Weaverthorpe Wellsite

Site Condition Report

Environmental Permitting (England and Wales) Regulations 2016

- **Application for a Bespoke Mining Waste Operation with Flare**
- **Application for a Bespoke Installation**

ISSUE No.	Description
250527	Draft for Client Review
250814	Initial issue for an application for a Mining Waste Operation with Flare >10 Tonnes per day
250903	Issued after Operator review

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1. PURPOSE AND CONTEXT

This Site Condition Report forms part of an application to the Environment Agency to authorise the undertaking of specific 'permitted activities' at the proposed Weaverthorpe Wellsite (herein referred to as the 'Wellsite'). In the context of onshore oil and gas operations, a number of activities are considered applicable to the environmental permitting regime.

The Wellsite within which the 'permitted activities' are undertaken is considered a 'regulated facility' under The Environmental Permitting (England and Wales) Regulations 2016, as amended (EPR2016) [Ref.1].

The purpose of the Site Condition Report is to set out the current condition of the Wellsite prior to the undertaking of the proposed operations by Egdon Resources U.K. Limited (herein referred to as the 'Operator').

The Operator is proposing to construct a wellsite ~850m to the east of the village of Foxholes located within the administrative boundary of North Yorkshire Council and within Foxholes with Butterwick parish. The boundary with the East Riding of Yorkshire lies approximately 350m to the east.

The Wellsite is located ~2 Km to the west of Wold Newton, ~15 Km south of Scarborough and ~16 Km northwest of Bridlington.

The Wellsite will be constructed to accommodate the drilling of an exploratory borehole to evaluate the potential for natural gas accumulations within the Sherwood Sandstone target formation.

An application to the Environment Agency is being proposed under EPR2016 to apply for a 'Mining Waste Operation with Flare', as defined by reference 1.8.6 of the Environment Agency (Environmental Permitting and Abstraction Licensing) (England) Charging Scheme [Ref.2].

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2. SCOPE

This Site Condition Report is applicable to the Weaverthorpe Wellsite and all operations conducted therein. It is applicable to the Operator, its contractors and subcontractors and can be used to support an application to the Environment Agency for an environmental permit under EPR2016.

This Site Condition Report has been produced following the Environment Agency H5 guidance [Ref.3] and is broken down into three sections covering:

I. **Application Section** – Issued as part of an application for an environmental permit for the purpose of demonstrating that the condition of the land, groundwater and air prior to proposed development.

II. **Operational Section** – Maintained throughout the lifetime of the 'regulated facility' and includes details of the as built site (including embedded pollution mitigation) and environmental sampling and analysis data.

III. **Surrender Section** – Summarises the impact the 'regulated activity' has had on the environment by comparing the baseline and operational sampling and analysis report. It also provides details on any pollution incidents that may have occurred and the remediation taken.

As the purpose of this Site Condition Report is for a new bespoke environmental permit application, and for the purpose of demonstrating the condition of the land, groundwater and air prior to the proposed development, Section I has been included only.

Section II and Section III will be completed and issued to the Environment Agency as part of an application to surrender the environmental permit issued by the Environment Agency.

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3. Abbreviations and Definitions

%:	Percentage
~:	Approximately
10^{-3}:	Figure equivalent to 0.001
Active Area:	Regulated Facility area that is underlined by HDPE to provide tertiary containment
AOD:	Above Ordnance Datum
AONB:	Areas of Outstanding Natural Beauty
AQIA:	Air Quality Impact Assessment
BAP:	Biodiversity Action Plan
bgl:	Below Ground Level
BGS:	British Geological Survey
CIRIA:	Construction Industry Research and Information Association
CQA:	Construction Quality Assurance
DrWPA:	Drinking Water Protected Areas
E:	East
EPR2016:	The Environmental Permitting (England and Wales) Regulations 2016, as amended
Groundwater Activity:	Has the meaning given within Regulation 2 of EPR2016
ha:	Hectare
HDPE:	High Density Polyethylene
Km:	Kilometre
LNR:	Local Nature Reserves
m^2/d:	Metre Squared per Day
m:	Metre
mAOD:	Metre(s) Above Ordnance Datum
mm:	Millimetre
MAGiC:	Multi-Agency Geographic Information for the Countryside
Mbgl:	Metres Below Ground Level

Mining Waste Operation:	Has the meaning given within Regulation 2 of EPR2016
N:	North
NE:	Northeast
NGR:	National Grid Reference
NNR:	National Nature Reserves
NSTA:	North Sea Transition Authority
NW:	Northwest
Operating Technique:	Documents approved by the regulator to ensure compliance with the issued permit
Operator:	Has the meaning given within Regulation 7 of EPR2016
Permitted Activities:	Any activity or operation defined within Schedule 1 to 29 of EPR2016
Regulated Facility:	Has the meaning given within Regulation 8 of EPR2016
RSPB:	Royal Society for the Protection of Birds
S:	South
SAC:	Special Areas of Conservation
SE:	Southeast
SPA:	Special Protection Areas
SPZ:	Source Protection Zone
SSSI:	Sites of Special Scientific Interest
SW:	Southwest
U.K.:	United Kingdom
Water Discharge Activity:	Has the meaning given within Regulation 2 of EPR2016
WFD:	Water Framework Directive
WR11:	Environment Agency's form for 'Notice of the intention to drill for minerals'

Table 1: Abbreviations and Definitions

SECTION I – CONDITION AT APPLICATION

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4. REGULATED FACILITY

The 'regulated facility' is located in the countryside in the county of North Yorkshire. It is centred on National Grid Reference (NGR) TA 02308 73142 and is located at the following address.

Weaverthorpe Wellsite

Land North of Butt Lane

Foxholes

North Yorkshire

YO25 3HY

Figure 1: Weaverthorpe Wellsite – Current (Source: Google Earth 17/12/2024)

4.1 Site Location Plan and Site Layout Plan

A number of site plans have been provided within the Site Plans document (04 – Site Plans) and detail the extent of the Wellsite, including its location, site layouts and point source emissions.

A copy of the following plans are provided within the Site Plans document (04 – Site Plans).

- 04A - ZG-ER-WRP1-FH-EPR-04-01 Location Plan 2500 Scale A2
- 04B - ZG-ER-WRP1-FH-EPR-04-02 Location Plan 10000 Scale A3
- 04C - ZG-ER-WRP1-FH-EPR-04-03 Indicative Site Layout Plan - Construction Phase 500 Scale A2
- 04D - ZG-ER-WRP1-FH-EPR-04-04 Indicative Site Layout Plan - Drilling Phase 500 Scale A3
- 04E - ZG-ER-WRP1-FH-EPR-04-05 Indicative Site Layout Plan - Well Testing Phase 500 Scale A3
- 04F - ZG-ER-WRP1-FH-EPR-04-06 Indicative Site Layout Plan - Retention Phase 500 Scale A2
- 04G - ZG-ER-WRP1-FH-EPR-04-07 Indicative Site Layout Plan - Well Abandonment Phase 500 Scale A3
- 04H - ZG-ER-WRP1-FH-EPR-04-08 Indicative Section Plan - Covered Ditch Construction 25 Scale A3

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5. CONDITION OF THE LAND AT PERMIT ISSUE

5.1 Sources of Information

The Site Condition Report has been compiled using a range of information sources, including:

- Multi-Agency Geographic Information for the Countryside (MAGIC) website [Ref.4]; and
- British Geological Survey (BGS) [Ref.5].

For clarity, all figures included in this document, for example, distances and areas, represent best estimates at the time of document production, and may change, as operations develop.

5.2 Environmental Setting

The Wellsite is located on agricultural land to the north of Butt Lane, near Foxholes, and is currently used for growing a potato crop.

The Wellsite is located ~850m to the east of the village of Foxholes, ~2 Km to the west of Wold Newton, ~15 Km south of Scarborough and ~16 Km northwest of Bridlington and covers an area of approximately 1.3 ha including the access track.

The Wellsite is located within the administrative boundary of North Yorkshire Council and within Foxholes with Butterwick parish.

The closest residential receptors are:

- West Field House – 570m; and
- Foxholes – 870m.

The proposal is to construct a temporary Wellsite within an enclosed and secure compound to drill an exploratory borehole. Should natural gas be encountered as predicated, the drilling rig will be demobilised from the Wellsite and the intention is then to undertake a short term well test. If natural gas is not encountered during the drilling phase, the exploratory borehole will be decommissioned (abandoned) in accordance with industry guidance, and the Wellsite restored to its former condition.

Details of receptors identified within 2 Km and 10 Km of the Wellsite are provided within Receptors (14 – Receptors) provided in support of the environmental permit application.

5.3 Designated Sites

A search of the Multi-Agency Geographic Information for the Countryside (MAGIC) website was undertaken to identify statutory receptors within 10 Km and 2 Km of the 'Wellsite'. The results of the search are provided within Table 2.

Receptors	Search Radius	Name	Distance from Site	Direction from Site	Grid Reference (Edge)
RAMSAR	**10 Km**	No Receptors Found	-	-	-
Special Areas of Conservation (SAC)	**10 Km**	No Receptors Found	-	-	-
Special Protection Areas (SPA)	**10 Km**	No Receptors Found	-	-	-
Areas of Outstanding Natural Beauty (AONB)	**10 Km**	No Receptors Found	-	-	-
SAC (Marine)	**10 Km**	No Receptors Found	-	-	-
SPA (Marine)	**10 Km**	No Receptors Found	-	-	-
Marine Conservation Zones	**10 Km**	No Receptors Found	-	-	-

Receptors	Search Radius	Name	Distance from Site	Direction from Site	Grid Reference (Edge)
World Heritage Sites	**10 Km**	No Receptors Found	-	-	-
Scheduled Ancient Monuments	**2 Km**	No Receptors Found	-	-	-
Local Nature Reserves (LNR)	**2 Km**	No Receptors Found	-	-	-
Wood Pastures and Parkland BAP Priority Habitat	**2 Km**	No Receptors Found	-	-	-
National Parks	**2 Km**	No Receptors Found	-	-	-
Sites of Special Scientific Interest (SSSI)	**2 Km**	No Receptors Found	-	-	-
National Nature Reserves (NNR)	**2 Km**	No Receptors Found	-	-	-
National Forest	**2 Km**	No Receptors Found	-	-	-
RSPB Reserves	**2 Km**	No Receptors Found	-	-	-
Registered Battlefields	**2 Km**	No Receptors Found	-	-	-
Registered Parks and Gardens	**2 Km**	No Receptors Found	-	-	-

Table 2: Non-Statutory Designated Sites

5.4 Hydrological Risk Assessment

A Hydrological Risk Assessment has been undertaken by the Operator's Hydrogeologist Consultant with relevant text extracted and reproduced within the following sections.

For clarity, Tables, Figures and Appendixes referenced within Section 5.4.1 to Section 5.6.12 refer to the Tables, Figures and Appendixes detailed within the Hydrological Risk Assessment.

5.4.1 Hydrology

The Site is situated on the side of a hill and in the catchment of the Gypsey Race water course, which is ephemeral and flows in a west-to-east direction approximately 340 m to the south to discharge into the North Sea at Bridlington 17 Km to the southeast. The Gypsey Race rises in the Great Wold Valley near Wharram-le-Street, ~16.5 Km to the west and is a winterbourne stream which is typically dry during the summer months. Between West Lutton and Rudston (i.e. past the Site) the stream typically flows underground in the chalk aquifer – the stream only becomes perennial around 10.5 Km to the south-east at Low Caythorpe.

The nearest Environment Agency Statutory Main River is the River Derwent, which is located ~7 Km to the north-west and has been heavily modified and straightened. The River Derwent is in a separate hydrological catchment.

5.4.2 Water Framework Directive Classifications

The Site is located in the 'Gypsey Race Operational Catchment ' which has a hydromorphological classification of 'not designated artificial or heavily modified'. The Water Framework Directive Regulations Cycle 3 Classifications for 2022 indicate that the water body has a 'bad' ecological status. Amongst the reasons for not achieving a 'good ecological status' are groundwater abstractions impacting on flow, point-source sewage discharge and diffuse-source agricultural pollution.

5.5 Soils

Geological mapping demonstrates that there are no superficial sediments, and that the soil type at and around the Site is mapped by LandIS Soilscapes site as "shallow lime-rich soils over chalk or limestone".

The soil is further classified as a loamy, free-draining composition. In the vicinity of the Gypsey Race watercourse, the soils are described as being "freely draining lime-rich loamy soils" which are typically given over to arable or grassland at higher altitude. Soilscapes are shown on Figure 6.

5.6 Geology

5.6.1 Overview

The British Geological Survey (BGS) 1:50,000 geology map (Sheet 54, Scarborough) indicates that the Site is directly underlain by the Flamborough Chalk Formation, with no mapped superficial deposits directly at the Site. The surface bedrock and superficial geology is shown in Figure 7.

The area is dominated by the Yorkshire Wolds, which are the northernmost Chalk hills in the United Kingdom.

5.6.2 Superficial Geology

The Site itself is not mapped as having any superficial deposits present.

Head deposits are present at lower elevations within surface water courses including the course of the Gypsey Race to the south in the south and Ganton Dale to the north. The superficial deposits associated with both of these local deposits are classified by the Environment Agency as 'Secondary (undifferentiated) aquifers' as shown on Figure 16.

5.6.3 Bedrock Geology

The following bedrock geology sequence as summarised in Table 3 has been identified in the local area. A generalised section, reproduced from BGS Sheet 54, is presented in Figure 8.

Table 3 detailing the Geological Sequence has been replicated as Table 3 below.

Period	Formation	Description	Thickness (m)
Cretaceous	Flamborough Chalk Formation	White, well-bedded, flint-free chalk with common marl seams	71
	Welton Chalk and Burnham Chalk Formations	White, massive or thickly bedded chalk with common flint nodules	Unspecified
	Ferriby Chalk Formation	Grey, soft, marly, flint-free chalk	38 – 60
	Hunstanton Formation	Rubbly to massive chalks with marl bands	12 – 30
	Speeton Clay Formation	Mudstones, cementstones and sporadic bentonites	92 – 500
Upper Jurassic	Kimmeridge Clay Formation	Mudstones, thin siltstone and cementstone beds; locally sands and silts	410
	Upper Calcareous Grit Formation	Sandstone, fine-grained, calcareous	8 – 33
	Coralline Oolite Formation	Limestone, interbedded with, and passing laterally into fine-grained sandstone	36
	Lower Calcareous Grit Formation	Sandstone, fine-grained, quartzose, spiculitic, bedded, variably calcareous	41 – 50
	Oxford Clay Formation	Grey-green mudstone, with sporadic beds of argillaceous limestone nodules	36 – 76
	Osgodby Formation	Calcareous sandstone and poorly lithified sand	3 – 13

Period	Formation	Description	Thickness (m)
Middle Jurassic	Cayton Clay Formation and Cornbrash Formation (undifferentiated)	Limestone and mudstone	1.5 – 3
Middle Jurassic	Scalby Formation	Mudstone and sandstone	60
	Scarborough Formation	Limestone and mudstone	11
	Cloughton Formation	Sandstone, mudstone and rare thin coals	Variable
	Eller Beck Formation	Ironstone, sandstone and mudstone	3
	Saltwick Formation	Sandstone, mudstone and locally thin coals	31
	Dogger Formation	Sandstone and ironstone	9
Lower Jurassic	Whitby Mudstone Formation	Mudstone with limestone concretions	82
	Cleveland Ironstone Formation	Mudstone, siltstone and sandstone with seams of ironstone	27
	Staithes Sandstone Formation	Silty sandstone	12
	Redcar Mudstone Formation	Mudstone with thin limestone and sandstone beds	250
Triassic	Mercia Mudstone Group	Red and green mudstone with gypsum and thin sandstone beds	100 – 312
	Sherwood Sandstone Group	Red sandstone	316 – 547

Table 3: Geological Sequence

At the Site, the following Formations are anticipated to be encountered, as summarised in the Well Design Schematic included in Appendix B:

- Flamborough Chalk Formation – directly beneath the Site;
- Ferriby Chalk Formation / Hunstanton Formation;
- Speeton Clay Formation;
- Kimmeridge Clay Formation;
- Corallian Group;
- Oxford Clay Formation;
- Estuarine Group;
- Lias Group;
- Mercia Mudstone Group; and
- Sherwood Sandstone Group.

The Cretaceous Chalk in the north of England is subdivided into groups. The Flamborough Chalk Formation outcrops at the Site and is underlain by the Welton Chalk, Burnham Chalk, Ferriby Chalk and the Hunstanton Formation. The Hunstanton Formation is locally expected to be up to 30 m thick in the area near Fordon. The contact between the Hunstanton Formation, which comprises marly chalks, and the Lower Cretaceous Speeton Clay is sharp. The Speeton

Clay Formation underlies the Chalk Group, and, according to the well design schematic included in Appendix B, is likely to be offset from the Hunstanton Formation by a fault.

The Flamborough Chalk Formation is described as a 'white, well-bedded, flint-free chalk with common marl seams' according to the BGS.

An extract from the section line presented on BGS Map Sheet 54 is included in Figure 10, with the extent of the section illustrated on Figure 9.

A 'zone of deformation' is noted in the vicinity of Fordon No.2 well (4.5 Km to the west), illustrated as the Foxholes Fault Zone demarked with ~ on Figure 7.

The Flamborough Chalk, previously referred to as the 'Upper Chalk' and the 'Chalk without Flints', has an uncertain boundary with the Welton Chalk and Burnham Chalk Formations (which were previously referred to as the 'Middle Chalk'), with the boundary reportedly only able to be shown as a general line separating the beds with flints from those without flints . The section indicates that the Flamborough Chalk thickens northwards in the vicinity of the Site.

The Kimmeridge Clay, Upper Calcareous Grit, Coraline Oolite Formation, Lower Calcareous Grit and the Oxford Clay Formation outcrop >8 Km to the north in the Vale of Pickering. The upper part of the Speeton Clay belongs to the Lower Cretaceous beds, whilst the lower part belongs to the Kimmeridge Clay. The Kimmeridge Clay is a calcareous mudstone with siltstone and cementstone beds. Water obtained from a bore sunk into the Kimmeridge Clay at Knapton Lodge, ~15 Km to the west, was noted to be saline. The Upper Calcareous Grit is a fine-grained calcareous sandstone which is estimated to be between 8 and 33 m thick in the vicinity, underlain by the limestones and sandstones of the Coralline Ooltie and Lower Calcareous Grit. The Oxford Clay is typically 36 to 76 m thick and represents the boundary with the Middle Jurassic beneath.

A series of limestone, mudstone, ironstone and sandstone formations make up the Middle Jurassic strata, some of which (Cayton Clay Formation, Eller Beck Formation and the Dogger Formation) are noted to be thin, with thicker mudstone bands (i.e. the Scalby Formation). Within the Lower Jurassic strata, thicker mudstone bands dominate (Whitby Mudstone Formation, Cleveland Ironstone Formation and Redcar Mudstone Formation) consisting of mudstone and siltstone with rare sandstone beds or limestone (in the lower part of the Redcar Mudstone Formation), with thinner silty sandstone formations in between (i.e. the Staithes Sandstone Formation). These rocks overlie the Triassic Mercia Mudstone Formation (mudstones and siltstones), which is of considerable thickness (100 to 312 m) in the region and locally anticipated to be up to 300 m at the Site (Table 2).

BGS borehole records, the locations of which are shown on Figure 11, indicate a significant thickness of Chalk in the vicinity of the Site. TA07SW30 at Westfield House, 600 m to the north-east of the Site, shows at least 40 m of White Chalk (there were no returns for the final 21 m of drilling). Borehole TA07SW31, ~1.2 Km to the north-east, shows at least 90 m of Chalk, equivalent to ~17 mAOD. None of the BGS boreholes in the area prove the base of the Chalk, due to the thickness in the area and the wells being drilled as early 20 Century water supply wells, for which drilling beyond the base of the strata was not required.

5.6.4 Hydrogeology

Groundwater levels at the Site are anticipated to be at ~40-45 mAOD. The regional hydrogeological map for the area indicates that the Site sits on a 40 mAOD groundwater contour. Given an approximate ground level at the Site of between 72 and 79 mAOD, it is likely that groundwater is between 27 and 32 m bgl, depending upon the seasonal fluctuation.

There is noted to be a high degree of faulting in the locality of the Site, denoted by the presence of the Foxholes Fault Zone. Fissure permeability is well-developed in the Chalk, making it highly productive.

According to the hydrogeological map, the water table generally responds to recharge within three weeks, with seasonal fluctuations some 10-15 m but in the highest parts of the outcrop they may exceed 30 m. Data from monitoring boreholes near to the Site support this, as Weaverthorpe Slack exhibits a higher seasonal range than Willy Howe Bottom due to its higher (~55 m) elevation. With a high degree of fissure flow, the near-surface geology at the Site will remain dry except during very heavy rainfall events.

The hydrogeological cross section (Figure 13) shows that the Gypsey Race downgradient of Foxholes, approximately 3.4 Km to the north-west of Haisthorpe, sits at the top of the saturated aquifer, where it typically becomes a permanent watercourse; upstream of this the watercourse is ephemeral.

The Environment Agency conducts monitoring within the Upper Chalk at several locations within the region. Data has been obtained for two monitoring boreholes: Willy Howe Bottom near Burton Fleming, ~4.6 Km to the east, and Weaverthorpe Slack near Weaverthorpe, ~5.6 Km to the west, with the data and locations presented on Figure 15.

The monitoring at Willy Howe is noted to include data for the 'bottom', 'middle' and 'drift' however all three locations correlate closely, so only data for the 'bottom' is presented.

Weaverthorpe Slack monitors are within the Welton Chalk Formation and Burnham Chalk Formation whilst Willy Howe Bottom monitors are within the Flamborough Chalk Formation. The data indicates the seasonal variations within the Chalk, which are closely correlated between the formations. There is a significant difference in ground elevation between the two locations, with Weaverthorpe Slack located some 57 m higher than Willy Howe.

The annual fluctuation in water levels is typical for chalk strata whereby winter seasonal recharge is hosted within the fissure network, which then dissipates over summer. Seasonal recharge in chalk strata is variable on an annual basis dependent on annual climatic effects and wider water supply demands, hence at Weaverthorpe Slack seasonal recharge can vary by between 6 m and 20 m, and by 2 m to 14 m at Willy Howe Bottom. Groundwater elevation at these monitoring locations shows a large degree of consistency over the past four decades (Figure 14), with peak levels limited by a combination of regional hydrogeological gradients and surface water courses in valley bottoms.

Groundwater in the study area is unconfined, both where it is at outcrop beneath surficial soils and where limited superficial deposits are present in the Wolds. To the east, approaching the coast, the Chalk becomes confined by glacial till.

Groundwater flow is from the north-west to the south-east. Based on March 2025 data, the regional hydraulic gradient is estimated to be 0.002 from Weaverthorpe Slack to Willy Howe Bottom and 0.003 from Weaverthorpe Slack to Middledale Farm (~8 Km to the south of the Site). The approximate gradient based on the regional hydrogeological contours (shown on Figure 12) is 0.004.

The base of the primary "at risk" groundwater is at the base of the various chalk units which are underlain by clay strata, i.e. the Speeton Clay. Lower confined groundwater is, however, present whereby the Kimmeridge Clay Formation confines the aquifers beneath.

Data on deeper groundwater is unknown, with little groundwater data available for the Triassic rocks at depth in the region, although the Sherwood Sandstone Group upgradient of the Site is known to be an important aquifer in the west and south-west towards York. However, within the region of the Site, the hydrogeological map reports that chlorides and sulphates tend to be high within the Triassic rocks, due to being clay-rich, at depth and with minimal flushing, resulting in saline conditions which are of limited resource value.

5.6.5 Aquifer Designations

The superficial head deposits associated with the Gypsey Race water course are designed as a 'Secondary (undifferentiated)' aquifer, meaning areas where it is not possible to apply either a Secondary A or B definition because of the variable characteristics of the geology (Figure 16).

The Chalk is designated as a Principal Aquifer (Figure 17), denoting a unit with a substantial water supply which has high permeability and can support water supply on a baseflow or strategic scale. The Chalk is a regionally important water body.

Due to the significance of the surface or near-surface Chalk aquifer, all local water supplies utilise this formation. As such, no nearby abstractions have been extended beyond the Chalk aquifer, meaning the Principal and Secondary A aquifers situated at depth beneath the Speeton Clay and Kimmeridge Clay Formation are unexploited in the area.

Table 4 summarises the aquifer designations of the geological formations which are expected to be encountered during the drilling of the exploration borehole, including surrounding formations present in the area. Much of the Cretaceous and Upper Jurassic formations are given 'Principal' aquifer status, with the exception of the clay formations (Speeton, Kimmeridge and Oxford) which will act as confining layers to the underlying water bearing units. Some of these formations, such as the Upper Calcareous Grit, Corralline Oolite and Lower Calcareous Grit which are part of the Corallian Group, are likely to be of limited thickness at the Site and therefore whilst their 'Principal' aquifer status is based on their nomenclature, they are locally of very limited significance and unlikely to provide recharge to surface water or the overlying chalk.

The water bearing units below the Speeton Clay can be generally considered as being part of three overarching confined water units.

The Speeton Clay Formation and Kimmeridge Clay Formation are likely to function as aquitards at the Site location. Below the Upper Jurassic Principal Aquifers, the Oxford Clay is also likely to function as an aquitard. Beneath this are a series of Middle Jurassic 'Secondary A' aquifers above the Whitby Mudstone aquitard classified as moderately productive but in reality, likely to be naturally highly saline due to their depth.

A fourth group of moderately productive 'Secondary A' aquifers is then present in the Lower Jurassic formations. The Redcar Mudstone and the Mercia Mudstone are likely to act as an aquitard over the Sherwood Sandstone Principal Aquifer, although there may be some water-bearing layers within these largely aquitard formations.

Egdon has previously conducted a petrophysical analysis of the Fordon-2 well ~4.5 Km to the east, which concluded that the Sherwood Sandstone contains salt-saturated brine. Given the depth of the Sherwood Sandstone aquifer and natural mineralisation effects at that depth, it is not considered to be capable of acting a potable water resource.

5.6.6 Hydraulic Properties

There are no site-specific data available regarding the hydraulic properties of the aquifers present on-Site. The Major Aquifer Properties Manual reports that transmissivity values in the Yorkshire Chalk can range from less than 1 m^2/d to over 10,000 m^2/d with a geometric mean of 1,258 m^2/d.

Storage coefficients have a geometric mean of 7.2 x 10^{-3}.

High transmissivity values are associated with the buried cliff line, which is over 15 Km to the east of the drill site and unlikely to affect aquifer permeability at the Site. Figure 4.5.8 of the Major Aquifer Properties Manual, the area of the Great Wold Valley in which the Site is located has amongst the highest hydraulic conductivity values modelled in the region, for which transmissivities of up to 8,000 m^2/d along the Wold Valley, an order of magnitude higher than those on the Octon Ridge ~2 Km to the south, have been recorded.

5.6.7 Drinking Water Protected Areas (DrWPA's)

The online data service https://data.catchmentbasedapproach.org/datasets/theriverstrust::wfdgroundwater-bodies-cycle-2/about presents The '1:50k WFD Groundwater bodies' as a polygon dataset, created to align with the requirements of the WFD and specifically Article 2, clause 2 (WFD Groundwater Bodies Cycle 2). The Site is located within a DrWPA (all groundwater bodies in England and Wales are designated, identified as a requirement of the Water Framework Directive) – the Site is within the Hull and East Riding Chalk Aquifers (reference GB40401G700700):

- Overall Rating – Poor
- Chemical Rating – Poor
- Quantitative – Poor

271 groundwater bodies in England are identified as DrWPA's covering 86% of England, data can also be viewed at https://mapapps2.bgs.ac.uk/ukso/home.html?layers=WFDGwBPollutionEng.

5.6.8 Groundwater Vulnerability

Groundwater Vulnerability, presented on Figure 18, is classified as "high". The level of vulnerability reflects the lack of superficial deposits at the Site, with the Chalk directly outcropping extensively in the region.

5.6.9 Springs

Ordnance Survey and online mapping does not record any springs within a 2 Km radius of the Site.

5.6.10 Source Protection Zones

The Site is situated within the 'total catchment' Zone 3 of a Source Protection Zone (Figure 2). The SPZ3 is associated with a number of abstractions, stretching from Bridlington to Driffield Wold. The closest designated inner source protection zone (SPZ1) is ~6.2 Km to the south at Kilham.

5.6.11 Abstractions

The Environment Agency has provided information on licensed groundwater abstractions within the vicinity of the Site. Only one abstraction has been identified: an agricultural spray irrigation licence, as summarised in Table 5 and the location presented on Figure 19.

Details regarding Private Water Supplies were obtained from the East Riding of Yorkshire council and Ryedale (now North Yorkshire) council and are summarised in Table 6 and the locations presented on Figure 19.

Table 5 detailing the Registered Private Water Supplies has been replicated as Table 4 below.

Licence	Holder	Purpose	Source	Easting	Northing	Distance from Wellsite
NE/026/0030/011	C B Rivis & Son	Agriculture – direct spray irrigation	Chalk Groundwater	501779	472606	690 m SW

Table 4: Environment Agency Licensed Groundwater Abstractions within 5 Km of the Wellsite

Table 6 detailing the Registered Private Water Supplies has been replicated as Table 5 below.

Location	Easting	Northing	Supply Type	Nature	Frequency of Use	Distance from Wellsite
Westfield House Farm, Foxholes Road, Wold Newton, East Riding of Yorkshire, YO25 3HY	502968	473260	Borehole	Domestic	Unknown	620 n E
Westfield Farm, Foxholes Road, Wold Newton, East Riding of Yorkshire, YO25 3HY	503488	473628	Unknown	Unknown	Unknown	1,200 m NE
Low Octon Grange, Octon Grange Lane, Octon, East Riding of Yorkshire, YO25 3HJ	502137	471778	Borehole	Domestic	Unknown	1,315 m S
Willy Howe Farm, Wold Newton Road, Burton Fleming, East Riding of Yorkshire, YO25 3HW	505962	471970	Unknown	Unknown	Unknown	3.780 m SE
Fordon Lane, Fordon, East Riding of Yorkshire, YO25 3HT	504932	475155	Unknown	Unknown	Unknown	3.245 m NE

Table 5: Registered Private Water Supplies

The BGS National Well Record Archive has been searched, which identified 13 well records within a 2 Km radius of the Site (Table 7, Figure 19). This includes locations registered as private water supplies in Table 6.

The BGS data reflects records of water wells which has been recorded, but these wells may be historical and no longer in use or recorded insufficient yield when constructed. With the exception of the two wells at Ganton Dale, all other records are within the Flamborough Chalk Formation.

The closest well to the Site is at Westerfield House Farm, 620 m to the east. This well recorded groundwater at ~34.5 mbgl (~51.3 mAOD) and was installed to a total depth of 63 m (22.9 mAOD) into the Chalk.

Table 7 detailing the BGS Water Well Records within 2 Km of the Wellsite has been replicated as Table 6 below.

BGS Ref.	Location	Aquifer	Depth (m)	Easting	Northing	Distance from Wellsite
TA07/44	Westfield House Farm	Flamborough Chalk	63.0	502950	473360	620 m E
TA07/72	Wold Newton Farm Foxholes	Flamborough Chalk	60.0	501779	472606	690 m SW
TA07/5	Westfield House Farm	Flamborough Chalk	10.5	503050	472850	732 m SE
TA07/9	Village Pump Foxholes	Flamborough Chalk	14.0	501380	472608	1,007 m W
TA07/50	Foxholes 2	Flamborough Chalk	34.6	501420	472420	1,080 m SW
TA07/46	Westfield Farm Wold Newton	Flamborough Chalk	90.0	503480	473730	1,250 m NE
TA07/6	Lower Octon Grange Farm	Flamborough Chalk	24.4	502182	471744	1,350 m S
TA07/7	Higher Octon Grange Farm	Flamborough Chalk	23.6	502090	471730	1,370 m S
TA07/51	Octon Grange 3	Flamborough Chalk	47.5	502150	471710	1,388 m S
TA07/49	Ganton Dale 1	Welton Chalk / Burnham Chalk	66.5	501610	474610	1,560 m N
TA07/8	Ganton Dale House	Welton Chalk / Burnham Chalk	82.3	501598	474652	1,603 m N
TA07/11A	Wold Cottage	Flamborough Chalk	13.1	504240	472310	2,040 m SE
TA07/11B	Wold Cottage	Flamborough Chalk	10.3	504240	472310	2,040 m SE

Table 6: BGS Water Well Records within 2 Km of the Wellsite

5.6.12 Discharge Consents and Pollution Incidents

The Environment Agency has provided details on discharge consents and pollution incidents, which are shown on Figure 20. Within a 2 Km radius of the Site, there is only one discharge consent and one pollution incident. A wider search within 4 Km, shown in Table 8, identifies that the majority of consents relate to domestic property discharges.

Table 8 detailing the Discharge consents within 4 Km of the Wellsite has been replicated as Table 7 below.

Consent No.	Effective	Address	Easting	Northing	Type	Direction
WRA8285	09/06/2017	Foxholes STW	501270	472210	WWTW	1,320 m SW
NPSWQD000174	26/07/2012	White House Farm	504563	473041	Domestic property	2,215 m E
WRA9010	14/11/2006	Boulton Cottages	504570	473310	Domestic property	2,215 m E
EPRKB3197EV	18/07/2018	Highfield Close	504611	473195	Domestic property	2,250 m E
WA6111	26/07/2012	Bridge Farm	504700	472800	Domestic property	2,350 m E
C4303	26/07/2012	Cat Babbleton	500200	474400	Domestic property	2,385 m NW
EPRCB3943KW	03/03/2025	1-6 Laking Mews	504803	472956	Domestic property	2,445 m E

Consent No.	Effective	Address	Easting	Northing	Type	Direction
EPRCB3943KW	03/03/2025	1-6 Laking Mews	504803	472956	Domestic property	2,445 m E
WA6339	26/07/2012	LG and D Gray	504900	473000	Domestic property	2,540 m E
WA6421	26/07/2012	Laking Lane	505000	473000	Domestic property	2,640 m E
NPSWQD005219	26/07/2012	Willerby Wold Farm	501192	476295	Cultural / Zoo / Community Centre / Museum / Library	3,285 m N

Table 7: Discharge consents within 4 Km of the Wellsite

The single pollution incident which occurred within a 2 Km radius of the Site (958990) was on 02/02/2012 and related to the burning of waste, being deemed a 'Category 3 (Minor)' incident to air only.

Incident 412238, some 2.1 Km to the east, related to a containment and control failure of oils and fuel on 01/07/2006, but was given a 'Category 3 (Minor)' impact to land and no impact elsewhere.

6. ENVIRONMENTAL PERMITTING (ENGLAND AND WALES) REGULATIONS 2016

6.1 Permitted Activities

The Wellsite has yet to be constructed and does not currently hold an environmental permit. Current Operational Status (Pre-Application)

The proposed Wellsite is located on agricultural land to the north of Butt Lane, near Foxholes, and is currently used for growing a potato crop.

The Wellsite is located ~850m to the east of the village of Foxholes, ~2 Km to the west of Wold Newton, ~15 Km south of Scarborough and ~16 Km northwest of Bridlington and covers an area of approximately 1.3 ha including the access track.

The Wellsite is located within the administrative boundary of North Yorkshire Council and within Foxholes with Butterwick parish.

The closest residential receptors are:

- West Field House – 570m; and
- Foxholes – 870m.

The proposal is to construct a temporary Wellsite within an enclosed and secure compound to drill an exploratory borehole. Should natural gas be encountered as predicated, the drilling rig will be demobilised from the Wellsite and the intention is then to undertake a short term well test. If natural gas is not encountered during the drilling phase, the exploratory borehole will be decommissioned (abandoned) in accordance with industry guidance, and the Wellsite restored to its former condition.

6.2 Proposed Development

The Operator is proposing to undertake four (4) phases of development as illustrated within Table 8.

Phase	Description	Approximate Timescale
Phase 1	**Construction of the Wellsite and Site Access** a) Access track civils from Butt Lane; construct access track along field boundary b) Installation of groundwater monitoring boreholes c) Earthworks on well pad; install fencing and gates d) Create perimeter containment system e) Install liner/tertiary containment f) Construct well cellar g) Install temporary matting as usable surface platform	5 weeks
Phase 2	**Drilling of the Weaverthorpe-1 Well.** a) Set conductor b) Mobilise rig and services c) Drill Weaverthorpe-1 well d) Log well to evaluate reservoir e) Rig down equipment and release drilling rig	8 weeks

Phase	Description	Approximate Timescale
Phase 3	**Testing – Dependent on the outcome of Phase 2** a) Mobilise test spread b) 5–7 days operational well test (short term well test), with shut-in periods to gather downhole data c) Gas management via approved ground flare system d) Suspend well to evaluate results e) Remove equipment and facilities	4 weeks
Phase 4a	**Site Suspension** a) Success case (proven gas from test evaluation): with well suspended, reduce site area size, remove temporary matting, install aggregate to create smaller working platform b) Install a surface water interceptor to manage clean surface water run-off	4 weeks
Phase 4b	**Site Restoration** a) Failure case (no gas encountered during drilling, or insufficient gas following test evaluation): plug wellbore with cement plugs to surface, cut conductor below ground level and remove well cellar, remove matting and liner, backfill perimeter ditches and restore site to agricultural land	6 weeks

Table 8: Phases of Development

Phase 1 – Wellsite Construction

Construction of the Wellsite will be undertaken during Phase 1 and will include the construction of an access and working site area with a well cellar, perimeter containment ditch and tertiary containment system.

The perimeter containment ditch system will be installed to facilitate easy reduction in site area in the testing success case. The design and installation of the well cellar, together with the design of the tertiary containment system will be subject to review and verification by the Environment Agency, and installed under a Construction Quality Assurance Plan (CQA).

Groundwater monitoring boreholes will be installed during the site construction phase.

The tertiary containment system and perimeter containment ditch ensures that any accidental spillages that may occur during the subsequent phases of operation are contained within the Wellsite.

Security fencing will be installed.

Phase 2 – Drilling Operation

The second phase of the development will include the drilling of an exploratory borehole (Weaverthorpe-1 Well). Following mobilisation of the drilling rig to site, the Weaverthorpe-1 Well will be drilled including a c400m deviated section in a north-westerly direction.

If drilling results are positive then the Weaverthorpe-1 Well will be cased and completed for testing as set out in Phase 4a. If not, then operations will move to abandonment and restoration as detailed in Phase 4b.

Phase 3 – Short Term Well Test

The third phase of the development will include a short term well test of the Weaverthorpe-1 Well. Following demobilisation of the drilling rig, a well test spread will be mobilised to site and will include a Shrouded Ground Flare, a 3-phase separator, waste storage tanks, a slick line unit and a coiled tubing unit.

The test will follow a standard short-term well test permitted under the well test regulations provided by the North Sea Transition Authority (NSTA). This will limit flare activity to a maximum of 96 hours over the full test period. Following the testing period, the Weaverthorpe-1 Well will be suspended to evaluate the results.

Phase 4a – Site Suspension

In a success case, the Weaverthorpe-1 Well will remain suspended and the well head and well cellar left in place, whilst regulatory approvals for production are progressed, developed and submitted.

The temporary matting will be removed, and the site working platform reduced; aggregate will be brought in to facilitate this. A surface water interceptor will be installed during this phase to manage clean surface waters.

The Wellsite will be maintained on a care and maintenance basis until such point as all regulatory approvals for production are progressed or if such approvals are not forthcoming then operations will move to abandonment and restoration as detailed in phase 4b.

Phase 4b – Site Restoration

In a failure case following testing (or failure to gain regulatory approvals as per phase 4a above) the well will be fully abandoned by setting cement plugs in the casing to surface, cutting the conductor below ground level and capping the casing with a welded plate. The well cellar will be removed, as will the perimeter/tertiary containment systems, groundwater borehole systems and the temporary matting (or aggregate). The groundwater monitoring boreholes will be decommissioned and the site will be restored to its original land condition and contours.

6.3 Non-Permitted Activities

Additional activities associated with the development, but not regulated under EPR2016 as a 'permitted activity' includes, but is not limited to:

- Car parking for staff vehicles;
- Provision of welfare facilities for site staff;
- Well and wellsite maintenance; and
- Storage and disposal of non-hazardous and hazardous wastes not directly associated with the permitted activities.

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7. ENVIRONMENTAL LEGISLATION AND APPLICABILITY

The proposed Wellsite has yet to be constructed and does not currently hold an environmental permit. No permitted activities are authorised under EPR2016.

7.1 Proposed Permitted Activities

The Wellsite will be the subject of several activities which, under current environmental legislation, requires an environmental permit. The Environment Agency regulate all permitted activities under the Environmental Permitting (England and Wales) Regulations 2016, as amended (EPR2016). Under EPR2016, Operators are required to submit environmental permit applications to the Environment Agency to seek approval to undertake such activities.

Onshore oil and gas developments are the subject of the environmental permitting regulations, and as such a number of environmental permits will be required to be obtained from the Environment Agency.

7.2 Environmental Permitting (England and Wales) Regulations 2016

The Environment Agency regulates all permitted activities under EPR2016 and require Operators to submit environmental permit applications to seek approval to undertake such activities. The Operator has assessed the activities associated with the proposed operations and considers certain activities to fall in scope of EPR2016 and therefore require the necessary environmental permits.

7.2.1 Industrial Emissions Activity

Schedule 1, Part 2 of EPR2016 details a number of activities that are classified as an Industrial Emissions Activity including 'Energy Activities' (Chapter 1) and 'Waste Management' (Chapter 5). Energy Activities include the storage of crude oil, whilst Waste Management includes the incineration of waste.

7.2.1.1 Incineration of Natural Gas

Schedule 1, Part 2 of EPR2016 transposes the requirements of the Industrial Emissions Directive, which requires an environmental permit to authorise an installation operation for the incineration and co-incineration of waste, as detailed within Section 5.1.

Part A(1)

(a) The incineration of hazardous waste in a waste incineration plant or waste co-incineration plant with a capacity exceeding 10 tonnes per day.

The proposed short term well test may involve the incineration of natural gas exceeding 10 tonnes per day and therefore an installation permit is being applied for.

7.2.1.2 Oil Storage

Schedule 1, Part 2, of EPR2016 transposes the requirements of the Industrial Emissions Directive, which requires an environmental permit to authorise an installation for gasification, liquefaction and refining activities, as detailed within Section 1.2, Part A(1) including the loading, unloading, handling or storage of, or the physical, chemical or thermal treatment of crude oil.

The proposed exploratory operations may involve the handling and storage and unloading of oil or condensate and therefore under EPR2016 a Standard Rules SR2015 No.2 Crude Oil Storage permit will be applied for.

7.2.2 Mining Waste Operation

Schedule 20 of EPR2016 defines a mining waste operation as being the management of extractive waste, whether or not it involves a waste facility. Under EPR2016, an environmental permit is required to authorise a mining waste operation.

In order to drill, test and undertake well treatments from the proposed Weaverthorpe-1 Well, it is necessary to apply for an environmental permit for a mining waste operation (which includes a flare).

The 'mining waste operation' will consider the extractive waste volumes and waste streams created as a result of both the drilling process and any subsequent testing and well treatment operations.

7.2.3 Groundwater Activity

Under Schedule 22 of EPR2016, an activity that could involve the discharge of pollutants into groundwater must be notified to the Environment Agency, together with the nature of these pollutants, under EPR2016. The Environment Agency will then determine whether the groundwater activity needs to be permitted.

During the life of the well, it may be necessary to undertake near wellbore treatments, including the use of liquid CO_2 which falls within the definition of a 'groundwater activity' under Schedule 22 of EPR2016.

Schedule 22 3 (3) of EPR2016 provides that '*The regulator may determine that a discharge, or an activity that might lead to a discharge, is not a groundwater activity if the input of the pollutant…*

> *(b) is or would be of a quantity and concentration so small as to obviate any present or future danger of deterioration in the quality of the receiving groundwater.*

To assist the regulator in determining whether the proposed activities are/are not considered groundwater activities a description of the operations, together with a technical justification as to why the Operator believes these can be excluded under Schedule 22 paragraph 3 (3) of EPR2016, is included within the Waste Management Plan (05 - Waste Management Plan) provided in support of the environmental permit application.

7.2.4 Water Discharge Activity

Schedule 21 of EPR2016 relates to water discharge activities, including the discharge or entry to inland freshwaters, coastal waters or relevant territorial waters of any trade effluent.

For clarity, the Environment Agency has provided the following response with regards to surface water discharges in their pre-application response:

> *'Please note that with regards to the water discharge activity, providing that the water discharged from the site is only unpolluted rainwater and you are taking necessary measures to prevent pollution we would not regulate this as a Schedule 21 water discharge activity. We may put additional restrictions on discharge to the site during well workover or testing phases.'*

The Operator is proposing to discharge only 'clean' surface run-off water from the Wellsite and therefore a surface water discharge permit will not be applied for.

The discharge of 'clean' surface run-off water from the Wellsite will be the subject of a Surface Water Management Plan (13 – Surface Water Management Plan) provided in support of the environmental permit application.

For clarity, the discharge of 'clean' surface run-off water from the Wellsite will only be undertaken following the completion of Phase 3 operations (short term well test). Surface run-off water accumulated during Phase 1, Phase 2 and Phase 3 operations will be removed offsite by an Environment Agency licenced waste contractor to an Environment Agency permitted waste treatment facility.

In the event that the Weaverthorpe-1 Well is a success case, 'clean' surface run-off water will be discharged to surface through a Class 1 Interceptor which will be installed following a successful short term well test phase of operations.

7.2.5 Water Resources Act 1991 (as amended by the Water Act 2003)

Under Section 199 of the Water Resources Act 1991 [Ref.6] (as amended by the Water Act 2003 [Ref.7]), a notice of the intention to construct or extend a boring for the purpose of searching for or extracting minerals must be submitted to the Environment Agency using form WR11.

The WR11 requires that a method statement, including drilling and casing designs, together with storage and use of chemicals and drilling muds, accompanies the WR11 application form.

The Weaverthorpe-1 Well will be the subject of an individual WR11 application.

8. RISKS POSED TO THE ENVIRONMENT AND HUMAN HEALTH

The risks posed by the proposed operations have been assessed as part of the application for an environmental permit.

The risks posed by the proposed 'permitted activities' have been considered within the Environmental Risk Assessment which forms part of any application to the Environment Agency and is considered an 'operating technique'.

The Environmental Risk Assessment (which is qualitative) considers activities that have the potential to cause harm to the environment and human health (pollution damage).

In addition, the Operator has employed the services of specialist consultants to address the risks posed specifically to air, groundwater, surface water and noise. Each assessment will be verified by the Environment Agency as part of the permit determination process.

A copy of the following assessments are provided in support of the environmental permit application:

1. Environmental Risk Assessment (07 – Environmental Risk Assessment);
2. Hydrogeological Risk Assessment (08 - Hydrogeological Risk Assessment);
3. Air Quality Impact Assessment (11 – Air Quality Impact Assessment); and
4. Noise and Vibration Impact Assessment (12 – Noise and Vibration Impact Assessment).

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9. MEASURES TAKEN TO PROTECT THE LAND

9.1 Impermeable Liner and Containment Systems

The Operator is proposing to construct a temporary Wellsite within an enclosed and secure compound to drill an exploratory borehole. Whilst the surface construction activities are not considered 'permitted activities' under EPR2016, it is important to outline how the Wellsite has been designed to ensure environmental containment should an onsite pollution event occur.

The Wellsite will be constructed by initially removing topsoil and subsoil and relocating it to the western boundary in a separate soil bund which provides mitigation against visual impact to any nearby receptors whilst also storing the soil which will be utilised during remediation of the Wellsite.

If required, the subsoil may be the subject of a 'cut to fill' method which involves the excavation of subsoil from the higher areas of the site and relocating it to the lower areas of the site to create a level plateau.

A well cellar will be constructed in the centre of the Wellsite for the drilling of the exploratory borehole. The well cellar will be 2.4m internal diameter with a minimum depth of 2.75m. The well cellar will be constructed with precast concrete rings, encased with a minimum 200mm concrete surround (jacket).

A reinforced concrete drilling pad will be constructed at surface, immediately surrounding the well cellar. The concrete pad will be designed and constructed in accordance with the proposed drilling rig loading requirements.

A perimeter containment ditch will be excavated around the perimeter of the Wellsite which will form part of the Wellsite's containment measures ensuring that any surface run-off water and surface spillages are contained within the Wellsite.

A High Density Polyethylene (HDPE) impermeable membrane will be installed across the Wellsite to provide a tertiary containment system which will ensure any surface run-off water and spillages flow to the perimeter containment ditch for subsequent collection by road tanker.

The HDPE impermeable membrane will be protected by two layers of non-woven geo-textile matting which will be placed above and below the HDPE impermeable membrane to provide protection from the underlying ground and from the site surface, reinforcing the site integrity.

The HDPE impermeable membrane will be installed in accordance with a Construction Quality Assurance (CQA) Plan and will be integrity tested during installation overseen by an independent third party CQA inspector.

The HDPE impermeable membrane is incorporated into the well cellar construction to maintain environmental integrity of the Wellsite.

The internal containment ditch will be piped and backfilled (French Drain).

For clarity, the Operator is not proposing to discharge surface run-off water during Phase 2 and Phase 3 operations. Surface run-off water collected within the perimeter ditch during Phase 2 (drilling operations) and Phase 3 (short term well test) will be transferred off site by an Environment Agency licenced waste contractor to an Environment Agency licensed waste treatment facility.

In the event that the Weaverthorpe-1 Well is a success case, 'clean' surface run-off water will be discharged to surface through a Class 1 Interceptor which will be installed following a successful short term well test.

Following the installation of the well cellar and tertiary containment system, temporary track matting will be installed across the Wellsite to provide a working surface. The temporary track matting will be Dura-Base 102mm thick HDPE interlocking matting or similar.

For clarity, in the event of a success case, the area of the Wellsite will be reduced. The temporary track matting will be removed and stone aggregate will be installed across the reduced area of the wellsite.

9.2 Well Cellar Integrity Testing

The well cellar will be constructed within the centre of the 'active area' of the Wellsite and forms a containment area from which the well will be drilled, whilst also housing the wellhead. A concrete drilling pad will be constructed at surface, immediately surrounding the well cellar.

Once the cellar is completed, an integrity test will be carried out to confirm its integrity. The test consists of filling the cellar with water and monitoring water loss over a period of 24 hours. The water level will be marked on the side wall of the cellar using marker dye to provide a reference point. The cellar will then be covered to avoid both water fill (precipitation) and water loss through evaporation.

If no water loss is observed, the well cellar will be considered integral. Where water loss is observed, remedial works will be undertaken to identify leaks which will be sealed and the test re-applied until integrity is confirmed.

9.3 Materials and Storage

Where required, temporary bunds will be installed to act as secondary containment for the storage and handling of substances, in particular crude oil and when present, produced water.

Spill kits will be available on site and close to identified pollution sources (e.g. fuel storage areas).

All oil containers, secondary containers and vehicles will be visually inspected on a daily basis to check for signs of damage, corrosion, bulging, leaks or unauthorised use.

No refuelling of plant and equipment is to take place without the use of a drip tray and where practicable undertaken in close proximity to spill kits.

Emergency response plans for the site will be established and plans to manage spillages will be implemented and enforced.

10. ENVIRONMENTAL MONITORING

To ensure that operations conducted at the Wellsite do not cause an adverse impact on the environment, the Operator shall undertake environmental monitoring in accordance with the methodologies presented to the Environment Agency.

This Section provides details of the environmental monitoring, which for clarity consists of sampling and analysis of a number of environmental parameters including:

- Air;
- Groundwater;
- Surface Water; and
- Soils.

The results of environmental monitoring will be issued to the Environment Agency in accordance with the requirements set out within the environmental permit.

10.1 Air Quality Monitoring

The Operators Air Quality Consultant has undertaken an Air Quality Impact Assessment (AQIA) (11 – Air Quality Impact Assessment) provided in support of the environmental permit application.

The AQIA has assessed the impact on air quality from the installation including the use of diesel fuel in mobile plant and stationary engines, the incineration of produced natural gas and the impact from dust emissions from construction activities.

The AQIA has assessed the impact on air quality from maximum pollutant process contributions from site operations as 'insignificant' which has been summarised within the Summary Section within the AQIA.

> *'Maximum pollutant process contributions from site operations occur within the wellsite boundary. Beyond this location, process contributions reduce significantly with distance. It is not considered that statutory air quality standards would be applicable around the area of maximum impact, or around and just beyond the site boundary, due to the infrequency of human exposure and limited access.*
>
> *At neighbouring locations of residential occupation, where long term human exposure might be expected, it is considered that pollutant process contributions from the proposed site operations are insignificant. In all cases the predicted environmental concentration of all pollutants is less than, and in some cases substantially less than, a third of the applicable standard. Bearing in mind the precautionary assumptions made in the assessment, it is considered unlikely that pollutant process contributions from the proposed exploratory operations at the Weaverthorpe wellsite will pose any risk to, or have any meaningful influence on, the continued attainment of air quality standards at the nearest locations of human exposure.*
>
> *At the nearest designated and local ecological sites requiring assessment, which are sensitive to nitrogen oxides, sulphur dioxide and nitrogen and acid deposition, process contributions are considered unlikely to pose any threat to, or have any substantial influence on, the attainment of critical levels and critical loads.*
>
> *Necessary assumptions made to undertake the modelling are considered to have the effect of substantially overestimating the process contribution to ambient concentrations. It is considered that the predicted process impact reported herein is a conservative assessment and the conclusions reached therefore incorporate a reasonable margin of comfort despite the inevitable uncertainty of such modelling studies.'*

10.1.1 Impact from Construction Activities

The AQIA has assessed the impact from dust arising from the installation as 'negligible' which has been summarised within the Summary Section within the AQIA.

> *'It is likely that the construction activities associated with the development of the wellsite will give rise to dust emissions. It is expected, based on Institute of Air Quality Management methodology, that with adequate mitigation measures in place the risk of dust impact from all proposed development operations will be 'negligible'.'*

10.1.2 Impact from Operations Traffic

The AQIA has assessed the impact from operations traffic as 'neutral' which has been summarised within the Summary Section within the AQIA.

> *'Increases in road traffic brought about by the construction activities and subsequent site operation are assessed to have a neutral impact on air quality based on the guidance within National Highways' Design Manual for Roads and Bridges.'*

10.1.3 Impact from Odour

There is a risk of fugitive releases of natural gas during drilling and well testing operations. There is potential for Sulphur compounds within the fugitive releases which are potentially odorous. An Odour Risk Assessment has concluded that fugitive releases pose a negligible risk to loss of amenity due to odour at the nearest residential neighbours.

10.2 Groundwater Quality Monitoring

The Operator is proposing to construct at least three (3) groundwater quality monitoring boreholes within the Wellsite in order to assess the potential for an impact from the proposed operations.

Groundwater monitoring will be implemented from one (1) upgradient groundwater monitoring borehole and from two (2) downgradient groundwater monitoring boreholes.

Following construction of the groundwater quality monitoring boreholes, the Operator is proposing a scheme of groundwater quality monitoring to be undertaken at the Wellsite.

The scheme will consist of three (3) rounds of groundwater quality monitoring to establish a baseline, followed by subsequent rounds of groundwater quality monitoring to be undertaken at intervals agreed with the Environment Agency in accordance with the requirements set out within the environmental permit.

10.3 Surface Run-off Water

The Operator is proposing to discharge only 'clean' surface run-off water from the Wellsite and therefore a surface water discharge permit will not be applied for.

The discharge of 'clean' surface run-off water from the Wellsite will be the subject of a Surface Water Management Plan (13 – Surface Water Management Plan) provided in support of the environmental permit application.

For clarity, the Operator is not proposing to discharge surface run-off water during Phase 2 and Phase 3 operations. Surface run-off water collected within the perimeter ditch during Phase 2 (drilling operations) and Phase 3 (short term well test) will be transferred off site by an Environment Agency licenced waste contractor to an Environment Agency licensed waste treatment facility.

In the event that the Weaverthorpe-1 Well is a success case, 'clean' surface run-off water will be discharged to surface through a Class 1 Interceptor which will be installed following a successful short term well test phase of operations.

Where there is potential for the surface run-off water to be contaminated, the surface run-off water will be tested to identify any pollutants contained within the surface run-off water.

If the results of the test identify that the surface run-off water is contaminated from any site spillages, arrangements will be made for the surface run-off water to be transported off site by an Environment Agency licenced waste contractor to an Environment Agency licensed waste treatment facility.

If the results of the test identify that the surface run-off water is 'clean' then the surface run-off water will be discharged in accordance with the Operator's Surface Water Management Plan.

10.4 Soil Analysis

The Operator is proposing to undertake soil sampling analysis to establish a good reference point as to the condition of the land underneath the Wellsite, which should be the target condition upon eventual site restoration.

The soil sampling and analysis will form the basis of a Ground Investigation Report which will be utilised as a baseline prior to the commencement of the development.

REFERENCES

1. The Environmental Permitting (England and Wales) Regulations 2016

   Available at: https://www.legislation.gov.uk/uksi/2016/1154/contents/made

2. Environment Agency (Environmental Permitting and Abstraction Licensing) (England) Charging Scheme

   Available at: https://www.gov.uk/government/publications/environmental-permits-and-abstraction-licences-tables-of-charges

3. Environment Agency, 2013, Guidance for Applicants H5: Site Condition Report – Guidance and Templates [Version: 3.0]

   Available at: https://www.gov.uk/government/publications/environmental-permitting-h5-site-condition-report

4. Multi-Agency Geographic Information for the Countryside

   Available at: https://magic.defra.gov.uk/MagicMap.aspx

5. British Geological Survey (BGS) Maps and Resources

   Available at: https://www.bgs.ac.uk/discovering-geology/maps-and-resources/maps/

6. Water Resources Act 1991

   Available at: https://www.legislation.gov.uk/ukpga/1991/57/contents

7. Water Act 2003

   Available at: https://www.legislation.gov.uk/ukpga/2003/37/contents