groundwater would apply to the use of drilling fluids, until a low permeability formation was reached into which casing could be set.</p> <p>Details of where the casing would be installed and cemented into the low permeability formation beneath a groundwater body once that formation is reached would be set out in the Water Resources Act 1999 section 199 WR11 notification for this borehole.</p> <p>Each layer of casing will be tested as appropriate to the geological conditions and technical requirements, to confirm integrity.</p> <p>Drilling would not take place within source protection zones (SPZ) 1 or 2, as defined in the Environment Agency's Groundwater protection: principles and practice (pp. 23-24).</p> <p>During PTT, only KCl (potassium chloride salt) at 2-4% (dependant on the salinity within the formation) would be used. The PTT will occur at depths in excess of 1000 m</p>
Preventing pollution of soil, groundwater or surface water from leaks from construction vehicles or on-site tanks	<p>The geomembrane and "closed-loop" drainage system would be maintained to ensure all liquids remained on the site for removal by a licensed waste contractor, and treatment prior to disposal if required.</p> <p>Frequent checking of integrity of site surface and drainage system.</p> <p>Cement mixing for well cement would take place in truck-mounted silos on the hardstanding area</p> <p>Rigs would be refuelled from dedicated tanks, which would be filled directly from fuel tankers that deliver to the site. This would be undertaken in the hardstanding area to ensure any spillage would drain to the impermeable cellar rather than the perimeter drainage pipe.</p> <p>Drilling fluids (muds) would be stored in a mud tank with a closed-loop system to prevent leakage.</p> <p>Water for the drilling process would be contained within a closed-loop system with any potential excess water from the drilling process being transported off site in suitable tankers by a licensed contractor.</p>

Maintenance of the Site (Stage 3)

The impermeable site membrane and perimeter drainage system would be retained and frequently checked to confirm their integrity. A routine monitoring plan would be agreed with the Environment Agency to check nearby watercourses and groundwater.

Decommissioning and Restoration (Stage 5)

Operations during Stage 5 would be similar to the construction operations at Stage 1 and the same protective measures would apply for appropriate activities. In addition, the protective measures in the table below would be followed.

Stage 5 Hydrogeology Environmental Protection Measures

<i>Aim</i>	<i>Measures built into Proposal</i>
Minimising soil damage during ground restoration works	The methods in the restoration and aftercare plan would be followed to prevent soil damage.
	Once the site surface membrane was removed, care would be taken to avoid pollution of soil, groundwater or surface water from fuel leaks or routine activities during ground restoration (as outlined for Stage 1 prior to laying the membrane).
	Aggregate and concrete (pad and cellar) would be fully removed from site before the impermeable liner was removed so any residual contamination would not be washed into soil.
Avoid pollution of aquifer during decommissioning	Measures would be taken when decommissioning the vertical core well to ensure there would be no inputs of pollutants to groundwater and that there was no subsequent leakage of groundwater, including any gas or other contaminants that this may contain, into the well or to other geological horizons.
Prevention of leaks of gas or suspension fluid from vertical core well once abandoned	At decommissioning, two permanent barriers would be set within the wellbore to seal the well. These would be pressure tested and tagged to ensure integrity.
	The well has been designed in accordance with the Borehole Regulations reviewed by the HSE and by an independent third party well examiner to ensure wellbore integrity. During drilling each layer of casing will be tested as appropriate to the geological conditions and technical requirements, to confirm integrity.
	Suspension/ Decommissioning fluid would be brine.

Air Quality

Dust from site preparation, construction and vehicle passage on access roads will be controlled with standard dust-control measures including use of water sprays where necessary, and is not considered likely to present a nuisance to site neighbours.

As the well is only being cored, there is very limited potential for hydrocarbon gas (methane) to be released during the drilling process. There will be no operational flaring or venting. Any emissions which do occur will be short-term and very small in volume and are not expected to have a material effect on local air quality.

On-site generators and the drilling rig (both diesel powered) would produce temporary, localised emissions to air, likely to include NO_x, SO_x, PM₁₀ and 2.5, CO and VOCs. Generators would be sized appropriately for site energy requirements, would be efficient and well maintained, with emissions reduced as far as possible.

Emissions from operating the rig would also be reduced through choice of an efficient rig appropriate for the site, with minimal emissions.