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TEGCO LTD

IMMINGHAM WASTE TO ENERGY PLANT

SITE CONDITION REPORT

MAY 2023

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TEGCO LTD

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SITE CONDITION REPORT

MAY 2023

PREPARED BY:

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APPROVED BY:

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APPENDICES

DRAWINGS	TITLE	SCALE
1816 005	Site Plan (Max Design)	1:500@A0

1 INTRODUCTION

1.1.1 Wardell Armstrong have been appointed to prepare a Site Condition Report to support a permit application made by TEGCO for their Waste to Energy Plant at Stallinborough in North Lincolnshire.

1.1.2 The report is based on a Phase 1 Desk Study and Phase II Site investigation completed by RGS with additional information from a Remediation Strategy and Drainage Technical Note prepared by Alan Wood and Partners. Baseline data is provided within the Phase II report.

1.1.3 The report has been written to comply with the Environment Agency's H5 template for Site Condition Reports. It summarises the environmental setting of the site, any existing contamination identified, the hazardous substances to be stored on site and the measures in place to protect the land so as to ensure the site is maintained in and/or returned to a "satisfactory state", allowing eventual surrender of the permit.

2 SITE DETAILS

2.1.1 The applicant is TEGCO Ltd who will operate the waste to energy plant close to Scandinavian Way, Stallingborough, Grimsby, DN41 8DT. The site can be accessed from Netherlands Way or Europa Way.

2.1.2 The grid reference for the site the site is 520681 414377.

2.1.3 This document, GM12772 Report 01, represents the Site Condition Report at application.

2.1.4 The site boundary is shown on drawing 1816, 005, prepared by Max Design. An aerial photograph is also shown in the RGS Phase 1 report.

3 CONDITION OF LAND AT PERMIT ISSUE

3.1 Geology Hydrology and Surface Water

3.1.1 The Phase I Report (Appendix 1) identified that the site was likely to comprise made ground placed over superficial deposits of the Tidal Flat Deposits, described as "a normally consolidated soft silty clay, with layers of sand, gravel and peat."

3.1.2 The site was also identified as overlying the Flamborough Chalk Formation.

3.1.3 This assessment was borne out by the site investigation, which revealed made ground across the site to a depth of up to 2.1m. Made ground comprised a sandy gravel with stone, brick, concrete, and ash present.

3.1.4 The underlying superficial deposits comprised mainly silty clays with horizons of sand gravel and peat present in some boreholes.

3.1.5 The bedrock was encountered just over 19m below ground level comprising a weathered chalk.

3.1.6 MAGIC.gov.uk, accessed on 10th May 2023, does not show the superficial deposits at the site, though it does show superficials, designated as a secondary undifferentiated aquifer, nearby.

3.1.7 Unsurprisingly, MAGIC.gov.uk shows that the chalk bedrock is defined as a principle aquifer and it is known to support groundwater abstractions, the closest of which is to the north of the site. The site lies within the zone III, total catchment, for this borehole. The site is not shown in a drinking water protection area.

3.1.8 RGS monitored groundwater levels at 8 standpipes installed at the site during the summer of 2020. This showed that groundwater was present close to the surface with levels being monitored between 0.0m and 1.1m below ground level.

3.1.9 In terms of surface water, the closest surface water course is the North Beck Drain, which lies to the north and west of the site boundary. Given the location, it is likely that this is in hydraulic continuity with groundwater under the site. The North Beck Drain flows towards the Humber Estuary, which lies approximately 1.175km to the east of the site.

3.1.10 The Humber Estuary is designated as a Ramsar Site, Special Area of Conservation, Special Protection Area for birds and a Site of Special Scientific Interest.

3.1.11 The site is thus in a relatively sensitive location in terms of hydrology and hydrogeology and measures will need to be maintained to protect the North Beck Drain and groundwater immediately beneath the site, to prevent any contamination reaching the chalk principle aquifer of the highly protected Humber Estuary.

3.2 Pollution History

3.2.1 As part of their Phase 1 report RGS reviewed historical mapping for the site. This revealed the following history of the site.

3.2.2 Between 1886 and 1984 the site remained undeveloped and comprised agricultural fields, although electrical power lines were installed, crossing the site, in the 1950s or 1960s. In the late 19th and early 20th centuries the adjoining land was also relatively undeveloped, with a railway being constructed to the East in the 1930s. A "gypsum disposal bed" is described 75m to the northwest of the site from the 1950s.

3.2.3 Between 1978 and 1984 an industrial estate was developed the south of the site. From 1984 the industrial estate continued to expand and the site was developed for the first time. The RGS report describes a large warehouse constructed in the centre of the site. Additional railway lines were located to the north and south of the site. It appears from their report that these features are likely to have been part of the Immingham Rail Freight Terminal and may have been used to store soda ash and for the dismantling of railway stock.

3.2.4 The site then remains relatively unchanged until the present day.

3.2.5 There is therefore potential for the site to be contaminated from storage of materials and dismantling of railways stock, during its use as a rail freight terminal.

3.2.6 There are a number of potentially polluting land uses nearby. The RGS report highlights one current and one historic landfill around 215m southwest of the site, the gypsum disposal bed approximately 75m to the north, a potential transfer station 3m northeast of the site, an inert waste transfer and treatment site 24m east of the site and a waste treatment facility 63m southeast of the site.

3.2.7 Their report also highlights various exempt activities within 250m of the site. A review of the Environment Agency's online public register, undertaken on 10th May 2023, shows that 12 exemptions were registered within 1km of the site. These included sites on Scandinavian Way, Netherlands Way and Europa Way with storage and sorting of materials for reuse or recycling and screening of inert materials to produce aggregate taking place close to the site.

3.2.8 A site walkover undertaken by RGS did not identify and olfactory or visual evidence of contamination on the site.

3.3 Evidence of Contamination and Baseline Data

3.3.1 A site investigation was undertaken by RGS in 2020, comprising 10 cable percussive boreholes, 4 windowless sample boreholes and 12 trial pits. During the investigation standpipes were place in 8 of the boreholes to provide gas and groundwater

monitoring. Samples were taken from groundwater and soils. A copy of the report is provided as Appendix 2.

3.3.2 The results showed that in general gas levels were low across the site. The maximum reading for methane was 1.8% though levels were typically less than 1%. Carbon dioxide was measured at a maximum of 6.8% but again levels were typically less than 1%.

3.3.3 17 soil samples were tested for asbestos and it was identified in just one sample. Further quantification showed that asbestos was present at a level of <0.001%.

3.3.4 Soils were tested for a range of potential contaminants including metals, metalloids, and common organic and inorganic pollutants. For the soil samples, total levels of contamination were compared to soil screening values set for commercial use. The only contaminants that breached the SSVs were PAHs. Overall, it was determined by the report writers that no contamination had been found at levels that would present a risk, based on the end use of the site for commerce or industry.

3.3.5 Water monitoring revealed that, in general, levels of contamination were low. Despite the potential for rail stock to have been dismantled on site in the past, no total petroleum hydrocarbons (TPH), polycyclic aromatic hydrocarbons (PAH) or phenols were detected in any groundwater samples. Some metals or metalloids were detected at levels above the environmental quality standards (EQS) for fresh water including antimony, cadmium, copper, selenium, vanadium and zinc. The report concluded that as levels were not particularly high in soils this represented a declining source and further contamination was unlikely.

3.3.6 Overall, no specific remediation was required to develop the site as an EfW facility, though it was recommended that gas protection measures were installed and that there was a watching brief to deal with any contamination encountered during the development. See Appendix 3, Remediation Strategy, prepared by Alan Wood and Partners, for further detail.

3.3.7 The full Phase II report is presented as Appendix 2. This provides the full results of the investigation and is considered to represent the baseline data for this site.

4 PERMITTED ACTIVITIES

4.1 Activities on Site

4.1.1 The site is to be developed as an Energy from Waste Facility and will treat 320,000 tonnes of refuse derived fuel (RDF) each year, to generate electricity.

4.1.2 RDF delivered to site will be unloaded into a bunker inside the Tipping Hall, which will have impermeable flooring. Waste will be moved to the incineration lines and the heat will be used in two boilers to raise steam and drive the turbine for electricity generation.

4.1.3 Exhaust air from the incineration lines will pass through an air treatment plant where hydrated lime will be added to treat acid gases and powdered activated carbon (PAC) will be added to adsorb metals and other pollutants as the gas passes through the bag filters.

4.1.4 Air pollution control residues collected from the bag filters will be transferred via a fully enclosed system to one of three sealed silos.

4.1.5 Air will be treated using SNCR, with urea as the reagent, to reduce levels of nitrogen dioxide in the exhaust.

4.1.6 Lime and PAC will be delivered to site by tanker and will also be stored in sealed silos with a sealed system to deliver these reactants into the process whilst avoiding emissions.

4.1.7 All silos will be fitted with a cartridge filter at the vent to prevent emissions of particulates to air and systems will be in place to prevent over filling and minimise the risk of dust escaping. The area around the silos will comprise concrete surfacing so that in the unlikely event of a spillage this can be easily cleared and there is no risk of emissions to surface water or groundwater.

4.1.8 Diesel will be stored on site for the operation of site plant such as the fire water pump and back-up generator. This will be stored within the equipment in self-bunded tanks with the bund capable of containing at least 110% of the tank's contents. Again, systems will be in place to prevent overfilling or any emissions during delivery or fuelling. Back up fuel for the incineration plant will be natural gas and therefore does not pose a risk to soils and water.

4.1.9 Bottom ash will also be stored in a bunker constructed from impermeable concrete to prevent pollutants leaching. The ash bunker will be located inside a building, preventing rainwater from coming into contact with waste.

4.1.10 Any other materials used in the process will be used in relatively small quantities. These will be stored in suitable drums or IBCs and will be provided with bunding to prevent emissions in the event of a leak or spill.

4.2 Site Drainage

4.2.1 All waste and other materials will be stored inside the buildings or in sealed silos preventing rainwater from coming into contact with potentially polluting materials. Bunding will be provided for all tanks, drums etc, to provide secondary containment for all liquids. Storage areas will have concrete surfacing allowing any spillage to be contained and cleaned up, preventing emissions to groundwater.

4.2.2 Alan Wood and Partners have prepared a drainage strategy for the site and this is included as Appendix 4.

4.2.3 Process water will be stored in a sealed pit, constructed from concrete. The intention is that all process water will be recirculated and reused on site, with eventual use as a quench for the bottom ash. On the rare occasions that excess water is present (for example if a boiler needs to be drained down) then the water will be collected by tanker. (Note that this supersedes the information in the Drainage Technical Note).

4.2.4 Roof water and drainage from clean external areas of the site will be drain to the North Beck Drain via a SuD system.

4.2.5 The site has been divided into high, medium and low risk areas. The high risk areas include the yard at the entrance to the tipping hall. With the most traffic, this area will drain to the SuDS via a class 1 interceptor, to capture any oily residues.

4.2.6 The other high risk areas are around the APCR silos and chemical unloading point. Although within the SuDs, these two areas are designed to be self-contained and can be isolated in the event of a spill. Following a spillage, they will be isolated and will only be re-connected to the drainage system once a full clean-up has been completed.

4.2.7 Most of the other external areas are classed as medium risk and water from these areas will pass through filter drains and a detention basin to allow settlement of any solids. Water from low risk areas, including the roofs, will flow directly via collector drains to the detention basin.

4.2.1 Water will be moved from the detention basin to the beck at a controlled rate of 5.6 l/s using a pump. This means that in an emergency situation, where a spillage may run into the drainage system, the pump can be switched off to retain water on site. This will allow for sampling and testing and, if necessary, removal of the water to a permitted site using a tanker.

4.2.2 The SuDS with pumped discharge is expected to be an improvement on the current situation, where stormwater flows into the beck with no controls.

5 HAZARDOUS AND POLLUTING SUBSTANCES

5.1.1 The Industrial Emissions Directive (transposed into English law via the Environmental Permitting Regulations 2016) requires that a baseline report is submitted where the activity involves the use, production or release of relevant hazardous substances.

5.1.2 The baseline report should determine the state of soil and groundwater so as to be able to make a quantified comparison on cessation of the activities.

5.1.3 Hazardous Substances are those that are defined Article 3 of Regulation (EC) No. 1272/2008, on the classification, labelling and packaging of substances and mixtures, and do not include waste.

5.1.4 The table below sets out hazardous substances that may be stored on site as well as the wastes and non-hazardous materials that could be potentially polluting. The table summarises how they will be contained to prevent emissions to the environment.

Table 1: Hazardous Substances Stored on Site				
Substance	**Relevant Hazardous Substance**	**Maximum Stored**	**Use**	**Stored**
Hydrated Lime	Yes H314 causes skin burns H318 causes severe eye damage	108 tonnes	Air pollution control, control of HCL, SO_2 and other acid gases	Stored in 2No.120m^3 sealed silos with enclosed delivery systems over concrete surface. Procedures in place to prevent overfilling or spills.
Diesel	Yes H351 suspected carcinogen H304 aspiration hazard H332 harmful if inhaled H315 skin irritant H226 flammable liquid H411 chronic toxin in the aquatic environment	1.3m^3	Operation of back-up generator and fire pump	Appropriate tank with bunding to 110% of the size of the tank. Procedures in place to prevent overfilling or spills.
Lubricating oil and grease	Potentially, depending on make up	Very small quantity only	Plant maintenance	Stored in appropriate containers with drip tray/bund to contain any leaks or spills. Stored inside building on impermeable pavement.
Hydraulic oil	No	Very small quantity only	Plant maintenance	Stored in appropriate containers with drip tray/bund to contain any leaks or spills. Stored inside building on impermeable pavement.
Boiler chemicals	Potentially, depending on make up	Very small quantity only	To prevent lime scale or corrosion in boiler pipes	Stored in appropriate containers with drip tray/bund to contain any leaks or spills. Stored inside building on impermeable pavement.
PAC	No	0.5 tonnes	Air pollution control, control of metals and VOCS	Sealed silo with enclosed delivery systems over concrete surface. Procedures in place to prevent overfilling or spills.
Urea 40% solution	No	50m^3	Air pollution control, control of NO_X	Sealed and bunded container with enclosed delivery systems in a building. Procedures in place to prevent overfilling or spills.
Bottom ash	No	450 tonnes	Residue from process	Sealed bunker inside a building to prevent leaching.
Air Pollution control residues (flue gas cleaning residues)	No but may have hazardous properties H314 causes skin burns H318 causes severe eye damage	192 tonnes	Residue from essential pollution prevention	2 sealed silos with enclosed delivery systems over concrete surface. Procedures in place to prevent overfilling or spills.
Fly ash (boiler dust)	No but potentially has hazardous properties, depending on make up	69 tonnes	Residue from cleaning of boiler tubes	Sealed silo with enclosed delivery systems over concrete surface. Procedures in place to prevent overfilling or spills.
Boiler drain down water	No	120m^3	Residue from boiler maintenance	Appropriate tank, pending collection and disposal at permitted site.
Refuse derived fuel	No	2,880 tonnes	Incoming waste prepared for incineration	Off loaded inside tipping hall. Store in concrete built bunker inside building to prevent leaching.

6 CONCLUSION

6.1.1 The installation will store and use diesel and lime which are relevant hazardous substances. It is therefore necessary to provide a baseline report as part of the application.

6.1.2 This report provides the Site Condition Report at permit issue and, along with the appendices, provides the baseline report with the results of analysis of soil and groundwater samples taken from the site presented in the appendices.

6.1.3 The operations on site, hazardous substances used and other substances that could potentially cause pollution of soil and groundwater are presented with a summary of how they will be stored to prevent emissions.

6.1.4 The site will operate in accordance with the best available techniques for incineration and as such pollution of soils or groundwater will be prevented.

6.1.5 Monitoring will be carried out in accordance with the permit conditions to ensure that no pollution has occurred. Due to the measures in place, the minimum level of monitoring is deemed sufficient, that is once every five years for ground water and once every ten years for soils.

APPENDICES

Appendix 1

Phase 1 Environmental Desk Study (RGS)

Environmental
Geotechnical
Specialists

PHASE 1 ENVIRONMENTAL DESK STUDY

job number	date
C700/20/E/1078	06/05/2020

site address
Immingham EFW Sites 1 and 2,
Scandinavian Way,
Stallingborough,
Grimsby, North East Lincolnshire, DN41 8DT

written by	checked by
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GEOTECHNICAL ENVIRONMENTAL

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Appendices

Environmental Geotechnical Specialists

Report on a Phase One Desk Study

Location:	Immingham EFW Sites 1 and 2, Scandinavian Way, Stallingborough, Grimsby, North East Lincolnshire, DN41 8DT
For:	Newton Energi Limited
Report No.	C700/20/E/1078 Report date: May 2020

For and on behalf of **Rogers Geotechnical Services Ltd**

Dr. Mike Cook BSc PhD
Environmental Engineer

Charlotte Mason BSc FGS
Geo-environmental Engineer

1. Introduction

The site comprises an area of brownfield land located at the Former Immingham Railfreight Terminal, Scandinavian Way, Stallingborough, Grimsby, North East Lincolnshire, DN41 8DT. The site is approximately 5.24 hectares in size and its National Grid reference is centred around 520705 414392.

It is understood that development proposals currently comprise the partial demolition of the existing building and the erection of a 20MWE waste to energy power generation facility, 65m stack and associated plant, machinery, parking and external works. In order to assist with the decision making process, and any planning and construction aspects of the development, a phase one environmental desk study has been commissioned and is the subject of this report.

In accordance with issued guidance, a site walkover was conducted on the 28th April 2020 and the following observations were made:

General site description/current site use
The site comprises an empty warehouse and vacant surrounding land. The warehouse covers a large footprint in the centre of the site. The surrounding land is generally clear and flat, however a beck runs along the northwest and northern side of the site along which embankments are present.

Site boundaries/access
Access is available to the site off two roads, Netherlands Way which adjoins the sites southwest corner and Europa Way which adjoins the sites southeast corner. The site boundaries mainly comprise metal and wire fencing, with concrete walls also present in some locations.

Topography
The site is relatively flat, with the exception of the area surrounding the beck, where an embankments are present.

Surface cover of site
The site appears to be mainly covered by gravel. Some small mounds of were present along the sites southern border. From surface these mounds appear to comprise a mixture of soils and gravels. The embankment area along the beck is covered by grass and light shrubs.

Visible evidence of contamination/ contaminative sources
The soil mounds on site may be contaminated depending on the exact nature of the material at depth. There were no other visible signs of contamination present during the time of the walkover.

Presence of vegetation and wildlife
Vegetation across the majority of the site was limited to weeds and rare shrubs. However, grass and light shrubs are present along the becks embankment. Vegetation seems to be healthy with no evidence of degradation. There were no obvious signs of invasive flora, fauna, nesting birds, burrowing animals or edible plants observed during the time of the site walkover.

Services
Electrical services and drains were noted to be present on site, the locations of these will need to be considered during any intrusive investigation. There were no overhead services present within the site at the time of the walkover.

Site neighbours
The site is located within an industrial area, with an industrial estate present to the east, south and southwest. Agricultural fields are present beyond the beck to the north.

In order to ensure that the site is fully characterised and to comply with the Environment Act 1995[1], a Phase One Desk Study has been commissioned by Newton Energi Limited. The desk study is intended to assess the environmental impact of historical, current and future factors on the development. This report will present the data obtained and provide a conceptual ground model and preliminary risk assessment as well as discussing the scope of any intrusive investigation that may be required. This report does not consider ecological impacts (e.g. bats) or botanical risks (e.g. Japanese Knotweed).

2. Review and Summary of Published Data

As a part of this desk study the following data has been considered.

- Groundsure Reports - Appendix 1
- Historical maps - Appendix 2
- Site Plan - Appendix 3
- Photographs - Appendix 4

The data obtained from the above mentioned sources has been summarised below[2].

[1]S57 of the Environment Act 1995 inserted the contaminated land regime into the Environmental Protection Act 1990 (Part 2A). The regime **'provides a risk based approach to the identification and remediation of land where contamination poses an unacceptable risk to human health or the environment'** See http://www.environment-agency.gov.uk/research/planning/40405.aspx. This places a duty on local authorities to inspect their areas for contaminated land and require its remediation using the 'suitable for use' approach. Much of this duty is discharged via the planning regime under the Town and Country Planning Act 1990 as historical land contamination is a 'material planning consideration.' The local authorities are required to secure the removal of unacceptable risks via remediation of the land, to therefore ensure the site is suitable for its new use. This is fulfilled via completion of a Phase One Environmental Desk Study, Phase Two Intrusive Investigation, Phase Three Remediation Strategy and Phase Four Validation Report. Therefore, as a minimum, once a site has been developed it should not be capable of being designated as 'contaminated land' under Part 2A of the Environmental Protection Act 1990, as inserted by the Environment Act 1995 (see also PPS 23 Planning and Pollution Control Section 8)

[2] This report is a summary only and reference must be made in full to the information provided in the Groundsure Report.

2.1 Historical Land Use

Table 1: Historical Land Use[3]

HISTORICAL MAPPING SUMMARY		
Map Dates	**On site**	**Within 250m**
1886 – 1910	The site is not developed and appears to comprise agricultural fields.	A beck/drain (North Beck Drain) appears to be present running along the sites northwest and northern borders. Further drains are also present in the area. Drain – 50m S, 60m S, 70m NE, 90m E, 100m S Foot bridge – 100m SW. Small buildings (potential house) – 100m SW
1930 –1951	The site itself remains largely unchanged.	A railway (marked Grimsby District Light Railway) has now been constructed to the east of the main site. This railway adjoins the edge of the north-eastern leg
1951 – 1968	Electric power lines now cross the site, trending southwest from the north-eastern corner.	Gypsum Disposal Bed – 75m NW. Osbourne House – 110m SW.
1978 – 1984	The site itself remains largely unchanged.	Osbourne house and the small buildings to the southwest have now been removed (assumed demolished). The area to the south of the site now appears to have been developed into an industrial estate. Warehouse – 25m S, 50m SW, 175m SW, 190m S. Depot – 50m SE, 125m S, 125m SW.
1984 – 1988	A large warehouse has now been constructed on the centre of the site, which matches the footprint of the building currently on site (which is to be demolished). A railway line track now runs from the railway to the east, along the sites north-eastern leg and across the southern side of the site. A smaller structure is present to the south of the warehouse, this is marked as a weighbridge. Based on communications, it is understood that the features were formerly Immingham Railfreight Terminal. Past uses of which are understood to include (but are not limited to), the storage of soda ash and the dismantling railway stock.	The industrial estate to the south of the site has now been expanded. Warehouse – 90m SW.
2001 – 2020	A small structure is present to the west of the warehouse, this building is not labelled.	The surrounding are remains largely unchanged.

NB. All distances given are approximate only.

2.2 Published Geology and Geological Hazards

Table 2: Geological Data for the Site

BGS MAPPING DATA			
Strata Type	**Strata Name[4]**	**Previous Name[4]**	**Description[5]**
Made Ground/Fill	Made Ground (Undivided)	N/A	Made ground is an area where the pre-existing (natural or artificial) land surface is raised by artificial deposits. The purpose of the made ground is unspecified. Variable composition.
Superficial Geology	Tidal Flat Deposits (Clay and Silt)	N/A	Tidal flat deposits, including mud flat and sand flat deposits, are deposited on extensive nearly horizontal marshy land in the intertidal zone that is alternately covered and uncovered by the rise and fall of the tide. They consist of unconsolidated sediment, mainly mud and/or sand. They may form the top surface of a deltaic deposit. Normally a consolidated soft silty clay, with layers of sand, gravel and peat. Characteristically low relief.
Solid Geology	Flamborough Chalk Formation	N/A	White, well-bedded, flint-free chalk with common marl seams (typically about one per metre). Common stylolitic surfaces and pyrite nodules.

[3] See Appendix 2
[4] Sources: British Geological Survey (NERC) Map Sheets 81; Patrington; Solid and Drift Edition, and Geology of Britain Viewer [*online resource from www.bgs.ac.uk*]
[5] Sources: British Geological Survey (NERC) Lexicon of Named Rock Units [*online resource from www.bgs.ac.uk*]

GEOLOGICAL FEATURES			
Type	**Location**	**Features**	**Comments**
Mining Activity	On site	Coal mining.	The study site is not located within the specified search distance of an identified mining area.
		Non-coal Mining.	Not indicated to be present on site.
Linear Features	-	-	None recorded within 250m.
Landslip Deposits	No data	No data	No data

BGS BOREHOLE DATA			
Reference[6]	**Location**	**Generalised Strata Description**	**Depth**
TA21SW311	131m NW	TOPSOIL	0.3m
		Loamy CLAY	0.9m
		WARP (considered as flood deposits)	7.9m
		Boulder CLAY	18.9m
		Soft CHALK	23.5m
		Soft and hard CHALK	61.0m
TA21SW93	237m NE	WARP (considered as flood deposits)	11.9m
		PEAT	12.5m
		CLAY	14.3m
		GRAVEL and SAND	14.9m
		CLAY	18.9m
		SAND	20.2m
		CLAY	21.3m
		CHALK	33.8m

NATURAL GROUND SUBSIDENCE & HAZARDS[7]	
Type	**Risk Rating**
Potential for collapsible ground stability hazards	Negligible.
Potential for compressible ground stability	Very Low (Majority of Site).
	Moderate (Area around North Beck Drain).
	Compressibility and uneven settlement hazards are probably present on this section of the site. Land use should consider specifically the compressibility and variability of the site.
Potential for ground dissolution stability	Negligible.
Potential for landslide ground stability	Very Low.

[6] http://www.bgs.ac.uk/discoveringGeology/geologyOfBritain/viewer.html
[7] See Groundsure report

Potential for running sand ground stability	Very Low (Majority of Site). Moderate (Area around North Beck Drain). Running sand conditions are probably present on this section of the site. Constraints may apply to land uses involving excavation or the addition or removal of water.
Potential for shrinking or swelling clay ground stability	Low.
Radon	The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level. BR211 states that no radon protective measures are necessary.

2.3 Construction Issues

2.3.1 Foundation Construction

On the basis of the prevailing geology, it is anticipated that made ground and/or superficial alluvium deposits may underlie the site. Should these deposits be present in a soft / loose in-situ condition to significant depths, a deep foundation solution (e.g. piles) may be required.

It should be appreciated that an intrusive investigation will be required to validate the above opinions.

2.3.2 Site Won Materials

It would appear that made ground and/or cohesive soils are likely to be encountered at shallow depth over much of the site. This material is likely to be relatively difficult to re-engineer as a construction material. However, depending on the results of laboratory testing, it may possible to modify/stabilise the soil using lime and/or cement to form a suitable sub-base replacement for pavements and hard standings.

2.3.3 Disposal of Site Materials

If made ground is present then contamination/WAC testing will be required to establish the nature of the underlying soil before disposal to a licensed landfill site. However, it is anticipated that the naturally occurring soils would not be significantly contaminated, thus would probably be accepted by a waste disposal site catering for inert material.

2.4. Mining and Natural Cavities

2.4.1 Coal Mining

The Groundsure Report states that the site is not within an area that may be affected by coal mining.

2.4.2 Non-Coal Mining

The Groundsure Report does not indicate non-coal mining to be present on site.

2.5 Waste Management and Gas Monitoring

Table 4: Landfill Data and Artificial Ground, Recorded and Anticipated			
ENVIRONMENT AGENCY, LOCAL AUTHORITY, BGS & HISTORIC LANDFILLS			
Waste Type	**Location**	**Comments**	**Monitoring Requirement**
Active Landfills	214m SW	Landfill type: Waste Landfilling (>10 T/D) Capacity: >25,000 Tonnes	Y
Historic Landfill	216m SW	Refuse Tip (1996 Mapping)	Y
Other waste sites	3m NE	Type: Waste Transfer Station. Description: Historic Planning Application.	N
	13m SE	Type: Waste to Energy Power Generation Facility. Description: Relating to the current planning application.	N
	35m NW	Type: Gypsum Disposal Bed Description: No further details available.	N
Environment Agency/Natural Resources Wales licensed waste sites	24m E	Type: Inert and Excavation Waste Transfer and Treatment Size: 25000 Tonnes Description: Sandstop Recycling	N
	63m SE	Type: Physical Treatment Facility Size: 25000 Tonnes Description: Kiln Lane Treatment Plant	N
Waste exemptions	On site	Type: Storing and Treating Waste Exemptions Description: Various	Y
	Within 250m	Various others within 250m	N
MADE GROUND & INFILLED GROUNDWORKINGS			
Description	**Location**	**Comments**	**Monitoring Requirement**
Records of Potentially Infilled Features	On Site	Made Ground	Y
	13m NW	Made Ground	Y

2.6 Hydrogeology, Hydrology

Table 5: Ground/Controlled Water Sensitivity and Flooding		
ENVIRONMENT AGENCY AQUIFER DESIGNATION[8]		
Strata	**Designation**	**Description**
Superficial Geology On Site	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.
Solid Geology On Site	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers.
GROUNDWATER SENSITIVITY[9]		
Description	**Location**	**Details**
Source Protection Zone	On Site	Status: Zone 3 – Total Catchment.
Abstraction Licences	-	None recorded within 250m.

[8] See Appendix 1
[9] See Appendix 1

Records of Part A(2) and Part B Activities and Enforcements	-	None recorded within 250m.
Records of Licensed Discharge Consents	-	None recorded within 250m.
List 2 Dangerous Substances	64m SE	Name: Sutton & Son Ltd. Substance: pH. Status: Not Active.
	192m SE	Name: Clayden Engineering Ltd. Substance: pH Status: Not Active.
Pollution Inventories	63m SE	Name: FBM Metals (UK) Ltd And FBM Holdings Ltd. Substances: Ammonia, Zinc, Plastic, Rubber, Various Unspecified.
Groundwater Vulnerability	On Site	Status: Superficial aquifer, low vulnerability.
CONTROLLED WATERS[10]		
Description	**Location**	**Details**
River Network Entries	19-74m NW/N/NE	North Beck Drain
	24m NW 55m NE 57m SE 74m NE 81m SE 92m E 110m E 166m NE 222m SW	Unspecified Drains
Surface Water Features	-	None recorded within 250m.

POLLUTION INCIDENTS[11]			
Pollutant	**Receptor**	**Location**	**Date**
Oils and Fuel	Water Impact: Category 3 (Minor) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)	148m S	June 2003
Commercial Waste	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 3 (Minor)	192m SW	June 2003

ENVIRONMENT AGENCY FLOOD RISK[12]		
Description	**Location**	**Details**
Flood Defences	On Site	No details given.
Zone 3	-	The site is situated within a zone 3 flood plain.
Surface Water Flooding	-	Highest onsite risk indicated by Groundsure Report: 1 in 30 year, 0.1m - 0.3m.
Groundwater Flooding	-	Highest onsite risk indicated by Groundsure Report: High.

2.7 Sensitive Land Use

Table 6: Sensitive Land Uses within 250m

REGISTERED SENSITIVE LAND USES [13]		
Description	**Location**	**Details**
Nitrate Vulnerable Zone	On site	North Beck Drain Nitrate Vulnerable Zone.
SSSI Impact Zones	On site	Type: All Applications.

[10] See Appendix 1
[11] See Appendix 1
[12] See Appendix 1
[13] See Appendix 1

2.8 Industrial Land Use and Potential Sources of Contamination

In order for a conceptual site model and preliminary risk assessment to be completed the historical maps and Groundsure data requires analysis to identify any past or present activities on the site and in the area that may have the potential to cause contamination on the site. Guidance has been issued by the Environment Agency, NHBC and Chartered Institute of Environmental Health.[14] Within this document, annex 3 provides examples of important contaminants that are associated with individual uses of land. This data assists in the formulation of any chemical testing regime.

Those that we consider potentially contaminative according to the guidance are given below:

Table 7: Potentially Contaminative Sources

HISTORICAL		
Land Use	**Location**	**Classification**
Historical Construction Made Ground (Indicated by BGS)	On site	Artificial/made ground.
Unspecified Warehouse (Assumed to be Immingham Railfreight Terminal)	On Site	Unspecified works/factories/features.
Unspecified Warehouses/Depots	15m SE 42m SE 57m SE 109m SE 139m S 170m SE 178m SE 203m SE	
Unspecified Tank	232m SE 248m SE	
Railway Sidings	On Site 2m NE 173m N	Railway features.
Dock Station	2m NE	
Sewage Works	236m NE	Sewage works and sewage farms
Electricity Substation	155m SE	Electrical features.
CURRENT		
Land Use	**Location**	**Classification**
Warehouse (Assumed to be the for former Immingham Railfreight Terminal)	On Site	Unspecified works/factories/features.
Warehouse	65m SE 94m S 177m S 195m SE	
Depot	101m SE 140m SE 146m SE	
Clayden Engineering Ltd	162m SE	
S L D Pumps and Power	162m SE	
Tank	176m SE 229m SE	
Pipeline	181m N 241m E	

[14] Guidance for the Safe Development of Housing on Land Affected by Contamination, R&D Publication 66: 2008 Volume 1 and 2.

Lincoln Oil Company	40m SE	Road vehicle fuelling, service and repair.
Electricity Substation	122m SE 157m SE	Electrical features.

3. Preliminary Qualitative Risk Assessment

The potential of contamination hazards on the land has been identified and the risks associated with them are assessed in the following preliminary risk assessment in accordance with industry practice and the 'suitable for use' approach. This has been conducted using the source-pathway-receptor approach. This method dictates that there must be a risk contaminant produced at a 'source' in sufficient concentration to cause harm and there must be a 'pathway' for the contaminant to reach an identifiable 'receptor' for the linkage to be proved and a contamination hazard to be considered present. Not all substances are contaminants and not all contaminants are considered to be a risk. Indeed DEFRA and The Environment Agency state that **'a contaminant is a substance which has the potential to cause harm, while a risk itself is considered to exist if such a substance is present in sufficient concentration to cause harm and a pathway exists for a receptor to be exposed to the substance.**'

R&D Publication 66: 2008 states that the groups at risk of harm (receptors) can be identified by the following categorisation:

1. Humans: site personnel, end users, visitors and adjacent land users.
2. The water environment – receptors: groundwater, surface water, coastal waters and artificial drainage.
3. Ecosystems: plants and animals.
4. Construction/building materials/services

In order to complete a conceptual site model and therefore a preliminary risk assessment, an appraisal of the sources of contamination, potential and actual, on and in the area of the site has therefore been completed with reference to this pollution linkage.[15]

3.1 Conceptual Ground Model & Preliminary Qualitative Risk Assessment

It is understood that the development proposals currently comprise the partial demolition of the existing building and the erection of a 20MWE waste to energy power generation facility, 65m stack and associated plant, machinery, parking and external works. In view of the sensitivity of the end users it is considered that the soil screening values (SSVs) for a commercial end use should be employed.

[15] This assessment has been based on the information as to the proposed development that has been provided by the client. If the plans should change, the assessment should be re-evaluated.

The preliminary risk assessment has been evaluated with reference to the following ratings and definitions:

N/A - A source-pathway-receptor linkage is not considered to exist and therefore a risk assessment is not required.

Low - A pollution linkage is unlikely and/or the likelihood of harm occurring is low and of minor consequence.

Moderate - The linkage exists but further field or laboratory data is required to confirm that the contaminant has reached the receptor and the levels of contaminant are harmful.

High - The linkage exists and the available data indicates that significant harm may be caused and remedial action could be necessary.

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Table 8: Conceptual Site Model and Preliminary Qualitative Risk Assessment

CONCEPTUAL SITE MODEL			PRELIMINARY RISK ASSESSMENT	
Pathways	**Receptor**	**Linkage Present?**	**Risk Rating**	**Notes**
Direct contact/dermal absorption/soil ingestion	Operative	Yes – operatives are likely to come in contact with the soil.	Moderate	There are potential on and off site sources of contamination that may have caused contamination of the site. Any on site sources of contamination could migrate to neighbouring properties. Further testing required to reach a firm conclusion.
	End User	Yes – end users are likely to come in contact with the soil.	Moderate	
	Neighbours	Yes – possible source on site and immediate neighbours are present.	Moderate	
Inhalation of Dust/Vapours	Operative	Yes – contact with soil likely during works and vapours may accumulate in enclosed spaces.	Moderate	There are potential on and off site sources of contamination that may have caused contamination of the site. Any on site sources of contamination could migrate to neighbouring properties. Construction activities may create dust on and off site, which, if contaminated, could adversely affect operatives, end users and neighbours. In the event that harmful vapours are present they may accumulate in enclosed spaces, affecting operatives, end users and neighbours Further testing required to reach a firm conclusion.
	End User	Yes – vapours may accumulate in enclosed spaces.	Moderate	
	Neighbours	Yes – neighbouring properties present and possible inhalation of dust during the works.	Moderate	
Ingestion of fruit/vegetables and/or waters	Operative	Yes – no edible plants in the area of the proposed new works. However, there is a beck along the north side of the site.	N/A (Edible Plants) Moderate (Water Sources)	There are potential on and off site sources of contamination that may have caused contamination of the site. Further testing required to reach a firm conclusion.
	End User	Yes – a limited amount of soft landscaping may be present as part of the new development.	Moderate	
	Neighbours	No – no residential dwellings are present within 250m of the proposed development.	N/A	

Migration of hazardous gases via permeable strata	Operative	Yes – possible off site sources and potential source on site associated with made ground.	Moderate	Possible source on site and within 250m. A programme of monitoring is recommended but is suggested to be limited to 4 readings over one month in the first instance. If significant made ground considered capable of producing harmful gases is revealed during the investigation works, the monitoring regime may require reconsideration to take into account a higher potential risk.
	End User		Moderate	
	Neighbours	Yes – possible source on site due to made ground.	Low to Moderate	It is not considered likely that any made ground that has been brought onto site for the construction of the demolished development will produce high levels of gas, thus presenting a significant risk of harm to this receptor. This should be re-assessed during any intrusive works should this be proven to the contrary.
Spillage/loss/run off direct to receiving water	Controlled Waters	Yes – possible source on site and a beck adjoins the site.	Moderate	There are potential on and off site sources of contamination that may have caused contamination of the site. Controlled waters within 250m. A principal underlies the site. Permeability of underlying geology should be assessed. Further testing required to reach a firm conclusion.
Migration via permeable unsaturated strata	Controlled Waters	Yes – possible source on site and Principal aquifer beneath the site.	Moderate	
Run off via drainage/sewers etc	Controlled Waters	Yes – possible source on site.	Moderate	
Direct contact with contaminated soils	Plants	Yes – a limited amount of soft landscaping may be present as part of the new development.	Moderate	There are potential on and off site sources of contamination that may have caused contamination of the site. Any on site sources of contamination could migrate to neighbouring properties. Further testing required to reach a firm conclusion.
Uptake via root system			Moderate	
Direct contact with contaminated soils	Building Materials	Yes – possible source on and off site and foundation and service installation materials may be affected by the site soil.	Moderate	There are potential on and off site sources of contamination that may have caused contamination of the site. Further testing required to reach a firm conclusion.
Direct contact with contaminated groundwater				

Migration of mine gas via permeable strata	Operative End User	No – not in an area affected by coal mining activity.	N/A	
Exposure to Radon	Operative End User	No – not in a radon affected area.	N/A	The publication BR211 states that no protection measures are necessary.
Mining Instability	End User	No – not in an area affected by coal mining activity.	N/A	
Unexploded Ordinance (UXO) Risk	Operative	Yes – the Zetica[16] online maps indicate that the site is at low risk from UXO.	Low	No further action required.

Notes:

1. The above data and table is a qualitative assessment of the probable risks identified at this site, based on the information made available to us from the client, third party professional data and walkover survey.

2. Should any additional or new data come to light, the risk assessment should be revisited and any necessary changes made to any recommendations resulting from this study.

3. Where further testing is recommended as part of the risk assessment, this is in order to provide a quantitative assessment of any contamination issues. It should at all times be considered that uncertainties may remain, and therefore any testing regime and ground investigation philosophy should be ready to accommodate any necessary alterations should any data come to light or it become evident that it has not been previously considered.

[16] Pre-desk study assessment [*online resource from www.zeticauxo.com*].

4. Intrusive Investigation

4.1 Site Investigation Philosophy

The information from the Phase 1 Desk Study shows there are potential sources of contamination on the site and in the surrounding area. In view of the above, any intrusive investigation should be undertaken in accordance with the sampling strategies given in BS10175: 2011 +A2:2017 and CLR4:1994. These two sampling strategies may be classified as:

- Non Targeted – using a defined sampling pattern (BS10175)
- Targeted – based on prior knowledge and professional judgement (CLR4)

These sampling strategies are considered in more detail below. However, it is emphasised that they can be used individually or in combination depending on the depth of site knowledge.

Non Targeted Sampling

If no obvious 'hot spots' of contamination have been identified on a site, it would be recommended that a stratified random pattern of sampling points be considered. This work should be undertaken with reference to BS10175: 2011 +A2: 2017 *Investigation of potentially contaminated sites – Code of practice*: 7.6, and BS5930 2015, *Code of practice for ground investigations.*

Targeted Sampling

If a possible 'hot spot' of contamination has been identified on a site, it is recommended that a herringbone pattern of sampling points be considered in the immediate vicinity. If strong evidence of contamination has then been identified, it is recommended that sampling be highly focused to reflect that evidence and the investigator's experience. This work should be undertaken with reference to CLR4, *Sampling Strategies for Contaminated Land, 1994*.

The density of sampling required is defined in BS10175: 2011: +A2: 2017: 7.7.2.2.3, which indicates that an *exploratory* investigation usually requires a lower density sample spacing than does a *main* investigation. The BS goes on to state that *the actual density should depend upon the confidence and robustness required of decisions that will be based on the information obtained. Thus the area and depth of interest will be related to the contaminants present, the pathways and the receptors. Typical densities of sampling grids can vary from 25m to 50m centres for exploratory investigations, and 10m to 25m centres for main investigations.*

4.2 Site Specific Investigation

In view of the information provided above it is considered that an investigation of the site should include the following main elements.

4.2.1 Contamination Assessment

It may be appreciated that BS 10175 clause 7.7.2.2.3 suggests that the number of sampling points at the site should be based on a minimum of three testing locations or the size of the site with respect to the appropriate grid spacing, whichever the greater. On the basis of the site area being 5.24ha, the number of sampling points at the site should be considered with respect to the table below.

Table 9: Summary of Sampling Strategy

NUMBER OF SAMPLING POINTS					
	Soil	**Water**	**Asbestos**	**Standpipes**	**Standpipe Readings**
Exploratory Investigation 50m x 50m grid	21	-	21	21	A minimum of 4 readings over 1 month would be required as per risk assessment, however any regime must take into account the guidance detailed below.
Target Areas	It is not anticipated that any made ground across the site would be localised, hence a non-targeted sampling strategy is recommended in the first instance. Notwithstanding the above, a samples should be taken from the soil mounds in order to assess their suitability to remain on site. Should evidence of historic transformers become apparent, associated with historic railway land, targeted PCB testing will be necessary.				

Chemical testing should be undertaken on the above grid spacing and the following standard testing regime should be undertaken

- **Metals** – Be, Cd, Cr, Cu, Hg, Ni, Pb, V, Zn.
- **Semi Metals and Non Metals** – As, Se, Free Cyanide.
- **Hydrocarbons –** Polycyclic aromatic hydrocarbons (PAH EPA16), Total petroleum hydrocarbons (TPH CWG).
- **Others** – pH, Organic Content.
- **Asbestos**

Sampling Method

Investigation should include the installation of twenty-one gas monitoring standpipes for subsequent monitoring. Furthermore, soils should be obtained for chemical sampling. The sampling strategy should employ the non-targeted strategy given above in the first instance, i.e. at least twenty-one sampling points, as it is anticipated that made ground will be present across the site.

It should be possible to carry out the above work with a cable percussive drilling rig, however, it may be pragmatic to use a windowless sampling rig as well in order to achieve adequate site coverage.

Gas Monitoring

The final gas monitoring regime should be undertaken in accordance with Table 4.2 of CIRIA C665: 2007: *Assessing risks posed by hazardous ground gasses to buildings.* In that document guidance for the frequency of monitoring is provided on tables 5.5a and 5.5b *Typical/idealised frequency and period of monitoring* on page 60. For convenience, these tables have been combined and reproduced below.

Table 10: Typical/idealised Frequency and Period of Monitoring.					
Sensitivity of development	**Generation potential of source**				
	Very low	**Low**	**Moderate**	**High**	**Very High**
Low (commercial)	**4/1**	**6/2**	**6/3**	**12/6**	**12/12**
Moderate (flats)	6/2	6/3	9/6	12/12	24/24
High (residential + gardens)	6/3	9/6	12/6	24/12	24/24

Notes:

a) The first number is the minimum number of readings and the second number is the minimum period in months, for example 4/1 – Four sets of readings over 1 month.

b) At least two sets of readings must be at low and falling atmospheric pressure (but not restricted to periods below 1000mb) known as worst case conditions.

c) The frequency and period stated are considered to represent typical minimum requirements. Depending on specific circumstances fewer or additional readings may be required (e.g. any such variation subject to site specific justification). The NHBC guidance is also recommending these periods/frequencies of monitoring.

d) Historical data can be used as part of the data set.

e) Not all sites will require gas monitoring. However this would need to be confirmed with demonstrable evidence.

f) Placing high sensitivity end use on a high hazard site is not normally acceptable unless the source is removed or treated to reduce its gassing potential. Under such circumstances long-term monitoring may not be appropriate or required.

g) This guidance should be read in conjunction with BS 8576:2013 figure 6 which may justify fewer readings in the first instance, where the generation potential is considered to be very low to low. However, this should be undertaken pragmatically, and further readings obtained according to the above table, where a potentially significant source is identified and initial readings suggest that remedial measures are not necessary.

4.2.2 Geotechnical Assessment

In addition to the above contamination assessment which is likely to be required by planning authorities and insurance providers, the following investigation strategy could be considered:

Sampling Method

It is anticipated that a cable percussive drilling rig will be able to gain sufficient data in regard to the near surface soils. Moreover, such equipment should be able to undertake Standard Penetration Testing (SPT).

Soakaway Design

Should soakaway data be required for drainage design, trialpits could be excavated and infiltration tests conducted. Alternatively these tests could be undertaken within boreholes.

Geotechnical Testing

An allowance for geotechnical testing of the soils should be included in any ground investigation.

4.2.3 Flood Risk Assessment

It is recommended that a flood risk assessment is undertaken, as the Groundsure report records the site as within a zone 3 floodplain.

4.2.4 Reporting

The above data will need to be formulated into a formal assessment that should include the following:

- Geotechnical recommendations.
- Contamination assessment.
- Flood risk assessment.
- Contamination remediation strategy.
- Any recommendations for further work, if required and including validation reports where site remediation is necessary.

As soon is as practicable, and prior to the above, this Phase 1 report should be forwarded to the relevant authorities, in order to ensure they have sufficient time to review and discuss any issues.

5. References

- British Standards Institution (2015), BS5930: *Code of practice for site investigations*, B.S.I., London.
- British Standards Institution (2007), Amendment No 1 to BS5930: *Code of practice for site investigations*, B.S.I., London.
- British Standards Institution (2011) +A2:2017, BS 10175: *Investigation of potentially contaminated sites – Code of Practice,* British Standards Institute.
- British Standards Institution (2013), BS 8576 Guidance on Investigations for Ground Gas – Permanent Gases and Volatile Organic Compounds.
- Department for Environment, Food and Rural Affairs and the Environment Agency, DEFRA R&D Publications, Environment Agency, Bristol.

- CLR 2, 1994, *Guidance on preliminary site inspection of contaminated land*, Volume 1.
- CLR 4, 1994, *Sampling Strategies for contaminated land*.
- R&D Publication 66: 2008 Guidance for the Safe Development of Housing on Land Affected by Contamination.
- CIRIA Report C665 (2007), Assessing risks posed by ground gasses in buildings.
- The Environment Agency: Groundwater source protection.

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Appendix 1

Groundsure Reports

Groundsure
LOCATION INTELLIGENCE

Enviro+Geo Insight

Former Immingham Railfreight Terminal, Scandinavian Way, Stallingborough, Grimsby, North East Lincolnshire, DN41 8DT

Order Details

Date: 04/05/2020

Your ref: C700_20_E_Immingham_EFW

Our Ref: GS-6755556

Client: Rogers Geotechnical Services

Site Details

Location: 520705 414392

Area: 5.24 ha

Authority: North East Lincolnshire Council

Contact us with any questions at:
info@groundsure.com
08444 159 000

Summary of findings

Page	Section	Past land use	On site	0-50m	50-250m	250-500m	500-2000m
14	1.1	Historical industrial land uses	2	7	9	20	-
16	1.2	Historical tanks	0	0	2	6	-
17	1.3	Historical energy features	0	0	1	1	-
17	1.4	Historical petrol stations	0	0	0	0	-
17	1.5	Historical garages	0	0	0	0	-
18	1.6	Historical military land	0	0	0	0	-
Page	Section	Past land use - un-grouped	On site	0-50m	50-250m	250-500m	500-2000m
19	2.1	Historical industrial land uses	2	9	15	30	-
22	2.2	Historical tanks	0	0	3	7	-
22	2.3	Historical energy features	0	0	2	2	-
23	2.4	Historical petrol stations	0	0	0	0	-
23	2.5	Historical garages	0	0	0	0	-
Page	Section	Waste and landfill	On site	0-50m	50-250m	250-500m	500-2000m
24	3.1	Active or recent landfill	0	0	1	0	-
25	3.2	Historical landfill (BGS records)	0	0	0	0	-
25	3.3	Historical landfill (LA/mapping records)	0	0	1	1	-
25	3.4	Historical landfill (EA/NRW records)	0	0	0	0	-
25	3.5	Historical waste sites	0	3	0	1	-
27	3.6	Licensed waste sites	0	1	4	13	-
31	3.7	Waste exemptions	10	0	19	24	-
Page	Section	Current industrial land use	On site	0-50m	50-250m	250-500m	500-2000m
37	4.1	Recent industrial land uses	1	3	17	-	-
39	4.2	Current or recent petrol stations	0	0	0	0	-
39	4.3	Electricity cables	0	0	0	0	-
39	4.4	Gas pipelines	0	0	0	0	-
39	4.5	Sites determined as Contaminated Land	0	0	0	0	-

39	4.6	Control of Major Accident Hazards (COMAH)	1	0	1	0	-
40	4.7	Regulated explosive sites	0	0	0	0	-
40	4.8	Hazardous substance storage/usage	0	0	1	0	-
41	4.9	Historical licensed industrial activities (IPC)	0	0	0	0	-
41	4.10	Licensed industrial activities (Part A(1))	0	0	11	5	-
44	4.11	Licensed pollutant release (Part A(2)/B)	0	0	0	4	-
45	4.12	Radioactive Substance Authorisations	0	0	0	0	-
45	4.13	Licensed Discharges to controlled waters	0	0	0	12	-
47	4.14	Pollutant release to surface waters (Red List)	0	0	0	0	-
48	4.15	Pollutant release to public sewer	0	0	0	0	-
48	4.16	List 1 Dangerous Substances	0	0	0	3	-
48	4.17	List 2 Dangerous Substances	0	0	2	16	-
50	4.18	Pollution Incidents (EA/NRW)	0	0	2	4	-
50	4.19	Pollution inventory substances	0	0	1	0	-
51	4.20	Pollution inventory waste transfers	0	0	1	0	-
52	4.21	Pollution inventory radioactive waste	0	0	0	0	-

Page	Section	Hydrogeology	On site	0-50m	50-250m	250-500m	500-2000m
53	5.1	Superficial aquifer	Identified (within 500m)				
54	5.2	Bedrock aquifer	Identified (within 500m)				
56	5.3	Groundwater vulnerability	Identified (within 50m)				
57	5.4	Groundwater vulnerability- soluble rock risk	None (within 0m)				
57	5.5	Groundwater vulnerability- local information	None (within 0m)				
58	5.6	Groundwater abstractions	0	0	0	0	14
61	5.7	Surface water abstractions	0	0	0	0	0
62	5.8	Potable abstractions	0	0	0	0	0
62	5.9	Source Protection Zones	1	1	0	1	-
62	5.10	Source Protection Zones (confined aquifer)	0	0	0	0	-

Page	Section	Hydrology	On site	0-50m	50-250m	250-500m	500-2000m
63	6.1	Water Network (OS MasterMap)	0	18	17	-	-

66	6.2	Surface water features	0	11	10	-	-
67	6.3	WFD Surface water body catchments	1	-	-	-	-
67	6.4	WFD Surface water bodies	0	1	0	-	-
67	6.5	WFD Groundwater bodies	1	-	-	-	-
Page	Section	River and coastal flooding	On site	0-50m	50-250m	250-500m	500-2000m
69	7.1	Risk of Flooding from Rivers and Sea (RoFRaS)	High (within 50m)				
70	7.2	Historical Flood Events	0	1	0	-	-
70	7.3	Flood Defences	1	1	2	-	-
71	7.4	Areas Benefiting from Flood Defences	0	0	0	-	-
71	7.5	Flood Storage Areas	0	0	0	-	-
72	7.6	Flood Zone 2	Identified (within 50m)				
73	7.7	Flood Zone 3	Identified (within 50m)				
Page	Section	Surface water flooding					
74	8.1	Surface water flooding	1 in 30 year, 0.1m - 0.3m (within 50m)				
Page	Section	Groundwater flooding					
76	9.1	Groundwater flooding	High (within 50m)				
Page	Section	Environmental designations	On site	0-50m	50-250m	250-500m	500-2000m
77	10.1	Sites of Special Scientific Interest (SSSI)	0	0	0	0	1
78	10.2	Conserved wetland sites (Ramsar sites)	0	0	0	0	1
81	10.3	Special Areas of Conservation (SAC)	0	0	0	0	1
81	10.4	Special Protection Areas (SPA)	0	0	0	0	3
82	10.5	National Nature Reserves (NNR)	0	0	0	0	0
82	10.6	Local Nature Reserves (LNR)	0	0	0	0	0
82	10.7	Designated Ancient Woodland	0	0	0	0	0
83	10.8	Biosphere Reserves	0	0	0	0	0
83	10.9	Forest Parks	0	0	0	0	0
83	10.10	Marine Conservation Zones	0	0	0	0	0
83	10.11	Green Belt	0	0	0	0	0
83	10.12	Proposed Ramsar sites	0	0	0	0	0

84	10.13	Possible Special Areas of Conservation (pSAC)	0	0	0	0	0
84	10.14	Potential Special Protection Areas (pSPA)	0	0	0	0	0
84	10.15	Nitrate Sensitive Areas	0	0	0	0	0
84	**10.16**	**Nitrate Vulnerable Zones**	1	0	0	0	2
86	**10.17**	**SSSI Impact Risk Zones**	2	-	-	-	-
88	**10.18**	**SSSI Units**	0	0	0	0	4
Page	Section	Visual and cultural designations	On site	0-50m	50-250m	250-500m	500-2000m
92	11.1	World Heritage Sites	0	0	0	-	-
92	11.2	Area of Outstanding Natural Beauty	0	0	0	-	-
92	11.3	National Parks	0	0	0	-	-
92	11.4	Listed Buildings	0	0	0	-	-
93	11.5	Conservation Areas	0	0	0	-	-
93	11.6	Scheduled Ancient Monuments	0	0	0	-	-
93	11.7	Registered Parks and Gardens	0	0	0	-	-
Page	Section	Agricultural designations	On site	0-50m	50-250m	250-500m	500-2000m
94	**12.1**	**Agricultural Land Classification**	Grade 3 (within 250m)				
95	12.2	Open Access Land	0	0	0	-	-
95	12.3	Tree Felling Licences	0	0	0	-	-
95	12.4	Environmental Stewardship Schemes	0	0	0	-	-
95	12.5	Countryside Stewardship Schemes	0	0	0	-	-
Page	Section	Habitat designations	On site	0-50m	50-250m	250-500m	500-2000m
96	13.1	Priority Habitat Inventory	0	0	0	-	-
96	13.2	Habitat Networks	0	0	0	-	-
96	13.3	Open Mosaic Habitat	0	0	0	-	-
96	13.4	Limestone Pavement Orders	0	0	0	-	-
Page	Section	Geology 1:10,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
97	**14.1**	**10k Availability**	Identified (within 500m)				
98	14.2	Artificial and made ground (10k)	0	0	0	0	-
99	14.3	Superficial geology (10k)	0	0	0	0	-

99	14.4	Landslip (10k)	0	0	0	0	-
100	14.5	Bedrock geology (10k)	0	0	0	0	-
100	14.6	Bedrock faults and other linear features (10k)	0	0	0	0	-
Page	Section	Geology 1:50,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
101	**15.1**	**50k Availability**	Identified (within 500m)				
102	**15.2**	**Artificial and made ground (50k)**	1	1	0	2	-
103	**15.3**	**Artificial ground permeability (50k)**	1	1	-	-	-
104	**15.4**	**Superficial geology (50k)**	1	0	0	0	-
105	**15.5**	**Superficial permeability (50k)**	Identified (within 50m)				
105	15.6	Landslip (50k)	0	0	0	0	-
105	15.7	Landslip permeability (50k)	None (within 50m)				
106	**15.8**	**Bedrock geology (50k)**	1	0	0	0	-
107	**15.9**	**Bedrock permeability (50k)**	Identified (within 50m)				
107	15.10	Bedrock faults and other linear features (50k)	0	0	0	0	-
Page	Section	Boreholes	On site	0-50m	50-250m	250-500m	500-2000m
108	**16.1**	**BGS Boreholes**	4	3	10	-	-
Page	Section	Natural ground subsidence					
110	**17.1**	**Shrink swell clays**	Low (within 50m)				
111	**17.2**	**Running sands**	Moderate (within 50m)				
113	**17.3**	**Compressible deposits**	Moderate (within 50m)				
115	**17.4**	**Collapsible deposits**	Negligible (within 50m)				
116	**17.5**	**Landslides**	Very low (within 50m)				
117	**17.6**	**Ground dissolution of soluble rocks**	Negligible (within 50m)				
Page	Section	Mining, ground workings and natural cavities	On site	0-50m	50-250m	250-500m	500-2000m
119	18.1	Natural cavities	0	0	0	0	-
120	18.2	BritPits	0	0	0	0	-
120	**18.3**	**Surface ground workings**	0	0	2	-	-
120	18.4	Underground workings	0	0	0	0	0
120	18.5	Historical Mineral Planning Areas	0	0	0	0	-

121	18.6	Non-coal mining	0	0	0	0	0
121	18.7	Mining cavities	0	0	0	0	0
121	18.8	JPB mining areas	None (within 0m)				
121	18.9	Coal mining	None (within 0m)				
121	18.10	Brine areas	None (within 0m)				
122	18.11	Gypsum areas	None (within 0m)				
122	18.12	Tin mining	None (within 0m)				
122	18.13	Clay mining	None (within 0m)				

Page	Section	Radon	
123	**19.1**	**Radon**	Less than 1% (within 0m)

Page	Section	Soil chemistry	On site	0-50m	50-250m	250-500m	500-2000m
124	**20.1**	**BGS Estimated Background Soil Chemistry**	2	0	-	-	-
124	20.2	BGS Estimated Urban Soil Chemistry	0	0	-	-	-
124	20.3	BGS Measured Urban Soil Chemistry	0	0	-	-	-

Page	Section	Railway infrastructure and projects	On site	0-50m	50-250m	250-500m	500-2000m
125	21.1	Underground railways (London)	0	0	0	-	-
125	21.2	Underground railways (Non-London)	0	0	0	-	-
126	21.3	Railway tunnels	0	0	0	-	-
126	**21.4**	**Historical railway and tunnel features**	2	3	3	-	-
126	21.5	Royal Mail tunnels	0	0	0	-	-
127	**21.6**	**Historical railways**	2	0	0	-	-
127	**21.7**	**Railways**	0	1	7	-	-
128	21.8	Crossrail 1	0	0	0	0	-
128	21.9	Crossrail 2	0	0	0	0	-
128	21.10	HS2	0	0	0	0	-

Recent aerial photograph

Capture Date: 21/04/2016

Site Area: 5.24ha

Recent site history - 2015 aerial photograph

Capture Date: 03/08/2015

Site Area: 5.24ha

Recent site history - 2014 aerial photograph

Capture Date: 27/09/2014

Site Area: 5.24ha

Recent site history - 2009 aerial photograph

Capture Date: 02/06/2009

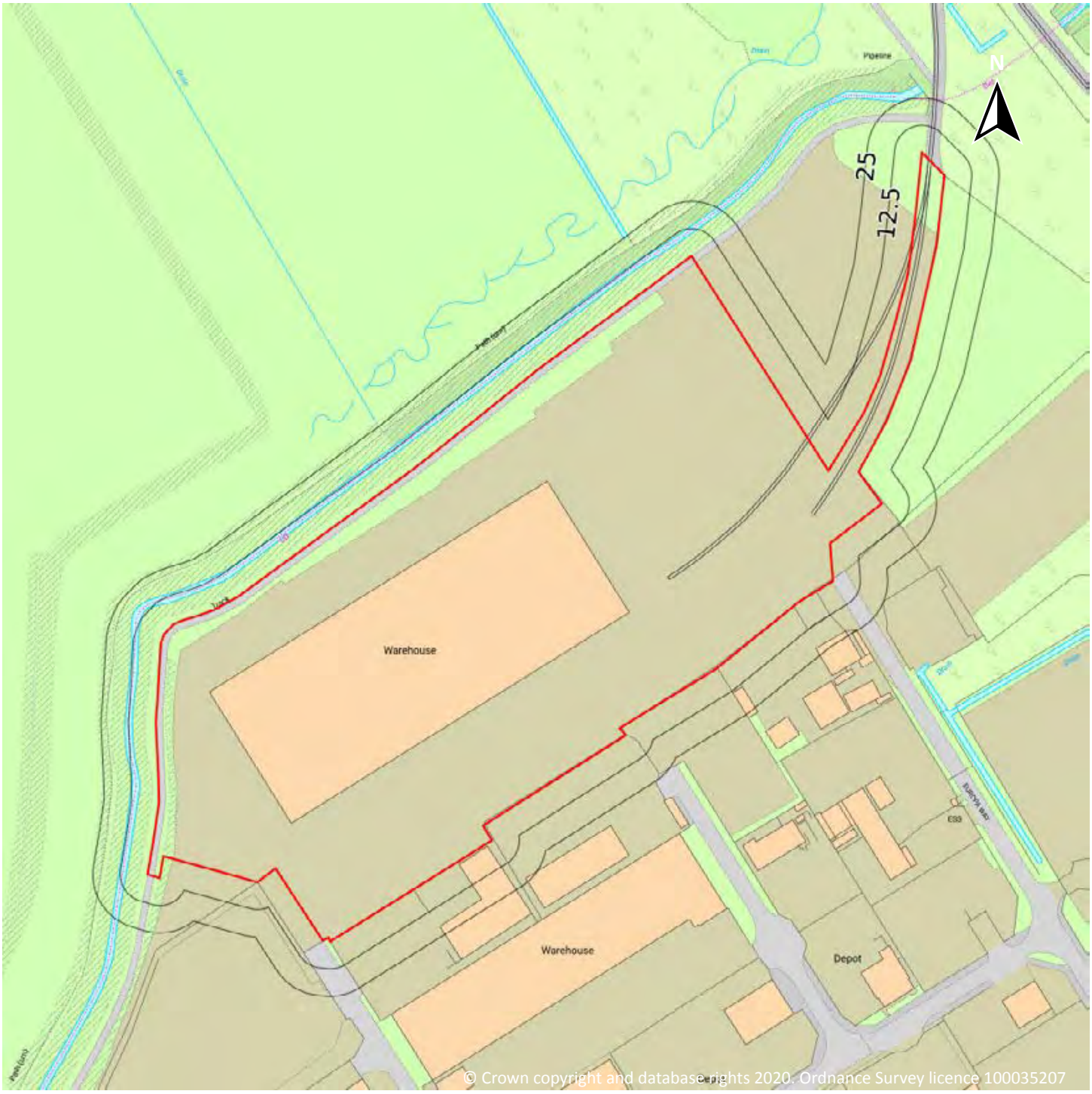
Site Area: 5.24ha

Recent site history - 1999 aerial photograph

Capture Date: 03/07/1999

Site Area: 5.24ha

OS MasterMap site plan



Site Area: 5.24ha

1 Past land use

Site Outline

Search buffers in metres (m)

Historical industrial land uses

Historical tanks

Historical energy features

1.1 Historical industrial land uses

Records within 500m	38

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 1:10,560 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 14**

ID	Location	Land use	Dates present	Group ID
1	**On site**	**Unspecified Warehouse**	**1988**	**1985835**

ID	Location	Land use	Dates present	Group ID
2	**On site**	**Railway Sidings**	**1988**	**1994297**
3	2m NE	Railway Sidings	1965	2001368
4	2m NE	Railway Sidings	1968	2002139
A	2m NE	Dock Station	1947	1988304
A	2m NE	Railway Sidings	1938 - 1947	1996271
5	15m SE	Unspecified Warehouses	1980 - 1988	1997579
6	36m NW	Gypsum Disposal Bed	1965	1988843
7	42m SE	Unspecified Warehouses	1980 - 1988	1994496
8	57m SE	Unspecified Depot	1980 - 1988	1993778
B	109m SE	Unspecified Depot	1988	1989840
9	139m S	Unspecified Warehouse	1980 - 1988	1992431
10	170m SE	Unspecified Depot	1980 - 1988	1993773
C	173m N	Railway Sidings	1947	1994854
C	173m N	Railway Sidings	1930	1995111
D	178m SE	Unspecified Warehouses	1980 - 1988	1992540
E	203m SE	Unspecified Depot	1980 - 1988	1991246
F	236m N	Sewage Works	1980 - 1988	1990902
G	294m SE	Unspecified Works	1980 - 1988	1997286
12	298m SE	Unspecified Works	1980 - 1988	2001468
F	319m N	Unspecified Tank	1980 - 1988	2001820
H	337m E	Railway Sidings	1980	1989985
H	337m E	Railway Sidings	1968	1990062
F	344m N	Unspecified Tank	1980 - 1988	1995784
F	366m N	Sewage Works	1930 - 1947	1996629
13	367m SE	Unspecified Depot	1980 - 1988	2001881
F	372m N	Unspecified Works	1968	1986962
I	396m N	Railway Sidings	1930	2000070
14	398m N	Railway Sidings	1886 - 1952	2002225

ID	Location	Land use	Dates present	Group ID
F	400m N	Sewage Works	1952	1995136
F	401m N	Sewage Works	1972	2001007
15	420m N	Unspecified Warehouse	1972	1985834
J	450m NW	Railway Sidings	1947	1995520
J	450m NW	Railway Sidings	1930	2000438
18	467m NE	Gas Valve Compound	1980 - 1988	1994317
19	489m NW	Unspecified Dock	1930	1987275
I	492m NW	Pump House	1988	1987309
20	493m SE	Industrial Estate	1988	1987810

This data is sourced from Ordnance Survey / Groundsure.

1.2 Historical tanks

Records within 500m	**8**

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 14**

ID	Location	Land use	Dates present	Group ID
11	232m SE	Unspecified Tank	1984 - 1996	334636
D	248m SE	Unspecified Tank	1984	333613
E	293m S	Unspecified Tank	1984	333614
F	323m N	Tanks	1978 - 1996	335683
F	373m N	Unspecified Tank	1978	334802
F	376m N	Unspecified Tank	1964	335593
G	412m SE	Tanks	1984	332464
17	463m SE	Unspecified Tank	1984	333612

This data is sourced from Ordnance Survey / Groundsure.

1.3 Historical energy features

Records within 500m	2

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 14**

ID	Location	Land use	Dates present	Group ID
B	155m SE	Electricity Substation	1984 - 1996	220053
16	431m S	Electricity Substation	1995 - 1996	220440

This data is sourced from Ordnance Survey / Groundsure.

1.4 Historical petrol stations

Records within 500m	0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

1.5 Historical garages

Records within 500m	0

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

1.6 Historical military land

Records within 500m	0

Areas of military land digitised from multiple sources including the National Archives, local records, MOD records and verified other sources, intelligently grouped into contiguous features.

This data is sourced from Ordnance Survey / Groundsure / other sources.

2 Past land use - un-grouped

Site Outline

Search buffers in metres (m)

Historical industrial land uses

Historical tanks

Historical energy features

2.1 Historical industrial land uses

Records within 500m	56

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 10,560 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 19**

ID	Location	Land Use	Date	Group ID
1	**On site**	**Unspecified Warehouse**	**1988**	**1985835**
2	**On site**	**Railway Sidings**	**1988**	**1994297**
3	2m NE	Railway Sidings	1965	2001368

ID	Location	Land Use	Date	Group ID
4	2m NE	Railway Sidings	1968	2002139
A	2m NE	Railway Sidings	1947	1996271
A	2m NE	Dock Station	1947	1988304
B	15m SE	Unspecified Warehouses	1988	1997579
B	15m SE	Unspecified Warehouses	1980	1997579
5	36m NW	Gypsum Disposal Bed	1965	1988843
C	42m SE	Unspecified Warehouses	1988	1994496
C	42m SE	Unspecified Warehouses	1980	1994496
D	57m SE	Unspecified Depot	1988	1993778
D	57m SE	Unspecified Depot	1980	1993778
E	109m SE	Unspecified Depot	1988	1989840
F	139m S	Unspecified Warehouse	1988	1992431
F	139m S	Unspecified Warehouse	1980	1992431
G	170m SE	Unspecified Depot	1988	1993773
G	170m SE	Unspecified Depot	1980	1993773
H	173m N	Railway Sidings	1947	1994854
H	173m N	Railway Sidings	1930	1995111
I	178m SE	Unspecified Warehouses	1988	1992540
I	178m SE	Unspecified Warehouses	1980	1992540
J	203m SE	Unspecified Depot	1988	1991246
J	203m SE	Unspecified Depot	1980	1991246
L	236m N	Sewage Works	1988	1990902
L	236m N	Sewage Works	1980	1990902
M	294m SE	Unspecified Works	1988	1997286
M	294m SE	Unspecified Works	1980	1997286
N	298m SE	Unspecified Works	1988	2001468
N	298m SE	Unspecified Works	1980	2001468
L	319m N	Unspecified Tank	1988	2001820

ID	Location	Land Use	Date	Group ID
L	319m N	Unspecified Tank	1980	2001820
O	337m E	Railway Sidings	1980	1989985
O	337m E	Railway Sidings	1968	1990062
L	344m N	Unspecified Tank	1988	1995784
L	344m N	Unspecified Tank	1980	1995784
L	366m N	Sewage Works	1947	1996629
L	366m N	Sewage Works	1947	1996629
L	367m N	Sewage Works	1947	1996629
L	367m N	Sewage Works	1930	1996629
P	367m SE	Unspecified Depot	1988	2001881
P	367m SE	Unspecified Depot	1980	2001881
L	372m N	Unspecified Works	1968	1986962
Q	396m N	Railway Sidings	1930	2000070
6	398m N	Railway Sidings	1886	2002225
L	400m N	Sewage Works	1952	1995136
L	401m N	Sewage Works	1972	2001007
7	420m N	Unspecified Warehouse	1972	1985834
S	450m NW	Railway Sidings	1947	1995520
S	450m NW	Railway Sidings	1930	2000438
T	467m NE	Gas Valve Compound	1988	1994317
T	467m NE	Gas Valve Compound	1980	1994317
U	488m NW	Railway Sidings	1930	2002225
U	489m NW	Unspecified Dock	1930	1987275
Q	492m NW	Pump House	1988	1987309
9	493m SE	Industrial Estate	1988	1987810

This data is sourced from Ordnance Survey / Groundsure.

2.2 Historical tanks

Records within 500m	10

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 19**

ID	Location	Land Use	Date	Group ID
K	232m SE	Unspecified Tank	1996	334636
K	233m SE	Unspecified Tank	1984	334636
I	248m SE	Unspecified Tank	1984	333613
J	293m S	Unspecified Tank	1984	333614
L	323m N	Tanks	1978	335683
L	323m N	Tanks	1996	335683
L	373m N	Unspecified Tank	1978	334802
L	376m N	Unspecified Tank	1964	335593
M	412m SE	Tanks	1984	332464
8	463m SE	Unspecified Tank	1984	333612

This data is sourced from Ordnance Survey / Groundsure.

2.3 Historical energy features

Records within 500m	4

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 19**

ID	Location	Land Use	Date	Group ID
E	155m SE	Electricity Substation	1984	220053
E	155m SE	Electricity Substation	1996	220053
R	431m S	Electricity Substation	1996	220440
R	431m S	Electricity Substation	1995	220440

This data is sourced from Ordnance Survey / Groundsure.

2.4 Historical petrol stations

Records within 500m	0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

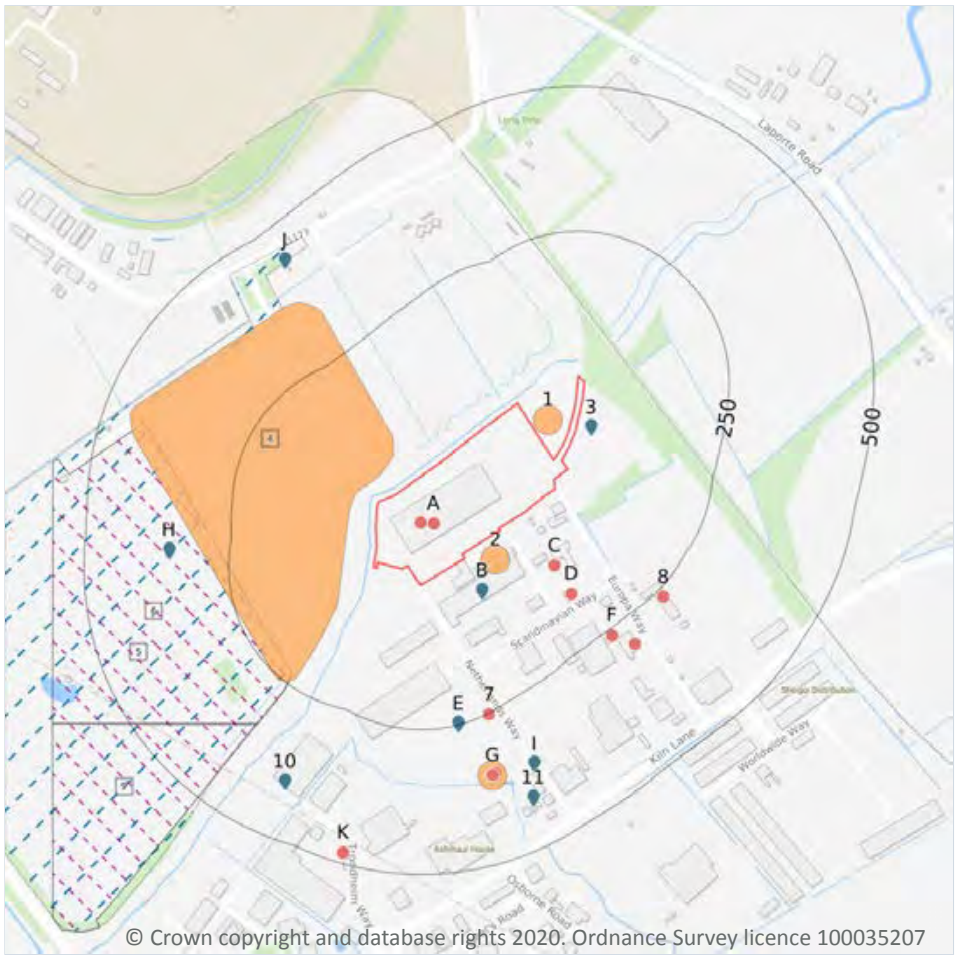
2.5 Historical garages

Records within 500m	0

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

3 Waste and landfill



3.1 Active or recent landfill

Records within 500m	1

Active or recently closed landfill sites under Environment Agency/Natural Resources Wales regulation.

Features are displayed on the Waste and landfill map on **page 24**

ID	Location	Details	
5	214m SW	Operator: Integrated Waste Management Ltd Site Address: Immingham Landfill, Queens Road, Immingham, Immingham, N E Lincolnshire, DN40 1QR	WML Number: 0 EPR Reference: - Landfill type: WASTE LANDFILLING; >10 T/D WITH CAPACITY >25,000T EXCLUDING INERT WASTE Status: Effective IPPC Reference: - EPR Number: -

This data is sourced from the Environment Agency and Natural Resources Wales.

3.2 Historical landfill (BGS records)

Records within 500m	0

Landfill sites identified on a survey carried out on behalf of the DoE in 1973. These sites may have been closed or operational at this time.

This data is sourced from the British Geological Survey.

3.3 Historical landfill (LA/mapping records)

Records within 500m	2

Landfill sites identified from Local Authority records and high detail historical mapping.

Features are displayed on the Waste and landfill map on **page 24**

ID	Location	Site address	Source	Data type
6	216m SW	Refuse Tip	1996 mapping	Polygon
9	337m SW	Refuse Tip	1996 mapping	Polygon

This data is sourced from the Ordnance Survey/Groundsure and Local Authority records.

3.4 Historical landfill (EA/NRW records)

Records within 500m	0

Known historical (closed) landfill sites (e.g. sites where there is no PPC permit or waste management licence currently in force). This includes sites that existed before the waste licensing regime and sites that have been licensed in the past but where a licence has been revoked, ceased to exist or surrendered and a certificate of completion has been issued.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.5 Historical waste sites

Records within 500m	4

Waste site records derived from Local Authority planning records and high detail historical mapping.

Features are displayed on the Waste and landfill map on **page 24**

ID	Location	Address	Further Details	Date
1	3m NE	Site Address: Land At Europa Way, Kiln Lane, Stallingborough, Grimsby, Humberside, DN41 8DW	Type of Site: Waste Transfer Station Planning application reference: DM/0748/16/SCR Description: Scheme comprises application for screening opinion to provide a new waste transfer station and Processing site. Data source: Historic Planning Application Data Type: Point	30/08/2016
2	13m SE	Site Address: Land West Of Netherlands Way, Terminal Netherlands Way, Stallingborough, Grimsby, Humberside, DN41 8DT	Type of Site: Waste To Energy Power Generation Facility Planning application reference: DM/0628/18/FUL Description: Scheme comprises partially demolish building and construction 20 megawatts waste to energy power generation facility and associated plant, machinery, parking and external works including sustainable urban drainage system. This project has been designed u sing building information modelling (BIM) Data source: Historic Planning Application Data Type: Point	06/09/2018
4	35m NW	Site Address: N/A	Type of Site: Gypsum Disposal Bed (B) Planning application reference: N/A Description: N/A Data source: Historic Mapping Data Type: Polygon	1951
G	326m S	Site Address: Netherlands Way, Stallingborough, Grimsby, Humberside, DN41 8DF	Type of Site: Food Waste Processing Plant Planning application reference: DM/1001/13/NMA Description: Scheme comprises application for non-material amendment pursuant to DC/1579/06/IMM - construction of a food waste to energy processing plant within building with associated works including 40 metre stack. The associated works include sewer systems, lands caping, infrastructure, enabling works, cable laying and access roads. Data source: Historic Planning Application Data Type: Point	08/01/2014

This data is sourced from Ordnance Survey/Groundsure and Local Authority records.

3.6 Licensed waste sites

Records within 500m	18

Active or recently closed waste sites under Environment Agency/Natural Resources Wales regulation.

Features are displayed on the Waste and landfill map on **page 24**

ID	Location	Details		
3	24m E	Site Name: Sandstop Recycling Site Address: Stallingborough Industrial Estate, Europa Way, Immingham, N E Lincs, DN41 8DU Correspondence Address: -	Type of Site: Inert & excavation Waste TS + treatment Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: SQL001 EPR reference: EA/EPR/CB3504KG/A001 Operator: Sandstop Quarries Ltd Waste Management licence No: 402106 Annual Tonnage: 0	Issue Date: 02/02/2015 Effective Date: - Modified:: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued
B	63m SE	Site Name: Kiln Lane Treatment Plant Site Address: Selvic Shipping And Fritzbender Metals, Land/ Premises At, Netherlands Way, Kiln Land Ind Estate, Stallingborough, Lincolnshire, DN41 8DF Correspondence Address: -	Type of Site: Physical Treatment Facility Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: SEL001 EPR reference: EA/EPR/RP3294NK/V003 Operator: Selvic Shipping Services Limited & F B M Metals (U K) Limited Waste Management licence No: 72096 Annual Tonnage: 16499	Issue Date: 05/02/1998 Effective Date: - Modified:: 07/01/2015 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified
B	63m SE	Site Name: Kiln Lane Treatment Plant Site Address: Land/ Premises At, Netherlands Way, Kiln Land Ind Estate, Stallingborough, N E Lincs, DN41 8DF Correspondence Address: -	Type of Site: Physical Treatment Facility Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: FBM001 EPR reference: EA/EPR/EB3002XK/V003 Operator: F B M Metals (U K) Ltd And F B M Holdings Ltd Waste Management licence No: 72096 Annual Tonnage: 25000	Issue Date: 05/02/1998 Effective Date: - Modified:: 08/02/2017 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: To PPC

ID	Location	Details		
E	248m S	Site Name: Kiln Lane Treatment Plant Site Address: Selvic Shipping And Fritzbender Metals, Land/ Premises At, Netherlands Way, Kiln Land Ind Est, Stallingborough, Lincolnshire, DN41 8DF Correspondence Address: -	Type of Site: Physical Treatment Facility Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: SEL001 EPR reference: RP3294NK/V002 Operator: Selvic Shipping Services Ltd & Fritzbender Metals (U K) Ltd Waste Management licence No: 72096 Annual Tonnage: 25000	Issue Date: 05/02/1998 Effective Date: - Modified:: 31/12/2003 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified
E	248m S	Site Name: Kiln Lane Treatment Plant Site Address: Selvic Shipping And Fritzbender Metals, Land/ Premises At, Netherlands Way, Kiln Land Ind Est, Stallingborough, Lincolnshire, DN41 8DF Correspondence Address: -	Type of Site: Physical Treatment Facility Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: SEL001 EPR reference: EA/EPR/RP3294NK/V002 Operator: Selvic Shipping Services Ltd & F B M Metals (U K) Limited Waste Management licence No: 72096 Annual Tonnage: 25000	Issue Date: 05/02/1998 Effective Date: - Modified:: 31/12/2003 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified
H	355m W	Site Name: Immingham Landfill Site (superseded By 73220 - Pp3830bv) Site Address: Integrated Waste Management Ltd, Queens Road, Immingham, N E Lincs, DN40 1QR Correspondence Address: Integrated Waste Management Ltd, The Hall, Lairgate, Beverley, HU17 8FE	Type of Site: Co-Disposal Landfill Site Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: WAS010 EPR reference: - Operator: WRG Ltd Waste Management licence No: 70825 Annual Tonnage: 2618413	Issue Date: 07/12/1992 Effective Date: - Modified:: - Surrendered Date: - Expiry Date: 14/11/2005 Cancelled Date: 14/11/2005 Status: IPPC
H	355m W	Site Name: Immingham Landfill Site (PP3830BV) Site Address: Integrated Waste Management Ltd, Queens Road, Immingham, N E Lincs, DN40 1QR Correspondence Address: -	Type of Site: Household, Commercial & Industrial Waste Landfill Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: IPC021 EPR reference: - Operator: WRG Ltd Waste Management licence No: 73220 Annual Tonnage: 0	Issue Date: 14/11/2005 Effective Date: - Modified:: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: IPPC

ID	Location	Details		
H	355m W	Site Name: Immingham Landfill Site Site Address: Integrated Waste Management Ltd, Queens Road, Immingham, N E Lincs, DN40 1QR Correspondence Address: Integrated Waste Management Ltd, The Hall, Lairgate, Beverley, HU17 8FE	Type of Site: Co-Disposal Landfill Site Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: WAS010 EPR reference: - Operator: Integrated Waste Management Ltd Waste Management licence No: 70825 Annual Tonnage: 2618413	Issue Date: 07/12/1992 Effective Date: - Modified:: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued
H	355m W	Site Name: Immingham Landfill Site Site Address: Integrated Waste Management Ltd, Queens Road, Immingham, N E Lincs, DN40 1QR Correspondence Address: -	Type of Site: Household, Commercial & Industrial Waste Landfill Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: IPC021 EPR reference: - Operator: Integrated Waste Management Ltd Waste Management licence No: 73220 Annual Tonnage: 0	Issue Date: 01/10/2004 Effective Date: - Modified:: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued
H	355m W	Site Name: Immingham Landfill Site (superseded By 73220 - Pp3830bv) Site Address: Integrated Waste Management Ltd, Queens Road, Immingham, N E Lincs, DN40 1QR Correspondence Address: -	Type of Site: Co-Disposal Landfill Site Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: WAS010 EPR reference: EA/EPR/YP3495NY/A001 Operator: W R G Ltd Waste Management licence No: 70825 Annual Tonnage: 2618413	Issue Date: 07/12/1992 Effective Date: - Modified:: - Surrendered Date: - Expiry Date: 14/11/2005 Cancelled Date: Nov 14 2005 12:00AM Status: To PPC
I	365m SE	Site Name: Huckers Yard Site Address: Unit 6, Netherlands Way, Stallingborough, N E Lincs, DN41 8DF Correspondence Address: -	Type of Site: 75kte Materials Recycling Facility Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: SJP006 EPR reference: EA/EPR/CP3694LQ/A001 Operator: S J P Trading Ltd Waste Management licence No: 100673 Annual Tonnage: 4999	Issue Date: 31/10/2008 Effective Date: - Modified:: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued

ID	Location	Details		
I	365m SE	Site Name: Huckers Yard Site Address: Unit 6, Netherlands Way, Stallingborough, N E Lincs, DN41 8DF Correspondence Address: -	Type of Site: 75kte Metal Recycling Site Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: SJP006 EPR reference: EA/EPR/CP3694LQ/V002 Operator: S J P Trading Ltd Waste Management licence No: 100673 Annual Tonnage: 79998	Issue Date: 31/10/2008 Effective Date: - Modified:: 25/07/2012 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified
10	401m S	Site Name: Sandstop Recycling Site Address: Sandstop Recycling, Stallingborough Industrial Estate, Netherlands Way, Immingham, N E Lincs, DN41 8DF Correspondence Address: -	Type of Site: Inert & excavation Waste TS + treatment Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: SAN085 EPR reference: EA/EPR/BB3504TE/S002 Operator: Sandstop Quarries Ltd Waste Management licence No: 401381 Annual Tonnage: 0	Issue Date: 02/05/2014 Effective Date: - Modified:: - Surrendered Date: May 18 2017 12:00AM Expiry Date: - Cancelled Date: - Status: Surrendered
11	414m SE	Site Name: Huckers Yard Site Address: Huckers Yard, Unit 6, Netherlands Way, Stallingborough, DN41 8DF Correspondence Address: -	Type of Site: 75kte Metal Recycling Site Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: STO160 EPR reference: EA/EPR/CB3809TK/V004 Operator: Stokesley Metals Ltd Waste Management licence No: 100673 Annual Tonnage: 79998	Issue Date: 31/10/2008 Effective Date: 15/05/2015 Modified:: 15/05/2019 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified
J	439m NW	Site Name: Immingham (Household Waste Recycling Centre) Site Address: Recycling Centre, Queens Road, Immingham, N E Lincs, DN40 1QR Correspondence Address: Iwmf, South Marsh Road, Stallingborough, N E Lincs, DN41 8BZ	Type of Site: Household, Commercial & Industrial Waste T Stn Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: CLE005 EPR reference: - Operator: Grimsby Operations Ltd Waste Management licence No: 73067 Annual Tonnage: 5000	Issue Date: 02/01/2001 Effective Date: - Modified:: 05/01/2004 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified

ID	Location	Details		
J	439m NW	Site Name: Immingham (Household Waste Recycling Centre) Site Address: Queens Road, Immingham, N E Lincs, DN40 1QR Correspondence Address: The Drive, Warley, Brentwood, Essex, CM13 3BE	Type of Site: Household, Commercial & Industrial Waste T Stn Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: CLE005 EPR reference: - Operator: Cleanaway Ltd. Waste Management licence No: 73067 Annual Tonnage: 5000	Issue Date: 02/01/2001 Effective Date: - Modified:: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued
J	439m NW	Site Name: Immingham Household Waste Amenity Site Site Address: Immingham Household Waste Amenity Site, Queens Road, Immingham, N E Lincs, DN40 1QR Correspondence Address: -	Type of Site: Household Waste Amenity Site Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: CLE005 EPR reference: EA/EPR/PP3192NP/V003 Operator: Grimsby Operations Ltd Waste Management licence No: 73067 Annual Tonnage: 4999	Issue Date: 02/01/2001 Effective Date: - Modified:: 06/03/2013 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified
J	439m NW	Site Name: Immingham Household Waste Amenity Site Site Address: Immingham Household Waste Amenity Site, Queens Road, Immingham, N E Lincs, DN40 1QR Correspondence Address: -	Type of Site: Household Waste Amenity Site Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: CLE005 EPR reference: EA/EPR/PP3192NP/V004 Operator: Grimsby Operations Limited Waste Management licence No: 73067 Annual Tonnage: 4999	Issue Date: 02/01/2001 Effective Date: - Modified:: 21/12/2017 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified

This data is sourced from the Environment Agency and Natural Resources Wales.

3.7 Waste exemptions

Records within 500m	**53**

Activities involving the storage, treatment, use or disposal of waste that are exempt from needing a permit. Exemptions have specific limits and conditions that must be adhered to.

Features are displayed on the Waste and landfill map on **page 24**

ID	Location	Site	Reference	Category	Sub-Category	Description
A	**On site**	**SCANDINAVIAN WAY, STALLINGBOROUGH, GRIMSBY, DN41 8DT**	**WEX105272**	**Storing waste exemption**	**Not on a farm**	**Storage of waste in secure containers**
A	**On site**	**SCANDINAVIAN WAY, STALLINGBOROUGH, GRIMSBY, DN41 8DT**	**WEX105272**	**Storing waste exemption**	**Not on a farm**	**Storage of waste in a secure place**
A	**On site**	**SCANDINAVIAN WAY, STALLINGBOROUGH, GRIMSBY, DN41 8DT**	**WEX105272**	**Treating waste exemption**	**Not on a farm**	**Cleaning, washing, spraying or coating relevant waste**
A	**On site**	**SCANDINAVIAN WAY, STALLINGBOROUGH, GRIMSBY, DN41 8DT**	**WEX105272**	**Treating waste exemption**	**Not on a farm**	**Sorting mixed waste**
A	**On site**	**SCANDINAVIAN WAY, STALLINGBOROUGH, GRIMSBY, DN41 8DT**	**WEX105272**	**Treating waste exemption**	**Not on a farm**	**Preparatory treatments (baling, sorting, shredding etc)**
A	**On site**	**SCANDINAVIAN WAY, STALLINGBOROUGH, GRIMSBY, DN41 8DT**	**WEX113889**	**Storing waste exemption**	**Not on a farm**	**Storage of waste in secure containers**
A	**On site**	**SCANDINAVIAN WAY, STALLINGBOROUGH, GRIMSBY, DN41 8DT**	**WEX113889**	**Storing waste exemption**	**Not on a farm**	**Storage of waste in a secure place**
A	**On site**	**SCANDINAVIAN WAY, STALLINGBOROUGH, GRIMSBY, DN41 8DT**	**WEX113889**	**Treating waste exemption**	**Not on a farm**	**Sorting mixed waste**
A	**On site**	**SCANDINAVIAN WAY, STALLINGBOROUGH, GRIMSBY, DN41 8DT**	**WEX113889**	**Treating waste exemption**	**Not on a farm**	**Preparatory treatments (baling, sorting, shredding etc)**
A	**On site**	**-**	**WEX163097**	**Storing waste exemption**	**Not on a Farm**	**Storage of waste in a secure place**
C	106m SE	Sandstop Quarries Ltd, Europa Way, Stallingborough, Immingham, DN41 8DU	WEX141998	Using waste exemption	Not on a farm	Spreading of plant matter to confer benefit
C	106m SE	Sandstop Quarries Ltd, Europa Way, Stallingborough, Immingham, DN41 8DU	WEX141998	Disposing of waste exemption	Not on a farm	Deposit of waste from dredging of inland waters
C	106m SE	Sandstop Quarries Ltd, Europa Way, Stallingborough, Immingham, DN41 8DU	WEX141998	Treating waste exemption	Not on a farm	Sorting mixed waste

ID	Location	Site	Reference	Category	Sub-Category	Description
C	106m SE	Sandstop Quarries Ltd, Europa Way, Stallingborough, Immingham, DN41 8DU	WEX141998	Treating waste exemption	Not on a farm	Screening and blending of waste
C	106m SE	Sandstop Quarries Ltd, Europa Way, Stallingborough, Immingham, DN41 8DU	WEX141998	Treating waste exemption	Not on a farm	Recovery of scrap metal
C	106m SE	Sandstop Quarries Ltd, Europa Way, Stallingborough, Immingham, DN41 8DU	WEX141998	Using waste exemption	Not on a farm	Use of mulch
C	106m SE	Sandstop Quarries Ltd, Europa Way, Stallingborough, Immingham, DN41 8DU	WEX141998	Using waste exemption	Not on a farm	Use of waste in construction
C	106m SE	Sandstop Quarries Ltd, Europa Way, Stallingborough, Immingham, DN41 8DU	WEX141998	Treating waste exemption	Not on a farm	Manual treatment of waste
C	106m SE	Sandstop Quarries Ltd, Europa Way, Stallingborough, Immingham, DN41 8DU	WEX141998	Using waste exemption	Not on a farm	Incorporation of ash into soil
D	162m SE	Lynx Recycling & Recovery, Scandinavian Way, Stallingborough, DN41 8DT	WEX114767	Storing waste exemption	Not on a farm	Storage of waste in a secure place
D	162m SE	Lynx Recycling & Recovery, Scandinavian Way, Stallingborough, DN41 8DT	WEX114767	Treating waste exemption	Not on a farm	Sorting mixed waste
D	162m SE	Lynx Recycling & Recovery, Scandinavian Way, Stallingborough, DN41 8DT	WEX114767	Treating waste exemption	Not on a farm	Manual treatment of waste
D	162m SE	Lynx Recycling & Recovery, Scandinavian Way, Stallingborough, DN41 8DT	WEX114767	Treating waste exemption	Not on a farm	Preparatory treatments (baling, sorting, shredding etc)
D	162m SE	Lynx Recycling & Recovery, Scandinavian Way, Stallingborough, DN41 8DT	WEX114767	Treating waste exemption	Not on a farm	Screening and blending of waste
D	162m SE	mistral energy, netherlands way, stallingborough, dn41 8dt	WEX132953	Disposing of waste exemption	Not on a farm	Disposal by incineration

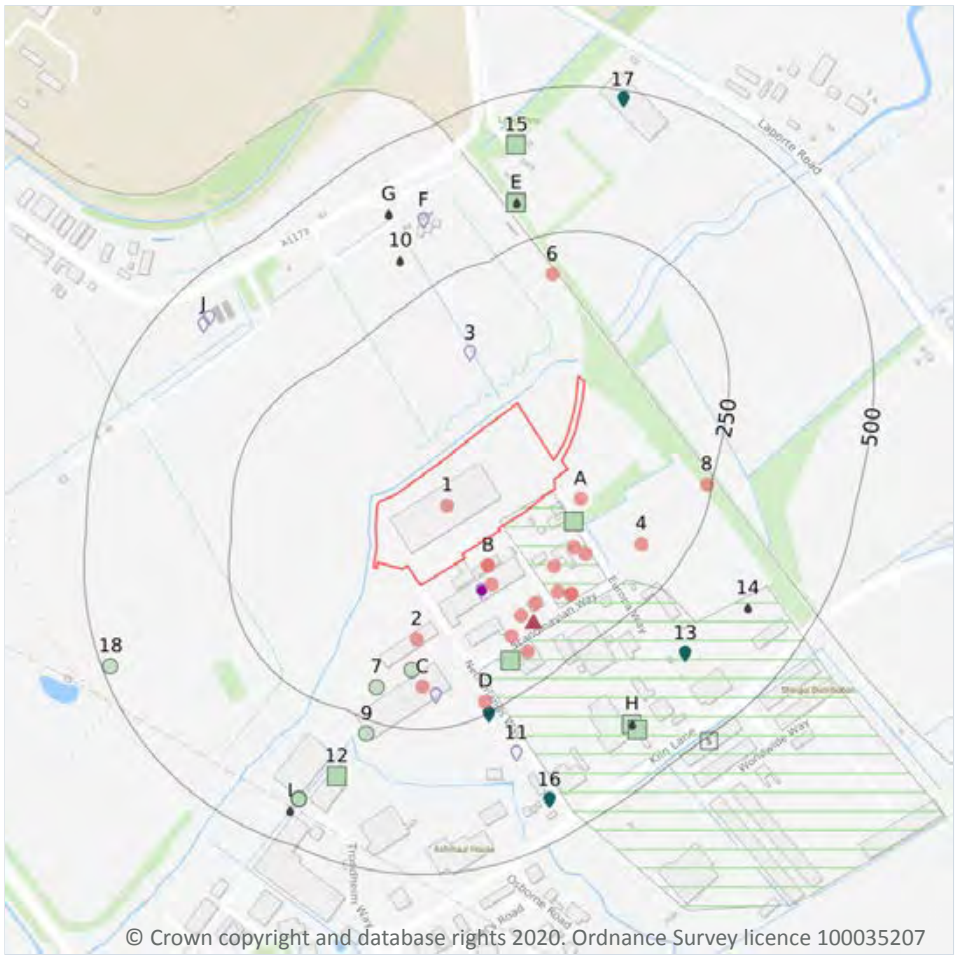
ID	Location	Site	Reference	Category	Sub-Category	Description
D	162m SE	mistral energy, netherlands way, stallingborough, dn41 8dt	WEX132953	Storing waste exemption	Not on a farm	Storage of waste in secure containers
D	162m SE	mistral energy, netherlands way, stallingborough, dn41 8dt	WEX132953	Storing waste exemption	Not on a farm	Storage of waste in a secure place
D	162m SE	mistral energy, netherlands way, stallingborough, dn41 8dt	WEX132953	Treating waste exemption	Not on a farm	Treatment of waste wood and waste plant matter by chipping, shredding, cutting or pulverising
D	162m SE	mistral energy, netherlands way, stallingborough, dn41 8dt	WEX132953	Using waste exemption	Not on a farm	Use of waste to manufacture finished goods
7	253m SE	HUCKERS YARD, NETHERLANDS WAY, STALLINGBOROUGH, GRIMSBY, DN41 8DF	WEX165575	Storing waste exemption	Not on a Farm	Storage of waste in a secure place
F	261m SE	PLOT 5 EUROPA WAY NORTH EAST LINCOLNSHIRE DN41 8DS	EPR/XF0109FX /A001	Using waste exemption	Non-Agricultural Waste Only	Burning of waste as a fuel in a small appliance
8	264m SE	LV Shipping Ltd, Europa Way, Stallingbrough, Immingham, DN41 8DS	WEX145361	Storing waste exemption	Not on a farm	Storage of waste in a secure place
F	298m SE	EUROPA WAY, STALLINGBOROUGH, GRIMSBY, DN41 8DS	WEX194354	Using waste exemption	Not on a farm	Use of waste in construction
F	298m SE	EUROPA WAY, STALLINGBOROUGH, GRIMSBY, DN41 8DS	WEX138345	Using waste exemption	Not on a farm	Burning of waste as a fuel in a small appliance
F	298m SE	EUROPA WAY, STALLINGBOROUGH, GRIMSBY, DN41 8DS	WEX153564	Treating waste exemption	Not on a farm	Treatment of waste wood and waste plant matter by chipping, shredding, cutting or pulverising
F	298m SE	EUROPA WAY, STALLINGBOROUGH, GRIMSBY, DN41 8DS	WEX153564	Using waste exemption	Not on a farm	Burning of waste as a fuel in a small appliance
G	349m S	FBM HOLDINGS LIMITED, KILN LANE INDUSTRIAL ESTATE, NETHERLANDS WAY, STALLINGBOROUGH, DN41 8DF	WEX100808	Storing waste exemption	Not on a farm	Storage of waste in a secure place

ID	Location	Site	Reference	Category	Sub-Category	Description
G	350m S	Unit 6 Netherlands Way GRIMSBY South Humberside DN41 8DF	EPR/SF0934CG/A001	Storing waste exemption	Non-Agricultural Waste Only	Storage of waste in secure containers
G	350m S	Unit 6 Netherlands Way GRIMSBY South Humberside DN41 8DF	EPR/SF0934CG/A001	Storing waste exemption	Non-Agricultural Waste Only	Storage of waste in a secure place
G	350m S	Unit 6 Netherlands Way GRIMSBY South Humberside DN41 8DF	EPR/SF0934CG/A001	Treating waste exemption	Non-Agricultural Waste Only	Recovery of textiles
G	350m S	Unit 6 Netherlands Way GRIMSBY South Humberside DN41 8DF	EPR/SF0934CG/A001	Treating waste exemption	Non-Agricultural Waste Only	Preparatory treatments (baling, sorting, shredding etc)
G	350m S	Unit 6 Netherlands Way GRIMSBY South Humberside DN41 8DF	EPR/SF0934CG/A001	Treating waste exemption	Non-Agricultural Waste Only	Treatment of waste wood and waste plant matter by chipping, shredding, cutting or pulverising
G	351m S	progen, netherlands way, stallingborough, dn41 8df	WEX184657	Using waste exemption	Not on a farm	Use of waste for a specified purpose
G	351m S	progen, netherlands way, stallingborough, dn41 8df	WEX184657	Using waste exemption	Not on a farm	Use of waste to manufacture finished goods
G	351m S	progen, netherlands way, stallingborough, dn41 8df	WEX184657	Treating waste exemption	Not on a farm	Treatment of waste wood and waste plant matter by chipping, shredding, cutting or pulverising
G	351m S	C/O PROGEN GROUP, NETHERLANDS WAY, STALLINGBOROUGH, DN41 8DF	WEX138759	Treating waste exemption	Not on a farm	Treatment of waste wood and waste plant matter by chipping, shredding, cutting or pulverising
G	351m S	C/O PROGEN GROUP, NETHERLANDS WAY, STALLINGBOROUGH, DN41 8DF	WEX138759	Using waste exemption	Not on a farm	Use of waste to manufacture finished goods
K	482m S	Sands Top Quarries Trondheim Way GRIMSBY South Humberside DN41 8FD	EPR/BE5381AS/A001	Storing waste exemption	Both agricultural and non-agricultural waste	Storage of waste in a secure place
K	482m S	Sands Top Quarries Trondheim Way GRIMSBY South Humberside DN41 8FD	EPR/BE5381AS/A001	Treating waste exemption	Both agricultural and non-agricultural waste	Screening and blending of waste

ID	Location	Site	Reference	Category	Sub-Category	Description
K	482m S	Sands Top Quarries Trondheim Way GRIMSBY South Humberside DN41 8FD	EPR/BE5381AS /A001	Treating waste exemption	Both agricultural and non-agricultural waste	Treatment of waste wood and waste plant matter by chipping, shredding, cutting or pulverising
K	482m S	Sands Top Quarries Trondheim Way GRIMSBY South Humberside DN41 8FD	EPR/BE5381AS /A001	Using waste exemption	Both agricultural and non-agricultural waste	Use of waste in construction
K	482m S	Sands Top Quarries Trondheim Way GRIMSBY South Humberside DN41 8FD	EPR/BE5381AS /A001	Using waste exemption	Both agricultural and non-agricultural waste	Spreading waste on non-agricultural land to confer benefit
K	482m S	Sands Top Quarries Trondheim Way GRIMSBY South Humberside DN41 8FD	EPR/BE5381AS /A001	Using waste exemption	Both agricultural and non-agricultural waste	Use of mulch

This data is sourced from the Environment Agency and Natural Resources Wales.

4 Current industrial land use



Site Outline

Search buffers in metres (m)

- Recent industrial land uses
- Control of Major Accident Hazards
- Hazardous substance storage/usage
- Part A(1) industrial activities
- Licensed pollutant release (Part A(2)/B)
- Licensed Discharges to controlled waters
- List 1 Dangerous Substances
- List 2 Dangerous Substances
- Pollution Incidents (EA/NRW)
- Pollution inventory substances
- Pollution inventory waste transfers

4.1 Recent industrial land uses

Records within 250m	21

Current potentially contaminative industrial sites.

Features are displayed on the Current industrial land use map on **page 37**

ID	Location	Company	Address	Activity	Category
1	**On site**	**Warehouse**	**Lincolnshire, DN41**	**Container and Storage**	**Transport, Storage and Delivery**
B	40m SE	Larco & Larco Self Storage Ltd	Scandinavian Way, Stallingborough, Grimsby, Lincolnshire, DN41 8DT	Container and Storage	Transport, Storage and Delivery

ID	Location	Company	Address	Activity	Category
B	40m SE	Lincol Oil Company	Scandinavian Way, Stallingborough, Grimsby, Lincolnshire, DN41 8DT	Fuel Distributors and Suppliers	Household, Office, Leisure and Garden
A	47m E	Coutts Transport Ltd	Europa Way, Stallingborough, Grimsby, Lincolnshire, DN41 8DS	Distribution and Haulage	Transport, Storage and Delivery
B	65m SE	Warehouse	Lincolnshire, DN41	Container and Storage	Transport, Storage and Delivery
2	94m S	Warehouse	Lincolnshire, DN41	Container and Storage	Transport, Storage and Delivery
A	101m SE	Depot	Lincolnshire, DN41	Container and Storage	Transport, Storage and Delivery
A	106m SE	N-tex Ltd	Scandinavian Way, Stallingborough, Grimsby, Lincolnshire, DN41 8DU	Distribution and Haulage	Transport, Storage and Delivery
A	122m SE	Electricity Sub Station	Lincolnshire, DN41	Electrical Features	Infrastructure and Facilities
A	139m SE	Dowson Transport	Martime Yard, Scandinavian Way, Stallingborough, Grimsby, Lincolnshire, DN41 8DT	Distribution and Haulage	Transport, Storage and Delivery
A	140m SE	Depot	Lincolnshire, DN41	Container and Storage	Transport, Storage and Delivery
A	146m SE	Depot	Lincolnshire, DN41	Container and Storage	Transport, Storage and Delivery
A	157m SE	Electricity Sub Station	Lincolnshire, DN41	Electrical Features	Infrastructure and Facilities
A	162m SE	Clayden Engineering Ltd	Scandinavian Way, Stallingborough, Grimsby, Lincolnshire, DN41 8DT	Lifting and Handling Equipment	Industrial Products
A	162m SE	S L D Pumps & Power	Scandinavian Way, Stallingborough, Grimsby, Lincolnshire, DN41 8DT	Industrial Repairs and Servicing	Repair and Servicing
4	176m SE	Tank	Lincolnshire, DN41	Tanks (Generic)	Industrial Features
C	177m S	Warehouse	Lincolnshire, DN41	Container and Storage	Transport, Storage and Delivery
6	181m N	Pipeline	Lincolnshire, DN40	Pipelines	Industrial Features
A	195m SE	Warehouse	Lincolnshire, DN41	Container and Storage	Transport, Storage and Delivery
D	229m SE	Tank	Lincolnshire, DN41	Tanks (Generic)	Industrial Features
8	241m E	Pipeline	Lincolnshire, DN41	Pipelines	Industrial Features

This data is sourced from Ordnance Survey.

4.2 Current or recent petrol stations

Records within 500m	0

Open, closed, under development and obsolete petrol stations.

This data is sourced from Experian.

4.3 Electricity cables

Records within 500m	0

High voltage underground electricity transmission cables.

This data is sourced from National Grid.

4.4 Gas pipelines

Records within 500m	0

High pressure underground gas transmission pipelines.

This data is sourced from National Grid.

4.5 Sites determined as Contaminated Land

Records within 500m	0

Contaminated Land Register of sites designated under Part 2a of the Environmental Protection Act 1990.

This data is sourced from Local Authority records.

4.6 Control of Major Accident Hazards (COMAH)

Records within 500m	2

Control of Major Accident Hazards (COMAH) sites. This data includes upper and lower tier sites, and includes a historical archive of COMAH sites and Notification of Installations Handling Hazardous Substances (NIHHS) records.

Features are displayed on the Current industrial land use map on **page 37**

ID	Location	Company	Address	Operational status	Tier
A	**On site**	**Immingham Railfreight Terminals Ltd**	**Immingham Railfreight Terminals Ltd, Europa Way, Kiln Lane Industrial Estate, Stallingborough, DN41 8DS**	**Historical NIHHS Site**	**-**
5	177m SE	Eic Transport&warehousing Ltd	Eic Transport&warehousing Ltd, Kiln Lane Industrial Estate, Stallingbrough	Historical NIHHS Site	-

This data is sourced from the Health and Safety Executive.

4.7 Regulated explosive sites

Records within 500m	**0**

Sites registered and licensed by the Health and Safety Executive under the Manufacture and Storage of Explosives Regulations 2005 (MSER). The last update to this data was in April 2011.

This data is sourced from the Health and Safety Executive.

4.8 Hazardous substance storage/usage

Records within 500m	**1**

Consents granted for a site to hold certain quantities of hazardous substances at or above defined limits in accordance with the Planning (Hazardous Substances) Regulations 2015.

Features are displayed on the Current industrial land use map on **page 37**

ID	Location	Details	
A	160m SE	Application reference number: HSC/DC/13 Application status: Approved Application date: 10/04/1996 Address: Immingham Railfreight Terminals Ltd, Kiln Lane Industrial Estate, Stallingborough, Grimsby, North East Lincolnshire, England, DN41 8DF	Details: Handling of steel, timber, soda ash, ammonium nitrate and aggregate. Enforcement: No Enforcement Notified Date of enforcement: No Enforcement Notified Comment: No Enforcement Notified

This data is sourced from Local Authority records.

4.9 Historical licensed industrial activities (IPC)

Records within 500m	0

Integrated Pollution Control (IPC) records of substance releases to air, land and water. This data represents a historical archive as the IPC regime has been superseded.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.10 Licensed industrial activities (Part A(1))

Records within 500m	16

Records of Part A(1) installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

Features are displayed on the Current industrial land use map on **page 37**

ID	Location	Details	
B	63m SE	Operator: FBM METALS (UK) LTD AND FBM HOLDINGS LTD Installation Name: KILN LANE TREATMENT PLANT EPR/EB3002XK Process: RECOVERY OR A MIX OF RECOVERY AND DISPOSAL OF > 50 T/D NON-HAZARDOUS WASTE (> 100 T/D IF ONLY AD) INVOLVING TREATMENT OF SLAGS AND ASHES Permit Number: AP3309PD Original Permit Number: DP3037WQ	EPR Reference: - Issue Date: 10/09/2019 Effective Date: 10/09/2019 Last date noted as effective: 30/01/2020 Status: EFFECTIVE
B	63m SE	Operator: FBM METALS (UK) LTD AND FBM HOLDINGS LTD Installation Name: KILN LANE TREATMENT PLANT EPR/EB3002XK Process: TEMPORARY STORAGE OF HAZ WASTE NOT UNDER S 5.2 PENDING ACTIVITIES LISTED IN S 5.1, 5.2, 5.3 AND PARAGRAPH (B) OF THIS SECTION WITH A TOTAL CAPACITY > 50 TONNES, EXCL TEMP STORAGE WHERE GENERATED Permit Number: AP3309PD Original Permit Number: DP3037WQ	EPR Reference: - Issue Date: 10/09/2019 Effective Date: 10/09/2019 Last date noted as effective: 30/01/2020 Status: EFFECTIVE

ID	Location	Details	
B	63m SE	Operator: FBM METALS (UK) LTD AND FBM HOLDINGS LTD Installation Name: KILN LANE TREATMENT PLANT EPR/EB3002XK Process: TEMPORARY STORAGE OF HAZ WASTE NOT UNDER S 5.2 PENDING ACTIVITIES LISTED IN S 5.1, 5.2, 5.3 AND PARAGRAPH (B) OF THIS SECTION WITH A TOTAL CAPACITY > 50 TONNES, EXCL TEMP STORAGE WHERE GENERATED Permit Number: DP3037WQ Original Permit Number: DP3037WQ	EPR Reference: - Issue Date: 18/05/2016 Effective Date: 18/05/2016 Last date noted as effective: 30/01/2020 Status: SUPERCEDED
B	63m SE	Operator: FBM METALS (UK) LTD AND FBM HOLDINGS LTD Installation Name: KILN LANE TREATMENT PLANT EPR/EB3002XK Process: DISPOSAL OR RECOVERY OF HAZ WASTE WITH CAPACITY EXCEEDING 10 TONNES PER DAY INVOLVING BLENDING OR MIXING PRIOR TO SUBMISSION TO ANY OF THE OTHER ACTIVITIES LISTED IN THIS SECTION OR IN SECTION 5.1 Permit Number: AP3309PD Original Permit Number: DP3037WQ	EPR Reference: - Issue Date: 10/09/2019 Effective Date: 10/09/2019 Last date noted as effective: 30/01/2020 Status: EFFECTIVE
B	63m SE	Operator: FBM METALS (UK) LTD AND FBM HOLDINGS LTD Installation Name: KILN LANE TREATMENT PLANT EPR/EB3002XK Process: DISPOSAL OR RECOVERY OF HAZARDOUS WASTE WITH A CAPACITY EXCEEDING 10 TONNES PER DAY INVOLVING PHYSICO-CHEMICAL TREATMENT Permit Number: AP3309PD Original Permit Number: DP3037WQ	EPR Reference: - Issue Date: 10/09/2019 Effective Date: 10/09/2019 Last date noted as effective: 30/01/2020 Status: EFFECTIVE
B	63m SE	Operator: FBM METALS (UK) LTD AND FBM HOLDINGS LTD Installation Name: KILN LANE TREATMENT PLANT EPR/EB3002XK Process: DISPOSAL OR RECOVERY OF HAZARDOUS WASTE WITH A CAPACITY EXCEEDING 10 TONNES PER DAY INVOLVING PHYSICO-CHEMICAL TREATMENT Permit Number: DP3037WQ Original Permit Number: DP3037WQ	EPR Reference: - Issue Date: 18/05/2016 Effective Date: 18/05/2016 Last date noted as effective: 30/01/2020 Status: SUPERCEDED

ID	Location	Details	
B	63m SE	Operator: FBM METALS (UK) LTD AND FBM HOLDINGS LTD Installation Name: KILN LANE TREATMENT PLANT EPR/EB3002XK Process: DISPOSAL OR RECOVERY OF HAZARDOUS WASTE WITH A CAPACITY EXCEEDING 10 TONNES PER DAY INVOLVING PHYSICO-CHEMICAL TREATMENT Permit Number: LP3335JD Original Permit Number: DP3037WQ	EPR Reference: - Issue Date: 31/10/2017 Effective Date: 31/10/2017 Last date noted as effective: 30/01/2020 Status: SUPERCEDED
B	63m SE	Operator: FBM METALS (UK) LTD AND FBM HOLDINGS LTD Installation Name: KILN LANE TREATMENT PLANT EPR/EB3002XK Process: TEMPORARY STORAGE OF HAZ WASTE NOT UNDER S 5.2 PENDING ACTIVITIES LISTED IN S 5.1, 5.2, 5.3 AND PARAGRAPH (B) OF THIS SECTION WITH A TOTAL CAPACITY > 50 TONNES, EXCL TEMP STORAGE WHERE GENERATED Permit Number: LP3335JD Original Permit Number: DP3037WQ	EPR Reference: - Issue Date: 31/10/2017 Effective Date: 31/10/2017 Last date noted as effective: 30/01/2020 Status: SUPERCEDED
3	118m NW	Operator: NORTH BECK ENERGY LIMITED Installation Name: NORTH BECK ENERGY CENTRE Process: THE INCINERATION OF NON-HAZARDOUS WASTE IN AN INCINERATION OR CO-INCINERATION PLANT WITH A CAPACITY EXCEEDING 3 TONNES PER HOUR. Permit Number: BP3739QT Original Permit Number: BP3739QT	EPR Reference: - Issue Date: 29/07/2019 Effective Date: 29/07/2019 Last date noted as effective: 30/01/2020 Status: EFFECTIVE
C	191m S	Operator: IMMINGHAM RAILFREIGHT TERMINALS LTD Installation Name: IMMINGHAM RAILFREIGHT TERMINALS LIMITED Process: ASBESTOS; STRIPPING FROM RAILWAY VEHICLES Permit Number: BK6882IF Original Permit Number: BK6882IF	EPR Reference: - Issue Date: 05/07/2001 Effective Date: 05/07/2001 Last date noted as effective: 30/01/2020 Status: SUPERCEDED
C	191m S	Operator: IMMINGHAM RAILFREIGHT TERMINALS LTD Installation Name: IMMINGHAM RAILFREIGHT TERMINALS LIMITED Process: ASBESTOS; STRIPPING FROM RAILWAY VEHICLES Permit Number: FP3730XS Original Permit Number: BK6882IF	EPR Reference: - Issue Date: - Effective Date: 05/12/2007 Last date noted as effective: 30/01/2020 Status: SURRENDER EFFECTIVE

ID	Location	Details	
11	332m SE	Operator: IMMINGHAM RAILFREIGHT TERMINALS LTD Installation Name: - Process: ASBESTOS; STRIPPING FROM RAILWAY VEHICLES Permit Number: BK6882 Original Permit Number: BK6882	EPR Reference: - Issue Date: 05/07/2001 Effective Date: 05/07/2001 Last date noted as effective: 01/10/2004 Status: SUPERSEDED BY PAS
F	355m NW	Operator: IMMINGHAM POWER LIMITED Installation Name: IMMINGHAM POWER LIMITED - EPR/RP3131QY Process: TRANCHE B SG PERMITTING DATE 1ST JANUARY 2019 Permit Number: RP3131QY Original Permit Number: RP3131QY	EPR Reference: - Issue Date: 04/06/2019 Effective Date: 04/06/2019 Last date noted as effective: 30/01/2020 Status: EFFECTIVE
F	355m NW	Operator: IMMINGHAM POWER LIMITED Installation Name: IMMINGHAM POWER LIMITED Process: NEW MEDIUM COMBUSTION PLANT Permit Number: RP3131QY Original Permit Number: RP3131QY	EPR Reference: - Issue Date: - Effective Date: - Last date noted as effective: 30/04/2019 Status: DETERMINATION
J	431m NW	Operator: UK POWER RESERVE LIMITED Installation Name: QUEENS ROAD POWER PLANT EPR/VP3032EZ Process: COMBUSTION; ANY FUEL =>50MW Permit Number: VP3032EZ Original Permit Number: VP3032EZ	EPR Reference: - Issue Date: 16/06/2014 Effective Date: 16/06/2014 Last date noted as effective: 30/01/2020 Status: SUPERCEDED
J	431m NW	Operator: UK POWER RESERVE LIMITED Installation Name: QUEENS ROAD POWER PLANT EPR/VP3032EZ/A001 Process: COMBUSTION; ANY FUEL =>50MW Permit Number: KP3938RY Original Permit Number: VP3032EZ	EPR Reference: - Issue Date: 19/12/2016 Effective Date: 19/12/2016 Last date noted as effective: 30/01/2020 Status: EFFECTIVE

This data is sourced from the Environment Agency and Natural Resources Wales.

4.11 Licensed pollutant release (Part A(2)/B)

Records within 500m	**4**

Records of Part A(2) and Part B installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

Features are displayed on the Current industrial land use map on **page 37**

ID	Location	Address	Details	
D	252m SE	Selvic Shipping Services Ltd, Netherlands Way, Stallingborough, North East Lincolnshire, DN37 8DF	Process: Coal & Coke Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified
13	361m SE	Cemex Stallingborough, Europe Way, Off Kiln Lane, Stallingborough, North East Lincolnshire, DN41 8DS	Process: Use of Bulk Cement Status: Current Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified
16	431m SE	A F Commercials, Netherlands Way, Stallingborough, DN41 8DF	Process: Waste Oil Burner 0.4 MW Status: New Legislation Applies Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified
17	483m N	PD Ports, Unit 7, Laporte Road, Stallingborough, DN40 2PR	Process: Coal & Coke Status: Current Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified

This data is sourced from Local Authority records.

4.12 Radioactive Substance Authorisations

Records within 500m	**0**

Records of the storage, use, accumulation and disposal of radioactive substances regulated under the Radioactive Substances Act 1993.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.13 Licensed Discharges to controlled waters

Records within 500m	**12**

Discharges of treated or untreated effluent to controlled waters under the Water Resources Act 1991.

Features are displayed on the Current industrial land use map on **page 37**

ID	Location	Address	Details	
E	317m N	IMMINGHAM OUTFALL	Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - WATER COMPANY Permit Number: AW3TS223 Permit Version: 1 Receiving Water: River Humber T The Sea	Status: REVOKED NEW CONSENT ISSUED (WATER ACT 1989 SECTION 113) Issue date: 22/03/1989 Effective Date: 22/03/1989 Revocation Date: 12/04/2005
E	317m N	IMMINGHAM OUTFALL	Effluent Type: SEWAGE DISCHARGES - UNSPECIFIED - WATER COMPANY Permit Number: AW3TSF619 Permit Version: 1 Receiving Water: River Humber T The Sea	Status: PRE NRA LEGISLATION WHERE ISSUE DATE 01-SEP-89 (HISTORIC ONLY) Issue date: 28/02/1967 Effective Date: 28/02/1967 Revocation Date: 27/09/1983
E	317m N	IMMINGHAM OUTFALL	Effluent Type: SEWAGE DISCHARGES - UNSPECIFIED - WATER COMPANY Permit Number: AW3TSF619 Permit Version: 2 Receiving Water: River Humber T The Sea	Status: PRE NRA LEGISLATION WHERE ISSUE DATE 01-SEP-89 (HISTORIC ONLY) Issue date: 28/09/1983 Effective Date: 28/09/1983 Revocation Date: 17/09/1989
E	317m N	IMMINGHAM OUTFALL	Effluent Type: SEWAGE DISCHARGES - UNSPECIFIED - WATER COMPANY Permit Number: AW3TSF619 Permit Version: 3 Receiving Water: River Humber T The Sea	Status: REVOKED NEW CONSENT ISSUED (WATER ACT 1989 SECTION 113) Issue date: 18/09/1989 Effective Date: 18/09/1989 Revocation Date: 12/04/2005
10	318m NW	EO NO 1 IMMINGHAM, SEWERAGE SCHEME	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: AW3NFF766 Permit Version: 1 Receiving Water: Unknown Trib. North Beck Drain	Status: CONSENT REVOKED - DISCHARGE CEASED (WRA 91, SCHED 10 & 6) Issue date: 29/05/1969 Effective Date: 29/05/1969 Revocation Date: 14/12/2000
14	391m SE	BATCHING PLANT KILN LN	Effluent Type: TRADE DISCHARGES - UNSPECIFIED Permit Number: PR3NFF682 Permit Version: 1 Receiving Water: Unknown Trib.	Status: PRE NRA LEGISLATION WHERE ISSUE DATE 01-SEP-89 (HISTORIC ONLY) Issue date: 18/01/1968 Effective Date: 18/01/1968 Revocation Date: 20/02/1992
G	394m NW	M/H QUEEN'S ROAD PS, IMMINGHAM	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: ANNNF10243 Permit Version: 1 Receiving Water: unnamed tributary North Beck D	Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: 28/08/1992 Effective Date: 28/08/1992 Revocation Date: 24/05/1995

ID	Location	Address	Details	
G	394m NW	M/H QUEEN'S ROAD PS, IMMINGHAM	Effluent Type: SEWAGE DISCHARGES - STW STORM OVERFLOW/STORM TANK - WATER COMPANY Permit Number: ANNNF1767 Permit Version: 1 Receiving Water: -	Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: 15/09/1990 Effective Date: 15/09/1990 Revocation Date: 08/04/1991
G	394m NW	M/H QUEEN'S ROAD PS, IMMINGHAM	Effluent Type: MISCELLANEOUS DISCHARGES - EMERGENCY DISCHARGES Permit Number: ANNNF2288 Permit Version: 1 Receiving Water: North Beck Drain River Humber	Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: 02/01/1990 Effective Date: 02/01/1990 Revocation Date: 28/08/1992
G	394m NW	M/H QUEEN'S ROAD PS, IMMINGHAM	Effluent Type: SEWAGE DISCHARGES - PUMPING STATION - WATER COMPANY Permit Number: ANNNF10243 Permit Version: 2 Receiving Water: unnamed tributary North Beck D	Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: 25/05/1995 Effective Date: 25/05/1995 Revocation Date: -
H	404m SE	SPS KILN LANE, STALLINGBOROUGH	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: AW3NFF592 Permit Version: 1 Receiving Water: Unknown trib.	Status: CONSENT REVOKED - DISCHARGE CEASED (WRA 91, SCHED 10 & 6) Issue date: 31/10/1966 Effective Date: 31/10/1966 Revocation Date: 27/03/2002
I	445m S	REDWOOD IND.PARK, STALLINGBOROUGH, S. HUMBERSIDE	Effluent Type: MISCELLANEOUS DISCHARGES - SURFACE WATER Permit Number: PRNNF09423 Permit Version: 1 Receiving Water: Trib Stllingborough Beck	Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: 21/09/1992 Effective Date: 21/09/1992 Revocation Date: 01/06/2009

This data is sourced from the Environment Agency and Natural Resources Wales.

4.14 Pollutant release to surface waters (Red List)

Records within 500m	**0**

Discharges of specified substances under the Environmental Protection (Prescribed Processes and Substances) Regulations 1991.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.15 Pollutant release to public sewer

Records within 500m	0

Discharges of Special Category Effluents to the public sewer.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.16 List 1 Dangerous Substances

Records within 500m	3

Discharges of substances identified on List I of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

Features are displayed on the Current industrial land use map on **page 37**

ID	Location	Name	Status	Receiving Water	Authorised Substances
E	318m N	Immingham Landfill Site	Active	River Humber	Mercury (other), Cadmium, Hexachlorocyclohexane, Carbon tetrachloride, Pentachlorophenol, Aldrin, Dieldrin, Endrin, Hexachlorobenzene, Hexachlorobutadiene, 1,2-dichloroethane, Trichlorobenzene, Total DDT
E	318m N	Tankclean Tankwash	Active	River Humber	Mercury (other)
E	318m N	Immingham Stw	Not Active	-	-

This data is sourced from the Environment Agency and Natural Resources Wales.

4.17 List 2 Dangerous Substances

Records within 500m	18

Discharges of substances identified on List II of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

Features are displayed on the Current industrial land use map on **page 37**

ID	Location	Name	Status	Receiving Water	Authorised Substances
A	64m SE	Sutton & Son Ltd	Not Active	Na	pH
A	192m SE	Clayden Engineering Ltd	Not Active	Na	pH

ID	Location	Name	Status	Receiving Water	Authorised Substances
E	318m N	Immingham Landfill Site	Not Active	River Humber	Cyanide, Dichlorvos, Tributyltin, Triphenyltin, Atrazine & Simazine, Azinphos-methyl, Endosulphan, Fenitrothion, Malathion, Trifluralin, Biphenyl
E	318m N	Isotank Services Ltd	Active	Na	Chromium, Copper, Lead, Nickel, pH, Zinc
E	318m N	Encycle Immingham	Active	Na	pH, Zinc
E	318m N	Shand Engineering Ltd	Active	Na	Chromium, Copper, Lead, Nickel, pH, Zinc
E	318m N	Meldan Fabrication Limited	Active	-	Copper, pH, Zinc
E	318m N	Sports & Leisure Management Ltd	Not Active	Na	pH
E	318m N	Tankclean Tankwash	Active	Na	Chromium, Copper, Lead, Nickel, pH, Zinc
E	318m N	Meldan Fabrication Limited	Not Active	Na	Copper, pH, Zinc
E	318m N	Encycle Immingham	Not Active	Na	pH, Zinc
E	318m N	George Revill (haulage) Limited	Not Active	Na	pH
E	318m N	Cemex - Immingham Concrete Plant	Not Active	Na	pH
E	318m N	Immingham Sewage Treatment Works	Not Active	-	-
12	361m SW	Jhs Fishproducts Limited	Not Active	Na	pH
H	405m SE	Shand Uk	Not Active	Na	Copper, pH, Zinc
15	413m N	Immingham Stw	Not Active	-	-
H	419m SE	Ninalink Ltd	Not Active	Na	pH

This data is sourced from the Environment Agency and Natural Resources Wales.

4.18 Pollution Incidents (EA/NRW)

Records within 500m	6

Records of substantiated pollution incidents. Since 2006 this data has only included category 1 (major) and 2 (significant) pollution incidents.

Features are displayed on the Current industrial land use map on **page 37**

ID	Location	Details	
C	148m S	Incident Date: 19/06/2003 Incident Identification: 167269 Pollutant: Oils and Fuel Pollutant Description: Diesel	Water Impact: Category 3 (Minor) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
7	192m SW	Incident Date: 13/06/2003 Incident Identification: 166047 Pollutant: Specific Waste Materials Pollutant Description: Commercial Waste	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 3 (Minor)
9	273m S	Incident Date: 22/02/2002 Incident Identification: 59953 Pollutant: Specific Waste Materials Pollutant Description: Commercial Waste	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 3 (Minor)
I	420m S	Incident Date: 03/12/2002 Incident Identification: 124387 Pollutant: Oils and Fuel Pollutant Description: Unidentified Oil	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
I	420m S	Incident Date: 03/12/2002 Incident Identification: 124387 Pollutant: Oils and Fuel Pollutant Description: Unidentified Oil	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
18	485m W	Incident Date: 25/07/2002 Incident Identification: 94526 Pollutant: Specific Waste Materials Pollutant Description: Containers	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)

This data is sourced from the Environment Agency and Natural Resources Wales.

4.19 Pollution inventory substances

Records within 500m	1

The pollution inventory (substances) includes reporting on annual emissions of certain regulated substances to air, controlled waters and land. A reporting threshold for each substance is also included. Where emissions fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

Features are displayed on the Current industrial land use map on **page 37**

ID: B, Location: 63m SE, Permit: EB3002XK
Operator: FBM Metals (UK) Ltd And FBM Holdings Ltd
Activity: DISPOSAL OR RECOVERY OF HAZARDOUS WASTE WITH A CAPACITY EXCEEDING 10 TONNES PER DAY INVOLVING PHYSICO-CHEMICAL TREATMENT
Address: Kiln Lane Treatment Plant Netherlands Way Kiln Lane Industrial Estate Stallingborough Lincolnshire DN41 8DF
Sector: Waste Treatment, Sub-sector: Hazardous
Releases:

Route	Substance	Reporting threshold (kg)	Quantity (kg)
Air	Ammonia	1000kg	Below Reporting Threshold
Air	Zinc	100kg	Below Reporting Threshold

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

4.20 Pollution inventory waste transfers

Records within 500m	**1**

The pollution inventory (waste transfers) includes reporting on annual transfers and recovery/disposal of controlled wastes from a site. A reporting threshold for each waste type is also included. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

Features are displayed on the Current industrial land use map on **page 37**

ID: B, Location: 63m SE, Permit: EB3002XK
Operator: FBM Metals (UK) Ltd And FBM Holdings Ltd
Activity: DISPOSAL OR RECOVERY OF HAZARDOUS WASTE WITH A CAPACITY EXCEEDING 10 TONNES PER DAY INVOLVING PHYSICO-CHEMICAL TREATMENT
Address: Kiln Lane Treatment Plant Netherlands Way Kiln Lane Industrial Estate Stallingborough Lincolnshire DN41 8DF
Sector: Waste Treatment, Sub-sector: Hazardous
Releases:

Route	Route description	Quantity (tonnes)	Release level	EWC code	EWC description	Hazardous waste
R4	Recycling/reclamation of metals and metal compounds	9.369	Absolute Value	10 05 11	dross and skimmings other than those mentioned in 10 05 10	No
R4	Recycling/reclamation of metals and metal compounds	50.98	Absolute Value	11 05 01	hard zinc	No

Route	Route description	Quantity (tonnes)	Release level	EWC code	EWC description	Hazardous waste
R4	Recycling/reclamation of metals and metal compounds	7.769	Absolute Value	11 05 02	zinc ash	No
R4	Recycling/reclamation of metals and metal compounds	55.46	Absolute Value	15 01 04	metallic packaging	No
R5	Recycling/reclamation of other inorganic materials	69.11	Absolute Value	19 12 04	plastic and rubber	No
D1	Deposit into or onto land (eg landfill, etc.)	63	Absolute Value	20 03 01	mixed municipal waste	No
D8	Biological treatment not specified elsewhere in this Table which results in final compounds or mixtures which are discarded by means of any of the operations numbers D1 to D12	28	Absolute Value	20 03 04	septic tank sludge	No

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

4.21 Pollution inventory radioactive waste

Records within 500m	**0**

The pollution inventory (radioactive wastes) includes reporting on annual releases of radioactive substances from a site, including the means of release. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

5 Hydrogeology - Superficial aquifer

Site Outline

Search buffers in metres (m)

- Principal
- Secondary A
- Secondary B
- Secondary Undifferentiated
- Unproductive
- Unknown

5.1 Superficial aquifer

Records within 500m	2

Aquifer status of groundwater held within superficial geology.

Features are displayed on the Hydrogeology map on **page 53**

ID	Location	Designation	Description
1	**On site**	**Unproductive**	**These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow**
2	399m N	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Bedrock aquifer

Site Outline

Search buffers in metres (m)

- Principal
- Secondary A
- Secondary B
- Secondary Undifferentiated
- Unproductive

5.2 Bedrock aquifer

Records within 500m	2

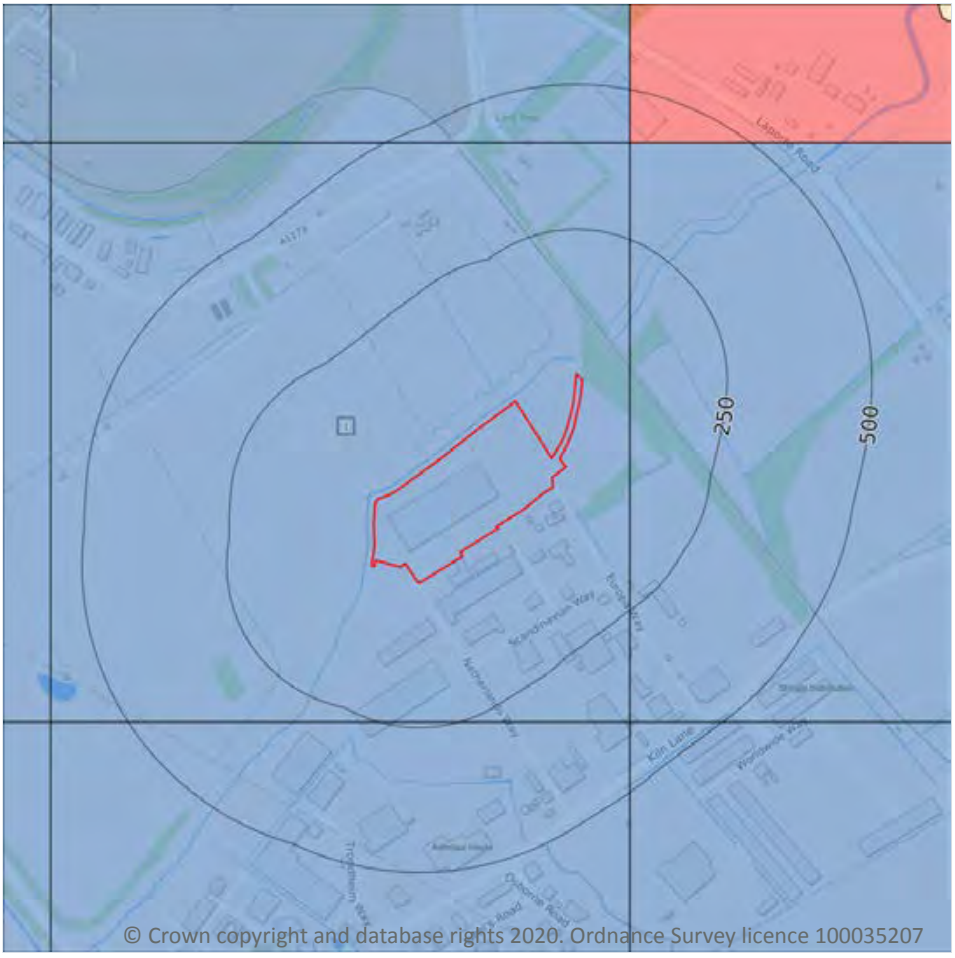
Aquifer status of groundwater held within bedrock geology.

Features are displayed on the Bedrock aquifer map on **page 54**

ID	Location	Designation	Description
1	**On site**	**Principal**	**Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers**
2	399m N	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Groundwater vulnerability



Site Outline

Search buffers in metres (m)

Superficial vulnerability
- Principal superficial aquifer, high vulnerability
- Secondary superficial aquifer, high vulnerability
- Principal superficial aquifer, medium vulnerability
- Secondary superficial aquifer, medium vulnerability
- Principal superficial aquifer, low vulnerability
- Secondary superficial aquifer, low vulnerability

Bedrock vulnerability
- Principal bedrock aquifer, high vulnerability
- Secondary bedrock aquifer, high vulnerability
- Principal bedrock aquifer, medium vulnerability
- Secondary bedrock aquifer, medium vulnerability
- Principal bedrock aquifer, low vulnerability
- Secondary bedrock aquifer, low vulnerability

Other information
- Unproductive aquifer
- Soluble rock risk
- Local information

5.3 Groundwater vulnerability

Records within 50m	1

An assessment of the vulnerability of groundwater to a pollutant discharged at ground level based on the hydrological, geological, hydrogeological and soil properties within a one kilometre square grid. Groundwater vulnerability is described as High, Medium or Low as follows:

- High - Areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits.
- Medium - Intermediate between high and low vulnerability.
- Low - Areas that provide the greatest protection from pollution. They are likely to be characterised by low leaching soils and/or the presence of superficial deposits characterised by a low permeability.

Features are displayed on the Groundwater vulnerability map on **page 56**

ID	Location	Summary	Soil / surface	Superficial geology	Bedrock geology
1	On site	**Summary Classification: Principal bedrock aquifer - Low Vulnerability Combined classification: Productive Bedrock Aquifer, Unproductive Superficial Aquifer**	**Leaching class: High Infiltration value: >70% Dilution value: <300mm/year**	**Vulnerability: Unproductive Aquifer type: Unproductive Thickness: >10m Patchiness value: >90% Recharge potential: Low**	**Vulnerability: Low Aquifer type: Principal Flow mechanism: Well connected fractures**

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

5.4 Groundwater vulnerability- soluble rock risk

Records on site	0

This dataset identifies areas where solution features that enable rapid movement of a pollutant may be present within a 1km grid square.

This data is sourced from the British Geological Survey and the Environment Agency.

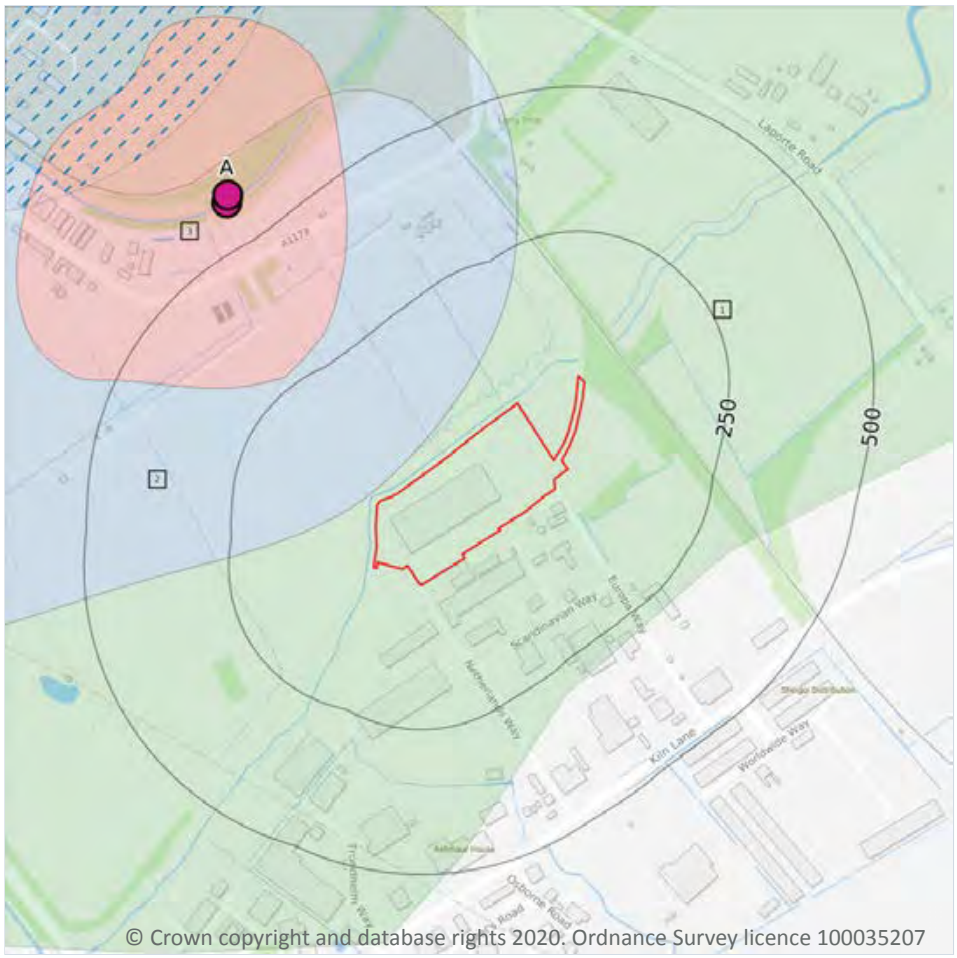
5.5 Groundwater vulnerability- local information

Records on site	0

This dataset identifies areas where additional local information affecting vulnerability is held by the Environment Agency. Further information can be obtained by contacting the Environment Agency local Area groundwater team through the Environment Agency National Customer Call Centre on 03798 506 506 or by email on enquiries@environment-agency.gov.uk.

This data is sourced from the British Geological Survey and the Environment Agency.

Abstractions and Source Protection Zones



Site Outline

Search buffers in metres (m)

- Source Protection Zone 1 — Inner catchment
- Source Protection Zone 2 — Outer catchment
- Source Protection Zone 3 — Total catchment
- Source Protection Zone 4 — Zone of Special Interest
- Source Protection Zone 1c — Inner catchment - confined aquifer
- Source Protection Zone 2c — Outer catchment - confined aquifer
- Source Protection Zone 3c — Total catchment - confined aquifer
- Drinking water abstraction licences
- Drinking water abstraction licences — Polygon features
- Drinking water abstraction licences — Linear features
- Groundwater abstraction licence (point)
- Groundwater abstraction licence (area)
- Groundwater abstraction licence (linear)
- Surface Water Abstractions (point)
- Surface Water Abstractions (area)
- Surface Water Abstractions (linear)

5.6 Groundwater abstractions

Records within 2000m	14

Licensed groundwater abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, between two points (line data) or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 58**

ID	Location	Details	
A	579m NW	Status: Historical Licence No: 4/29/09/*G/0045 Details: Raw Water Supply Direct Source: GROUND WATER SOURCE OF SUPPLY Point: LOCO BORE Data Type: Point Name: ASSOCIATED BRITISH PORTS Easting: 520300 Northing: 414900	Annual Volume (m^3): 945588 Max Daily Volume (m^3): 2619 Original Application No: - Original Start Date: 01/06/1966 Expiry Date: - Issue No: 100 Version Start Date: 01/04/1997 Version End Date: -
A	588m NW	Status: Active Licence No: 4/29/09/*G/0045 Details: Raw Water Supply Direct Source: GROUND WATER SOURCE OF SUPPLY Point: LOCO BORE Data Type: Point Name: ASSOCIATED BRITISH PORTS Easting: 520303 Northing: 414913	Annual Volume (m^3): 1,400,000 Max Daily Volume (m^3): 5,480 Original Application No: - Original Start Date: 01/06/1966 Expiry Date: - Issue No: 102 Version Start Date: 05/10/2017 Version End Date: -
-	1090m SW	Status: Active Licence No: 4/29/09/*G/0005 Details: Process Water Direct Source: GROUND WATER SOURCE OF SUPPLY Point: BOREHOLE C STALLINGBOROUGH Data Type: Point Name: Tronox Pigment UK Limited Easting: 520055 Northing: 413302	Annual Volume (m^3): 3,155,760 Max Daily Volume (m^3): 8,640 Original Application No: - Original Start Date: 01/07/1966 Expiry Date: - Issue No: 103 Version Start Date: 19/08/2019 Version End Date: -
-	1090m SW	Status: Active Licence No: 4/29/09/*G/0005 Details: Process Water Direct Source: GROUND WATER SOURCE OF SUPPLY Point: BORE B STALLINGBOROUGH Data Type: Point Name: Tronox Pigment UK Limited Easting: 520006 Northing: 413328	Annual Volume (m^3): 3,155,760 Max Daily Volume (m^3): 8,640 Original Application No: - Original Start Date: 01/07/1966 Expiry Date: - Issue No: 103 Version Start Date: 19/08/2019 Version End Date: -
-	1094m SW	Status: Historical Licence No: 4/29/09/*G/0005 Details: Process Water Direct Source: GROUND WATER SOURCE OF SUPPLY Point: BORE B STALLINGBOROUGH Data Type: Point Name: Cristal Pigment UK Limited Easting: 520050 Northing: 413300	Annual Volume (m^3): 829662 Max Daily Volume (m^3): 2273 Original Application No: - Original Start Date: 01/07/1966 Expiry Date: - Issue No: 101 Version Start Date: 23/10/2012 Version End Date: -

ID	Location	Details	
-	1133m SW	Status: Historical Licence No: 4/29/09/*G/0005 Details: Process Water Direct Source: GROUND WATER SOURCE OF SUPPLY Point: BORE A STALLINGBOROUGH Data Type: Point Name: Cristal Pigment UK Limited Easting: 519970 Northing: 413300	Annual Volume (m^3): 829662 Max Daily Volume (m^3): 2273 Original Application No: - Original Start Date: 01/07/1966 Expiry Date: - Issue No: 101 Version Start Date: 23/10/2012 Version End Date: -
-	1142m SW	Status: Active Licence No: 4/29/09/*G/0005 Details: Process Water Direct Source: GROUND WATER SOURCE OF SUPPLY Point: BORE A STALLINGBOROUGH Data Type: Point Name: Tronox Pigment UK Limited Easting: 519961 Northing: 413295	Annual Volume (m^3): 3,155,760 Max Daily Volume (m^3): 8,640 Original Application No: - Original Start Date: 01/07/1966 Expiry Date: - Issue No: 103 Version Start Date: 19/08/2019 Version End Date: -
-	1315m NW	Status: Active Licence No: 4/29/09/*G/0045 Details: Raw Water Supply Direct Source: GROUND WATER SOURCE OF SUPPLY Point: BOREHOLE AT IMMINGHAM Data Type: Point Name: ASSOCIATED BRITISH PORTS Easting: 519822 Northing: 415470	Annual Volume (m^3): 1,400,000 Max Daily Volume (m^3): 5,480 Original Application No: - Original Start Date: 01/06/1966 Expiry Date: - Issue No: 102 Version Start Date: 05/10/2017 Version End Date: -
-	1319m SE	Status: Historical Licence No: 4/29/09/*G/0103 Details: General Farming & Domestic Direct Source: GROUND WATER SOURCE OF SUPPLY Point: MCCARTHY BORE STALLINGBOROUGH Data Type: Point Name: MCCARTHY Easting: 521300 Northing: 413100	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 01/07/1966 Expiry Date: - Issue No: 100 Version Start Date: 01/05/1976 Version End Date: -
-	1352m NW	Status: Historical Licence No: 4/29/09/*G/0099 Details: Process water Direct Source: GROUND WATER SOURCE OF SUPPLY Point: NORSK HYDRO BORE IMMINGHAM Data Type: Point Name: HYDRO FERTILIZERS LTD Easting: 519800 Northing: 415500	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 01/07/1966 Expiry Date: - Issue No: 100 Version Start Date: 01/10/1990 Version End Date: -

ID	Location	Details	
-	1352m NW	Status: Historical Licence No: 4/29/09/*G/0099 Details: General Washing/Process Washing Direct Source: GROUND WATER SOURCE OF SUPPLY Point: NORSK HYDRO BORE IMMINGHAM Data Type: Point Name: ASSOCIATED BRITISH PORTS Easting: 519800 Northing: 415500	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 01/07/1966 Expiry Date: - Issue No: 101 Version Start Date: 01/10/2001 Version End Date: -
-	1352m NW	Status: Historical Licence No: 4/29/09/*G/0099 Details: Process Water Direct Source: GROUND WATER SOURCE OF SUPPLY Point: BOREHOLE AT IMMINGHAM Data Type: Point Name: ASSOCIATED BRITISH PORTS Easting: 519800 Northing: 415500	Annual Volume (m^3): 454607 Max Daily Volume (m^3): 2727 Original Application No: - Original Start Date: 01/07/1966 Expiry Date: - Issue No: 102 Version Start Date: 03/03/2003 Version End Date: -
-	1509m NW	Status: Historical Licence No: 4/29/09/*G/0020 Details: General Farming & Domestic Direct Source: GROUND WATER SOURCE OF SUPPLY Point: ULCEBY CARR FARM BORE1 ULCEBY Data Type: Point Name: WILKINS Easting: 519950 Northing: 415800	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 01/11/1966 Expiry Date: - Issue No: 100 Version Start Date: 01/05/1989 Version End Date: -
-	1695m SW	Status: Historical Licence No: 4/29/09/*G/0026 Details: General Farming & Domestic Direct Source: GROUND WATER SOURCE OF SUPPLY Point: MAUXHALL FM. BORE ST'NGBOROUGH Data Type: Point Name: SHEPHERD Easting: 519200 Northing: 413250	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 01/07/1966 Expiry Date: - Issue No: 100 Version Start Date: 01/07/1966 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.7 Surface water abstractions

Records within 2000m	**0**

Licensed surface water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

This data is sourced from the Environment Agency and Natural Resources Wales.

5.8 Potable abstractions

Records within 2000m	0

Licensed potable water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

This data is sourced from the Environment Agency and Natural Resources Wales.

5.9 Source Protection Zones

Records within 500m	3

Source Protection Zones define the sensitivity of an area around a potable abstraction site to contamination.

Features are displayed on the Abstractions and Source Protection Zones map on **page 58**

ID	Location	Type	Description
1	**On site**	**3**	**Total catchment**
2	20m NW	2	Outer catchment
3	270m NW	1	Inner catchment

This data is sourced from the Environment Agency and Natural Resources Wales.

5.10 Source Protection Zones (confined aquifer)

Records within 500m	0

Source Protection Zones in the confined aquifer define the sensitivity around a deep groundwater abstraction to contamination. A confined aquifer would normally be protected from contamination by overlying geology and is only considered a sensitive resource if deep excavation/drilling is taking place.

This data is sourced from the Environment Agency and Natural Resources Wales.

6 Hydrology

Site Outline

Search buffers in metres (m)

Water Network (OS MasterMap)

Surface water features (wider than 5m)

Surface water features (narrower than 5m)

WFD River, canal and surface water transfer water bodies

WFD Lake water bodies

WFD Transitional and coastal water bodies

WFD Surface water body catchments boundaries

WFD Groundwater body boundaries

6.1 Water Network (OS MasterMap)

Records within 250m	35

Detailed water network of Great Britain showing the flow and precise central course of every river, stream, lake and canal.

Features are displayed on the Hydrology map on **page 63**

ID	Location	Type of water feature	Ground level	Permanence	Name
B	10m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	North Beck Drain

ID	Location	Type of water feature	Ground level	Permanence	Name
C	24m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
D	29m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	North Beck Drain
E	29m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
F	36m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
F	37m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
F	37m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
F	37m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
F	37m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
F	38m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
F	38m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
F	40m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
F	41m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
F	42m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-

ID	Location	Type of water feature	Ground level	Permanence	Name
F	42m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
F	43m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
F	45m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
F	46m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
2	55m NE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
G	57m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
F	57m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
F	57m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
F	65m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
D	67m NE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
F	74m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
H	74m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
G	81m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-

ID	Location	Type of water feature	Ground level	Permanence	Name
G	81m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
I	86m NE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	North Beck Drain
J	92m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
K	110m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
I	117m NE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
J	165m NE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
5	166m NE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
L	222m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-

This data is sourced from the Ordnance Survey.

6.2 Surface water features

Records within 250m	**21**

Covering rivers, streams and lakes (some overlap with OS MasterMap Water Network data in previous section) but additionally covers smaller features such as ponds. Rivers and streams narrower than 5m are represented as a single line. Lakes, ponds and rivers or streams wider than 5m are represented as polygons.

Features are displayed on the Hydrology map on **page 63**

This data is sourced from the Ordnance Survey.

6.3 WFD Surface water body catchments

Records on site	1

The Water Framework Directive is an EU-led framework for the protection of inland surface waters, estuaries, coastal waters and groundwater through river basin-level management planning. In terms of surface water, these basins are broken down into smaller units known as management, operational and water body catchments.

Features are displayed on the Hydrology map on **page 63**

ID	Location	Type	Water body catchment	Water body ID	Operational catchment	Management catchment
A	**On site**	**River WB catchment**	**North Beck Drain**	**GB104029067575**	**Northern Becks**	**Louth Grimsby and Ancholme**

This data is sourced from the Environment Agency and Natural Resources Wales.

6.4 WFD Surface water bodies

Records identified	1

Surface water bodies under the Directive may be rivers, lakes, estuary or coastal. To achieve the purpose of the Directive, environmental objectives have been set and are reported on for each water body. The progress towards delivery of the objectives is then reported on by the relevant competent authorities at the end of each six-year cycle. The river water body directly associated with the catchment listed in the previous section is detailed below, along with any lake, canal, coastal or artificial water body within 250m of the site. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each water body listed.

Features are displayed on the Hydrology map on **page 63**

ID	Location	Type	Name	Water body ID	Overall rating	Chemical rating	Ecological rating	Year
1	10m NW	River	North Beck Drain	GB104029067575	Moderate	Good	Moderate	2016

This data is sourced from the Environment Agency and Natural Resources Wales.

6.5 WFD Groundwater bodies

Records on site	1

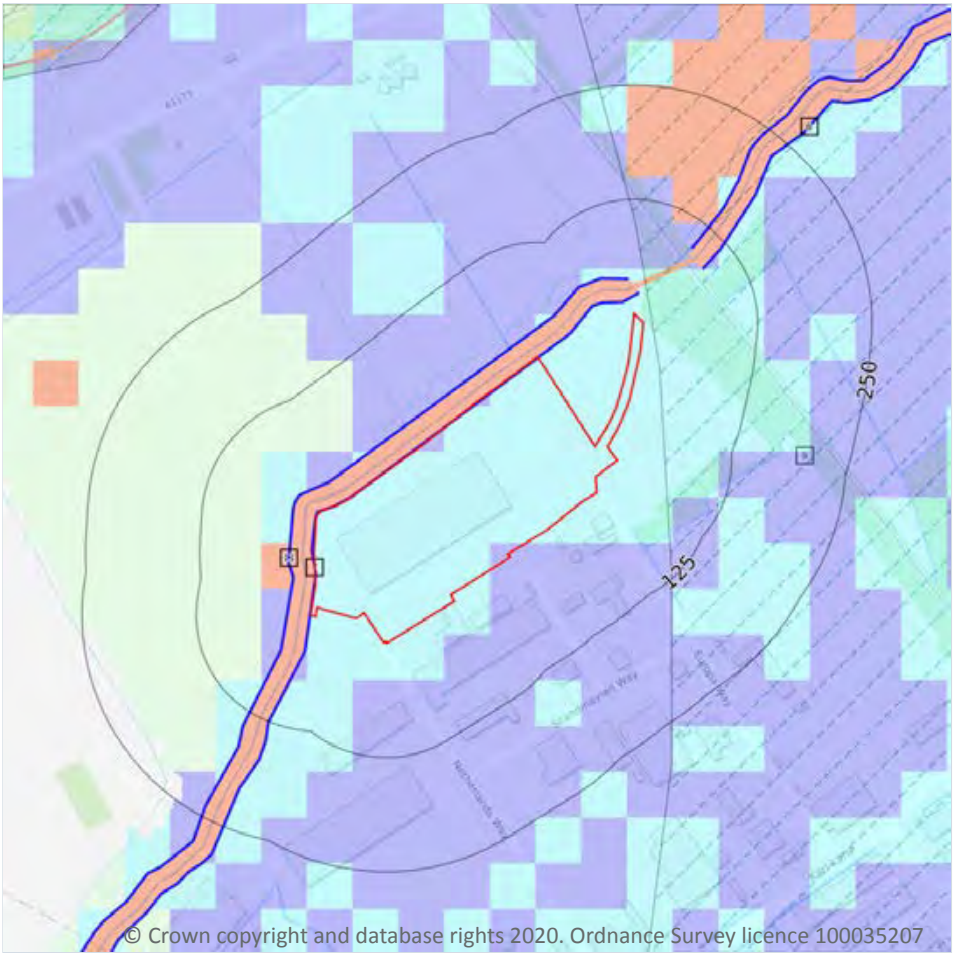
Groundwater bodies are also covered by the Directive and the same regime of objectives and reporting detailed in the previous section is in place. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each groundwater body listed.

Features are displayed on the Hydrology map on **page 63**

ID	Location	Name	Water body ID	Overall rating	Chemical rating	Quantitative	Year
A	**On site**	**Grimsby Ancholme Louth Chalk Unit**	**GB40401G401500**	**Poor**	**Poor**	**Poor**	**2015**

This data is sourced from the Environment Agency and Natural Resources Wales.

7 River and coastal flooding



Site Outline

Search buffers in metres (m)

Environment Agency river and coastal flooding:

- High
- Medium
- Low
- Very Low
- Historical Flood Events
- Areas Used for Flood Storage
- Areas Benefiting from Flood Defences
- Flood Defences

7.1 Risk of Flooding from Rivers and Sea (RoFRaS)

Records within 50m	22

The chance of flooding from rivers and/or the sea in any given year, based on cells of 50m. Each cell is allocated one of four flood risk categories, taking into account flood defences and their condition; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 100 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 100 chance) or High (greater than or equal to 1 in 30 chance).

Features are displayed on the River and coastal flooding map on **page 69**

Distance	RoFRaS flood risk
On site	**High**
0 - 50m	High

This data is sourced from the Environment Agency and Natural Resources Wales.

7.2 Historical Flood Events

Records within 250m	1

Records of historic flooding from rivers, the sea, groundwater and surface water. Records began in 1946 when predecessor bodies started collecting detailed information about flooding incidents, although limited details may be included on flooding incidents prior to this date. Takes into account the presence of defences, structures, and other infrastructure where they existed at the time of flooding, and includes flood extents that may have been affected by overtopping, breaches or blockages.

Features are displayed on the River and coastal flooding map on **page 69**

ID	Location	Event name	Date of flood	Flood source	Flood cause	Type of flood
9	10m E	January 1953 Along The Lincolnshire Coastline	1953-01-31 1953-02-01	Other	Overtopping of defences	Tidal

This data is sourced from the Environment Agency and Natural Resources Wales.

7.3 Flood Defences

Records within 250m	4

Records of flood defences owned, managed or inspected by the Environment Agency and Natural Resources Wales. Flood defences can be structures, buildings or parts of buildings. Typically these are earth banks, stone and concrete walls, or sheet-piling that is used to prevent or control the extent of flooding.

Features are displayed on the River and coastal flooding map on **page 69**

ID	Location	Update
7	**On site**	**10/03/2020**
11	24m W	10/03/2020
B	88m NE	10/03/2020
B	95m NE	10/03/2020

This data is sourced from the Environment Agency and Natural Resources Wales.

7.4 Areas Benefiting from Flood Defences

Records within 250m	0

Areas that would benefit from the presence of flood defences in a 1 in 100 (1%) chance of flooding each year from rivers or 1 in 200 (0.5%) chance of flooding each year from the sea.

This data is sourced from the Environment Agency and Natural Resources Wales.

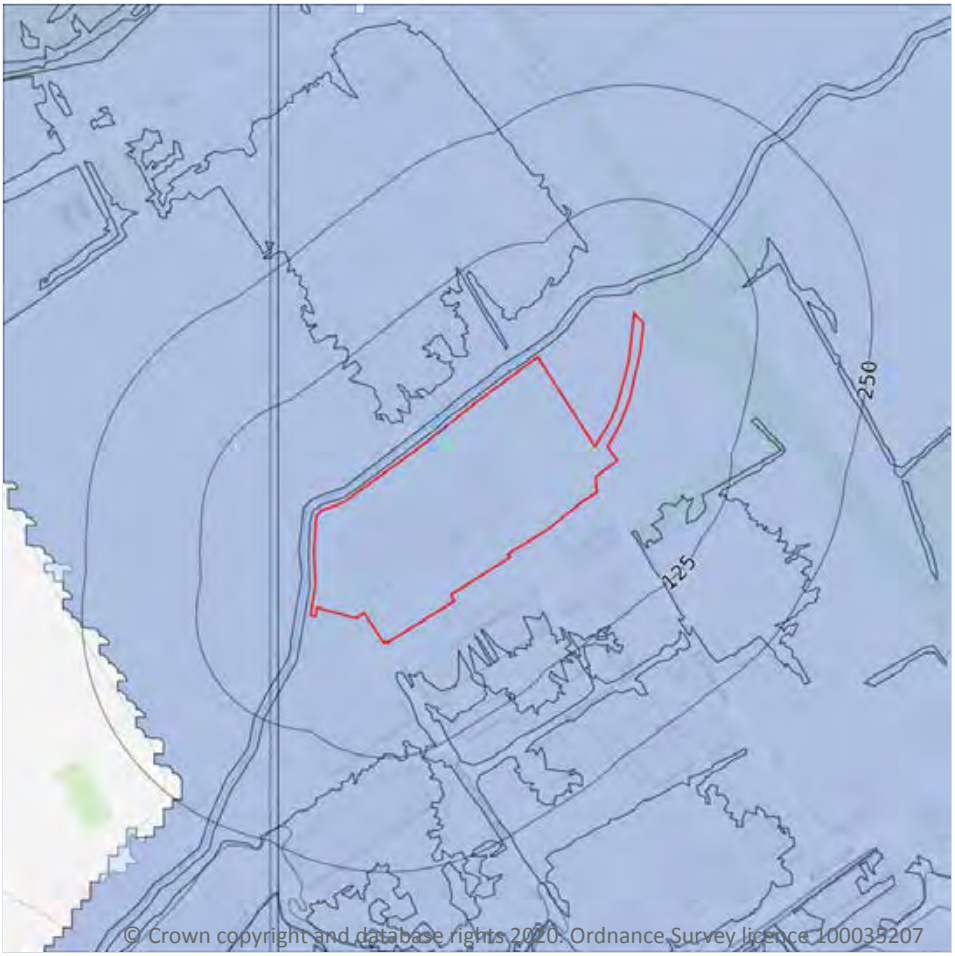
7.5 Flood Storage Areas

Records within 250m	0

Areas that act as a balancing reservoir, storage basin or balancing pond to attenuate an incoming flood peak to a flow level that can be accepted by the downstream channel or to delay the timing of a flood peak so that its volume is discharged over a longer period.

This data is sourced from the Environment Agency and Natural Resources Wales.

River and coastal flooding - Flood Zones



Site Outline

Search buffers in metres (m)

Flood zone 2

Flood zone 3

7.6 Flood Zone 2

Records within 50m	1

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land between Flood Zone 3 (see next section) and the extent of the flooding from rivers or the sea with a 1 in 1000 (0.1%) chance of flooding each year.

Features are displayed on the River and coastal flooding map on **page 69**

Location	Type
On site	**Zone 2 - (Fluvial /Tidal Models)**

This data is sourced from the Environment Agency and Natural Resources Wales.

7.7 Flood Zone 3

Records within 50m	1

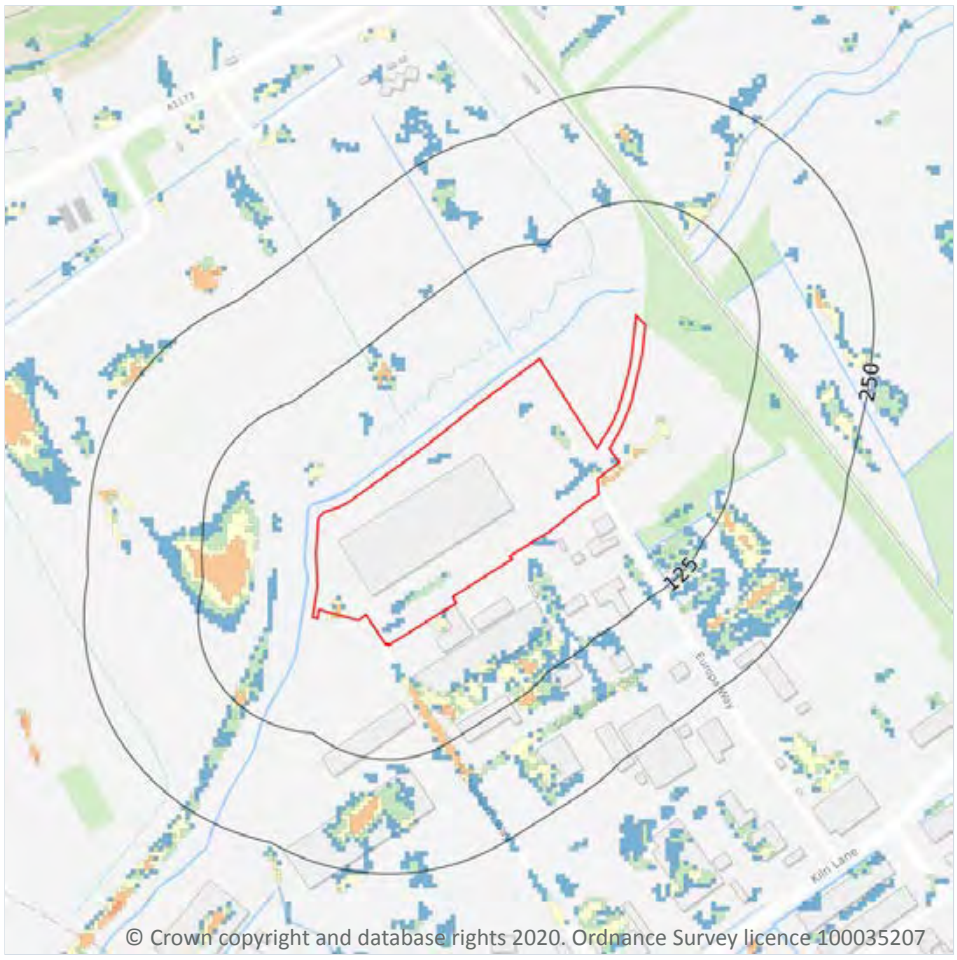
Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land with a 1 in 100 (1%) or greater chance of flooding each year from rivers or a 1 in 200 (0.5%) or greater chance of flooding each year from the sea.

Features are displayed on the River and coastal flooding map on **page 69**

Location	Type
On site	**Zone 3 - (Fluvial Models)**

This data is sourced from the Environment Agency and Natural Resources Wales.

8 Surface water flooding



Site Outline
Search buffers in metres (m)

1 in 1000 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 250 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 100 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 30 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

8.1 Surface water flooding

Highest risk on site	**1 in 30 year, 0.1m - 0.3m**
Highest risk within 50m	**1 in 30 year, 0.1m - 0.3m**

Ambiental Risk Analytics surface water (pluvial) FloodMap identifies areas likely to flood as a result of extreme rainfall events, i.e. land naturally vulnerable to surface water ponding or flooding. This data set was produced by simulating 1 in 30 year, 1 in 100 year, 1 in 250 year and 1 in 1,000 year rainfall events. Modern urban drainage systems are typically built to cope with rainfall events between 1 in 20 and 1 in 30 years, though some older ones may flood in a 1 in 5 year rainfall event.

Features are displayed on the Surface water flooding map on **page 74**

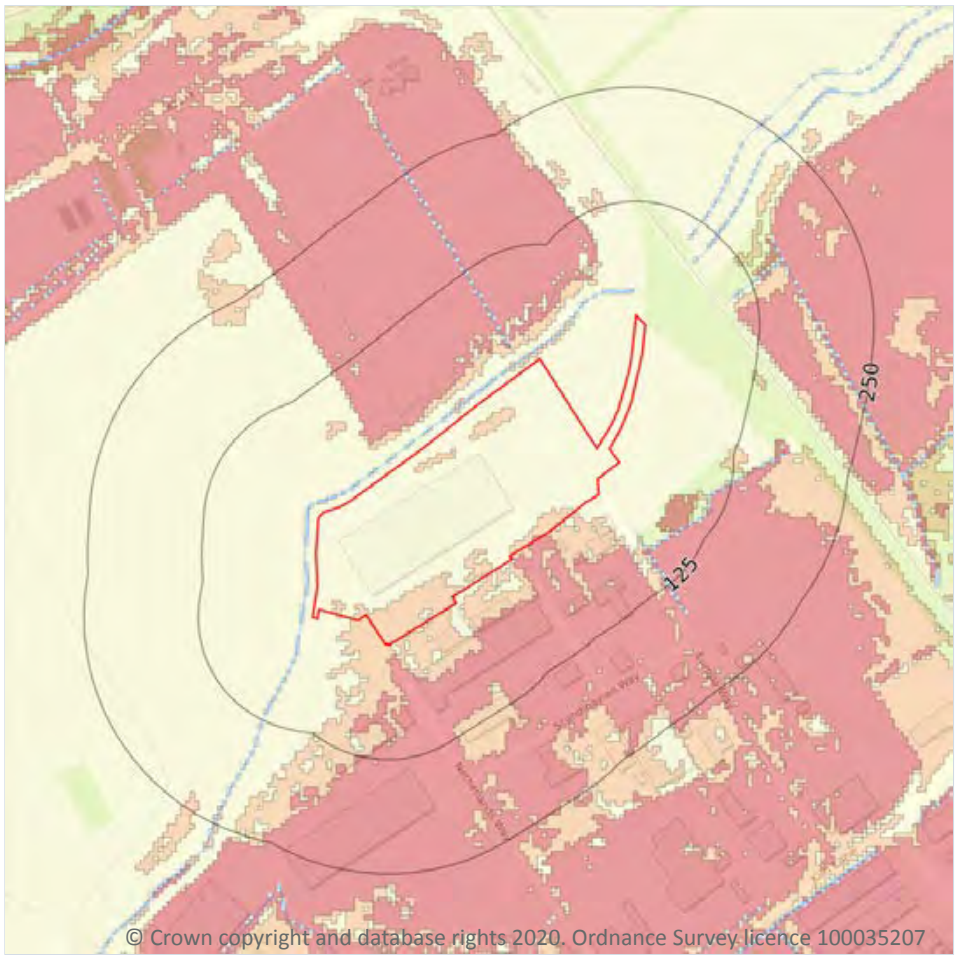
The data shown on the map and in the table above shows the highest likelihood of flood events happening at the site. Lower likelihood events may have greater flood depths and hence a greater potential impact on a site.

The table below shows the maximum flood depths for a range of return periods for the site.

Return period	Maximum modelled depth
1 in 1000 year	Between 0.1m and 0.3m
1 in 250 year	Between 0.1m and 0.3m
1 in 100 year	Between 0.1m and 0.3m
1 in 30 year	Between 0.1m and 0.3m

This data is sourced from Ambiental Risk Analytics.

9 Groundwater flooding



Site Outline

Search buffers in metres (m)

High

Moderate - High

Moderate

Low

Negligible

9.1 Groundwater flooding

Highest risk on site	**High**
Highest risk within 50m	**High**

Groundwater flooding is caused by unusually high groundwater levels. It occurs when the water table rises above the ground surface or within underground structures such as basements or cellars. Groundwater flooding tends to exhibit a longer duration than surface water flooding, possibly lasting for weeks or months, and as a result it can cause significant damage to property. This risk assessment is based on a 1 in 100 year return period and a 5m Digital Terrain Model (DTM).

Features are displayed on the Groundwater flooding map on **page 76**

This data is sourced from Ambiental Risk Analytics.

10 Environmental designations

Site Outline

Search buffers in metres (m)

- Sites of Special Scientific Interest (SSSI)
- Conserved wetland sites (Ramsar sites)
- Special Areas of Conservation (SAC)
- Special Protection Areas (SPA)

10.1 Sites of Special Scientific Interest (SSSI)

Records within 2000m	1

Sites providing statutory protection for the best examples of UK flora, fauna, or geological or physiographical features. Originally notified under the National Parks and Access to the Countryside Act 1949, SSSIs were re-notified under the Wildlife and Countryside Act 1981. Improved provisions for the protection and management of SSSIs were introduced by the Countryside and Rights of Way Act 2000 (in England and Wales) and (in Scotland) by the Nature Conservation (Scotland) Act 2004 and the Wildlife and Natural Environment (Scotland) Act 2010.

Features are displayed on the Environmental designations map on **page 77**

ID	Location	Name	Data source
A	890m NE	Humber Estuary	Natural England

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.2 Conserved wetland sites (Ramsar sites)

Records within 2000m	1

Ramsar sites are designated under the Convention on Wetlands of International Importance, agreed in Ramsar, Iran, in 1971. They cover all aspects of wetland conservation and wise use, recognizing wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities. These sites cover a broad definition of wetland; marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, and even some marine areas.

Features are displayed on the Environmental designations map on **page 77**

ID	Location	Site	Details
A	889m NE	Name: Humber Estuary Site status: Listed Data source: Natural England	Overview: The Humber Estuary is the largest macro-tidal estuary on the British North Sea coast. It drains a catchment of some 24,240 square kilometres and is the site of the largest single input of freshwater from Britain into the North Sea. It has the second-highest tidal range in Britain (max 7.4 m) and approximately one-third of the estuary is exposed as mud or sand flats at low tide. The inner estuary supports extensive areas of reedbed with areas of mature and developing saltmarsh backed in places by limited areas of grazing marsh in the middle and outer estuary. On the north Lincolnshire coast the saltmarsh is backed by low sand dunes with marshy slacks and brackish pools. The Estuary regularly supports internationally important numbers of waterfowl in winter and nationally important breeding populations in summer. Ramsar criteria: Ramsar criterion 1 The site is a representative example of a near-natural estuary with the following component habitats: dune systems and humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes, and coastal brackish/saline lagoons. It is a large macro-tidal coastal plain estuary with high suspended sediment loads, which feed a dynamic and rapidly changing system of accreting and eroding intertidal and subtidal mudflats, sandflats, saltmarsh and reedbeds. Examples of both strandline, foredune, mobile, semi-fixed dunes, fixed dunes and dune grassland occur on both banks of the estuary and along the coast. The estuary supports a full range of saline conditions from the open coast to the limit of saline intrusion on the tidal rivers of the Ouse and Trent. Wave exposed sandy shores are found in the outer/open coast areas of the estuary. These change to the more moderately exposed sandy shores and then to sheltered muddy shores within the main body of the estuary and up into the tidal rivers. The lower saltmarsh of the Humber is dominated by common cordgrass Spartina anglica and annual glasswort Salicornia communities. Low to mid marsh communities are mostly represented by sea aster Aster tripolium, common saltmarsh grass Puccinellia maritima and sea purslane Atriplex portulacoides communities. The upper portion of the saltmarsh community is atypical, dominated by sea couch Elytrigia atherica (Elymus pycnanthus) saltmarsh community. In the upper reaches of the estuary, the tidal marsh community is dominated by the common reed Phragmites australis fen and sea club rush Bolboschoenus maritimus swamp with the couch grass Elytrigia repens (Elymus repens) saltmarsh community. Within the Humber Estuary Ramsar site there are good examples of four of the five physiographic types of saline lagoon. Ramsar criterion 3 The Humber Estuary Ramsar site supports a breeding colony of grey seals Halichoerus grypus at Donna Nook. It is the second largest grey seal colony in England and the furthest south regular breeding site on the east coast. The dune slacks at Saltfleetby-Theddlethorpe on the southern extremity of the Ramsar site are the most north-easterly breeding site in Great Britain of the natterjack toad Bufo calamita. Ramsar criterion 5 Assemblages of international importance: 153,934 waterfowl, non-breeding season (5 year peak mean 1996/97-2000/2001) Ramsar criterion 6 – species/populations occurring at levels of international

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.3 Special Areas of Conservation (SAC)

Records within 2000m	1

Areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive.

Features are displayed on the Environmental designations map on **page 77**

ID	Location	Name	Features of interest	Habitat description	Data source
A	890m NE	Humber Estuary	Subtidal sandbanks; Estuaries; Intertidal mudflats and sandflats; Lagoons; Annual vegetation of drift lines; Glasswort and other annuals colonising mud and sand; Cord-grass swards; Atlantic salt meadows; Shifting dunes; Shifting dunes with marram; Dune grassland; Dunes with sea-buckthorn; Sea lamprey; River lamprey; Allis shad; Twaite shad; Grey seal; Common seal.	Bogs, Marshes, Water fringed vegetation, Fens; Salt marshes, Salt pastures, Salt steppes; Coastal sand dunes, Sand beaches, Machair; Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins)	Natural England

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.4 Special Protection Areas (SPA)

Records within 2000m	3

Sites classified by the UK Government under the EC Birds Directive, SPAs are areas of the most important habitat for rare (listed on Annex I to the Directive) and migratory birds within the European Union.

Features are displayed on the Environmental designations map on **page 77**

ID	Location	Name	Species of interest	Habitat description	Data source
1	890m NE	Humber Estuary	Common redshank; Sanderling; European golden plover; Dunlin; Pied avocet; Sanderling; Common redshank; Eurasian marsh harrier; Eurasian curlew; Common shelduck; Dark-bellied brent goose; Pied avocet; Grey plover; Ringed plover; Great bittern; Common gold	Salt marshes, Salt pastures, Salt steppes; Inland water bodies (Standing water, Running water); Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins); Coastal sand dunes, Sand beaches, Machair; Bogs, Marshes, Water fringed v	Natural England

ID	Location	Name	Species of interest	Habitat description	Data source
2	992m NE	Humber Estuary	Common redshank; Sanderling; European golden plover; Dunlin; Pied avocet; Sanderling; Common redshank; Eurasian marsh harrier; Eurasian curlew; Common shelduck; Dark-bellied brent goose; Pied avocet; Grey plover; Ringed plover; Great bittern; Common gold	Salt marshes, Salt pastures, Salt steppes; Inland water bodies (Standing water, Running water); Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins); Coastal sand dunes, Sand beaches, Machair; Bogs, Marshes, Water fringed v	Natural England
-	1281m N	Humber Estuary	Common redshank; Sanderling; European golden plover; Dunlin; Pied avocet; Sanderling; Common redshank; Eurasian marsh harrier; Eurasian curlew; Common shelduck; Dark-bellied brent goose; Pied avocet; Grey plover; Ringed plover; Great bittern; Common gold	Salt marshes, Salt pastures, Salt steppes; Inland water bodies (Standing water, Running water); Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins); Coastal sand dunes, Sand beaches, Machair; Bogs, Marshes, Water fringed v	Natural England

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.5 National Nature Reserves (NNR)

Records within 2000m	**0**

Sites containing examples of some of the most important natural and semi-natural terrestrial and coastal ecosystems in Great Britain. They are managed to conserve their habitats, provide special opportunities for scientific study or to provide public recreation compatible with natural heritage interests.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.6 Local Nature Reserves (LNR)

Records within 2000m	**0**

Sites managed for nature conservation, and to provide opportunities for research and education, or simply enjoying and having contact with nature. They are declared by local authorities under the National Parks and Access to the Countryside Act 1949 after consultation with the relevant statutory nature conservation agency.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.7 Designated Ancient Woodland

Records within 2000m	**0**

Ancient woodlands are classified as areas which have been wooded continuously since at least 1600 AD. This includes semi-natural woodland and plantations on ancient woodland sites. 'Wooded continuously' does not mean there is or has previously been continuous tree cover across the whole site, and not all trees within the woodland have to be old.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.8 Biosphere Reserves

Records within 2000m	0

Biosphere Reserves are internationally recognised by UNESCO as sites of excellence to balance conservation and socioeconomic development between nature and people. They are recognised under the Man and the Biosphere (MAB) Programme with the aim of promoting sustainable development founded on the work of the local community.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.9 Forest Parks

Records within 2000m	0

These are areas managed by the Forestry Commission designated on the basis of recreational, conservation or scenic interest.

This data is sourced from the Forestry Commission.

10.10 Marine Conservation Zones

Records within 2000m	0

A type of marine nature reserve in UK waters established under the Marine and Coastal Access Act (2009). They are designated with the aim to protect nationally important, rare or threatened habitats and species.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.11 Green Belt

Records within 2000m	0

Areas designated to prevent urban sprawl by keeping land permanently open.

This data is sourced from the Ministry of Housing, Communities and Local Government.

10.12 Proposed Ramsar sites

Records within 2000m	0

Ramsar sites are areas listed as a Wetland of International Importance under the Convention on Wetlands of International Importance especially as Waterfowl Habitat (the Ramsar Convention) 1971. The sites here supplied have a status of 'Proposed' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.13 Possible Special Areas of Conservation (pSAC)

Records within 2000m	0

Special Areas of Conservation are areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive. Those sites supplied here are those with a status of 'Possible' having been identified for potential adoption under the framework.

This data is sourced from Natural England and Natural Resources Wales.

10.14 Potential Special Protection Areas (pSPA)

Records within 2000m	0

Special Protection Areas (SPAs) are areas designated (or 'classified') under the European Union Wild Birds Directive for the protection of nationally and internationally important populations of wild birds. Those sites supplied here are those with a status of 'Potential' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.15 Nitrate Sensitive Areas

Records within 2000m	0

Areas where nitrate concentrations in drinking water sources exceeded or was at risk of exceeding the limit of 50 mg/l set by the 1980 EC Drinking Water Directive. Voluntary agricultural measures as a means of reducing the levels of nitrate were introduced by DEFRA as MAFF, with payments being made to farmers who complied. The scheme was started as a pilot in 1990 in ten areas, later implemented within 32 areas. The scheme was closed to further new entrants in 1998, although existing agreements continued for their full term. All Nitrate Sensitive Areas fell within the areas designated as Nitrate Vulnerable Zones (NVZs) in 1996 under the EC Nitrate Directive (91/676/EEC).

This data is sourced from Natural England.

10.16 Nitrate Vulnerable Zones

Records within 2000m	3

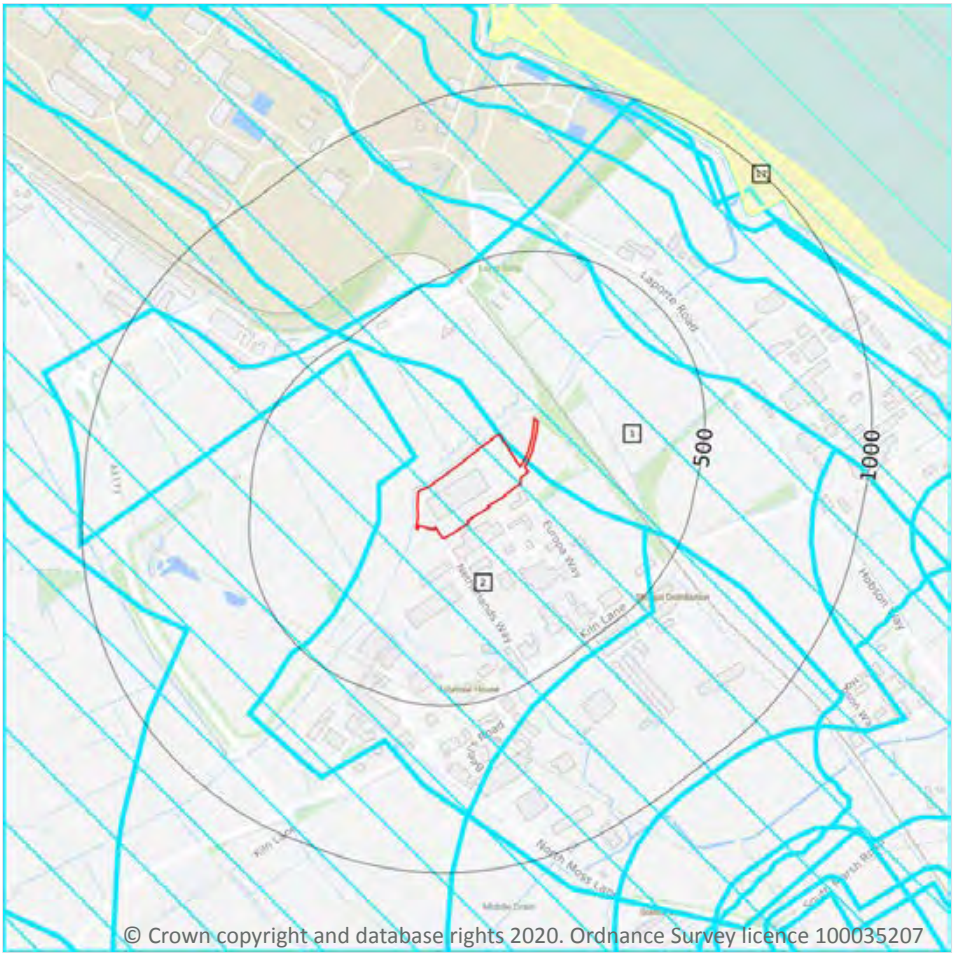
Areas at risk from agricultural nitrate pollution designated under the EC Nitrate Directive (91/676/EEC). These are areas of land that drain into waters polluted by nitrates. Farmers operating within these areas have to follow mandatory rules to tackle nitrate loss from agriculture.

Location	Name	Type	NVZ ID	Status
On site	**North Beck Drain NVZ**	**Surface Water**	**S359**	**Existing**

Location	Name	Type	NVZ ID	Status
1295m SW	Lincolnshire Chalk	Groundwater	G80	Changed
1456m NW	North Beck Drain NVZ	Surface Water	S359	Existing

This data is sourced from Natural England and Natural Resources Wales.

SSSI Impact Zones and Units



Site Outline

Search buffers in metres (m)

SSSI Impact Risk Zones

SSSI Units

- Not recorded
- Favourable
- Unfavourable - Recovering
- Unfavourable - No change
- Unfavourable - Declining
- Partially destroyed
- Destroyed

10.17 SSSI Impact Risk Zones

Records on site	2

Developed to allow rapid initial assessment of the potential risks to SSSIs posed by development proposals. They define zones around each SSSI which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts.

Features are displayed on the SSSI Impact Zones and Units map on **page 86**

ID	Location	Type of developments requiring consultation
1	On site	**All applications - All Planning Applications (Except Householder) Outside Or Extending Outside Existing Settlements/urban Areas Affecting Greenspace, Farmland, Semi Natural Habitats Or Landscape Features Such As Trees, Hedges, Streams, Rural Buildings/structures.** **Infrastructure - Pipelines, pylons and overhead cables. Any transport proposal including road, rail and by water (excluding routine maintenance). Airports, helipads and other aviation proposals.** **Wind and Solar - Solar schemes with footprint > 0.5ha, all wind turbines.** **Minerals, Oil and Gas - Planning applications for quarries, including: new proposals, Review of Minerals Permissions (ROMP), extensions, variations to conditions etc. Oil & gas exploration/extraction.** **Rural non-residential - Any non-residential development outside of existing urban areas where net additional gross internal floorspace following development is 30m² or more.** **Residential - Residential development of 10 units or more.** **Rural residential - Any residential developments outside of existing settlements/urban areas with a total net gain in residential units.** **Air pollution - Any industrial/agricultural development that could cause AIR POLLUTION (incl: industrial processes, livestock & poultry units with floorspace > 500m², slurry lagoons > 200m² & manure stores > 250t).** **Combustion - General combustion processes >20MW energy input. Incl: energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic digestion, sewage treatment works, other incineration/ combustion.** **Waste - Landfill. Incl: inert landfill, non-hazardous landfill, hazardous landfill.** **Composting - Any composting proposal with more than 500 tonnes maximum annual operational throughput. Incl: open windrow composting, in-vessel composting, anaerobic digestion, other waste management.** **Discharges - Any discharge of water or liquid waste of more than 2m³/day to ground (ie to seep away) or to surface water, such as a beck or stream (NB This does not include discharges to mains sewer which are unlikely to pose a risk at this location).** **Water supply - Large infrastructure such as warehousing / industry where net additional gross internal floorspace is > 1,000m² or any development needing its own water supply .** **Notes: A strategic approach has been developed for the loss of habitat used by SPA birds within the South Humber Bank mitigation zone (see local plan policy 9). You should liaise with the Council regarding how you should contribute to this strategic approach.**

ID	Location	Type of developments requiring consultation
2	On site	**All applications - All Planning Applications (Except Householder) Outside Or Extending Outside Existing Settlements/urban Areas Affecting Greenspace, Farmland, Semi Natural Habitats Or Landscape Features Such As Trees, Hedges, Streams, Rural Buildings/structures. Infrastructure - Pipelines, pylons and overhead cables. Any transport proposal including road, rail and by water (excluding routine maintenance). Airports, helipads and other aviation proposals. Wind and Solar - Solar schemes with footprint > 0.5ha, all wind turbines. Minerals, Oil and Gas - Planning applications for quarries, including: new proposals, Review of Minerals Permissions (ROMP), extensions, variations to conditions etc. Oil & gas exploration/extraction. Rural non-residential - Any non-residential development outside of existing urban areas where net additional gross internal floorspace following development is 30m² or more. Residential - Residential development of 10 units or more. Rural residential - Any residential developments outside of existing settlements/urban areas with a total net gain in residential units. Air pollution - Any industrial/agricultural development that could cause AIR POLLUTION (incl: industrial processes, livestock & poultry units with floorspace > 500m², slurry lagoons > 200m² & manure stores > 250t). Combustion - General combustion processes >20MW energy input. Incl: energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic digestion, sewage treatment works, other incineration/ combustion. Waste - Landfill. Incl: inert landfill, non-hazardous landfill, hazardous landfill. Composting - Any composting proposal with more than 75000 tonnes maximum annual operational throughput. Incl: open windrow composting, in-vessel composting, anaerobic digestion, other waste management. Discharges - Any discharge of water or liquid waste of more than 5m³/day to ground (ie to seep away) or to surface water, such as a beck or stream (NB This does not include discharges to mains sewer which are unlikely to pose a risk at this location). Water supply - Large infrastructure such as warehousing / industry where total net additional gross internal floorspace following development is 1,000m² or more. Notes: A strategic approach has been developed for the loss of habitat used by SPA birds within the South Humber Bank mitigation zone (see local plan policy 9). You should liaise with the Council regarding how you should contribute to this strategic approach.**

This data is sourced from Natural England.

10.18 SSSI Units

Records within 2000m	4

Divisions of SSSIs used to record management and condition details. Units are the smallest areas for which Natural England gives a condition assessment, however, the size of units varies greatly depending on the types of management and the conservation interest.

Features are displayed on the SSSI Impact Zones and Units map on **page 86**

ID: 17
Location: 890m NE
SSSI name: Humber Estuary
Unit name: Factory To Pipeline Jetty
Broad habitat: Littoral Sediment
Condition: Unfavourable - Recovering
Reportable features:

Feature name	Feature condition	Date of assessment
Aggregations of non-breeding birds - Black-tailed godwit, Limosa limosa islandica	Unfavourable - Recovering	21/12/2010
Aggregations of non-breeding birds - Curlew, Numenius arquata	Unfavourable - Recovering	21/12/2010
Aggregations of non-breeding birds - Dunlin, Calidris alpina alpina	Unfavourable - Recovering	21/12/2010
Aggregations of non-breeding birds - Knot, Calidris canutus	Unfavourable - Recovering	21/12/2010
Aggregations of non-breeding birds - Lapwing, Vanellus vanellus	Unfavourable - Recovering	21/12/2010
Aggregations of non-breeding birds - Oystercatcher, Haematopus ostralegus	Unfavourable - Recovering	21/12/2010
Aggregations of non-breeding birds - Ringed plover, Charadrius hiaticula	Unfavourable - Recovering	21/12/2010
Aggregations of non-breeding birds - Teal, Anas crecca	Unfavourable - Recovering	21/12/2010
Littoral sediment	Unfavourable - Recovering	30/03/2010

ID: 22
Location: 1069m NE
SSSI name: Humber Estuary
Unit name: Humber Bridge To Grimsby Dock Subtidal
Broad habitat: Littoral Sediment
Condition: Unfavourable - Recovering
Reportable features:

Feature name	Feature condition	Date of assessment
Aggregations of non-breeding birds - Pochard, Aythya ferina	Favourable	21/12/2010
Estuaries	Unfavourable - Recovering	21/12/2010
River lamprey, Lampetra fluviatilis	Unfavourable - Recovering	21/12/2010
Sea lamprey, Petromyzon marinus	Unfavourable - Recovering	21/12/2010

ID: 24
Location: 1128m N
SSSI name: Humber Estuary
Unit name: Pipeline Jetty To South Killingholme Haven
Broad habitat: Littoral Sediment
Condition: Unfavourable - Recovering
Reportable features:

Feature name	Feature condition	Date of assessment
Aggregations of non-breeding birds - Black-tailed godwit, Limosa limosa islandica	Unfavourable - Recovering	21/12/2010
Aggregations of non-breeding birds - Curlew, Numenius arquata	Unfavourable - Recovering	21/12/2010
Aggregations of non-breeding birds - Dunlin, Calidris alpina alpina	Unfavourable - Recovering	21/12/2010
Aggregations of non-breeding birds - Knot, Calidris canutus	Unfavourable - Recovering	21/12/2010
Aggregations of non-breeding birds - Lapwing, Vanellus vanellus	Unfavourable - Recovering	21/12/2010
Aggregations of non-breeding birds - Oystercatcher, Haematopus ostralegus	Unfavourable - Recovering	21/12/2010
Aggregations of non-breeding birds - Ringed plover, Charadrius hiaticula	Unfavourable - Recovering	21/12/2010
Aggregations of non-breeding birds - Teal, Anas crecca	Unfavourable - Recovering	21/12/2010
Littoral sediment	Unfavourable - Recovering	30/03/2010

ID: -
Location: 1395m E
SSSI name: Humber Estuary
Unit name: Middle Drain North
Broad habitat: Littoral Sediment
Condition: Unfavourable - Recovering
Reportable features:

Feature name	Feature condition	Date of assessment
Aggregations of non-breeding birds - Bar-tailed godwit, Limosa lapponica	Unfavourable - Recovering	21/12/2010
Aggregations of non-breeding birds - Black-tailed godwit, Limosa limosa islandica	Unfavourable - Recovering	21/12/2010
Aggregations of non-breeding birds - Curlew, Numenius arquata	Unfavourable - Recovering	21/12/2010
Aggregations of non-breeding birds - Dunlin, Calidris alpina alpina	Unfavourable - Recovering	21/12/2010
Aggregations of non-breeding birds - Golden plover, Pluvialis apricaria	Unfavourable - Recovering	21/12/2010
Aggregations of non-breeding birds - Grey plover, Pluvialis squatarola	Unfavourable - Recovering	21/12/2010

Feature name	Feature condition	Date of assessment
Aggregations of non-breeding birds - Knot, Calidris canutus	Unfavourable - Recovering	21/12/2010
Aggregations of non-breeding birds - Lapwing, Vanellus vanellus	Unfavourable - Recovering	21/12/2010
Aggregations of non-breeding birds - Oystercatcher, Haematopus ostralegus	Unfavourable - Recovering	21/12/2010
Aggregations of non-breeding birds - Redshank, Tringa totanus	Unfavourable - Recovering	21/12/2010
Aggregations of non-breeding birds - Ringed plover, Charadrius hiaticula	Unfavourable - Recovering	21/12/2010
Aggregations of non-breeding birds - Shelduck, Tadorna tadorna	Unfavourable - Recovering	21/12/2010
Aggregations of non-breeding birds - Teal, Anas crecca	Unfavourable - Recovering	21/12/2010
Littoral sediment	Unfavourable - Recovering	30/03/2010

This data is sourced from Natural England and Natural Resources Wales.

11 Visual and cultural designations

11.1 World Heritage Sites

Records within 250m	0

Sites designated for their globally important cultural or natural interest requiring appropriate management and protection measures. World Heritage Sites are designated to meet the UK's commitments under the World Heritage Convention.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.2 Area of Outstanding Natural Beauty

Records within 250m	0

Areas of Outstanding Natural Beauty (AONB) are conservation areas, chosen because they represent 18% of the finest countryside. Each AONB has been designated for special attention because of the quality of their flora, fauna, historical and cultural associations, and/or scenic views. The National Parks and Access to the Countryside Act of 1949 created AONBs and the Countryside and Rights of Way Act, 2000 added further regulation and protection. There are likely to be restrictions to some developments within these areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

11.3 National Parks

Records within 250m	0

In England and Wales, the purpose of National Parks is to conserve and enhance landscapes within the countryside whilst promoting public enjoyment of them and having regard for the social and economic well-being of those living within them. In Scotland National Parks have the additional purpose of promoting the sustainable use of the natural resources of the area and the sustainable social and economic development of its communities. The National Parks and Access to the Countryside Act 1949 established the National Park designation in England and Wales, and The National Parks (Scotland) Act 2000 in Scotland.

This data is sourced from Natural England, Natural Resources Wales and the Scottish Government.

11.4 Listed Buildings

Records within 250m	0

Buildings listed for their special architectural or historical interest. Building control in the form of 'listed building consent' is required in order to make any changes to that building which might affect its special interest. Listed buildings are graded to indicate their relative importance, however building controls apply to all buildings equally, irrespective of their grade, and apply to the interior and exterior of the building in its entirety, together with any curtilage structures.

This data is sourced from English Heritage, Cadw and Historic Environment Scotland.

11.5 Conservation Areas

Records within 250m	0

Local planning authorities are obliged to designate as conservation areas any parts of their own area that are of special architectural or historic interest, the character and appearance of which it is desirable to preserve or enhance. Designation of a conservation area gives broader protection than the listing of individual buildings. All the features within the area, listed or otherwise, are recognised as part of its character. Conservation area designation is the means of recognising the importance of all factors and of ensuring that planning decisions address the quality of the landscape in its broadest sense.

This data is sourced from English Heritage, Cadw and Historic Environment Scotland.

11.6 Scheduled Ancient Monuments

Records within 250m	0

A scheduled monument is an historic building or site that is included in the Schedule of Monuments kept by the Secretary of State for Digital, Culture, Media and Sport. The regime is set out in the Ancient Monuments and Archaeological Areas Act 1979. The Schedule of Monuments has c.20,000 entries and includes sites such as Roman remains, burial mounds, castles, bridges, earthworks, the remains of deserted villages and industrial sites. Monuments are not graded, but all are, by definition, considered to be of national importance.

This data is sourced from English Heritage, Cadw and Historic Environment Scotland.

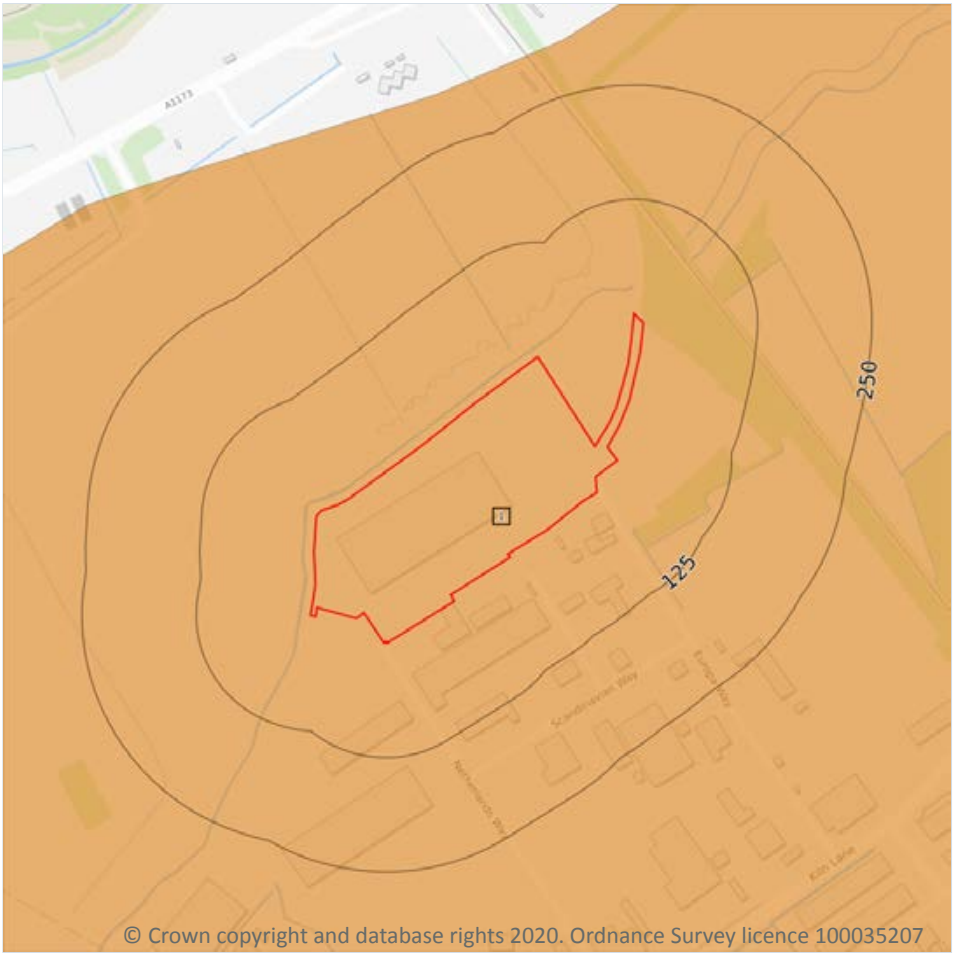
11.7 Registered Parks and Gardens

Records within 250m	0

Parks and gardens assessed to be of particular interest and of special historic interest. The emphasis being on 'designed' landscapes, rather than on planting or botanical importance. Registration is a 'material consideration' in the planning process, meaning that planning authorities must consider the impact of any proposed development on the special character of the landscape.

This data is sourced from English Heritage, Cadw and Historic Environment Scotland.

12 Agricultural designations



Site Outline

Search buffers in metres (m)

- Grade 1 - excellent quality
- Grade 2 - very good quality
- Grade 3 - good to moderate quality
- Grade 3a - good quality
- Grade 3b - moderate quality
- Grade 4 - poor quality
- Grade 5 - very poor quality
- Non-agricultural land
- Urban land
- Exclusion land
- Tree felling licences
- Open Access land

12.1 Agricultural Land Classification

Records within 250m	1

Classification of the quality of agricultural land taking into consideration multiple factors including climate, physical geography and soil properties. It should be noted that the categories for the grading of agricultural land are not consistent across England, Wales and Scotland.

Features are displayed on the Agricultural designations map on **page 94**

ID	Location	Classification	Description
1	On site	Grade 3	**Good to moderate quality agricultural land. Land with moderate limitations which affect the choice of crops, timing and type of cultivation, harvesting or the level of yield. Where more demanding crops are grown yields are generally lower or more variable than on land in Grades 1 and 2.**

This data is sourced from Natural England.

12.2 Open Access Land

Records within 250m	0

The Countryside and Rights of Way Act 2000 (CROW Act) gives a public right of access to land without having to use paths. Access land includes mountains, moors, heaths and downs that are privately owned. It also includes common land registered with the local council and some land around the England Coast Path. Generally permitted activities on access land are walking, running, watching wildlife and climbing.

This data is sourced from Natural England and Natural Resources Wales.

12.3 Tree Felling Licences

Records within 250m	0

Felling Licence Application (FLA) areas approved by Forestry Commission England. Anyone wishing to fell trees must ensure that a licence or permission under a grant scheme has been issued by the Forestry Commission before any felling is carried out or that one of the exceptions apply.

This data is sourced from the Forestry Commission.

12.4 Environmental Stewardship Schemes

Records within 250m	0

Environmental Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment.

This data is sourced from Natural England.

12.5 Countryside Stewardship Schemes

Records within 250m	0

Countryside Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. Main objectives are to improve the farmed environment for wildlife and to reduce diffuse water pollution.

This data is sourced from Natural England.

13 Habitat designations

13.1 Priority Habitat Inventory

Records within 250m	0

Habitats of principal importance as named under Natural Environment and Rural Communities Act (2006) Section 41.

This data is sourced from Natural England.

13.2 Habitat Networks

Records within 250m	0

Habitat networks for 18 priority habitat networks (based primarily, but not exclusively, on the priority habitat inventory) and areas suitable for the expansion of networks through restoration and habitat creation.

This data is sourced from Natural England.

13.3 Open Mosaic Habitat

Records within 250m	0

Sites verified as Open Mosaic Habitat. Mosaic habitats are brownfield sites that are identified under the UK Biodiversity Action Plan as a priority habitat due to the habitat variation within a single site, supporting an array of invertebrates.

This data is sourced from Natural England.

13.4 Limestone Pavement Orders

Records within 250m	0

Limestone pavements are outcrops of limestone where the surface has been worn away by natural means over millennia. These rocks have the appearance of paving blocks, hence their name. Not only do they have geological interest, they also provide valuable habitats for wildlife. These habitats are threatened due to their removal for use in gardens and water features. Many limestone pavements have been designated as SSSIs which affords them some protection. In addition, Section 34 of the Wildlife and Countryside Act 1981 gave them additional protection via the creation of Limestone Pavement Orders, which made it a criminal offence to remove any part of the outcrop. The associated Limestone Pavement Priority Habitat is part of the UK Biodiversity Action Plan priority habitat in England.

This data is sourced from Natural England.

14 Geology 1:10,000 scale - Availability

Site Outline

Search buffers in metres (m)

Full coverage

Partial coverage

No coverage

14.1 10k Availability

Records within 500m	1

An indication on the coverage of 1:10,000 scale geology data for the site, the most detailed dataset provided by the British Geological Survey. Either 'Full', 'Partial' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:10,000 scale - Availability map on **page 97**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**No coverage**	**No coverage**	**No coverage**	**No coverage**	**NoCov**

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Artificial and made ground

14.2 Artificial and made ground (10k)

Records within 500m	0

Details of made, worked, infilled, disturbed and landscaped ground at 1:10,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Superficial

14.3 Superficial geology (10k)

Records within 500m	0

Superficial geological deposits at 1:10,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

This data is sourced from the British Geological Survey.

14.4 Landslip (10k)

Records within 500m	0

Mass movement deposits on BGS geological maps at 1:10,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Bedrock

14.5 Bedrock geology (10k)

Records within 500m	0

Bedrock geology at 1:10,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

This data is sourced from the British Geological Survey.

14.6 Bedrock faults and other linear features (10k)

Records within 500m	0

Linear features at the ground or bedrock surface at 1:10,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

This data is sourced from the British Geological Survey.

15 Geology 1:50,000 scale - Availability

Site Outline

Search buffers in metres (m)

Geological map tile

15.1 50k Availability

Records within 500m	1

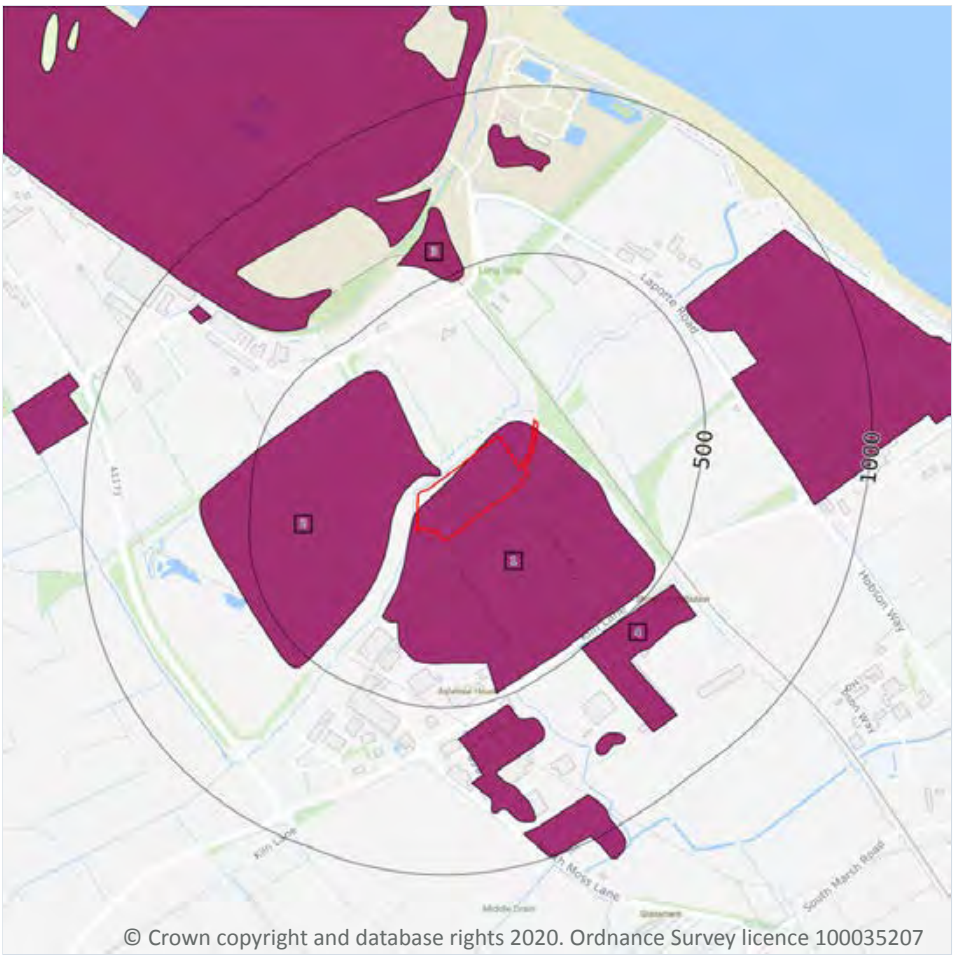
An indication on the coverage of 1:50,000 scale geology data for the site. Either 'Full' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:50,000 scale - Availability map on **page 101**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**Full**	**Full**	**Full**	**No coverage**	**EW081_082_patrington_and_spurn_v4**

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Artificial and made ground



Site Outline

Search buffers in metres (m)

- Made ground
- Worked ground
- Infilled ground
- Disturbed ground
- Landscaped ground

15.2 Artificial and made ground (50k)

Records within 500m **4**

Details of made, worked, infilled, disturbed and landscaped ground at 1:50,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

Features are displayed on the Geology 1:50,000 scale - Artificial and made ground map on **page 102**

ID	Location	LEX Code	Description	Rock description
1	**On site**	**MGR-ARTDP**	**MADE GROUND (UNDIVIDED)**	**ARTIFICIAL DEPOSIT**
2	13m NW	MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT
3	477m NW	MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT
4	498m SE	MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT

This data is sourced from the British Geological Survey.

15.3 Artificial ground permeability (50k)

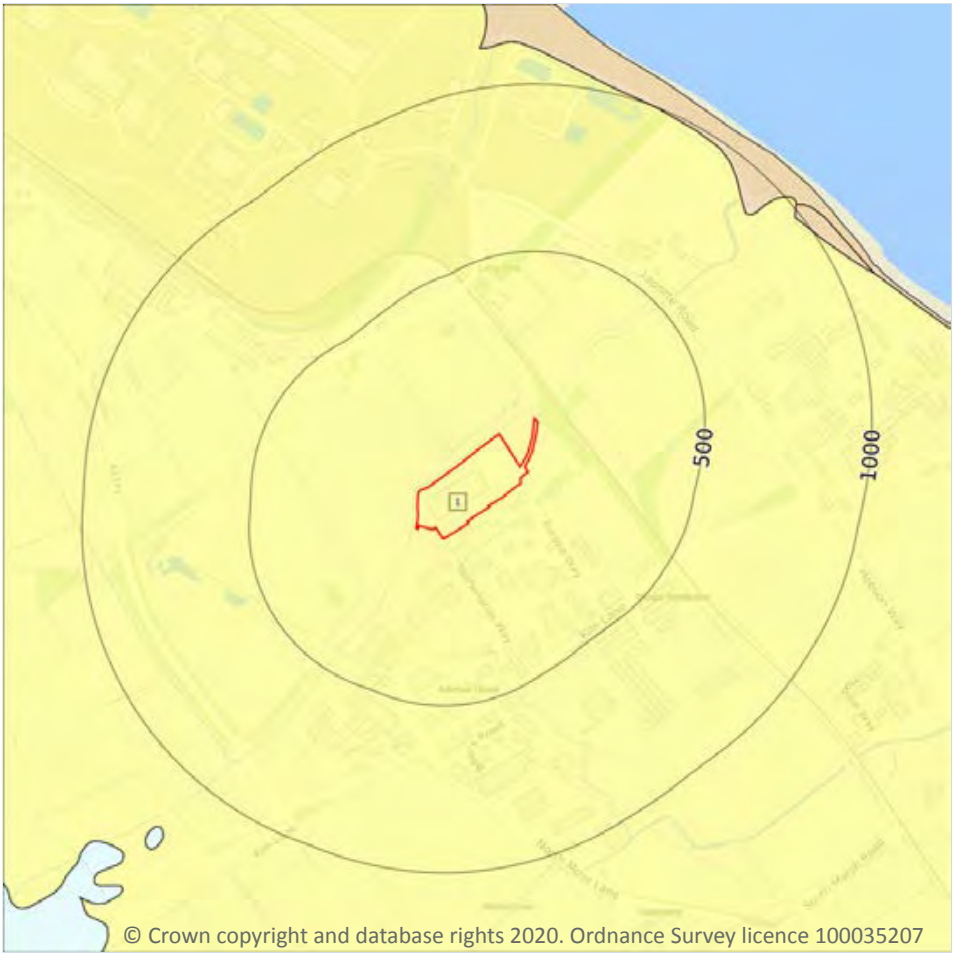
Records within 50m	**2**

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any artificial deposits (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	**Mixed**	**Very High**	**Low**
12m W	Mixed	Very High	Low

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Superficial



Site Outline

Search buffers in metres (m)

Landslip (50k)

Superficial geology (50k)
Please see table for more details.

15.4 Superficial geology (50k)

Records within 500m **1**

Superficial geological deposits at 1:50,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:50,000 scale - Superficial map on **page 104**

ID	Location	LEX Code	Description	Rock description
1	**On site**	**TFD-XCZ**	**TIDAL FLAT DEPOSITS**	**CLAY AND SILT**

This data is sourced from the British Geological Survey.

15.5 Superficial permeability (50k)

Records within 50m	1

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any superficial deposits (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	**Intergranular**	**Low**	**Very Low**

This data is sourced from the British Geological Survey.

15.6 Landslip (50k)

Records within 500m	0

Mass movement deposits on BGS geological maps at 1:50,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

15.7 Landslip permeability (50k)

Records within 50m	0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any landslip deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Bedrock

Site Outline

Search buffers in metres (m)

Bedrock faults and other linear features (50k)

Bedrock geology (50k)
Please see table for more details.

15.8 Bedrock geology (50k)

Records within 500m	1

Bedrock geology at 1:50,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 106**

ID	Location	LEX Code	Description	Rock age
1	**On site**	**FCK-CHLK**	**FLAMBOROUGH CHALK FORMATION - CHALK**	**SANTONIAN**

This data is sourced from the British Geological Survey.

15.9 Bedrock permeability (50k)

Records within 50m	1

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of bedrock (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	**Fracture**	**Very High**	**Very High**

This data is sourced from the British Geological Survey.

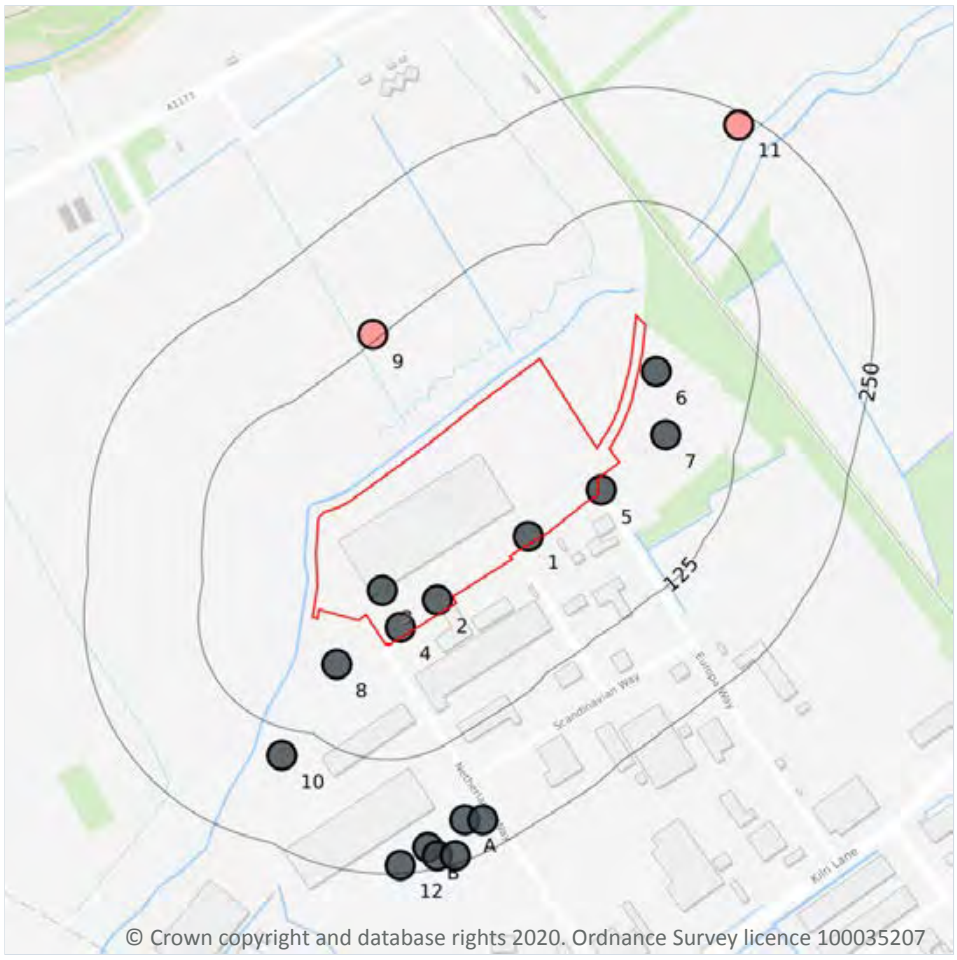
15.10 Bedrock faults and other linear features (50k)

Records within 500m	0

Linear features at the ground or bedrock surface at 1:50,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

This data is sourced from the British Geological Survey.

16 Boreholes



Site Outline

Search buffers in metres (m)

Confidential

0 - 10m

10 - 30m

30m+

Unknown

16.1 BGS Boreholes

Records within 250m	17

The Single Onshore Boreholes Index (SOBI); an index of over one million records of boreholes, shafts and wells from all forms of drilling and site investigation work held by the British Geological Survey. Covering onshore and nearshore boreholes dating back to at least 1790 and ranging from one to several thousand metres deep.

Features are displayed on the Boreholes map on **page 108**

ID	Location	Grid reference	Name	Length	Confidential	Web link
1	On site	520790 414360	IMMINGHAM RAILFREIGHT TERMINAL TP 6	-	Y	N/A
2	On site	520690 414290	IMMINGHAM RAILFREIGHT TERMINAL TP 5	-	Y	N/A
3	On site	520630 414300	IMMINGHAM RAILFREIGHT TERMINAL TP 3	-	Y	N/A

ID	Location	Grid reference	Name	Length	Confidential	Web link
4	**On site**	**520650 414260**	**IMMINGHAM RAILFREIGHT TERMINAL TP 4**	**-**	**Y**	**N/A**
5	3m E	520870 414410	IMMINGHAM RAILFREIGHT TERMINAL TP 7	-	Y	N/A
6	19m E	520930 414540	IMMINGHAM RAILFREIGHT TERMINAL TP 9	-	Y	N/A
7	48m E	520940 414470	IMMINGHAM RAILFREIGHT TERMINAL TP 8	-	Y	N/A
8	52m S	520580 414220	IMMINGHAM RAILFREIGHT TERMINAL TP 2	-	Y	N/A
9	131m NW	520620 414580	FISONS LTD, IMMINGHAM NO. 2	60.96	N	465816
10	155m S	520520 414120	IMMINGHAM RAILFREIGHT TERMINAL TP 1	-	Y	N/A
A	208m SE	520720 414050	STALLINGBOROUGH 01	-	Y	N/A
A	216m SE	520740 414050	STALLINGBOROUGH WS01	-	Y	N/A
B	225m S	520680 414020	STALLINGBOROUGH TP01	-	Y	N/A
B	236m S	520690 414010	STALLINGBOROUGH TP16	-	Y	N/A
11	237m NE	521020 414810	LONGMARSH IMMINGHAM LINCS	33.83	N	465596
12	241m S	520650 414000	STALLINGBOROUGH 02	-	Y	N/A
B	242m S	520710 414010	STALLINGBOROUGH WS03	-	Y	N/A

This data is sourced from the British Geological Survey.

17 Natural ground subsidence - Shrink swell clays

Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.1 Shrink swell clays

Records within 50m	1

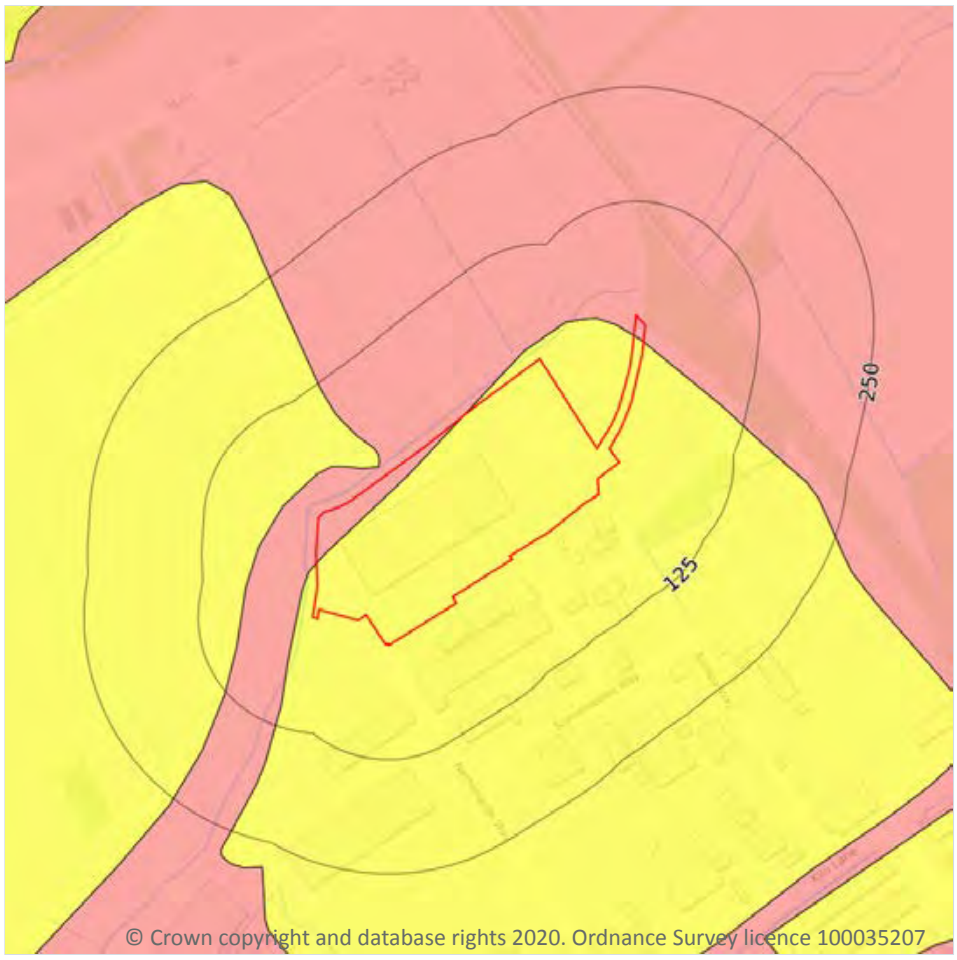
The potential hazard presented by soils that absorb water when wet (making them swell), and lose water as they dry (making them shrink). This shrink-swell behaviour is controlled by the type and amount of clay in the soil, and by seasonal changes in the soil moisture content (related to rainfall and local drainage).

Features are displayed on the Natural ground subsidence - Shrink swell clays map on **page 110**

Location	Hazard rating	Details
On site	**Low**	**Ground conditions predominantly medium plasticity.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Running sands



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.2 Running sands

Records within 50m	3

The potential hazard presented by rocks that can contain loosely-packed sandy layers that can become fluidised by water flowing through them. Such sands can 'run', removing support from overlying buildings and causing potential damage.

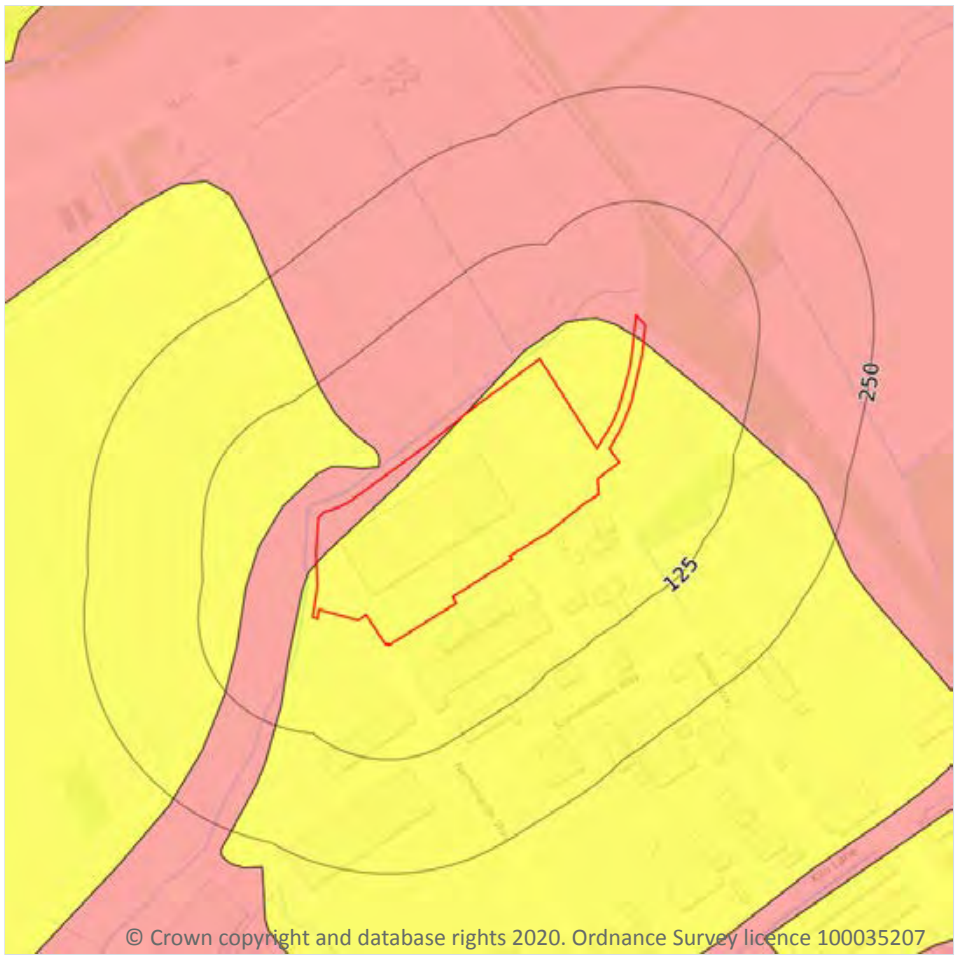
Features are displayed on the Natural ground subsidence - Running sands map on **page 111**

Location	Hazard rating	Details
On site	**Very low**	**Running sand conditions are unlikely. No identified constraints on land use due to running conditions unless water table rises rapidly.**

Location	Hazard rating	Details
On site	**Moderate**	**Running sand conditions are probably present. Constraints may apply to land uses involving excavation or the addition or removal of water.**
13m NW	Very low	Running sand conditions are unlikely. No identified constraints on land use due to running conditions unless water table rises rapidly.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Compressible deposits



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.3 Compressible deposits

Records within 50m	3

The potential hazard presented by types of ground that may contain layers of very soft materials like clay or peat and may compress if loaded by overlying structures, or if the groundwater level changes, potentially resulting in depression of the ground and disturbance of foundations.

Features are displayed on the Natural ground subsidence - Compressible deposits map on **page 113**

Location	Hazard rating	Details
On site	**Very low**	**Compressibility and uneven settlement problems are not likely to be significant on the site for most land uses.**

Location	Hazard rating	Details
On site	**Moderate**	**Compressibility and uneven settlement hazards are probably present. Land use should consider specifically the compressibility and variability of the site.**
13m NW	Very low	Compressibility and uneven settlement problems are not likely to be significant on the site for most land uses.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Collapsible deposits

Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.4 Collapsible deposits

Records within 50m	1

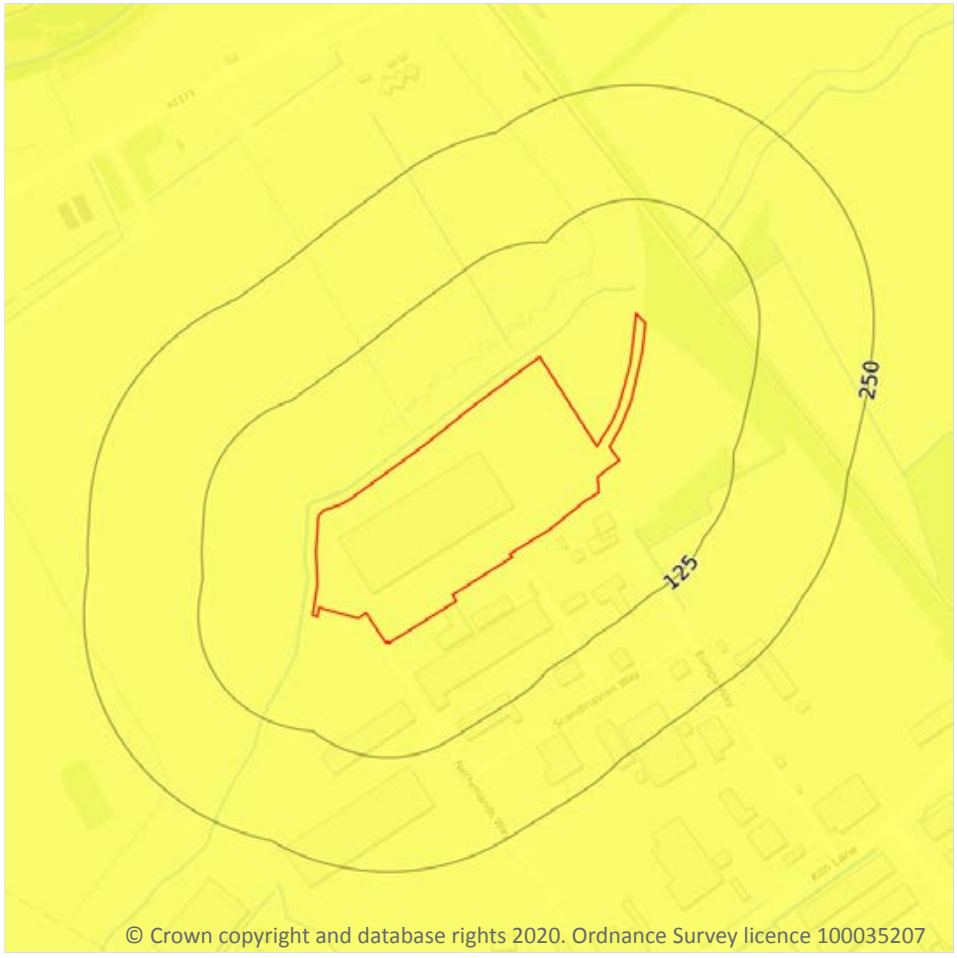
The potential hazard presented by natural deposits that could collapse when a load (such as a building) is placed on them or they become saturated with water.

Features are displayed on the Natural ground subsidence - Collapsible deposits map on **page 115**

Location	Hazard rating	Details
On site	**Negligible**	**Deposits with potential to collapse when loaded and saturated are believed not to be present.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Landslides



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.5 Landslides

Records within 50m	1

The potential for landsliding (slope instability) to be a hazard assessed using 1:50,000 scale digital maps of superficial and bedrock deposits, combined with information from the BGS National Landslide Database and scientific and engineering reports.

Features are displayed on the Natural ground subsidence - Landslides map on **page 116**

Location	Hazard rating	Details
On site	**Very low**	**Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Ground dissolution of soluble rocks

Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.6 Ground dissolution of soluble rocks

Records within 50m	1

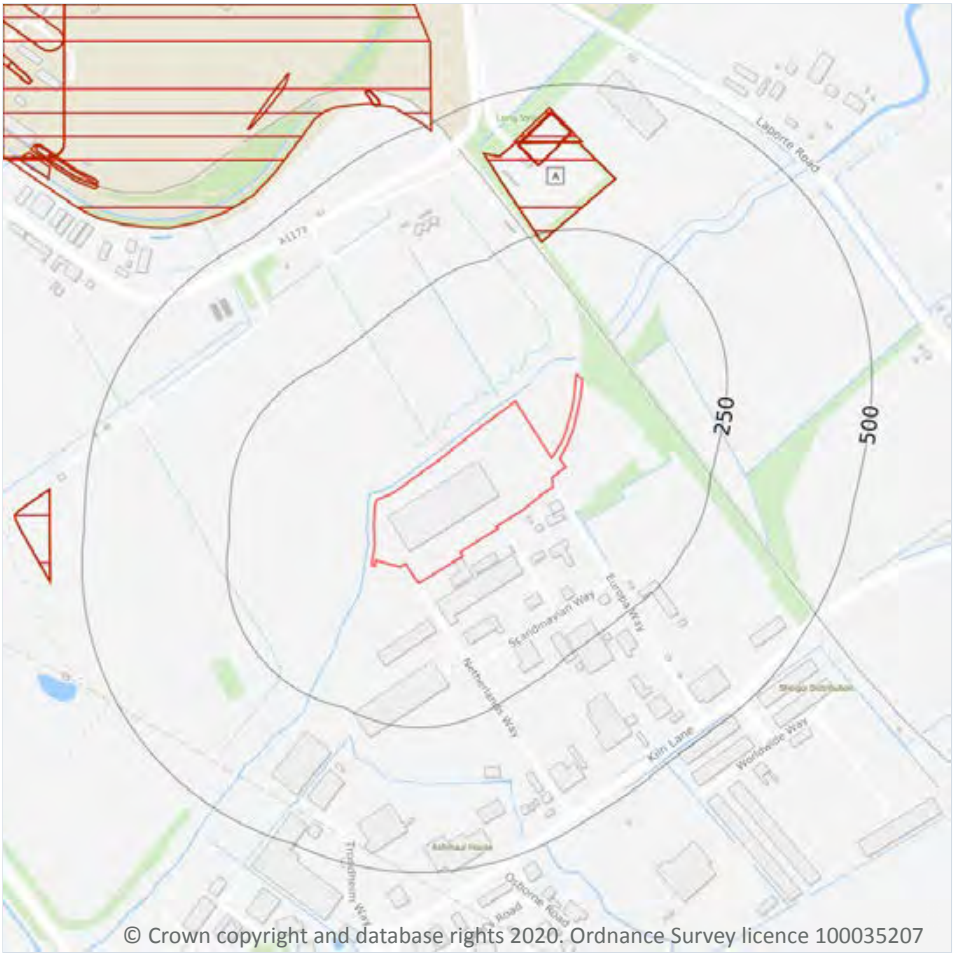
The potential hazard presented by ground dissolution, which occurs when water passing through soluble rocks produces underground cavities and cave systems. These cavities reduce support to the ground above and can cause localised collapse of the overlying rocks and deposits.

Features are displayed on the Natural ground subsidence - Ground dissolution of soluble rocks map on **page 117**

Location	Hazard rating	Details
On site	**Negligible**	**Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.**

This data is sourced from the British Geological Survey.

18 Mining, ground workings and natural cavities



Site Outline

Search buffers in metres (m)

- Natural cavities (Area)
- Natural cavities (Point)
- BritPits
- Surface ground workings
- Underground workings
- Historical Mineral Planning Areas
- Mining Cavities

Non Coal Mining

- Sporadic underground mining of restricted extent possible
- Localised small scale underground mining possible
- Small scale mining possible
- Underground mining known or likely within or in close proximity
- Underground mining known within or in very close proximity

18.1 Natural cavities

Records within 500m	0

Industry recognised national database of natural cavities. Sinkholes and caves are formed by the dissolution of soluble rock, such as chalk and limestone, gulls and fissures by cambering. Ground instability can result from movement of loose material contained within these cavities, often triggered by water.

This data is sourced from Peter Brett Associates (PBA).

18.2 BritPits

Records within 500m	0

BritPits (an abbreviation of British Pits) is a database maintained by the British Geological Survey of currently active and closed surface and underground mineral workings. Details of major mineral handling sites, such as wharfs and rail depots are also held in the database.

This data is sourced from the British Geological Survey.

18.3 Surface ground workings

Records within 250m	2

Historical land uses identified from Ordnance Survey mapping that involved ground excavation at the surface. These features may or may not have been subsequently backfilled.

Features are displayed on the Mining, ground workings and natural cavities map on **page 119**

ID	Location	Land Use	Year of mapping	Mapping scale
A	236m N	Sewage Works	1988	1:10000
A	236m N	Sewage Works	1980	1:10000

This is data is sourced from Ordnance Survey/Groundsure.

18.4 Underground workings

Records within 1000m	0

Historical land uses identified from Ordnance Survey mapping that indicate the presence of underground workings e.g. mine shafts.

This is data is sourced from Ordnance Survey/Groundsure.

18.5 Historical Mineral Planning Areas

Records within 500m	0

Boundaries of mineral planning permissions for England and Wales. This data was collated between the 1940s (and retrospectively to the 1930s) and the mid 1980s. The data includes permitted, withdrawn and refused permissions.

This data is sourced from the British Geological Survey.

18.6 Non-coal mining

Records within 1000m	0

The potential for historical non-coal mining to have affected an area. The assessment is drawn from expert knowledge and literature in addition to the digital geological map of Britain. Mineral commodities may be divided into seven general categories - vein minerals, chalk, oil shale, building stone, bedded ores, evaporites and 'other' commodities (including ball clay, jet, black marble, graphite and chert).

This data is sourced from the British Geological Survey.

18.7 Mining cavities

Records within 1000m	0

Industry recognised national database of mining cavities. Degraded mines may result in hazardous subsidence (crown holes). Climatic conditions and water escape can also trigger subsidence over mine entrances and workings.

This data is sourced from Peter Brett Associates (PBA).

18.8 JPB mining areas

Records on site	0

Areas which could be affected by former coal mining. This data includes some mine plans unavailable to the Coal Authority.

This data is sourced from Johnson Poole and Bloomer.

18.9 Coal mining

Records on site	0

Areas which could be affected by past, current or future coal mining.

This data is sourced from the Coal Authority.

18.10 Brine areas

Records on site	0

The Cheshire Brine Compensation District indicates areas that may be affected by salt and brine extraction in Cheshire and where compensation would be available where damage from this mining has occurred. Damage from salt and brine mining can still occur outside this district, but no compensation will be available.

This data is sourced from the Cheshire Brine Subsidence Compensation Board.

18.11 Gypsum areas

Records on site	0

Generalised areas that may be affected by gypsum extraction.

This data is sourced from British Gypsum.

18.12 Tin mining

Records on site	0

Generalised areas that may be affected by historical tin mining.

This data is sourced from Mining Searches UK.

18.13 Clay mining

Records on site	0

Generalised areas that may be affected by kaolin and ball clay extraction.

This data is sourced from the Kaolin and Ball Clay Association (UK).

19 Radon

Site Outline

Search buffers in metres (m)

- Greater than 30%
- Between 10% and 30%
- Between 5% and 10%
- Between 3% and 5%
- Between 1% and 3%
- Less than 1%

19.1 Radon

Records on site	1

Estimated percentage of dwellings exceeding the Radon Action Level. This data is the highest resolution radon dataset available for the UK and is produced to a 75m level of accuracy to allow for geological data accuracy and a 'residential property' buffer. The findings of this section should supersede any estimations derived from the Indicative Atlas of Radon in Great Britain. The data was derived from both geological assessments and long term measurements of radon in more than 479,000 households.

Features are displayed on the Radon map on **page 123**

Location	Estimated properties affected	Radon Protection Measures required
On site	**Less than 1%**	**None****

This data is sourced from the British Geological Survey and Public Health England.

20 Soil chemistry

20.1 BGS Estimated Background Soil Chemistry

Records within 50m **2**

The estimated values provide the likely background concentration of the potentially harmful elements Arsenic, Cadmium, Chromium, Lead and Nickel in topsoil. The values are estimated primarily from rural topsoil data collected at a sample density of approximately 1 per 2 km^2. In areas where rural soil samples are not available, estimation is based on stream sediment data collected from small streams at a sampling density of 1 per 2.5 km^2; this is the case for most of Scotland, Wales and southern England. The stream sediment data are converted to soil-equivalent concentrations prior to the estimation.

Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	**15 - 25 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**90 - 120 mg/kg**	**30 - 45 mg/kg**
On site	**15 - 25 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**90 - 120 mg/kg**	**30 - 45 mg/kg**

This data is sourced from the British Geological Survey.

20.2 BGS Estimated Urban Soil Chemistry

Records within 50m **0**

Estimated topsoil chemistry of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc and bioaccessible Arsenic and Lead in 23 urban centres across Great Britain. These estimates are derived from interpolation of the measured urban topsoil data referred to above and provide information across each city between the measured sample locations (4 per km^2).

This data is sourced from the British Geological Survey.

20.3 BGS Measured Urban Soil Chemistry

Records within 50m **0**

The locations and measured total concentrations (mg/kg) of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc in urban topsoil samples from 23 urban centres across Great Britain. These are collected at a sample density of 4 per km^2.

This data is sourced from the British Geological Survey.

21 Railway infrastructure and projects

Site Outline
Search buffers in metres (m)
Crossrail 1 Stations
Crossrail 1 Route
Crossrail 1 Worksites
Crossrail 2 Stations
Crossrail 2 Route
Crossrail 2 Worksites
Crossrail 2 Safeguarding
Crossrail 2 Headhouses
Railway stations
Active railways
Active tunnels
Abandoned railways
Historic railways
Historic tunnels
Underground stations
Underground Lines
Royal Mail tunnels
HS2 optimised route
HS2 Stations
HS2 Depots
HS2 Surface Safeguarding
HS2 Subsurface Safeguarding

21.1 Underground railways (London)

Records within 250m	0

Details of all active London Underground lines, including approximate tunnel roof depth and operational hours.

This data is sourced from publicly available information by Groundsure.

21.2 Underground railways (Non-London)

Records within 250m	0

Details of the Merseyrail system, the Tyne and Wear Metro and the Glasgow Subway. Not all parts of all systems are located underground. The data contains location information only and does not include a depth assessment.

This data is sourced from publicly available information by Groundsure.

21.3 Railway tunnels

Records within 250m	0

Railway tunnels taken from contemporary Ordnance Survey mapping.

This data is sourced from the Ordnance Survey.

21.4 Historical railway and tunnel features

Records within 250m	8

Railways and tunnels digitised from historical Ordnance Survey mapping as scales of 1:1,250, 1:2,500, 1:10,000 and 1:10,560.

Features are displayed on the Railway infrastructure and projects map on **page 125**

Location	Land Use	Year of mapping	Mapping scale
On site	**Railway Sidings**	**1984**	**2500**
On site	**Railway Sidings**	**1988**	**10000**
2m NE	Railway Sidings	1965	10560
2m NE	Railway Sidings	1968	10560
2m NE	Railway Sidings	1947	10560
140m N	Railway Sidings	1996	2500
173m N	Railway Sidings	1947	10560
173m N	Railway Sidings	1930	10560

This data is sourced from Ordnance Survey/Groundsure.

21.5 Royal Mail tunnels

Records within 250m	0

The Post Office Railway, otherwise known as the Mail Rail, is an underground railway running through Central London from Paddington Head District Sorting Office to Whitechapel Eastern Head Sorting Office. The line is 10.5km long. The data includes details of the full extent of the tunnels, the depth of the tunnel, and the depth to track level.

This data is sourced from Groundsure/the Postal Museum.

21.6 Historical railways

Records within 250m	2

Former railway lines, including dismantled lines, abandoned lines, disused lines, historic railways and razed lines.

Features are displayed on the Railway infrastructure and projects map on **page 125**

Location	Description
On site	**Disused**
On site	**Disused**

This data is sourced from OpenStreetMap.

21.7 Railways

Records within 250m	8

Currently existing railway lines, including standard railways, narrow gauge, funicular, trams and light railways.

Features are displayed on the Railway infrastructure and projects map on **page 125**

Location	Name	Type
1m NE	-	rail
75m NE	-	rail
77m NE	Not given	Single Track
79m NE	Not given	Single Track
159m E	Not given	Single Track
175m N	Not given	Multi Track
204m N	-	rail
204m N	-	rail

This data is sourced from Ordnance Survey and OpenStreetMap.

21.8 Crossrail 1

Records within 500m	0

The Crossrail railway project links 41 stations over 100 kilometres from Reading and Heathrow in the west, through underground sections in central London, to Shenfield and Abbey Wood in the east.

This data is sourced from publicly available information by Groundsure.

21.9 Crossrail 2

Records within 500m	0

Crossrail 2 is a proposed railway linking the national rail networks in Surrey and Hertfordshire via an underground tunnel through London.

This data is sourced from publicly available information by Groundsure.

21.10 HS2

Records within 500m	0

HS2 is a proposed high speed rail network running from London to Manchester and Leeds via Birmingham. Main civils construction on Phase 1 (London to Birmingham) of the project began in 2019, and it is currently anticipated that this phase will be fully operational by 2026. Construction on Phase 2a (Birmingham to Crewe) is anticipated to commence in 2021, with the service fully operational by 2027. Construction on Phase 2b (Crewe to Manchester and Birmingham to Leeds) is scheduled to begin in 2023 and be operational by 2033.

This data is sourced from HS2 ltd.

Data providers

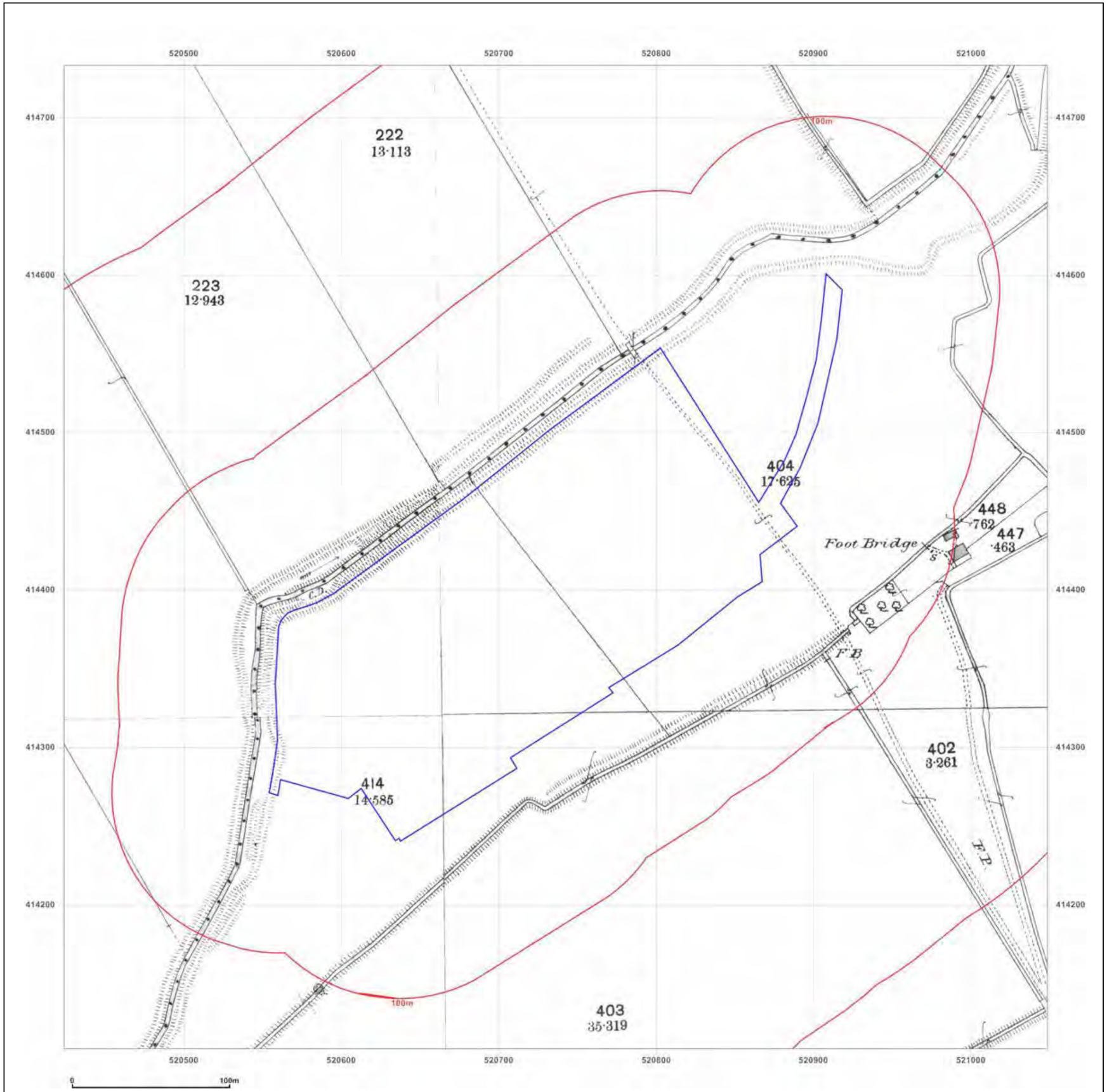
Groundsure works with respected data providers to bring you the most relevant and accurate information. To find out who they are and their areas of expertise see https://www.groundsure.com/sources-reference.

Terms and conditions

Groundsure's Terms and Conditions can be accessed at this link: https://www.groundsure.com/terms-and-conditions-jan-2020/.

Appendix 2

Historical Maps



Groundsure INSIGHTS

Site Details:

Former Immingham Railfreight Terminal, Scandinavian Way, Stallingborough, Grimsby, North East Lincolnshire, DN41 8DT

Client Ref: C700_20_E_Immingham_EFW
Report Ref: GS-6755555
Grid Ref: 520736, 414421

Map Name: County Series
Map date: **1888**
Scale: 1:2,500
Printed at: 1:2,500

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Surveyed 1888
Revised 1888
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1888
Revised 1888
Edition N/A
Copyright N/A
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Surveyed 1888
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Copyright N/A
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Revised 1888
Edition N/A
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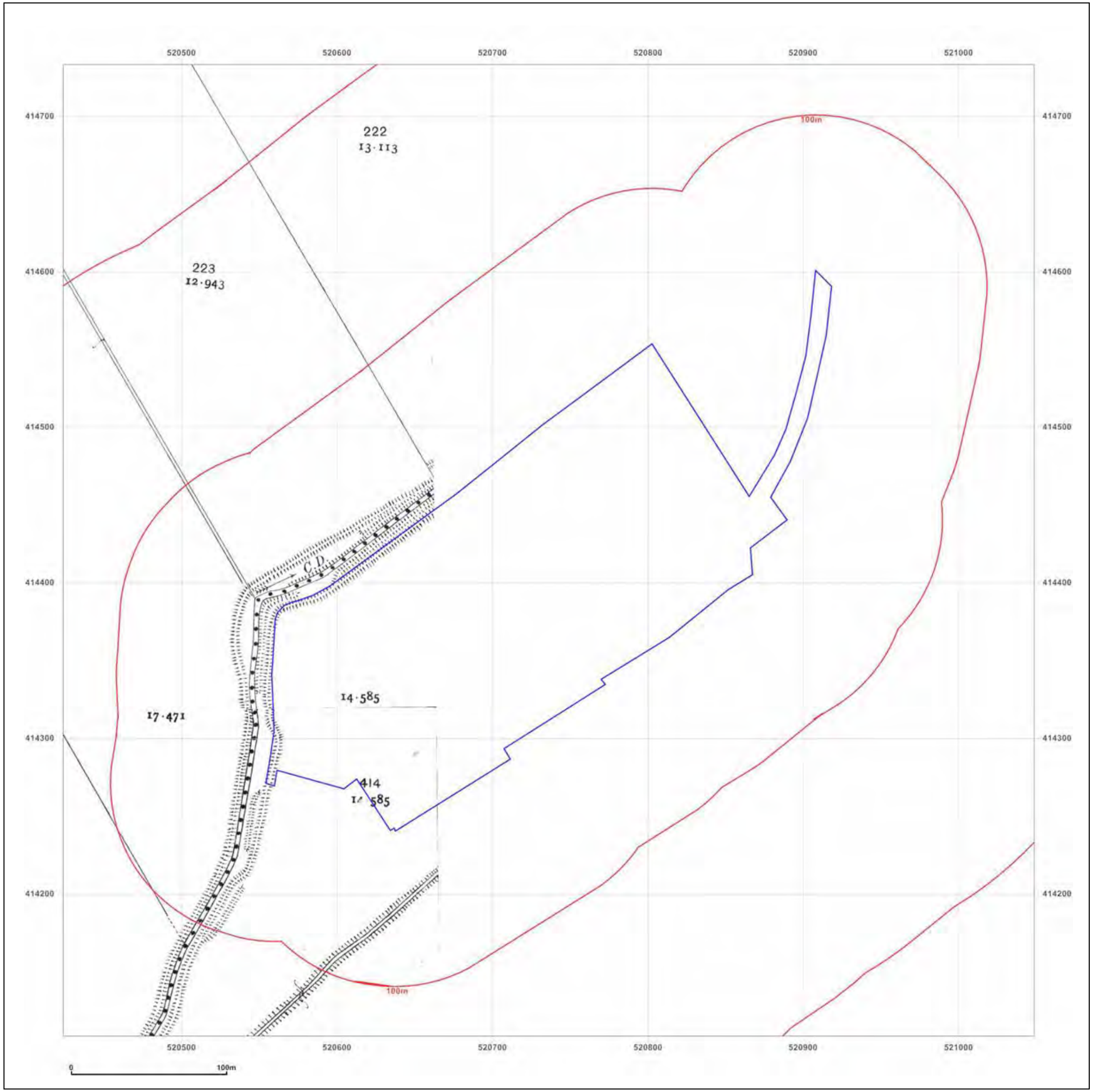

Groundsure INSIGHTS

Site Details:

Former Immingham Railfreight Terminal, Scandinavian Way, Stallingborough, Grimsby, North East Lincolnshire, DN41 8DT

Client Ref: C700_20_E_Immingham_EFW
Report Ref: GS-6755555
Grid Ref: 520736, 414421

Map Name: County Series
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Printed at: 1:2,500

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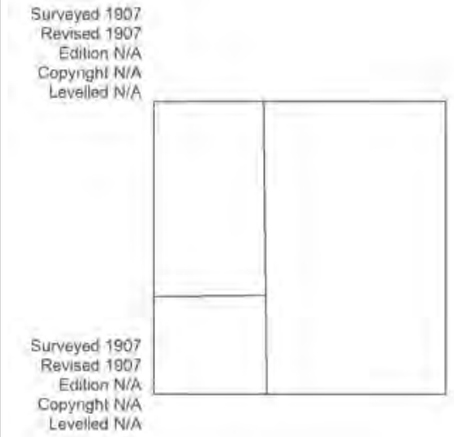

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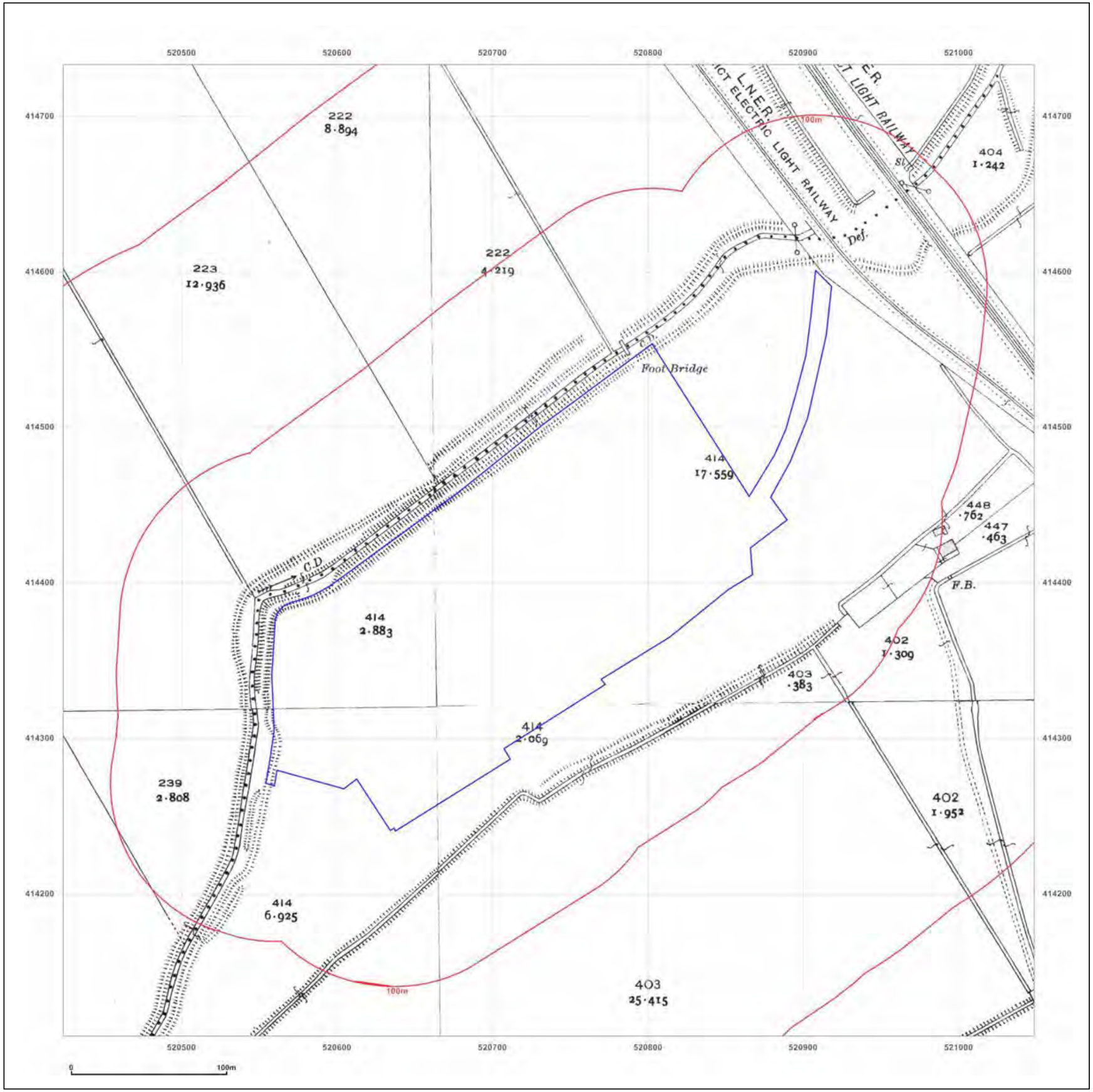

Groundsure INSIGHTS

Site Details:

Former Immingham Railfreight Terminal, Scandinavian Way, Stallingborough, Grimsby, North East Lincolnshire, DN41 8DT

Client Ref: C700_20_E_Immingham_EFW
Report Ref: GS-6755555
Grid Ref: 520736, 414421

Map Name: County Series
Map date: **1932**
Scale: 1:2,500
Printed at: 1:2,500

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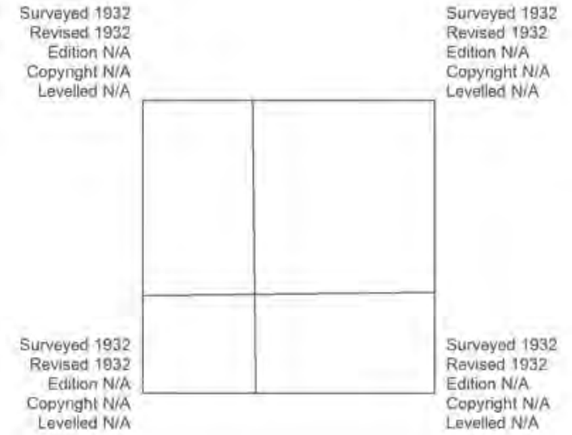

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Production date: 04 May 2020

Map legend available at:
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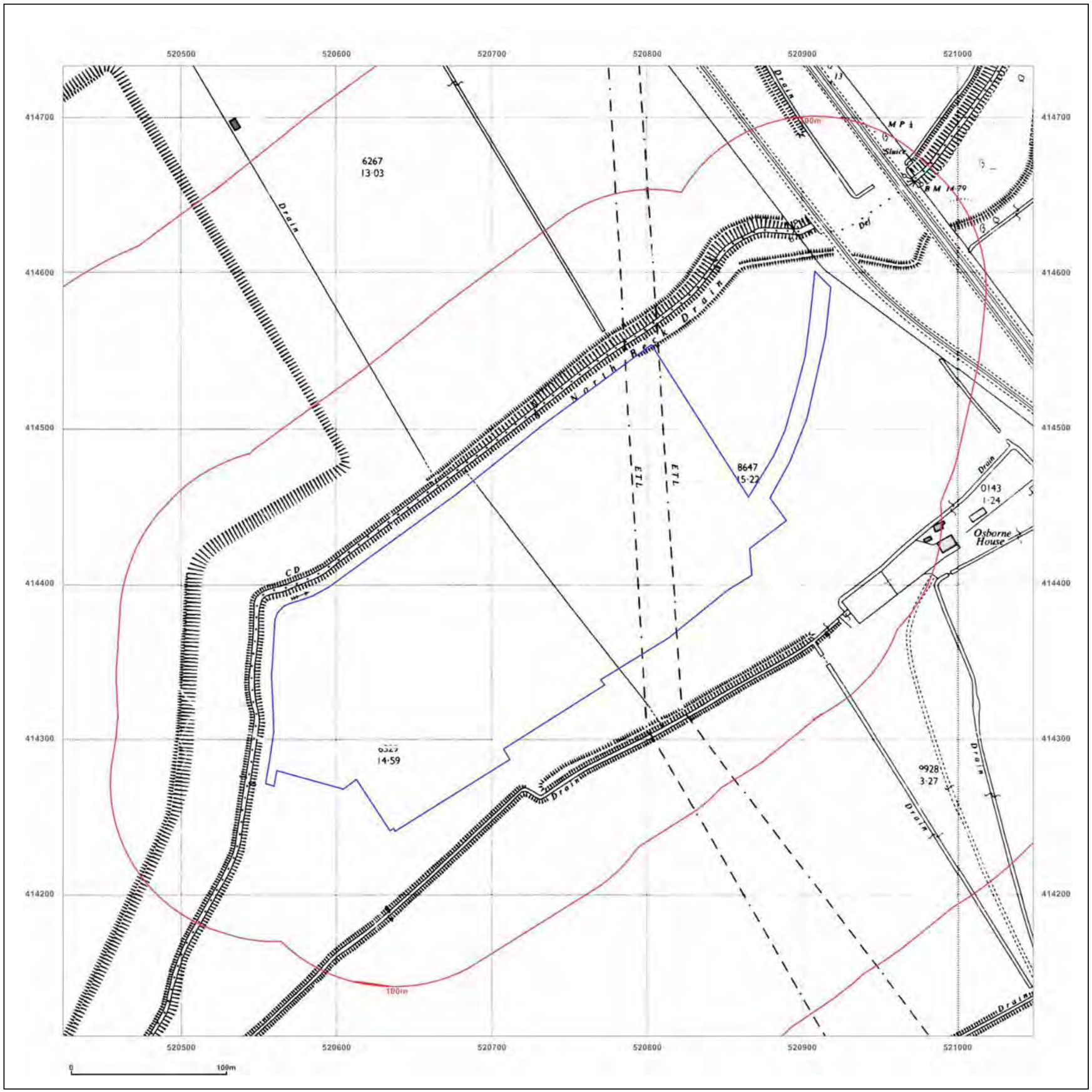

Groundsure INSIGHTS

Site Details:

Former Immingham Railfreight Terminal, Scandinavian Way, Stallingborough, Grimsby, North East Lincolnshire, DN41 8DT

Client Ref: C700_20_E_Immingham_EFW
Report Ref: GS-6755555
Grid Ref: 520736, 414421

Map Name: National Grid

Map date: **1964**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

Surveyed N/A
Revised N/A
Edition N/A
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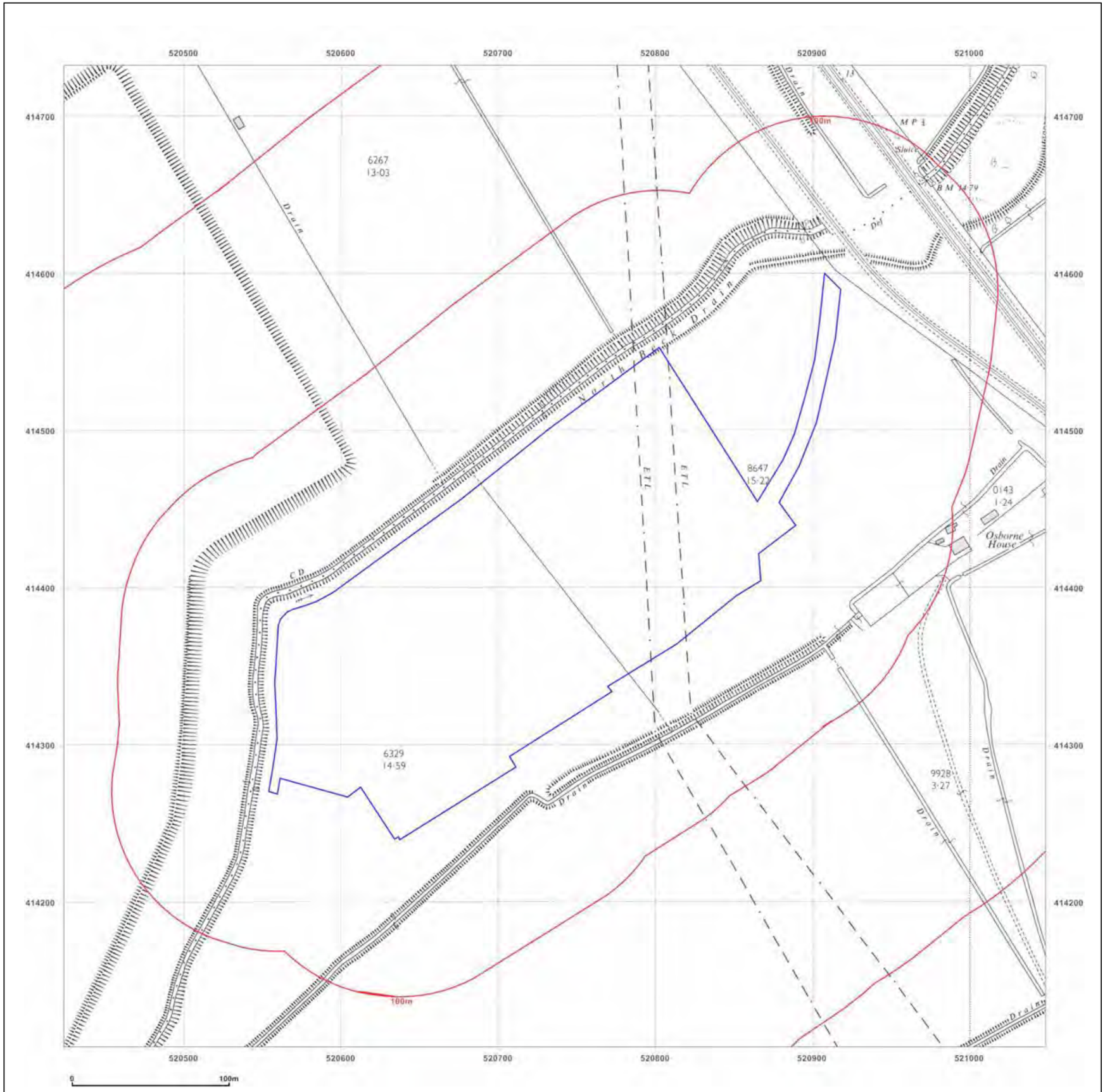

Groundsure INSIGHTS

Site Details:

Former Immingham Railfreight Terminal, Scandinavian Way, Stallingborough, Grimsby, North East Lincolnshire, DN41 8DT

Client Ref: C700_20_E_Immingham_EFW
Report Ref: GS-6755555
Grid Ref: 520736, 414421

Map Name: National Grid
Map date: **1964**
Scale: 1:2,500
Printed at: 1:2,500

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Surveyed 1964
Revised 1964
Edition N/A
Copyright 1964
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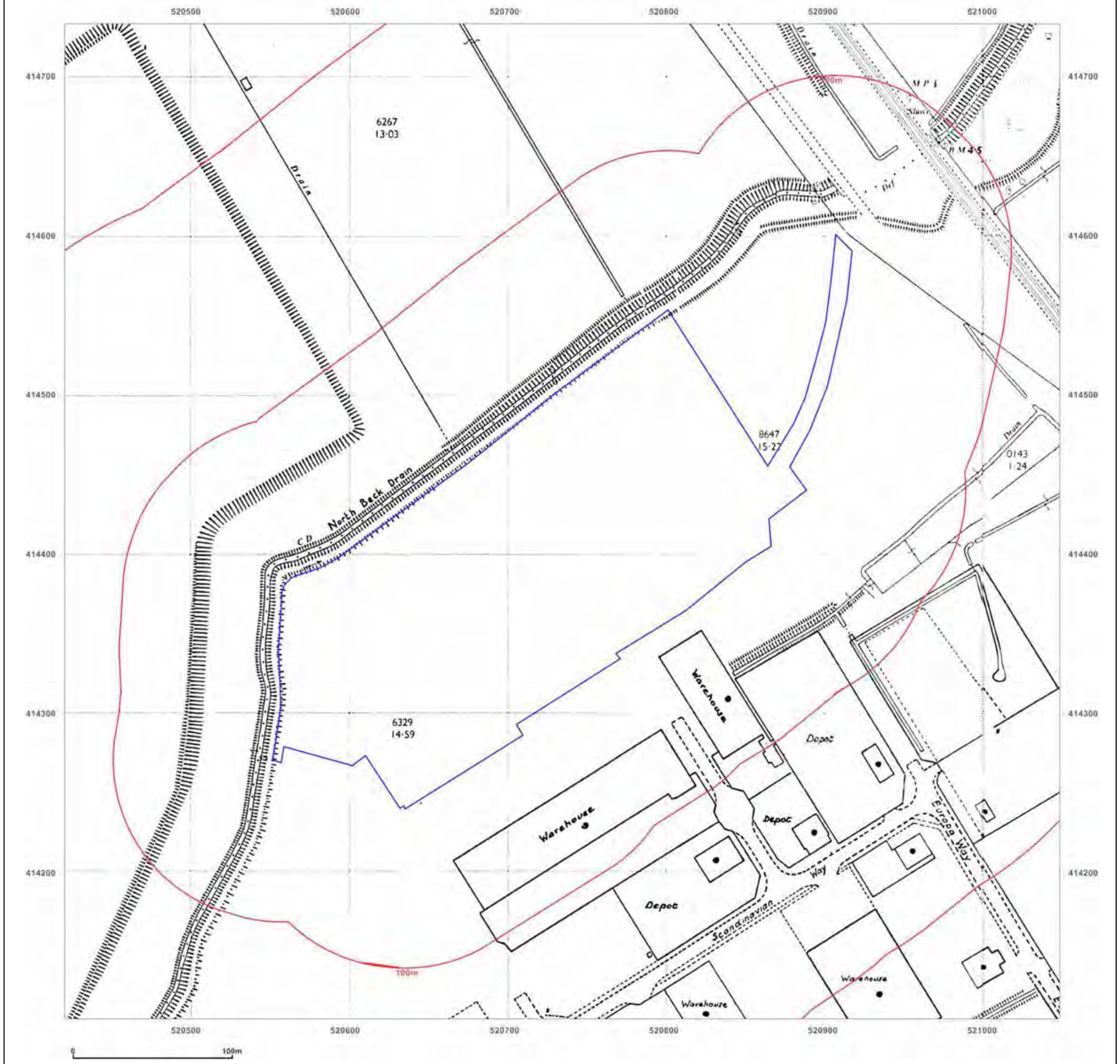

Groundsure INSIGHTS

Site Details:

Former Immingham Railfreight Terminal, Scandinavian Way, Stallingborough, Grimsby, North East Lincolnshire, DN41 8DT

Client Ref: C700_20_E_Immingham_EFW
Report Ref: GS-6755555
Grid Ref: 520736, 414421

Map Name: National Grid

Map date: **1978**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed N/A
Revised N/A
Edition N/A
Copyright 1978
Levelled N/A

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Revised 1978
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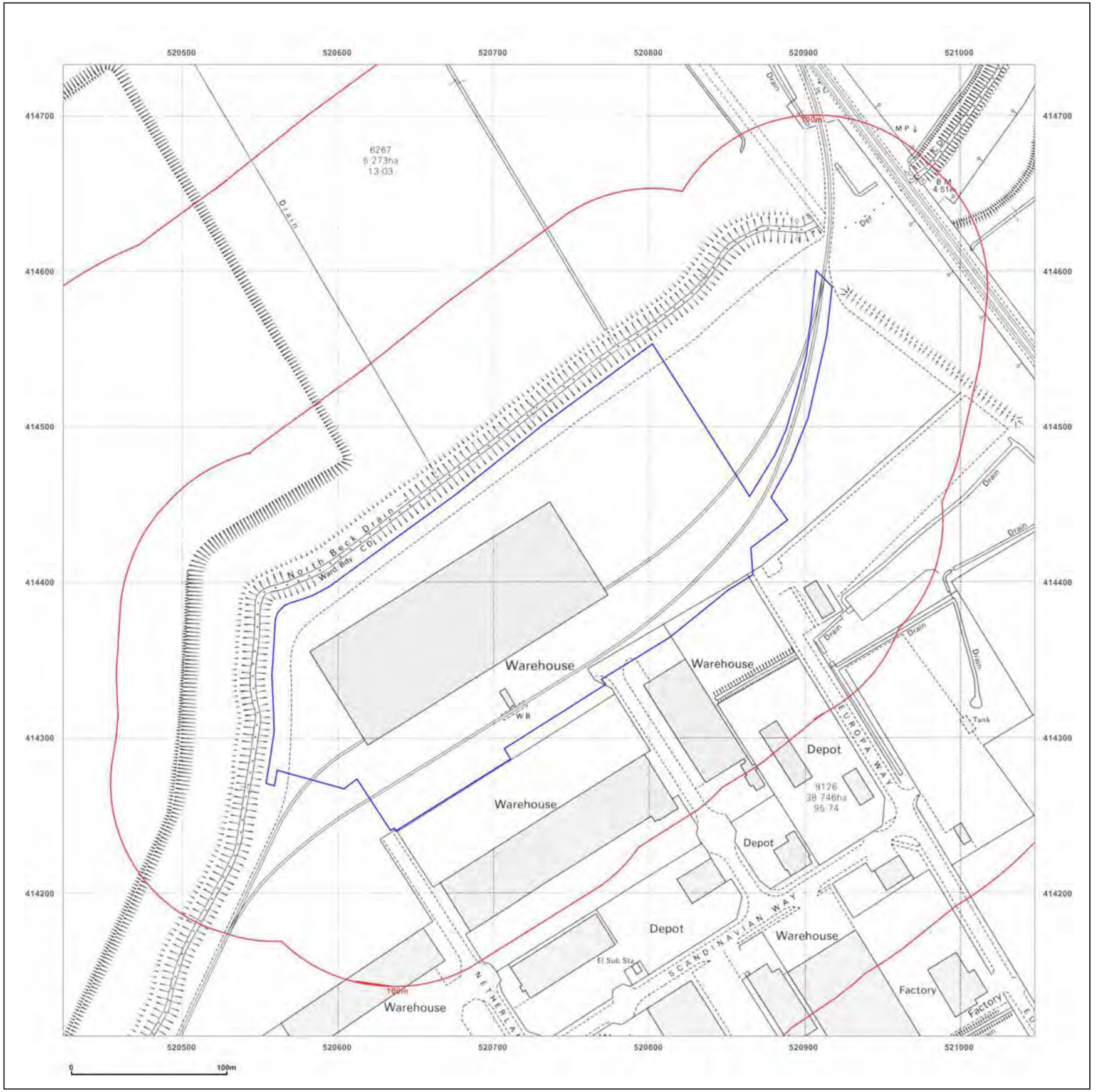

Groundsure INSIGHTS

Site Details:

Former Immingham Railfreight Terminal, Scandinavian Way, Stallingborough, Grimsby, North East Lincolnshire, DN41 8DT

Client Ref: C700_20_E_Immingham_EFW
Report Ref: GS-6755555
Grid Ref: 520736, 414421

Map Name: National Grid

Map date: **1984**

Scale: 1:2,500

Printed at: 1:2,500

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Revised 1984
Edition N/A
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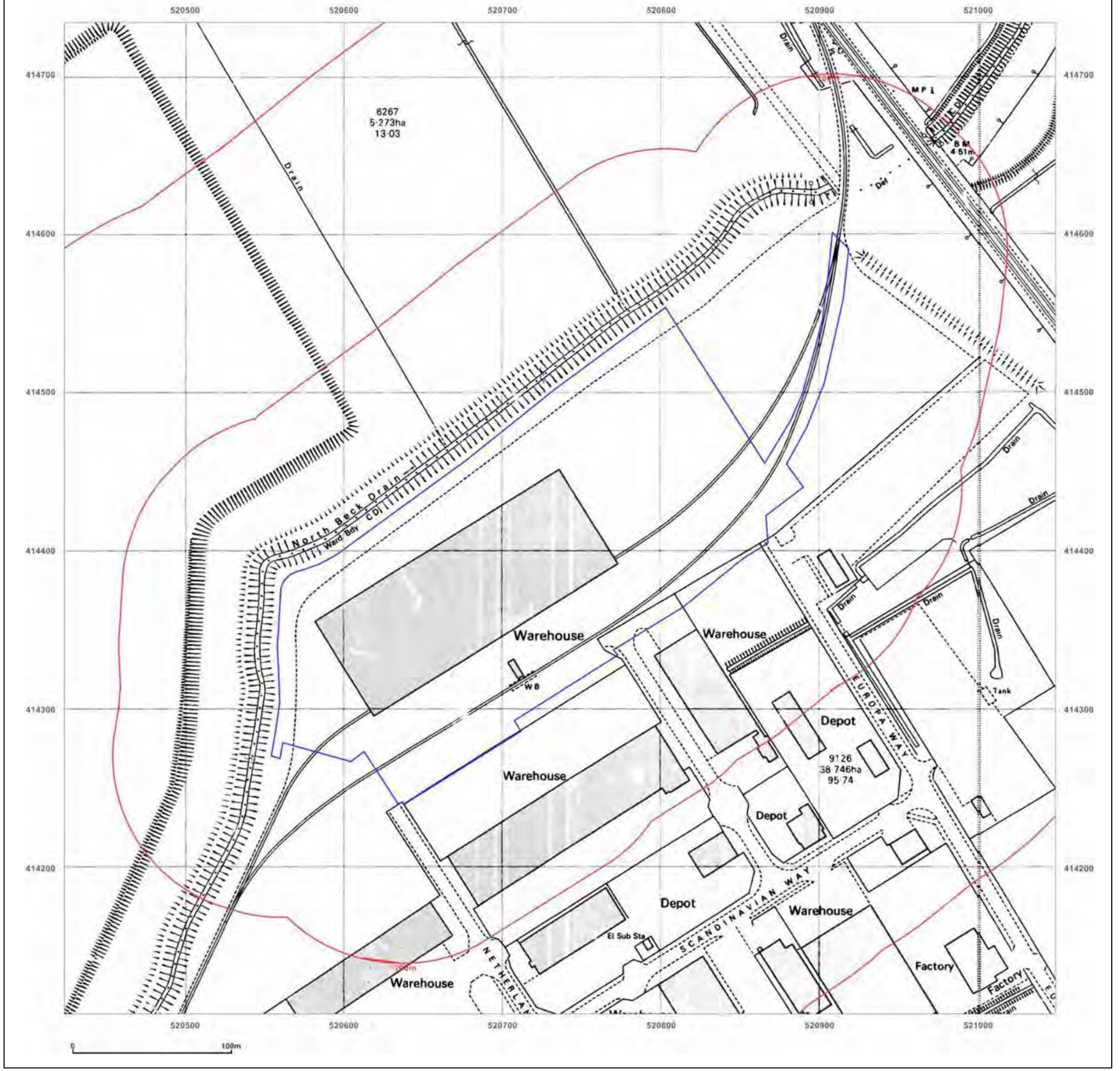

Groundsure INSIGHTS

Site Details:

Former Immingham Railfreight Terminal, Scandinavian Way, Stallingborough, Grimsby, North East Lincolnshire, DN41 8DT

Client Ref: C700_20_E_Immingham_EFW
Report Ref: GS-6755555
Grid Ref: 520736, 414421

Map Name: National Grid

Map date: **1986**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

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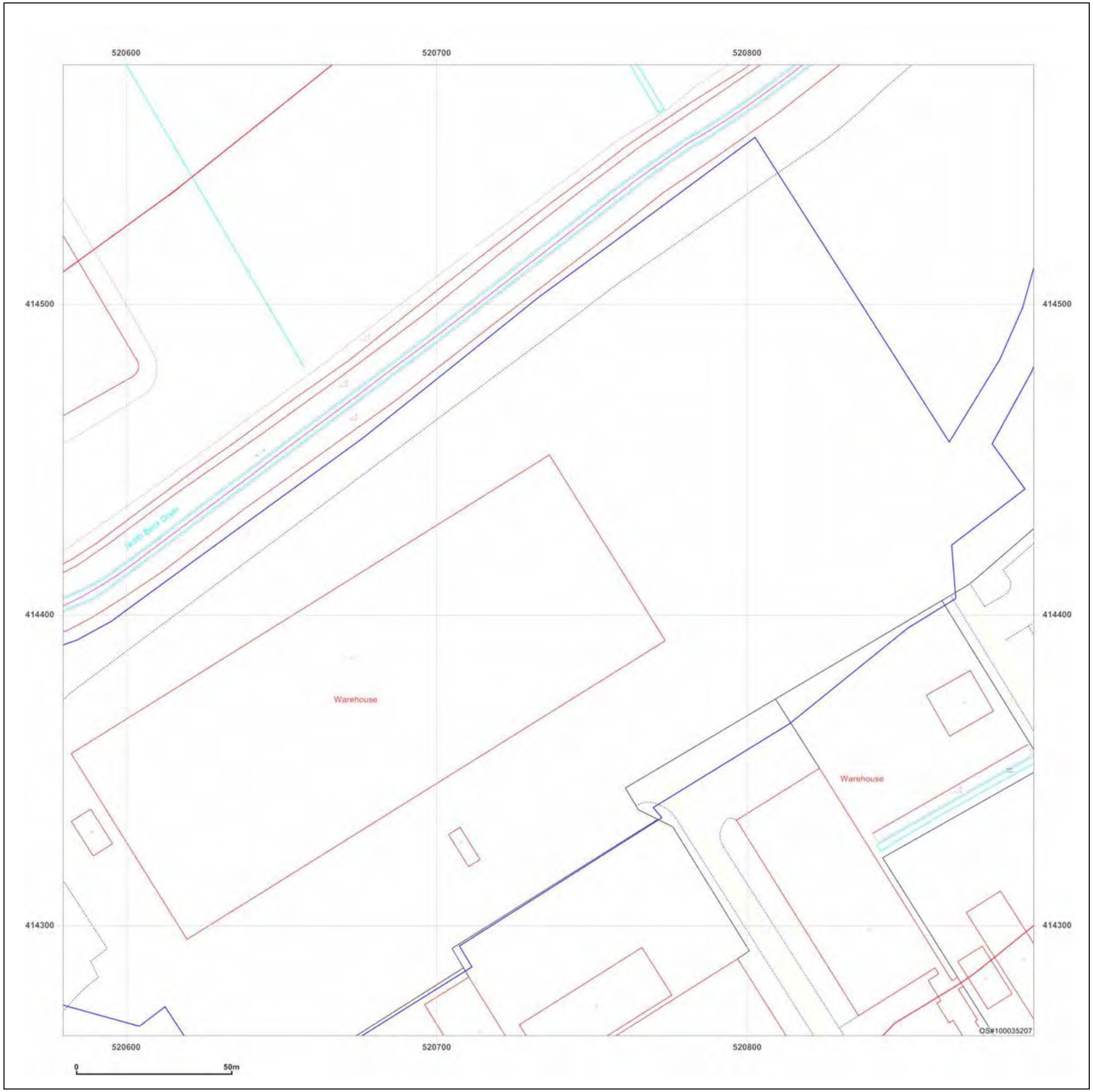

Groundsure INSIGHTS

Site Details:

Former Immingham Railfreight Terminal, Scandinavian Way, Stallingborough, Grimsby, North East Lincolnshire, DN41 8DT

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Report Ref: GS-6755555
Grid Ref: 520736, 414421

Map Name: LandLine
Map date: **2003**
Scale: 1:1,250
Printed at: 1:1,250

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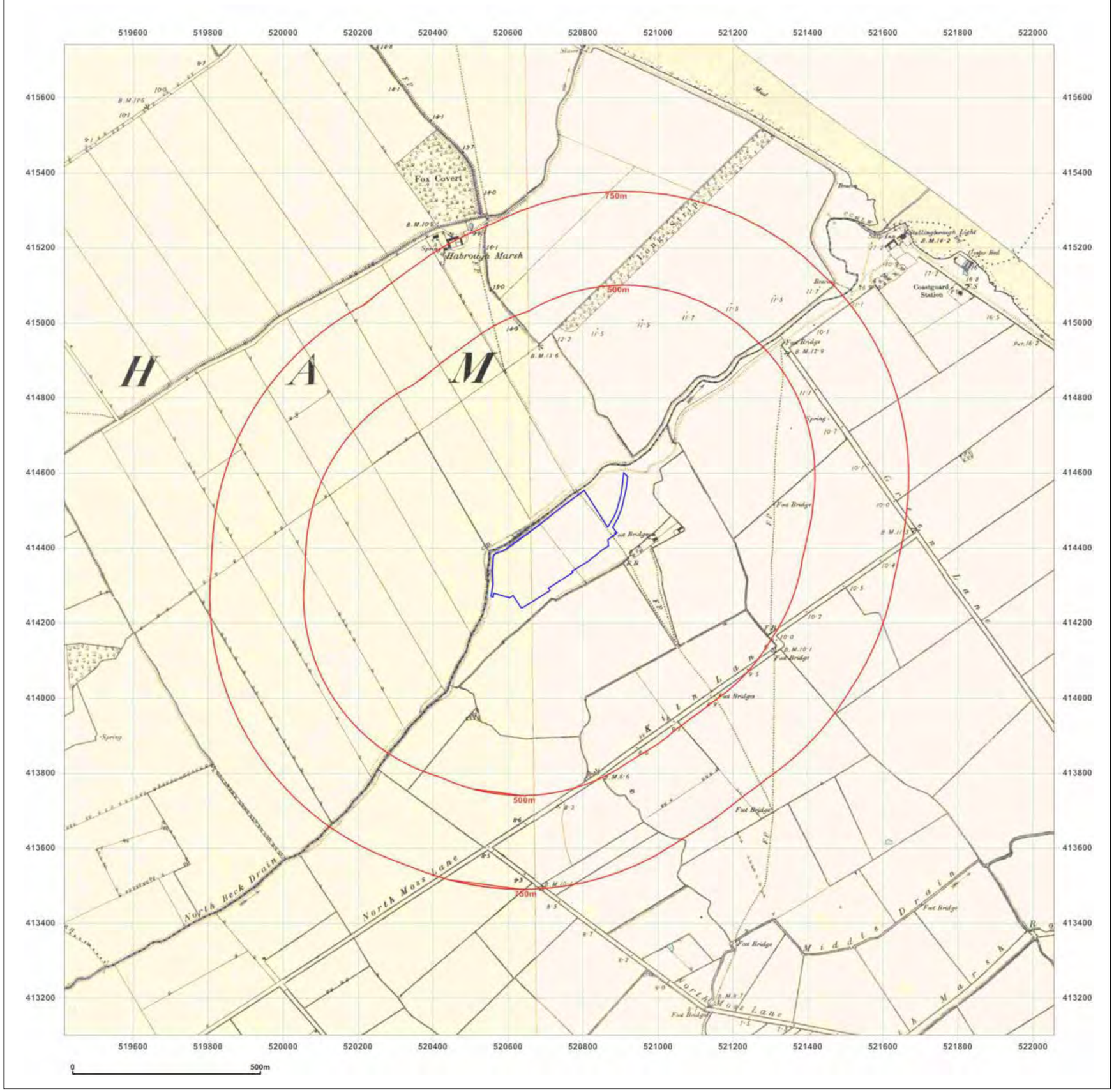

Groundsure INSIGHTS

Site Details:

Former Immingham Railfreight Terminal, Scandinavian Way, Stallingborough, Grimsby, North East Lincolnshire, DN41 8DT

Client Ref: C700_20_E_Immingham_EFW
Report Ref: GS-6755555
Grid Ref: 520736, 414421

Map Name: County Series

Map date: **1886-1887**

Scale: 1:10,560

Printed at: 1:10,560

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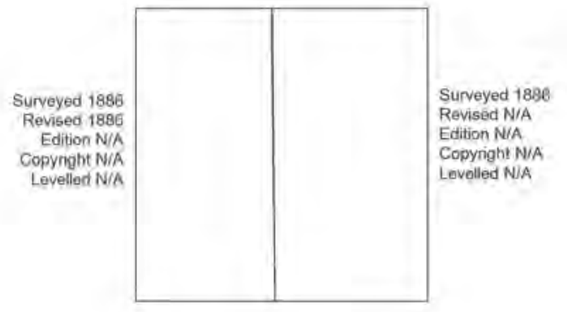

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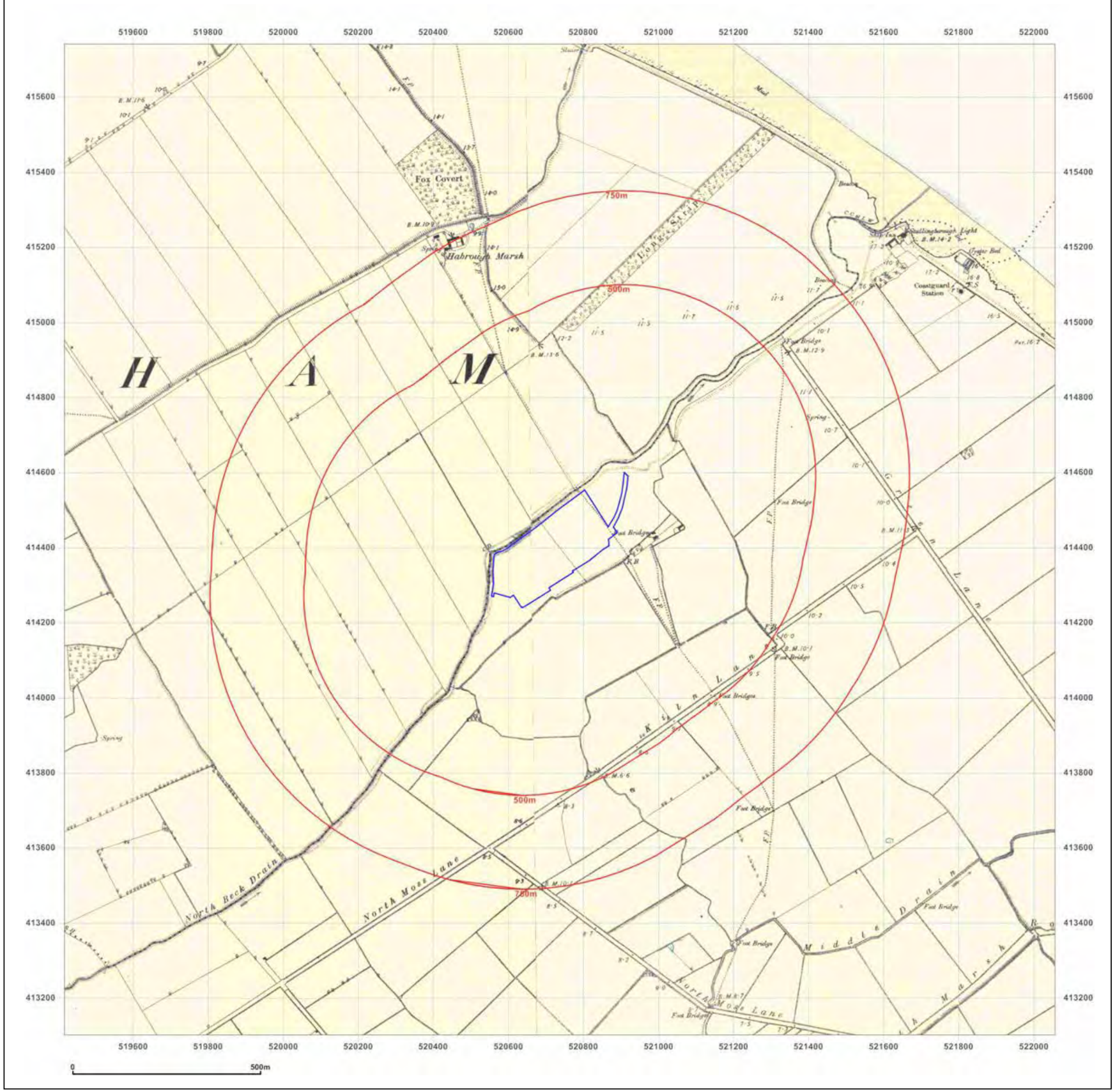
Production date: 04 May 2020

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Groundsure INSIGHTS

Site Details:

Former Immingham Railfreight Terminal, Scandinavian Way, Stallingborough, Grimsby, North East Lincolnshire, DN41 8DT

Client Ref: C700_20_E_Immingham_EFW
Report Ref: GS-6755555
Grid Ref: 520736, 414421

Map Name: County Series

Map date: **1886-1887**

Scale: 1:10,560

Printed at: 1:10,560

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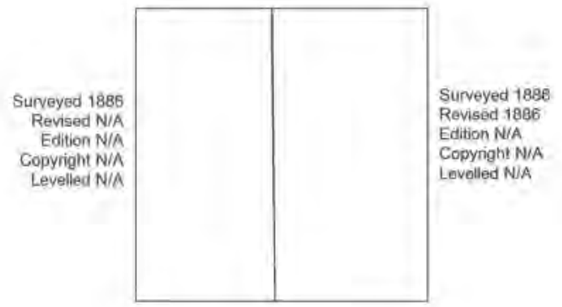

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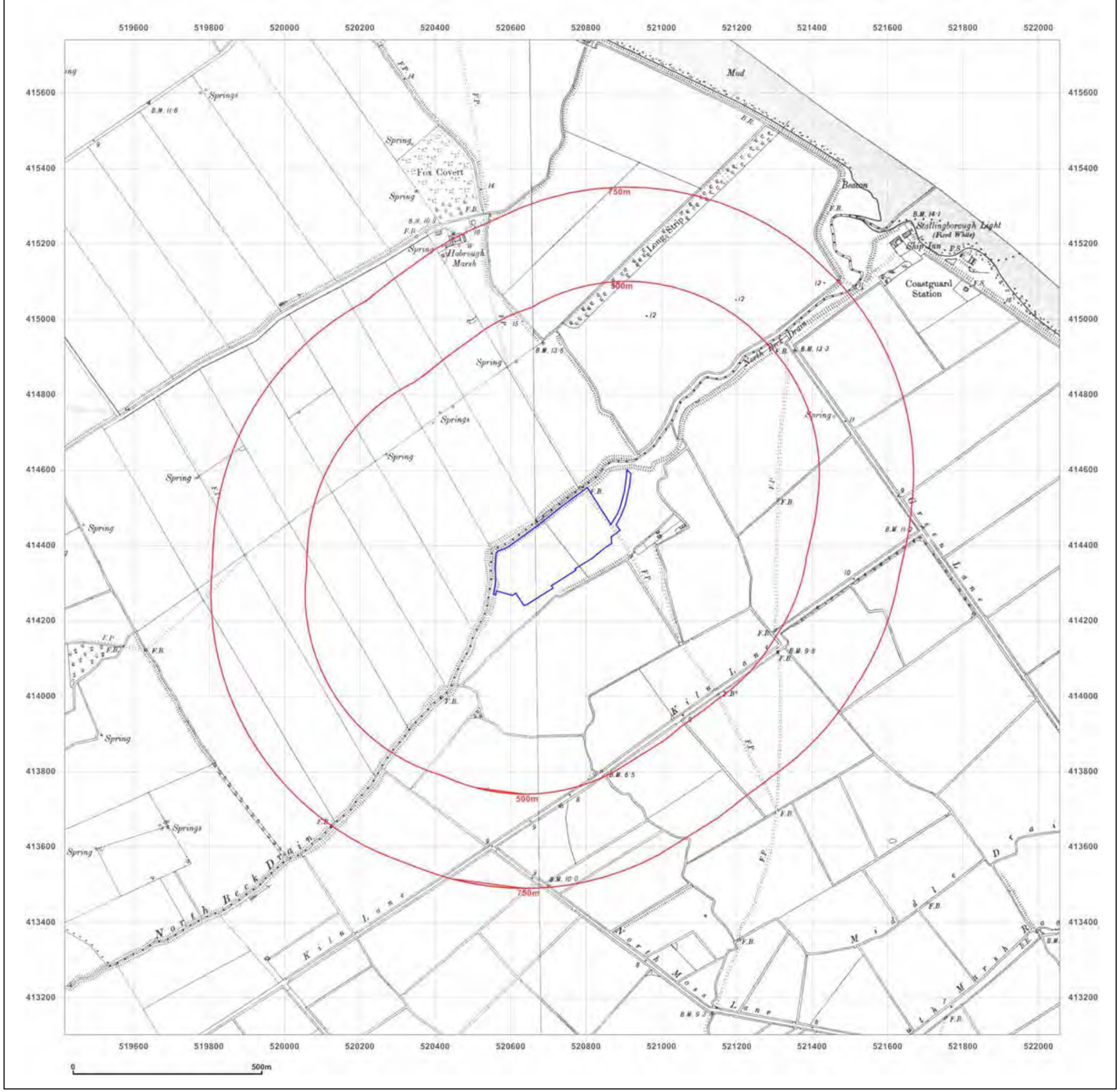

Groundsure INSIGHTS

Site Details:

Former Immingham Railfreight Terminal, Scandinavian Way, Stallingborough, Grimsby, North East Lincolnshire, DN41 8DT

Client Ref: C700_20_E_Immingham_EFW
Report Ref: GS-6755555
Grid Ref: 520736, 414421

Map Name: County Series

Map date: **1905-1906**

Scale: 1:10,560

Printed at: 1:10,560

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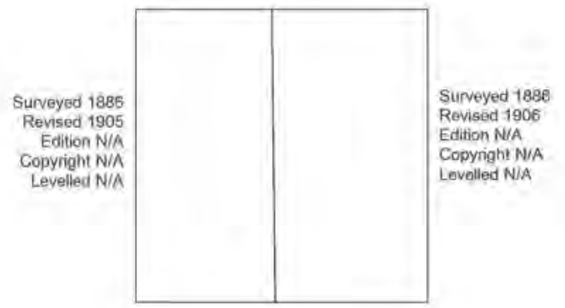

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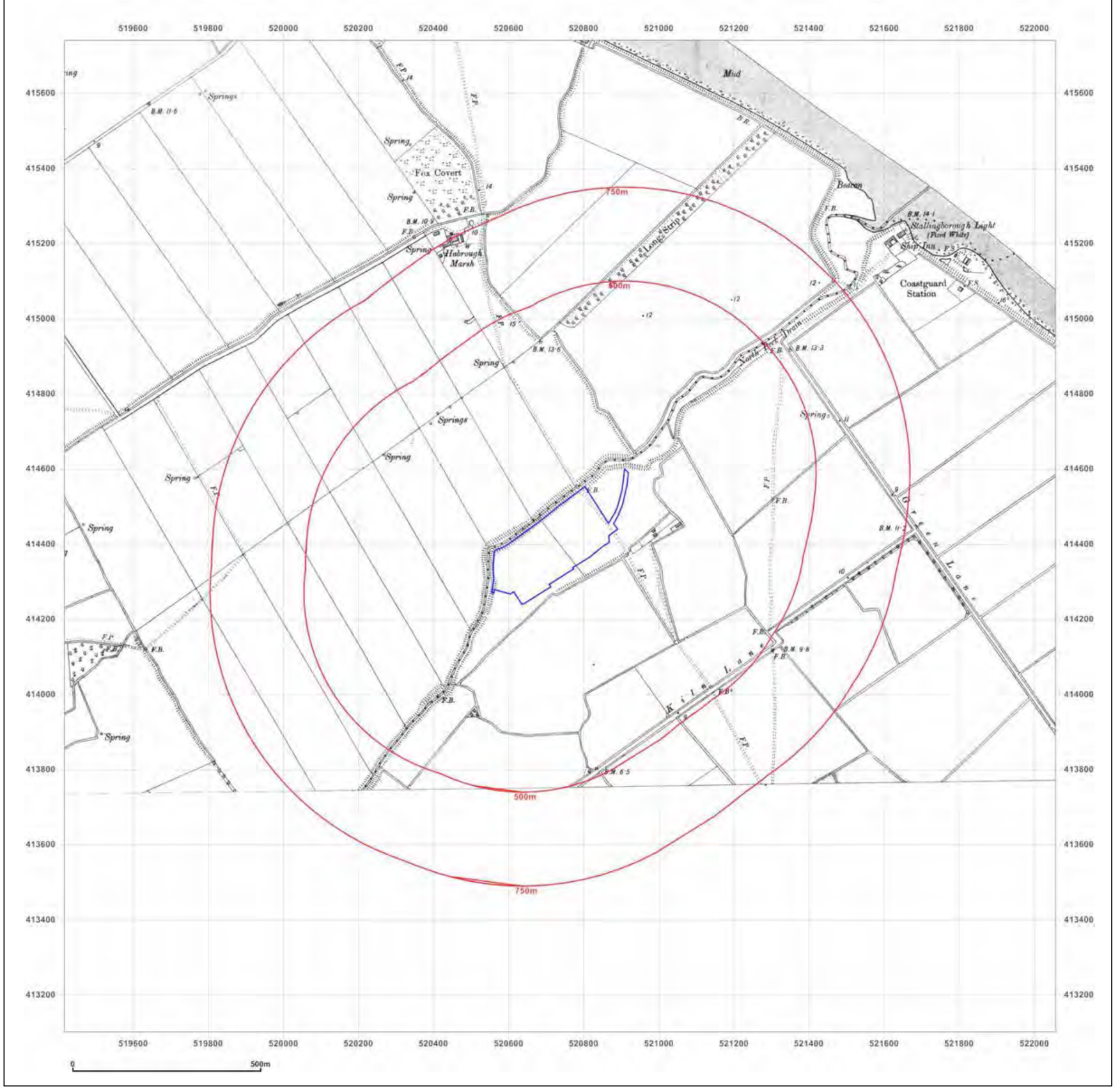

Groundsure INSIGHTS

Site Details:

Former Immingham Railfreight Terminal, Scandinavian Way, Stallingborough, Grimsby, North East Lincolnshire, DN41 8DT

Client Ref: C700_20_E_Immingham_EFW
Report Ref: GS-6755555
Grid Ref: 520736, 414421

Map Name: County Series

Map date: **1906**

Scale: 1:10,560

Printed at: 1:10,560

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Edition N/A
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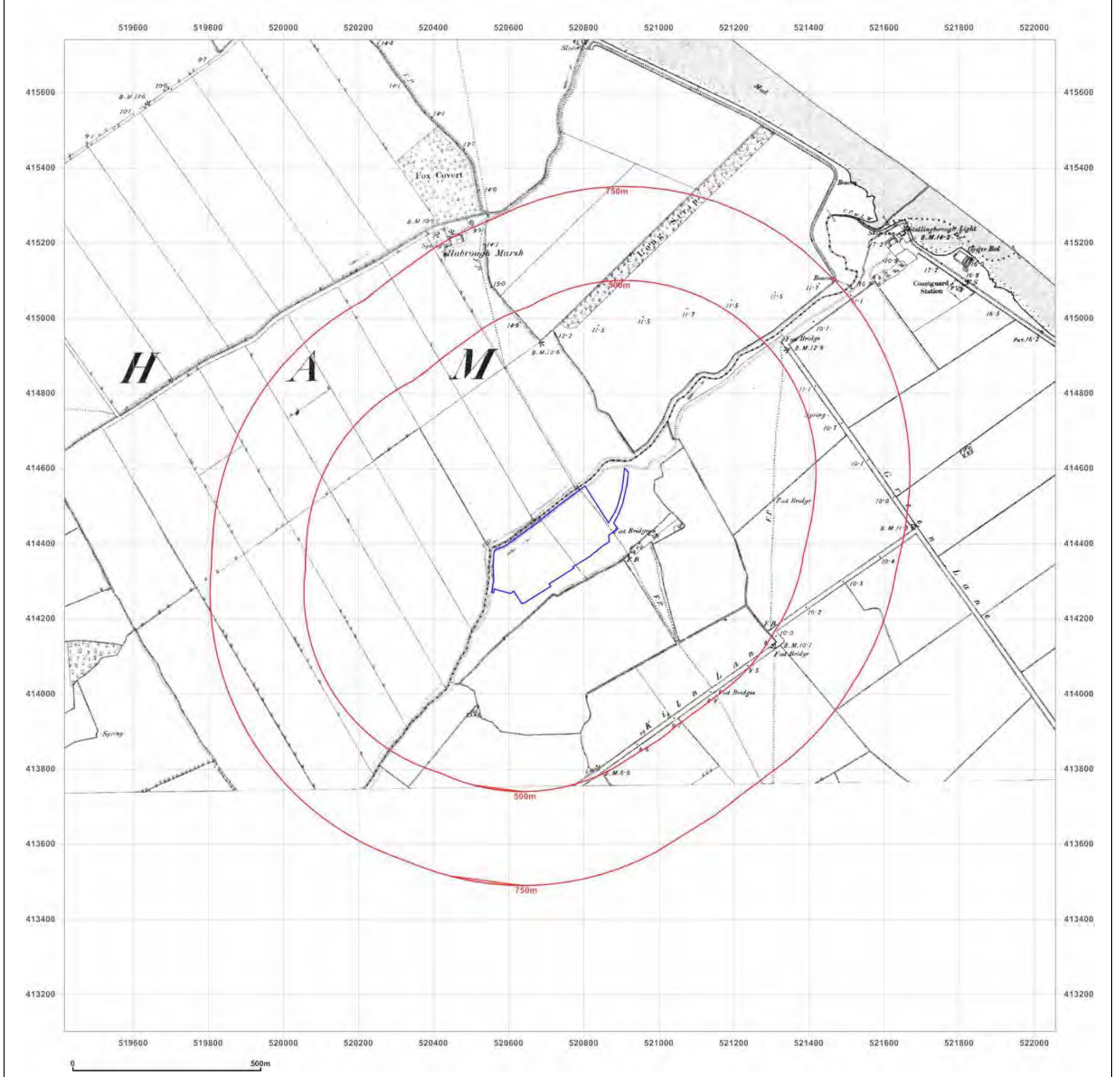

Groundsure INSIGHTS

Site Details:

Former Immingham Railfreight Terminal, Scandinavian Way, Stallingborough, Grimsby, North East Lincolnshire, DN41 8DT

Client Ref: C700_20_E_Immingham_EFW
Report Ref: GS-6755555
Grid Ref: 520736, 414421

Map Name: County Series
Map date: **1907**
Scale: 1:10,560
Printed at: 1:10,560

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Revised N/A
Edition N/A
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Levelled N/A

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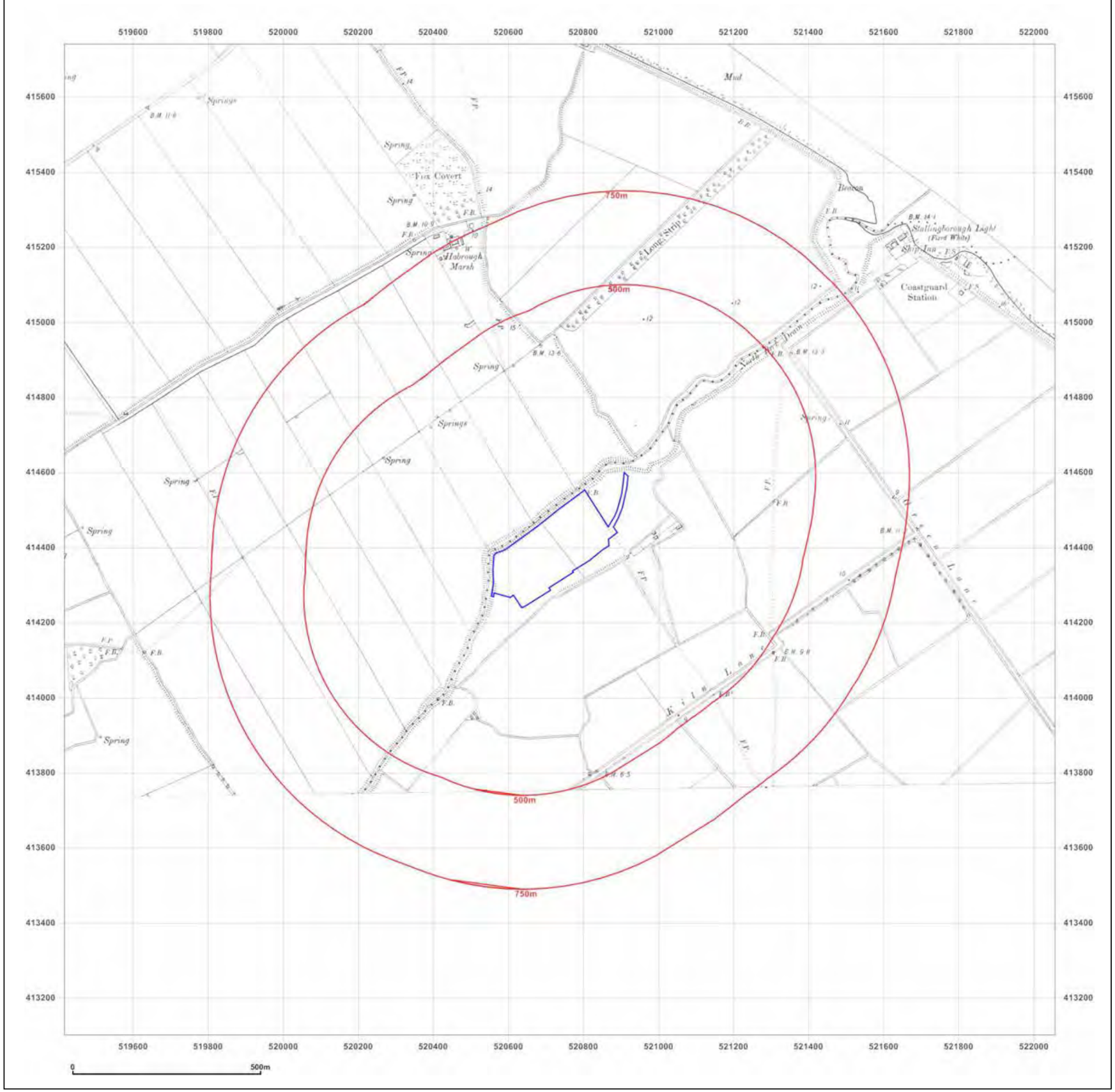

Groundsure INSIGHTS

Site Details:

Former Immingham Railfreight Terminal, Scandinavian Way, Stallingborough, Grimsby, North East Lincolnshire, DN41 8DT

Client Ref: C700_20_E_Immingham_EFW
Report Ref: GS-6755555
Grid Ref: 520736, 414421

Map Name: County Series

Map date: **1910**

Scale: 1:10,560

Printed at: 1:10,560

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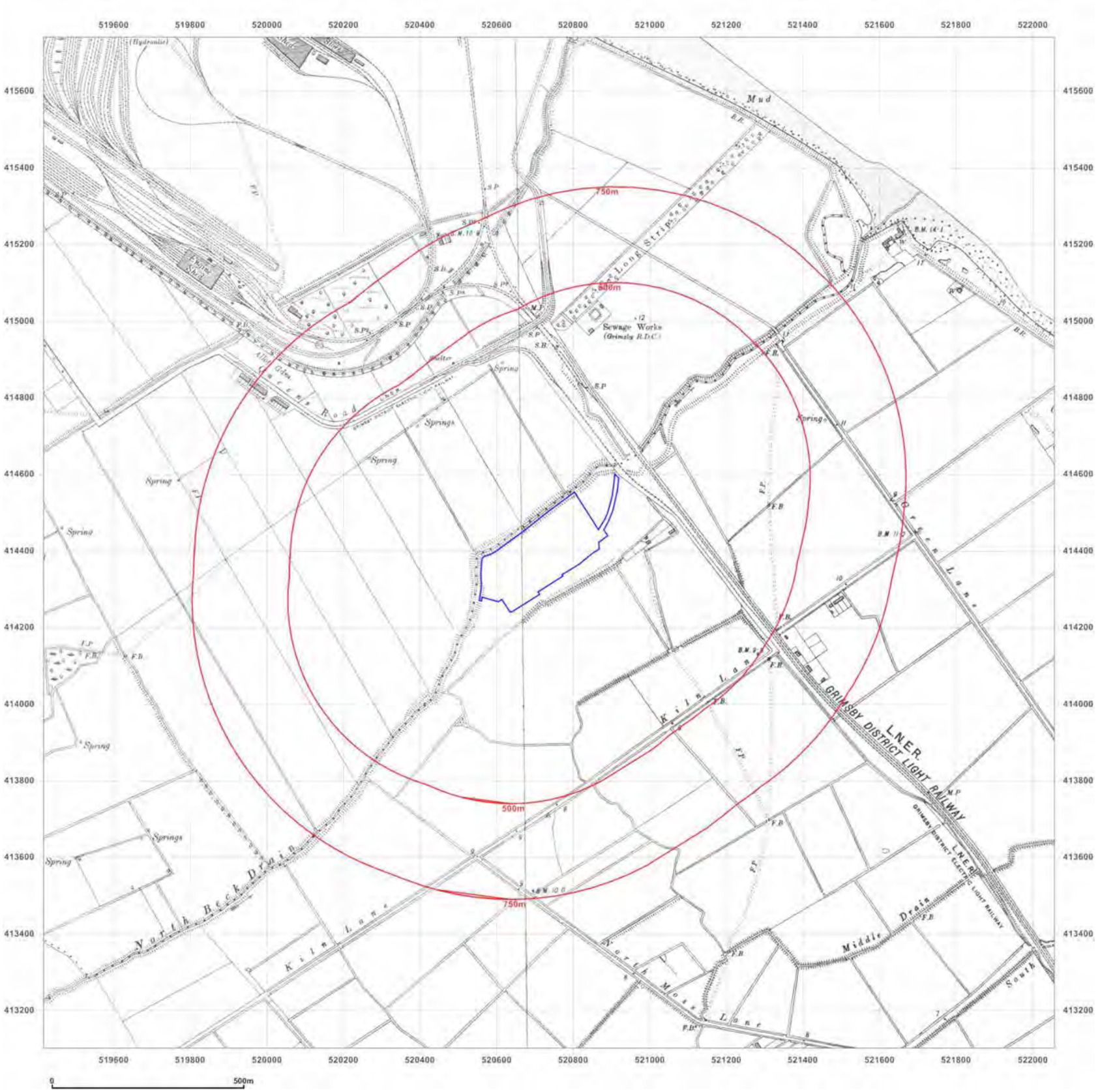

Groundsure INSIGHTS

Site Details:

Former Immingham Railfreight Terminal, Scandinavian Way, Stallingborough, Grimsby, North East Lincolnshire, DN41 8DT

Client Ref: C700_20_E_Immingham_EFW
Report Ref: GS-6755555
Grid Ref: 520736, 414421

Map Name: County Series
Map date: **1930**
Scale: 1:10,560
Printed at: 1:10,560

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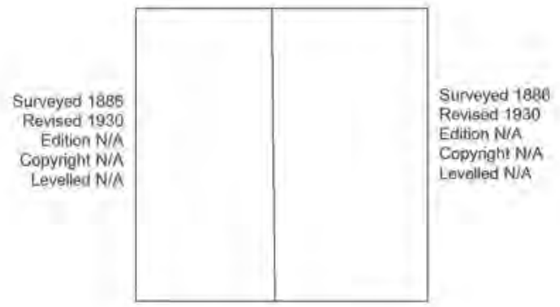

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Production date: 04 May 2020

Map legend available at:
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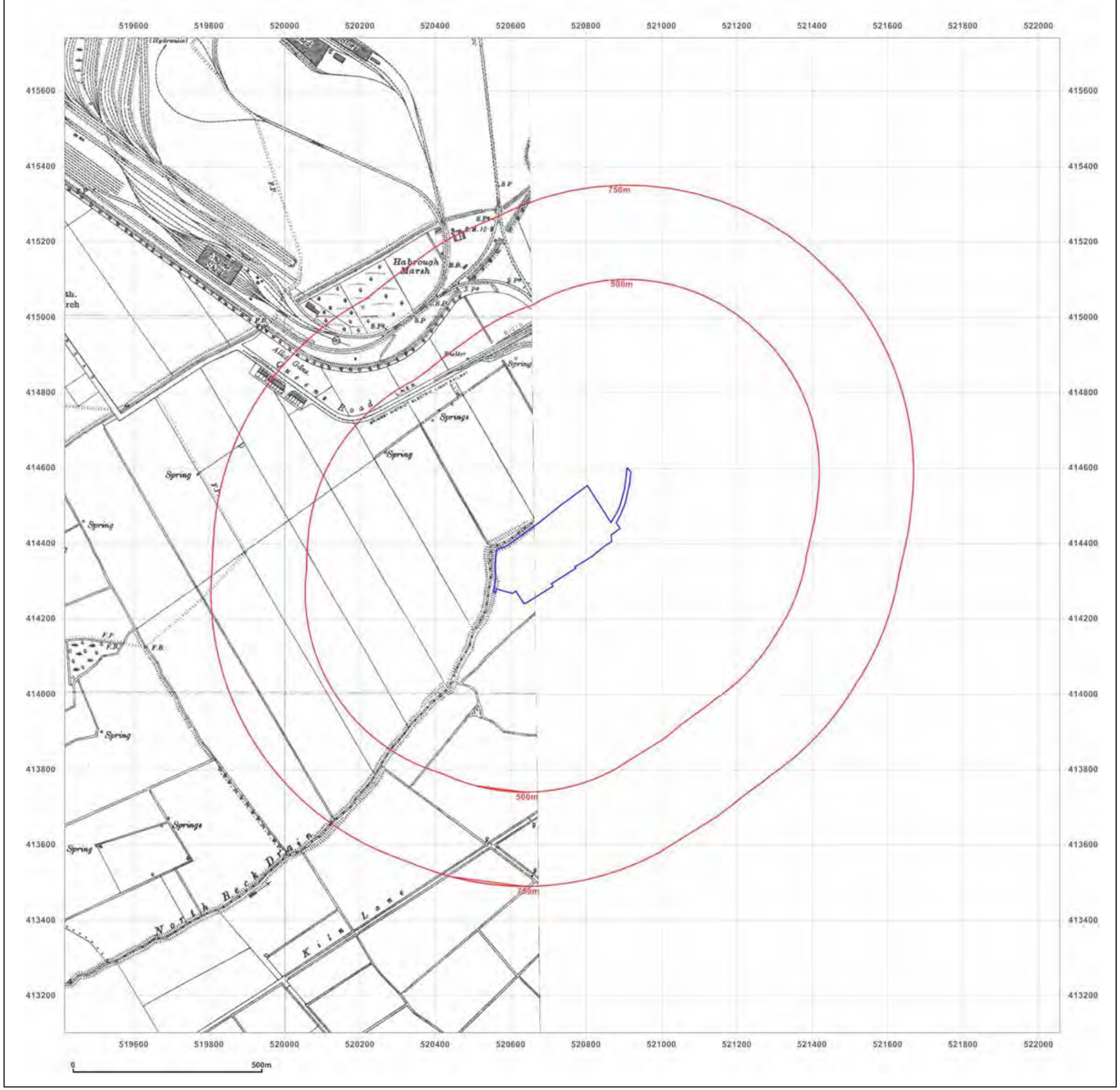

Groundsure INSIGHTS

Site Details:

Former Immingham Railfreight Terminal, Scandinavian Way, Stallingborough, Grimsby, North East Lincolnshire, DN41 8DT

Client Ref: C700_20_E_Immingham_EFW
Report Ref: GS-6755555
Grid Ref: 520736, 414421

Map Name: County Series

Map date: **1930**

Scale: 1:10,560

Printed at: 1:10,560

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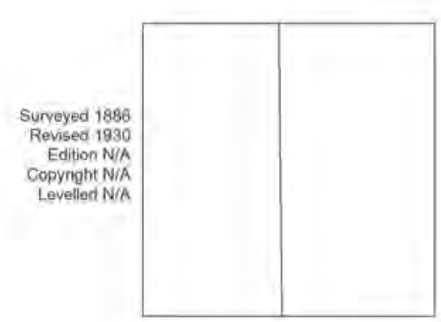

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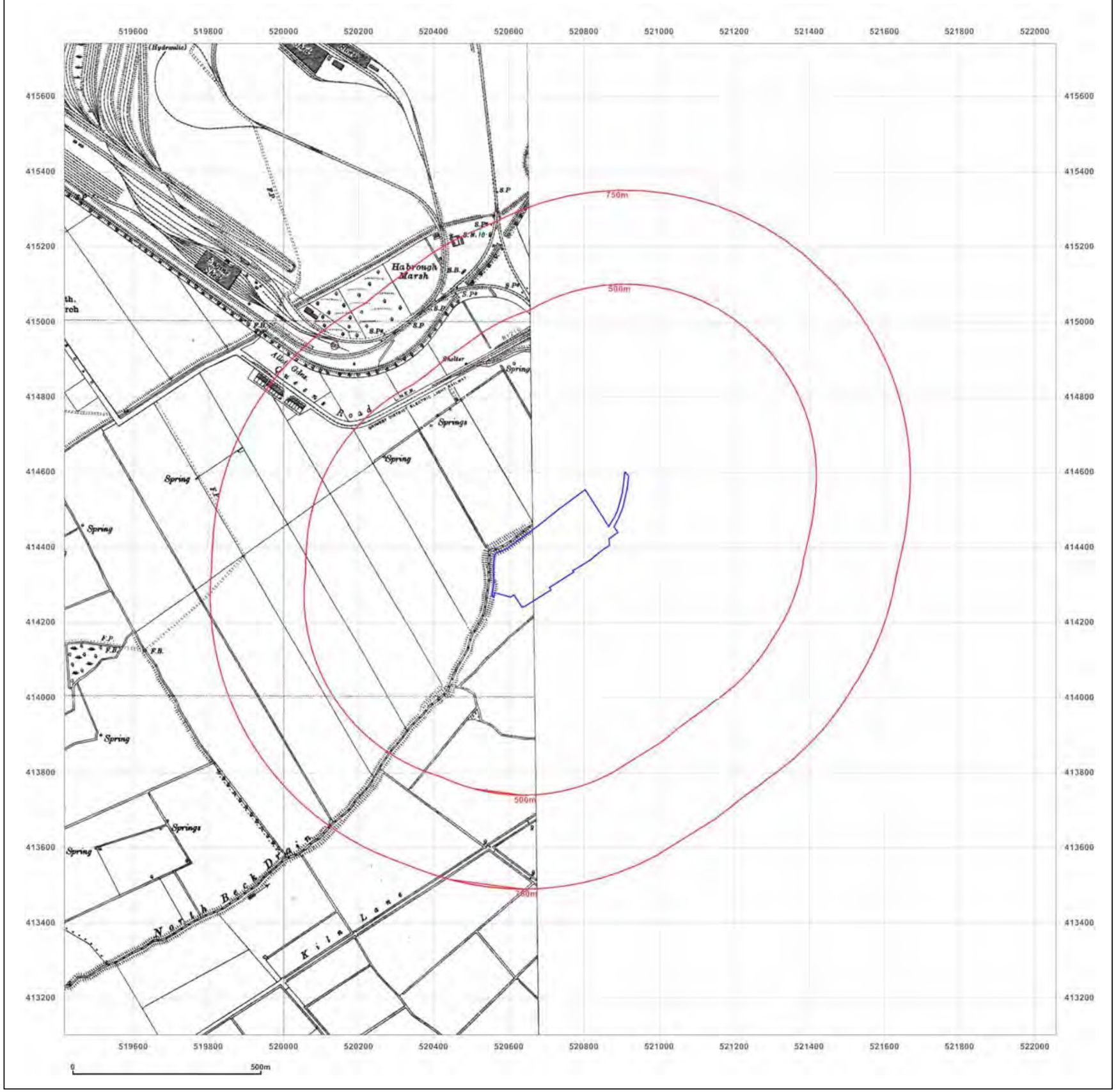

Groundsure INSIGHTS

Site Details:

Former Immingham Railfreight Terminal, Scandinavian Way, Stallingborough, Grimsby, North East Lincolnshire, DN41 8DT

Client Ref: C700_20_E_Immingham_EFW
Report Ref: GS-6755555
Grid Ref: 520736, 414421

Map Name: County Series

Map date: **1938**

Scale: 1:10,560

Printed at: 1:10,560

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Surveyed N/A
Revised N/A
Edition N/A
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Production date: 04 May 2020

Map legend available at:
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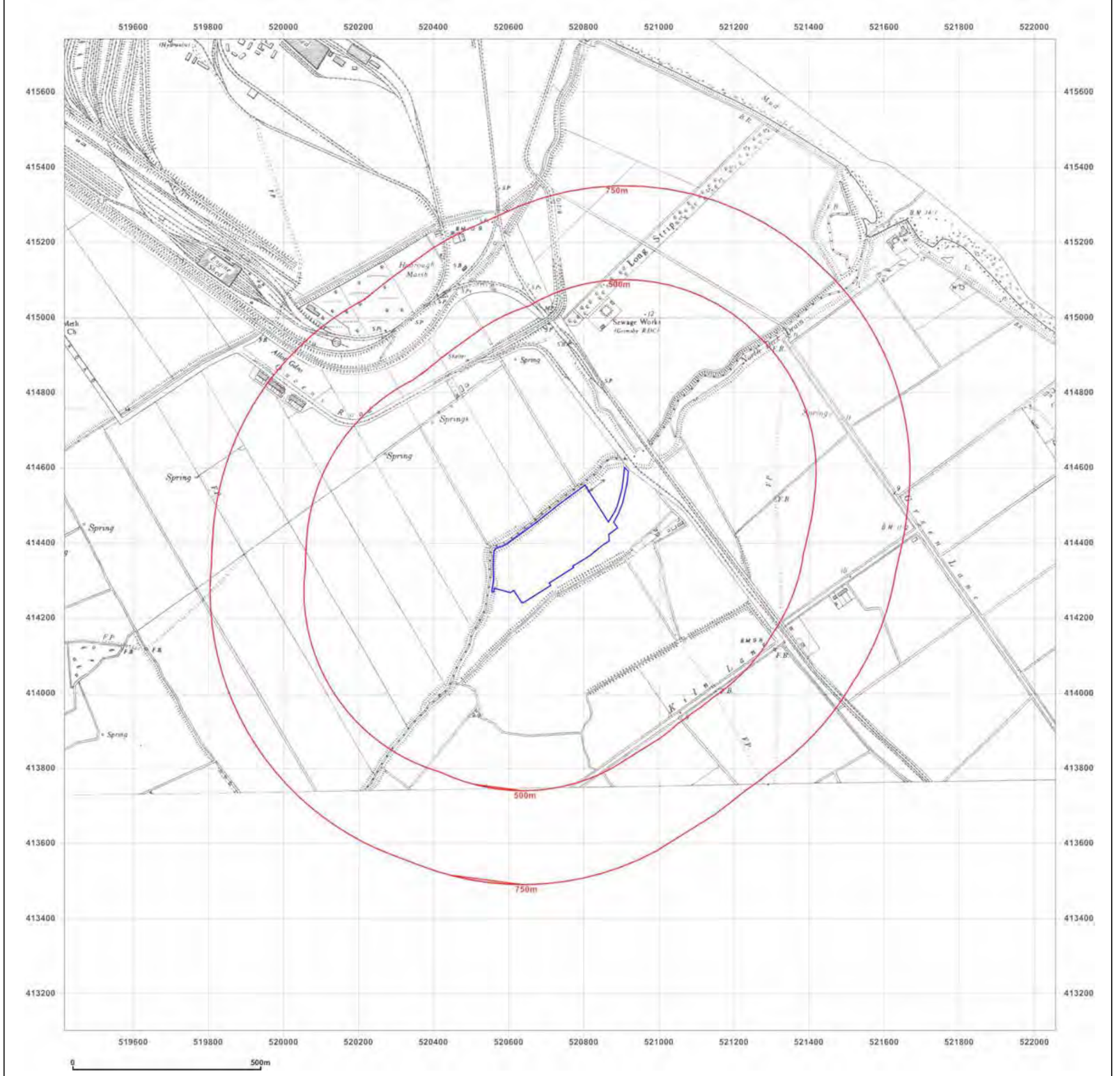

Groundsure INSIGHTS

Site Details:

Former Immingham Railfreight Terminal, Scandinavian Way, Stallingborough, Grimsby, North East Lincolnshire, DN41 8DT

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Report Ref: GS-6755555
Grid Ref: 520736, 414421

Map Name: County Series

Map date: **1947**

Scale: 1:10,560

Printed at: 1:10,560

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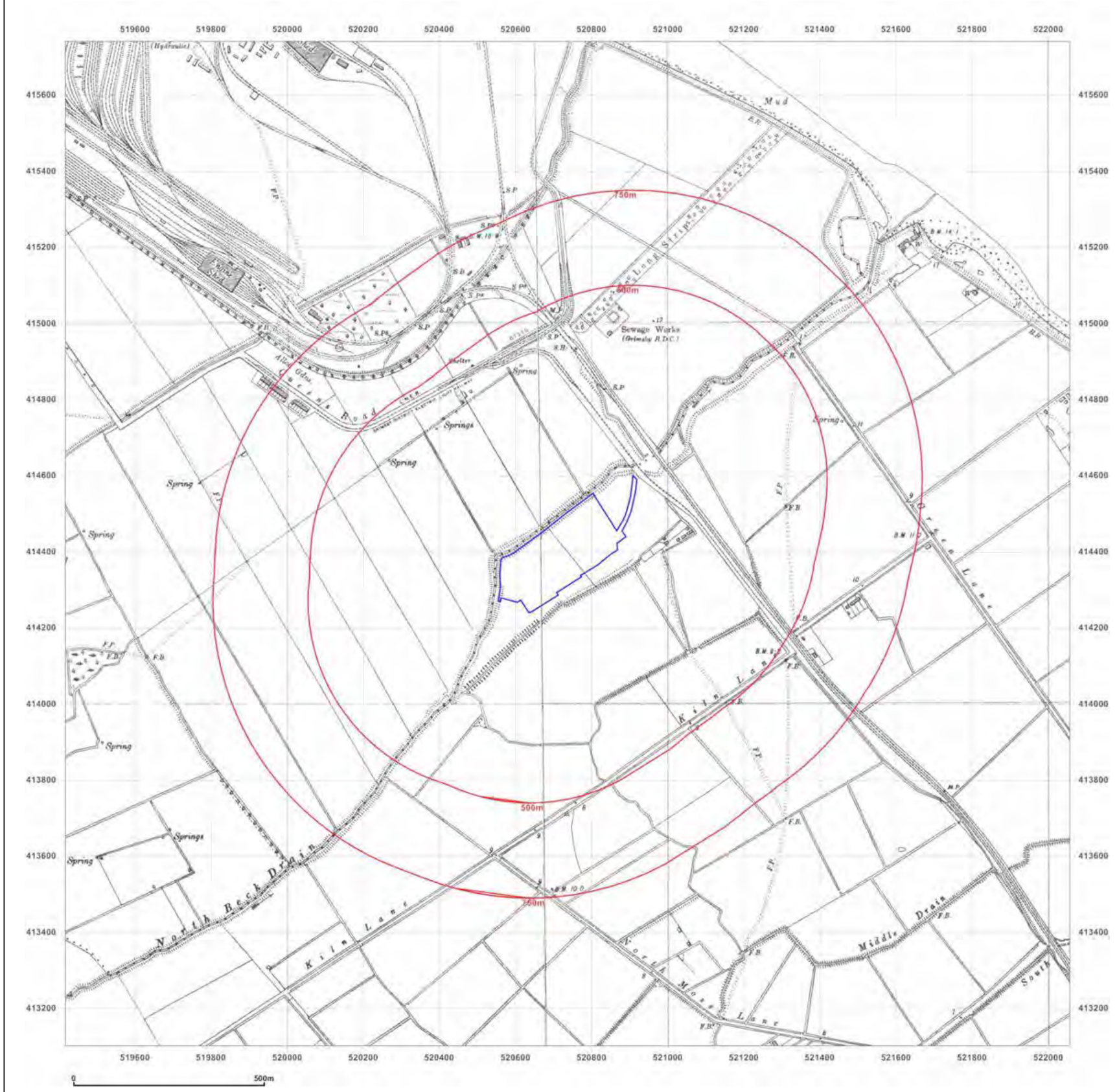

Groundsure INSIGHTS

Site Details:

Former Immingham Railfreight Terminal, Scandinavian Way, Stallingborough, Grimsby, North East Lincolnshire, DN41 8DT

Client Ref: C700_20_E_Immingham_EFW
Report Ref: GS-6755555
Grid Ref: 520736, 414421

Map Name: County Series

Map date: **1947-1951**

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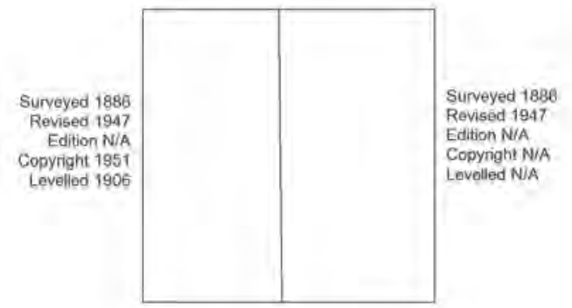

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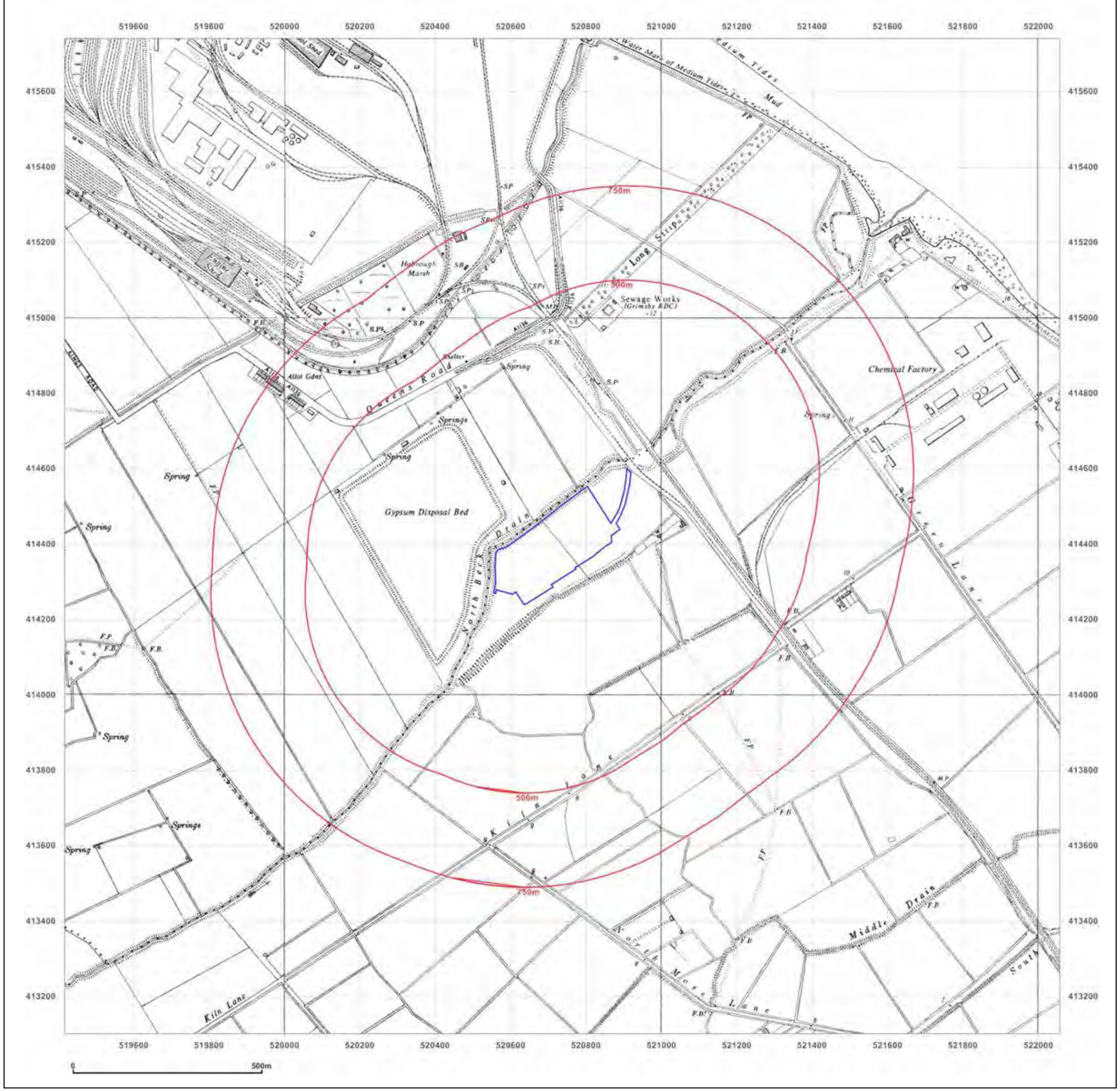

Groundsure INSIGHTS

Site Details:

Former Immingham Railfreight Terminal, Scandinavian Way, Stallingborough, Grimsby, North East Lincolnshire, DN41 8DT

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Report Ref: GS-6755555
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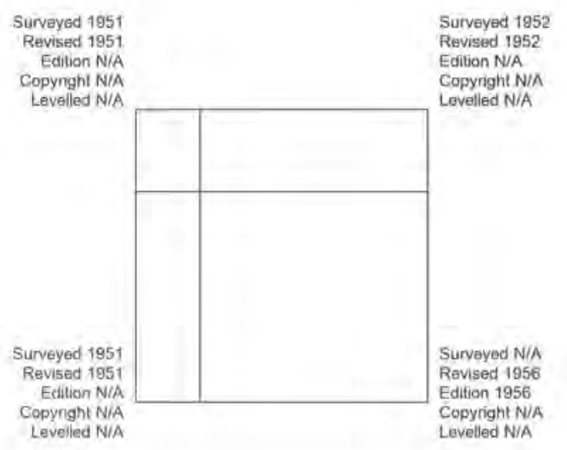

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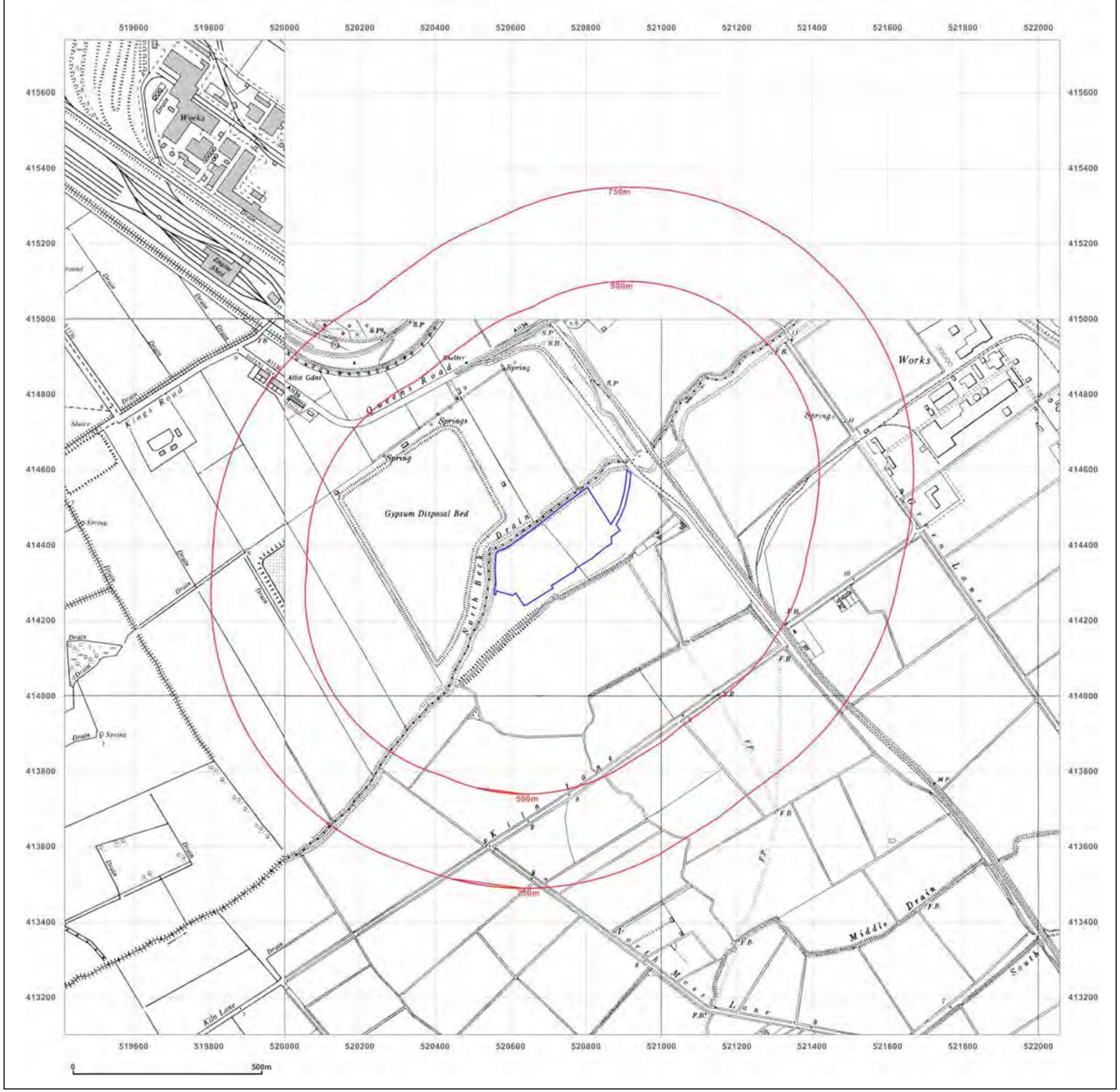

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Site Details:

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Report Ref: GS-6755555
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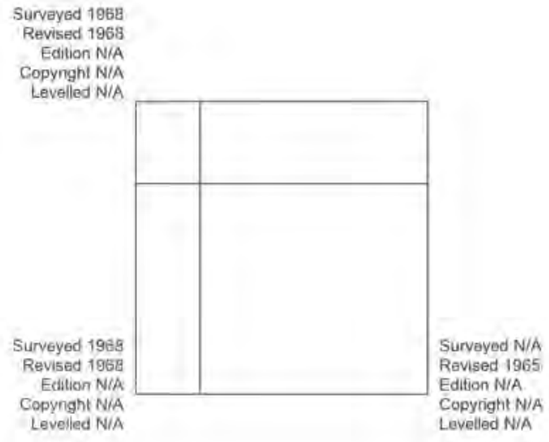

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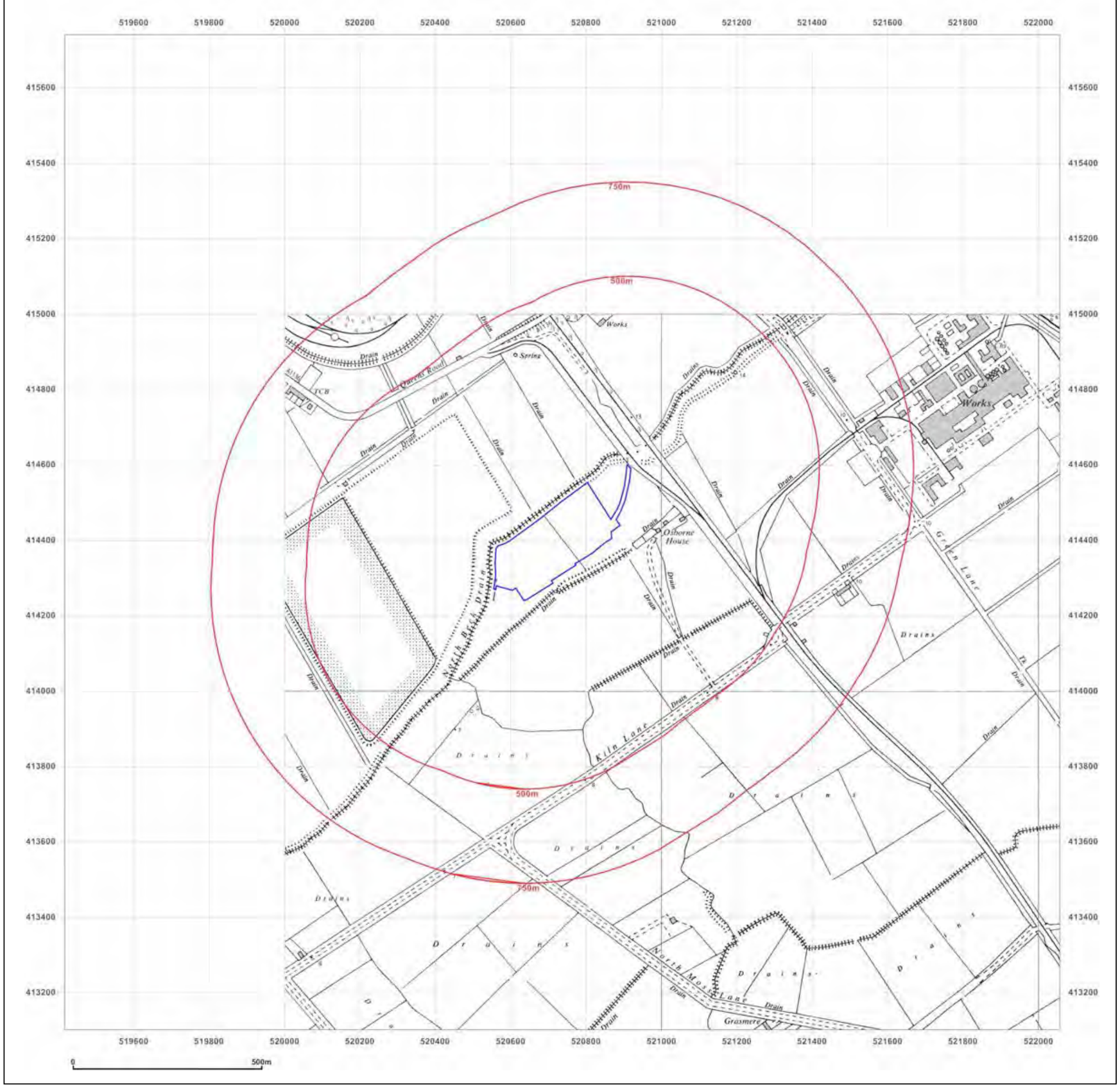

Groundsure INSIGHTS

Site Details:

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Client Ref: C700_20_E_Immingham_EFW
Report Ref: GS-6755555
Grid Ref: 520736, 414421

Map Name: Provisional
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Printed at: 1:10,560

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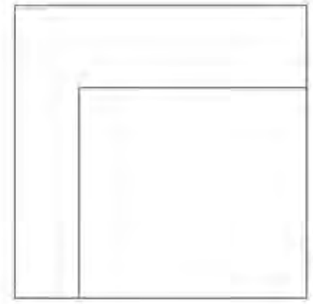

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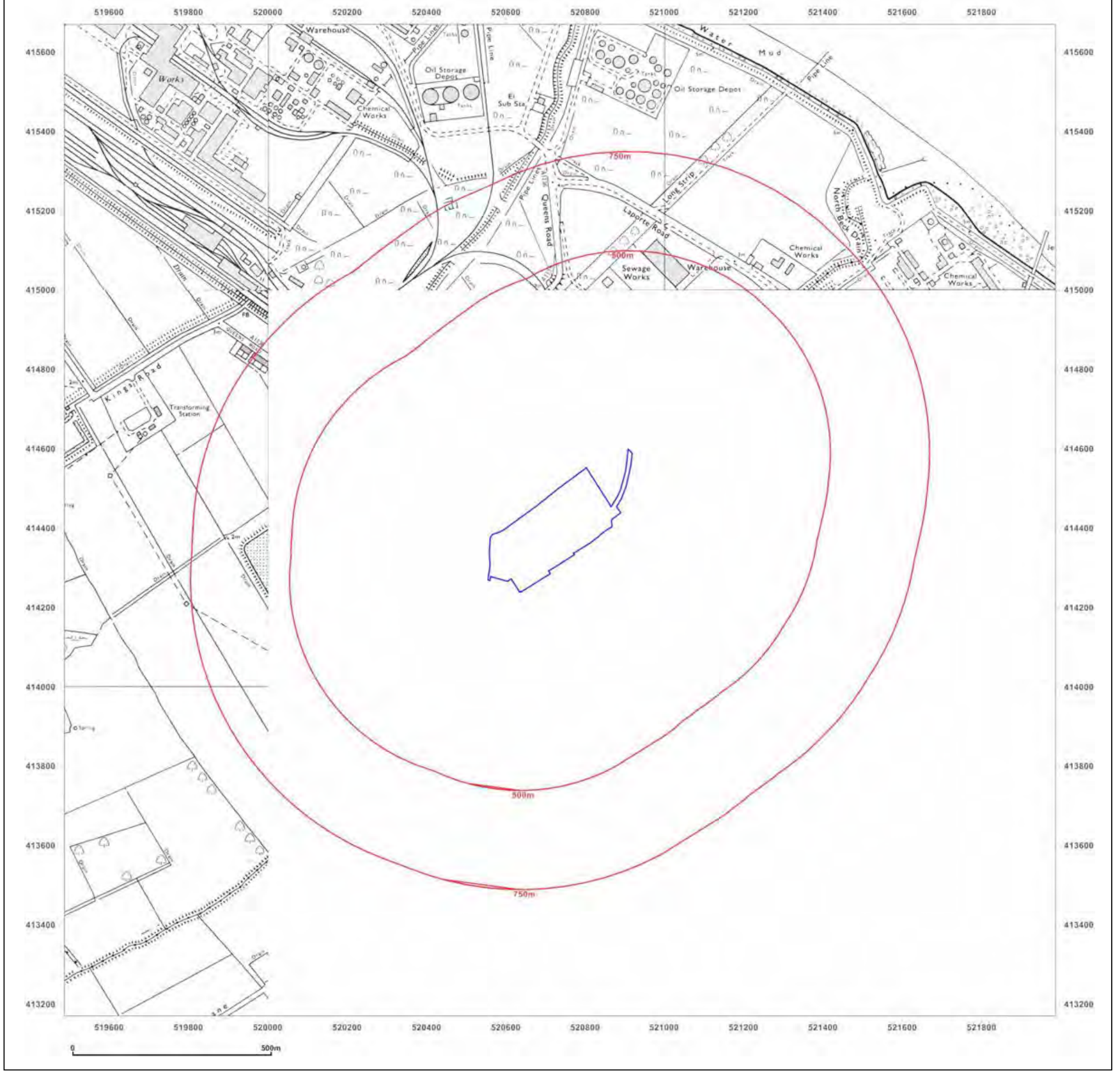

Groundsure INSIGHTS

Site Details:

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Client Ref: C700_20_E_Immingham_EFW
Report Ref: GS-6755555
Grid Ref: 520736, 414421

Map Name: National Grid
Map date: **1972-1976**
Scale: 1:10,000
Printed at: 1:10,000

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Surveyed 1974
Revised 1974
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1972
Revised 1972
Edition N/A
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Levelled N/A

Surveyed 1969
Revised 1976
Edition N/A
Copyright N/A
Levelled N/A

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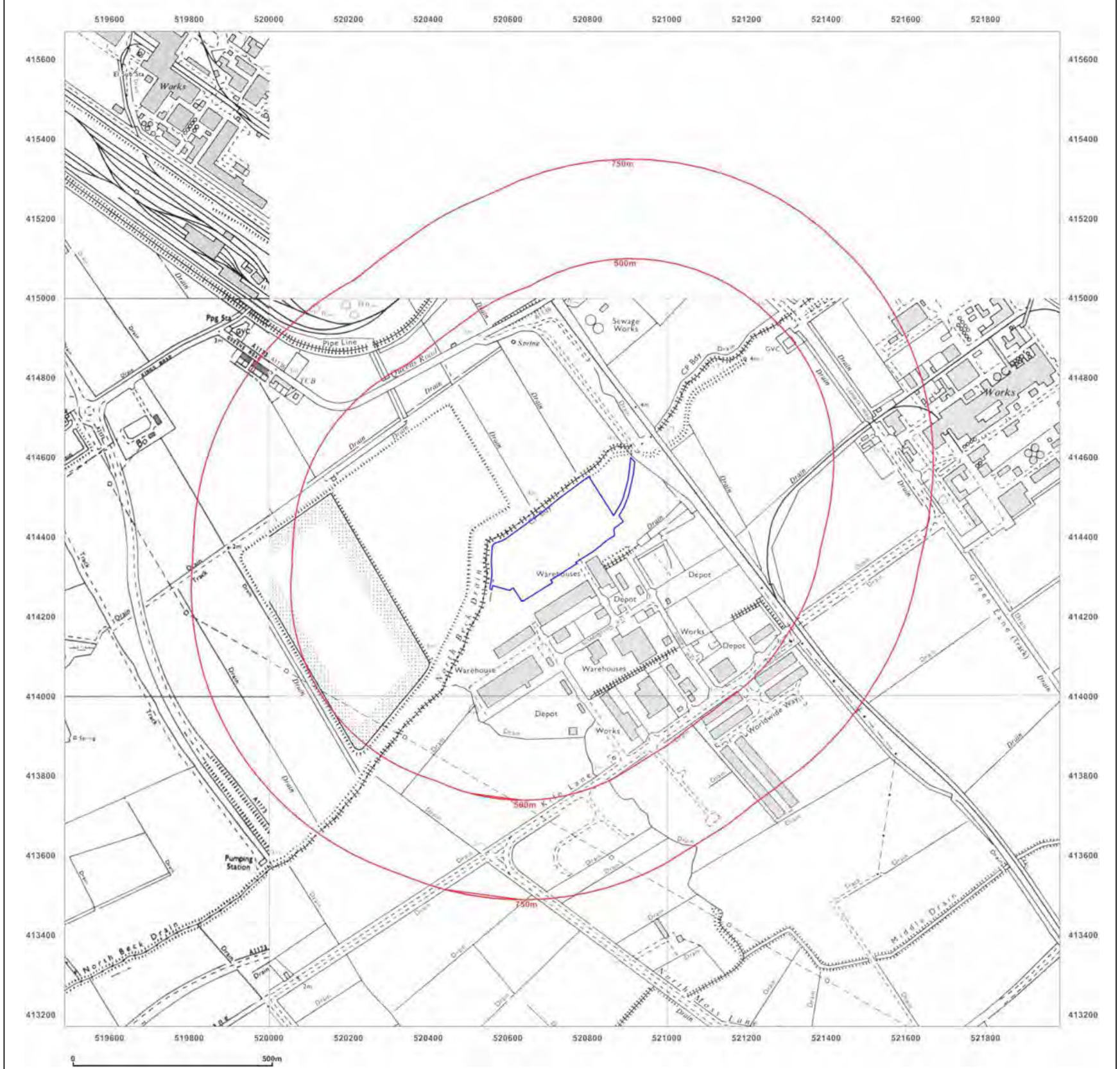

Groundsure INSIGHTS

Site Details:

Former Immingham Railfreight Terminal, Scandinavian Way, Stallingborough, Grimsby, North East Lincolnshire, DN41 8DT

Client Ref: C700_20_E_Immingham_EFW
Report Ref: GS-6755555
Grid Ref: 520736, 414421

Map Name: National Grid

Map date: **1980-1985**

Scale: 1:10,000

Printed at: 1:10,000

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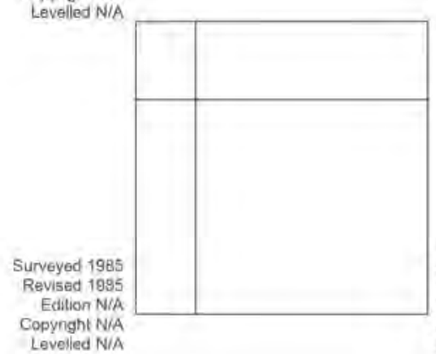
Surveyed 1975
Revised 1983
Edition N/A
Copyright N/A
Levelled N/A



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Levelled N/A

Surveyed 1978
Revised 1980
Edition N/A
Copyright N/A
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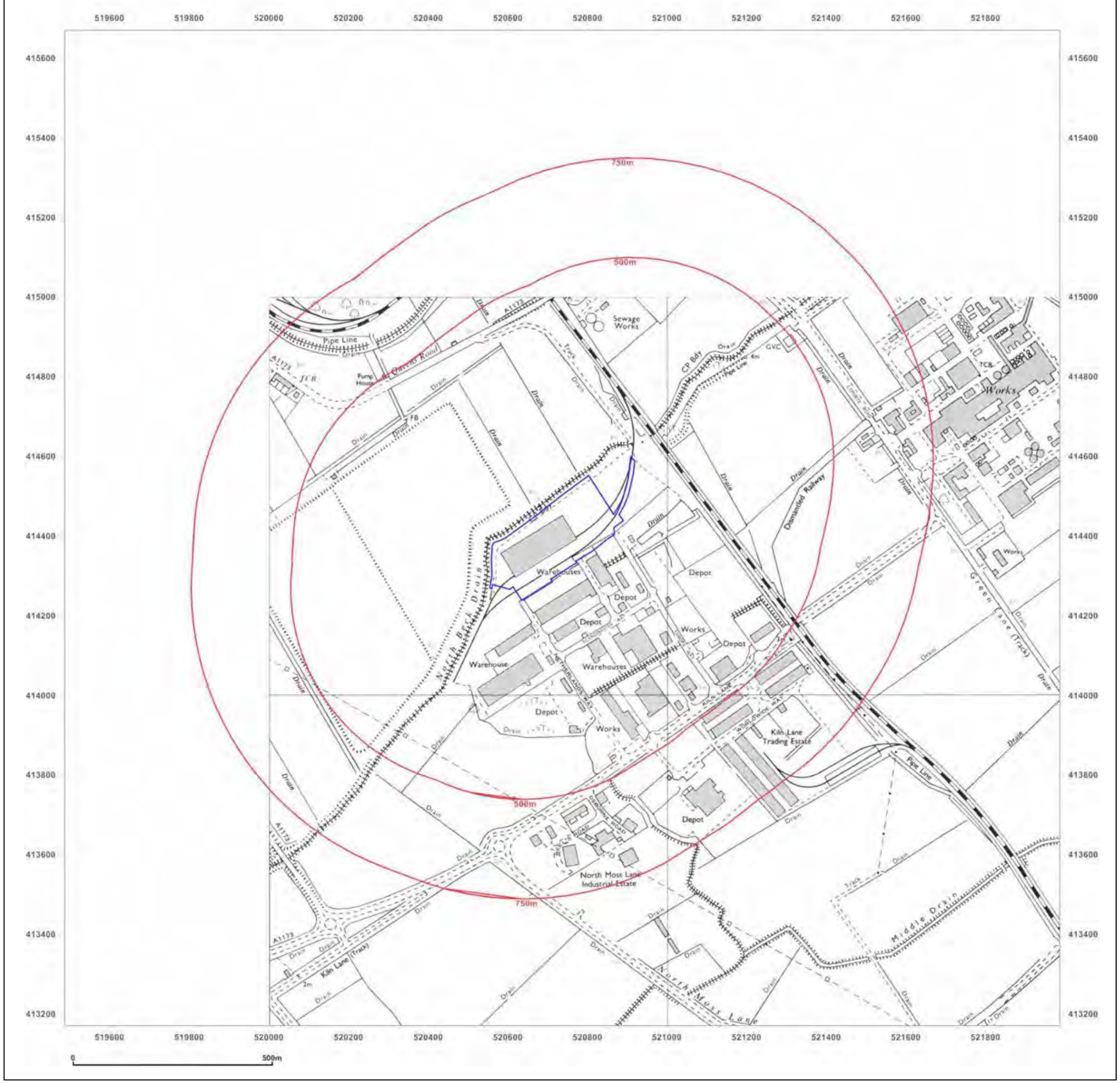

Groundsure INSIGHTS

Site Details:

Former Immingham Railfreight Terminal, Scandinavian Way, Stallingborough, Grimsby, North East Lincolnshire, DN41 8DT

Client Ref: C700_20_E_Immingham_EFW
Report Ref: GS-6755555
Grid Ref: 520736, 414421

Map Name: National Grid

Map date: **1988**

Scale: 1:10,000

Printed at: 1:10,000

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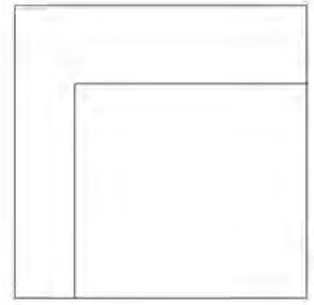

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Revised 1988
Edition N/A
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Groundsure INSIGHTS

Site Details:

Former Immingham Railfreight Terminal, Scandinavian Way, Stallingborough, Grimsby, North East Lincolnshire, DN41 8DT

Client Ref: C700_20_E_Immingham_EFW
Report Ref: GS-6755555
Grid Ref: 520736, 414421

Map Name: National Grid
Map date: 2001
Scale: 1:10,000
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W: www.groundsure.com

Production date: 04 May 2020

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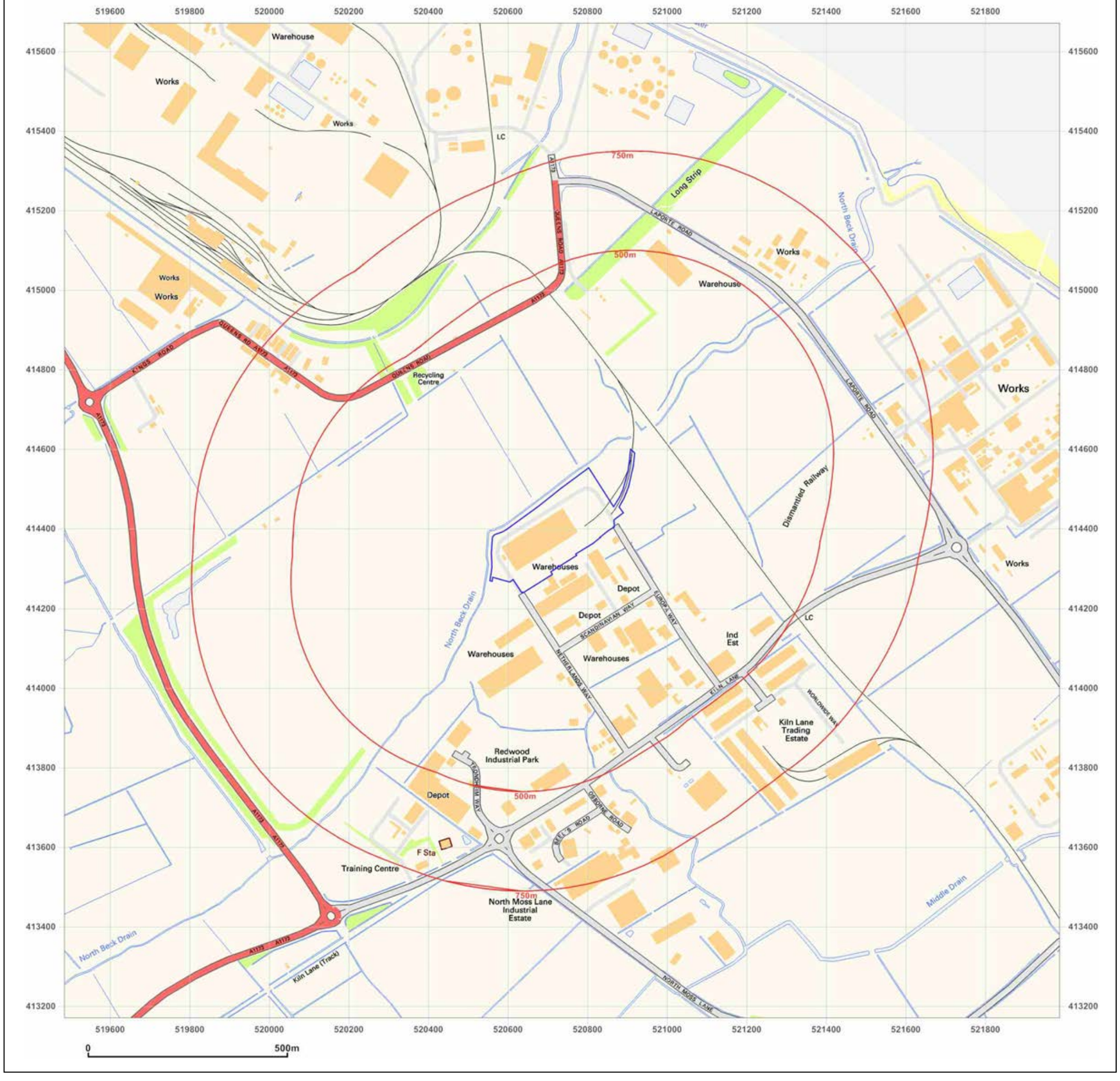

Groundsure INSIGHTS

Site Details:

Former Immingham Railfreight Terminal, Scandinavian Way, Stallingborough, Grimsby, North East Lincolnshire, DN41 8DT

Client Ref: C700_20_E_Immingham_EFW
Report Ref: GS-6755555
Grid Ref: 520736, 414421

Map Name: National Grid
Map date: **2010**
Scale: 1:10,000
Printed at: 1:10,000

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Groundsure INSIGHTS

Site Details:

Former Immingham Railfreight Terminal, Scandinavian Way, Stallingborough, Grimsby, North East Lincolnshire, DN41 8DT

Client Ref: C700_20_E_Immingham_EFW
Report Ref: GS-6755555
Grid Ref: 520736, 414421

Map Name: National Grid
Map date: **2020**
Scale: 1:10,000
Printed at: 1:10,000

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Production date: 04 May 2020

Map legend available at:
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Appendix 3

Site Plans

SCALE 1:1000 (A3)

EFW SITE NO.1

EFW SITE NO.2

SUB STATION

RAIL SITE

HERLANDS WAY

ROPA WAY

Environmental Geotechnical Specialists RGS

Appendix 4

Photographs

Entrance off Netherlands Way (Facing North)

View from southwestern corner (Facing East)

	Rogers Geotech-nical	Project Name: **Immingham EFW Sites 1 and 2, Scandinavian Way, Grimsby, DN41 8DT**	Project Number: **C700/20/E/1078**

View from northwestern corner (Facing East)

View from northeastern corner (Facing South)

	Rogers Geotech-nical	Project Name: **Immingham EFW Sites 1 and 2, Scandinavian Way, Grimsby, DN41 8DT**	Project Number: **C700/20/E/1078**

View from southeastern corner (Facing West)

Door on southern side of current warehouse (Suspected electrical cable path indicated in black)

	Rogers Geotech-nical	Project Name: **Immingham EFW Sites 1 and 2, Scandinavian Way, Grimsby, DN41 8DT**	Project Number: **C700/20/E/1078**

Inside the warehouse (Western area)

Inside the warehouse (Eastern area)

	Rogers Geotech-nical	Project Name: **Immingham EFW Sites 1 and 2, Scandinavian Way, Grimsby, DN41 8DT**	Project Number: **C700/20/E/1078**

On site drain (1)

Example drain line marked by tyres.

	Rogers Geotech-nical	Project Name: **Immingham EFW Sites 1 and 2, Scandinavian Way, Grimsby, DN41 8DT**	Project Number: **C700/20/E/1078**

Appendix 2

Phase 2 Environmental Report (RGS)

Environmental
Geotechnical
Specialists

GEOTECHNICAL ENVIRONMENTAL

PHASE 2 ENVIRONMENTAL REPORT

job number C700/20/E/1078	date 06/05/2020

site address
Immingham EFW Sites 1 and 2,
Scandinavian Way,
Stallingborough,
Grimsby, North East Lincolnshire, DN41 8DT

written by M.Cook	checked by C.Mason
issued by M.Cook	

Rogers Geotechnical Services Ltd
Telephone 0843 50 666 87 Fax 0843 51 599 30
Email enquiries@rogersgeotech.co.uk
www.rogersgeotech.co.uk
Offices 1 & 2, Barncliffe Business Park, Near Bank, Shelley,
Huddersfield, West Yorkshire HD8 8LU.

Environmental Geotechnical Specialists

Contents

Environmental Geotechnical Specialists

Appendices

1.	Site Plan
2.	Borehole Records
3.	Trialpit Records
4.	Laboratory Testing
5.	Fill Screening Values

Environmental Geotechnical Specialists

Report on a Phase 2 Environmental Investigation

Location:	Netherlands Way Stallingborough, Immingham DN41 8DF
For:	TEGCO LTD
Consultants:	Ray Postolowsky
Report No.	C700/20/E/1077 Report date: September 2020

For and on behalf of **Rogers Geotechnical Services Ltd**

Dr Mike Cook BSc PHD
Environmental Engineer

Imran Sakoor BEng FGS
Geo-environmental Engineer

Report Summary[1]

Item	Comments	Section
Development	Construction of a new commercial facility	1.
Geology	Superficial geology – Tidal Flat Deposits. Solid geology – Flamborough Chalk Formation.	5.
Strata Conditions	In general, limited a depth of made ground was revealed over silty clays. Underlain by weathered chalk.	6.1
Groundwater	Refer to factual report.	6.2
Contamination	Asbestos contamination identified within site soils, heavy metal contamination identified within groundwater.	9.1.1
Bulk Ground Gasses	Characteristic Situation level 2 adopted.	9.1.2
Effect of Sulphates	DC-2 concrete.	9.1.3

[1] This summary should not be relied upon to provide a comprehensive review. All of the information contained in this document should be considered.

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Environmental Geotechnical Specialists

1. Introduction

It is understood that the site is to be developed by the construction of a commercial facility that will be occupied by Newton Energi. Plans are yet to be finalised, however it is understood that the development will include new buildings, bunkers and an associated sub-station.

Consequently, a site investigation has been undertaken in accordance with the instruction from the client. This work was required in order to determine the nature of the underlying soils and to take into consideration the risk of any contamination present. This report describes the work undertaken, presents the data obtained and discusses the ground conditions in relation to the proposed works.

It should be appreciated that this report focuses on the environmental aspects of the work undertaken and does not include any geotechnical information or recommendations for foundations.

2. Limitations

The recommendations made and opinions expressed in this report are based on the ground conditions revealed by the site works, together with an assessment of the site and of the laboratory test results. Whilst opinions may be expressed relating to sub-soil conditions in parts of the site not investigated, for example between borehole positions, these are for guidance only and no liability can be accepted for their accuracy.

This report has been prepared in accordance with our understanding of current best practice. However, new information or legislation, or changes to best practice may necessitate revision of the report after the date of issue.

3. Previous Reports

A Phase 1 Desk Study has been undertaken by Rogers Geotechnical Services (RGS) and the results were presented as report number C700/20/E/1078 in May 2020. A Factual Report on the intrusive investigation was also presented by RGS as report number C700/20/E/1077 in September 2020. Information obtained from these reports have been used within this Environmental Report.

4. Fieldworks

The fieldworks were undertaken between the 11th of May and the 4th of June 2020 and included the following:

- Ten light cable percussive boreholes.
- Four windowless sample boreholes.
- Twelve machine excavated trialpits.
- Two piezometer installations.
- Eight gas/water monitoring standpipes.

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The investigatory locations are shown on the site plan which is presented in Appendix 1 to this report.

4.1 Cable Percussive Boreholes

The boreholes were sunk using a 1.5 tonne capacity light cable percussive (shell and auger) drilling rig with 150mm diameter tools and casing.

During the boring operations, representative disturbed samples of the arisings were taken at regular depth intervals and sealed in plastic bags. Standard penetration tests (SPTs) were undertaken at regular depth increments. The SPTs were conducted in accordance with the procedures given in BS EN ISO 22476: Part 3: 2005 +A1: 2011, and the results are summarised on the borehole records. During this work an automatic trip hammer of 63.5kg falling through 760mm was employed to drive either a cone or split barrel sampler assembly into the ground, the barrel samples were retained in air tight plastic containers. Groundwater levels were recorded when struck and boring stopped for a period of time to allow the water level to be monitored.

All recovered samples were returned to the laboratory for subsequent logging and testing. The soils were described in general accordance with BS5930: 2015 + A1: 2020 and full descriptions are given on the borehole records, which are presented in Appendix 2. Also included on these records are the water levels, casing details, standard penetration test results and a record of samples taken.

4.2 Windowless Sample Boreholes

These boreholes were sunk using a drive-in windowless sampler. The cores were undertaken in 1m lengths and typically reduced in diameter from 80mm for the first 1m through 70mm and 60mm for subsequent 1m increments. The recovered cores were sealed and returned to the laboratory for logging and subsequent testing. The soils were described in general accordance with BS5930: 2015 +A1: 2020 and full descriptions are given on the windowless sample records which are presented in Appendix 2. Also included on these records are the core diameters and percentages of core recovered.

4.3 Machine Excavated Trialpits

Twelve trialpits were excavated in order to collect sufficient samples of the coarse made ground and assess the stability of the underlying soils that formed the sides of the excavation. The soils exposed in the trialpits were again logged on site in general accordance with BS5930: 2015 +A1: 2020, and full descriptions are given on the trialpit records which are presented in Appendix 4.

Once excavations were completed, the trialpits were carefully re-instated with the arisings. Whilst every care was taken during the infilling process, including compacting of the infill at regular intervals with the back acting arm of the excavator, it should be appreciated that some mounding of the surface may have resulted. Moreover, the infilled soils may be subjected to settlement over time, such that a depression in the surface may also occur. Therefore, the locations of any pits undertaken in this investigation should be conveyed to the current site user, as the mounds or depressions associated with the pits may present a risk to current site operations. Furthermore, it must be realised that the infilled pits represent an area of disturbance within the site soils, thus the

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soils at the pit locations may vary characteristically compared to the undisturbed ground. As such, foundations placed in this disturbed material may not perform as anticipated.

4.4 Gas/Groundwater Monitoring Standpipes and Piezometers

Standpipes were installed within eight of the windowless sample boreholes and the details of the installations are shown on the appropriate borehole records. In all cases, the monitoring standpipe consisted of a perforated pipe from the base of the borehole to between 1.0m below surface, with a non-perforated pipe to ground level. The response zone was filled with pea gravel, with a bentonite seal above and the installation was capped with a stop box cover in a concrete surround.

Geosense VWP-300 vibrating wire piezometers were installed within cable percussive boreholes CP4 and CP6A, the details and results of which are presented within Appendix 5 of the factual report.

5. Geology

The available published geological data for the site has been examined and the following table presents the anticipated geology.

Table 1: Geological Data for the Site

Strata Type	Strata Name[2]	Previous Name[3]	Description[2]
Artificial Ground	Made Ground	-	Made ground is an area where the pre-existing land surface is raised by artificial deposits. The purpose of the made ground is unspecified. Variable composition.
Superficial Geology	Tidal Flat Deposits	Estuarine Alluvium	Tidal flat deposits, including mud flat and sand flat deposits, are deposited on extensive nearly horizontal marshy land in the intertidal zone that is alternately covered and uncovered by the rise and fall of the tide. They consist of unconsolidated sediment, mainly mud and/or sand. They may form the top surface of a deltaic deposit. A normally consolidated soft silty clay, with layers of sand, gravel and peat. Characteristically low relief.
Solid Geology	Flamborough Chalk Formation	Chalk Without Flints Upper Chalk	White, well-bedded, flint-free chalk with common marl seams (typically about one per metre). Common stylolitic surfaces and pyrite nodules.

[2] Sources: British Geological Survey (NERC) Map Sheets 81; Patrington; Solid and Drift Edition, and Geology of Britain Viewer [*online resource from www.bgs.ac.uk*]
[3] Sources: British Geological Survey (NERC) Lexicon of Named Rock Units [*online resource from www.bgs.ac.uk*]

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6. Strata Conditions

The succession has been shown to include the following:

Table 2: Generalised Strata Profile

Depth m below ground level to underside of layer	Strata Type	Positions Layer
0.7 – 2.1	MADE GROUND (GRAVEL/COBBLES)	ALL
1.4 – 1.9	MADE GROUND (Cohesive)	CP01, CP03, CP09, CP10
2.3 – 9.0	Silty CLAY	CP01, CP02, CP03, CP04, CP06a, CP07a, CP09, CP10
+1.8 – 7.4	Slightly organic CLAY	CP01, CP02, CP04, CP05, CP07a, CP08, CP09, CP10 TP01 to TP12 WS01, WS02, WS04, WS06, WS07, WS08, WS09, WS10
6.1 – 7.6	Organic CLAY/PEAT	CP04, CP05, CP06a, CP08, CP09, CP10
9.2	SILT/SAND	CP10
+10 – 19.3	Gravelly silty CLAY	CP01 to CP10
+19.3 – +30.45	CHALK	CP01, CP02, CP04, CP06a, CP07a, CP10

'+' denotes that the strata extended below the termination depth of the investigated positions, thus the extent of the deposit is only proven to the depths indicated.

6.1 General Strata

In general, the borehole records indicate that a 0.7m to 2.1m capping of made ground was present at all positions. Beneath the made ground, silty locally organic clays were then revealed to depths of between 2.3m and 7.4m below ground level (bgl) at CP01-CP05, CP06a, CP07a, CP08-CP10, TP1 to TP12, WS1-WS4, WS6 and WS7 to WS10.

Below the above strata, organic clays with horizons of peat were then revealed to depths of between 6.1m and 7.6m bgl at positons CP04, CP05, CP6a, CP08, CP9 and CP10. With respect to the published geological data for the site, it is considered that these soils represent Tidal Flat Deposits, which are indicated to be present below the site.

Underlying the Tidal Flat Deposits, gravelly silty clay (gravel is of chalk and flint) was encountered to between 19.2m and 19.3m within CP01, CP02, CP04, CP6a, CP7a and CP10 to the termination depth of CP3, CP5, CP8, CP9. Underlying the gravelly silty clay, weathered chalk was then present to the termination of CP01, CP02, CP04, CP06a, CP07a and CP10. With respect to the available published geological data for the site, this stratum is anticipated to represent the upper weathered fraction of the Flamborough Chalk Formation.

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6.2 Groundwater

Groundwater strikes were observed at numerous positions during the site investigation, these are noted on the appropriate borehole and trial pit logs within Appendices 2, 3 and 4. However, it should be appreciated that the normal rate of boring does not permit the recording of an equilibrium water level for any one strike, moreover, groundwater levels are subject to seasonal variation or changes on local drainage conditions.

In addition to the above, readings from the vibrating wire piezometers are presented within Appendix 5 of the factual report.

7. Insitu Testing

7.1 Standpipe Monitoring

The standpipes were monitored between the 19th of June and 17th July 2020. The results of the gas monitoring undertaken to date are tabulated below:

Table 3: Standpipe Monitoring

Borehole No.	Date	CH_4 (%)	CO_2 (%)	O_2 (%)	Flow (l/hr)	Barometric Pressure (mb)	Water Level (m bgl)	Standpipe Depth (m)
WS01	19.06.20	1.8	1.1	15.2	0.0	1012↔	1.03	3.58
	03.07.20	1.2	1.0	17.5	0.1	1011↔	1.00	
	10.07.20	0.9	0.9	18.1	0.1	1019↑	0.95	
	17.07.20	0.7	0.9	18.1	0.1	1021↔	1.10	
WS02	19.06.20	0.2	6.8	2.4	0.0	1012↔	0.77	3.75
	03.07.20	1.5	1.0	18.9	0.1	1012↔	0.70	
	10.07.20	0.2	0.3	20.6	0.0	1019↑	0.67	
	17.07.20	0.2	0.4	20.2	0.0	1021↔	0.85	
WS04	19.06.20	0.0	1.1	16.4	0.1	1012↔	1.08	3.77
	03.07.20	0.1	1.0	20.3	0.1	1012↔	0.90	
	10.07.20	0.1	1.4	20.2	0.1	1019↑	0.95	
	17.07.20	0.1	1.5	19.9	0.1	1021↔	1.05	
WS06	19.06.20	0.4	0.1	19.5	0.4	1012↔	0.66	3.30
	03.07.20	0.2	0.2	20.3	0.0	1011↔	0.30	
	10.07.20	0.0	0.2	20.6	0.0	1019↑	0.65	
	17.07.20	0.0	0.2	20.2	0.0	1021↔	0.60	
WS07	19.06.20	*	*	*	*	1012↔	0.00	2.60
	03.07.20	0.0	0.1	20.8	0.0	1011↔	0.00	
	10.07.20	*	*	*	*	1019↑	0.00	
	17.07.20	0.0	0.1	20.5	0.0	1021↔	0.10	
WS08	19.06.20	0.1	0.2	20.0	0.0	1012↔	0.32	3.35
	03.07.20	0.0	0.3	20.3	0.0	1012↔	0.30	
	10.07.20	0.5	0.5	20.1	0.1	1020↑	0.35	
	17.07.20	0.3	0.7	18.7	0.1	1021↔	0.30	
WS09	19.06.20	0.1	0.0	19.3	0.4	1012↔	0.85	3.85
	03.07.20	0.1	0.1	19.7	0.0	1012↔	0.60	
	10.07.20	0.1	0.1	20.8	0.0	1020↑	0.65	
	17.07.20	0.0	0.1	20.4	0.0	1021↔	1.00	

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WS10	19.06.20	0.0	0.1	20.6	0.1	1012↔	1.50	3.85
	03.07.20	0.1	5.5	15.3	0.1	1012↔	1.50	
	10.07.20	0.0	0.1	14.3	0.1	1020↑	1.42	
	17.07.20	0.0	6.1	13.7	0.1	1021↔	1.50	

*water sat at ground level – unable to monitor position.

This work was undertaken using a GA5000 ground gas analyser, serial No G503524 which was last calibrated on the 18th May 2020.

8. Laboratory Testing - Environmental

8.1 Environmental Testing

A suite of testing was conducted by Chemtest Ltd on soil and water samples from across the site and the following regime was undertaken.

- Metals – Be, Cd, Cr(III), Cr(VI), Cu, Hg, Ni, Pb, V and Zn.
- Semi and Non-Metals - As, Sb, Se, Total, Complex and Free CN^-.
- Polycyclic aromatic hydrocarbons (PAHs).
- Petroleum hydrocarbons (TPHs).
- Others – pH, organic content and total/soluble SO_4^{2-}.
- Asbestos screen (restricted to select trialpit samples).

This testing was undertaken by Chemtest Ltd and the results of all of the chemical testing are presented in Appendix 5 of this report. It should be appreciated that the suite and sampling locations were specified by the client.

9. Discussion of Ground Conditions - Environmental

9.1 Discussion of Test Results

It is understood that the site is to be developed by the construction of a new commercial facility with associated buildings, bunkers and an associated sub-station. Consequently, the site may be classified as commercial.

9.1.1 Soil Samples

The results of the chemical testing undertaken on soil samples obtained during this investigation have been compared to the ATRISK soil screening values (SSVs) as compiled by WS Atkins plc. With respect to the results it should be appreciated that the soil organic matter (SOM) content for the samples tested was found to range between 1.1% and 17%, with an average of 4.9%. On this basis, it is considered that the screening values associated with 1% SOM should be adopted. These values have been derived in such a way as to adhere to the principles within the revised CLEA

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model and include the most current release of the SGVs. A list of subscribers is provided within the website[4] and these include many local authorities.

A comparison of the results of the testing, together with the data given above, can be found within Appendix 5. These results indicate the following:

Table 4: Summary of Contaminated Areas

Location	Strata	Depth (m)	Contaminants found to be exceeding SSVs (Commercial)
CP4	MADE GROUND	0.6 – 1.2	PAHs (Benzo[a]anthracene, Chrysene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Benzo[a]pyrene, Indeno(1,2,3-c,d)Pyrene, Dibenz(a,h)Anthracene, Benzo[g,h,i]perylene).
CP4	Silty CLAY	2.5	None.
CP6A	MADE GROUND	0.6 – 1.5	PAHs (Benzo[a]anthracene, Chrysene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Benzo[a]pyrene, Indeno(1,2,3-c,d)Pyrene, Dibenz(a,h)Anthracene, Benzo[g,h,i]perylene).
CP6A	Silty CLAY	2.0 – 2.5	PAHs (Benzo[a]anthracene, Chrysene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Indeno(1,2,3-c,d)Pyrene, Dibenz(a,h)Anthracene, Benzo[g,h,i]perylene).
CP7A	MADE GROUND	0.8 – 2.0	PAHs (Benzo[a]anthracene, Chrysene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Indeno(1,2,3-c,d)Pyrene, Dibenz(a,h)Anthracene, Benzo[g,h,i]perylene).
CP7A	Silty CLAY	3.0	None.
CP8	MADE GROUND	0.6	None.
CP8	Silty CLAY	2.5	None.
CP10	MADE GROUND	0.6 – 1.2	PAHs (Benzo[a]anthracene, Chrysene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Indeno(1,2,3-c,d)Pyrene, Dibenz(a,h)Anthracene, Benzo[g,h,i]perylene).
TP1	MADE GROUND	0 – 0.9	PAHs (Benzo[a]anthracene, Chrysene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Indeno(1,2,3-c,d)Pyrene, Dibenz(a,h)Anthracene, Benzo[g,h,i]perylene).
TP2	MADE GROUND	0 – 0.7	None (asbestos test only).
TP3	MADE GROUND	0 – 1.2	Asbestos. PAHs (Benzo[a]anthracene, Chrysene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Indeno(1,2,3-c,d)Pyrene, Dibenz(a,h)Anthracene, Benzo[g,h,i]perylene).
TP4	MADE GROUND	0 – 0.7	PAHs (Benzo[a]anthracene, Chrysene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Indeno(1,2,3-c,d)Pyrene, Dibenz(a,h)Anthracene, Benzo[g,h,i]perylene).
TP5	MADE GROUND	0 – 0.8	PAHs (Chrysene).
TP7	MADE GROUND	0 – 0.7	PAHs (Benzo[a]anthracene, Chrysene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Indeno(1,2,3-c,d)Pyrene, Dibenz(a,h)Anthracene, Benzo[g,h,i]perylene).
TP8	MADE GROUND	1.3 – 1.5	PAHs (Benzo[a]anthracene, Chrysene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Indeno(1,2,3-c,d)Pyrene, Dibenz(a,h)Anthracene, Benzo[g,h,i]perylene).
TP11	MADE GROUND	0.0 – 1.6	PAHs (Benzo[a]anthracene, Chrysene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Indeno(1,2,3-c,d)Pyrene, Dibenz(a,h)Anthracene, Benzo[g,h,i]perylene).
TP12	MADE GROUND	0.0 – 1.1	PAHs (Chrysene, Indeno(1,2,3-c,d)Pyrene, Dibenz(a,h)Anthracene, Benzo[g,h,i]perylene).

[4] http://www.atrisksoil.co.uk/pages/general/subscribers.asp

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Concentrations of chromium(VI), free cyanide, and total petroleum hydrocarbons (aliphatic C5 to C12; aromatic C5 to C12) were below the detection limits for the tests. Detectable levels of all other contaminants were recorded, but these fell below the associated Atrisk Soil Screening Values.

It should be appreciated that the soil screening values for PAHs (where appropriate) represents vapour saturation limits. The inhalation of vapour pathway contributes less than 10% of total exposure, which is unlikely to significantly affect the combined assessment criterion[5]. In view of this, the ATRISK soil SSVs notes that the users may wish to consider using a combined assessment criterion if free product is not observed, the values for which are also provided on the summary of contamination analysis. It is therefore considered that the criteria for no free product should be adopted for the PAHs. The results of the contaminants found to exceed these screening values are tabulated below:

Table 5: Summary of Contaminated Areas (No free product)

Location	Strata	Depth (m)	Contaminants found to be exceeding SSVs (Commercial)
CP4	MADE GROUND	0.6 – 1.2	None.
CP4	Silty CLAY	2.5	None.
CP6A	MADE GROUND	0.6 – 1.5	None.
CP6A	Silty CLAY	2.0 – 2.5	None.
CP7A	MADE GROUND	0.8 – 2.0	None.
CP7A	Silty CLAY	3.0	None.
CP8	MADE GROUND	0.6	None.
CP8	Silty CLAY	2.5	None.
CP10	MADE GROUND	0.6 – 1.2	None.
TP1	MADE GROUND	0 – 0.9	None.
TP3	MADE GROUND	0 – 1.2	Asbestos.
TP4	MADE GROUND	0 – 0.7	None.
TP5	MADE GROUND	0 – 0.8	None.
TP7	MADE GROUND	0 – 0.7	None.
TP8	MADE GROUND	1.3 – 1.5	None.
TP11	MADE GROUND	0.0 – 1.6	None.
TP12	MADE GROUND	0.0 – 1.1	None.

[5] Ref: ATRISK soil, SSVs derived using CLEA v1.071 for 1% SOM, Commercial land use, 23.06.17

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On the basis of the above information, a 'hotspot' of asbestos contamination has been observed within the made ground at the position of TP3. Notwithstanding the above, the results of the areas of the site away from TP3 appear to be generally uncontaminated with respect to the proposed commercial end use for the site. It should be noted however that due to the limited quantities and/or coarse nature of the samples obtained within the CP boreholes, asbestos testing could not be undertaken at all positions and was restricted to select trialpit positions; TP1, TP2, TP3, TP4, TP5, TP7, TP8, TP11, TP12. Nonetheless, good coverage has been attained across the site.

9.1.2 Water Samples

Table 6: Summary of Water Concentration and Associated EQSs

Determinand	Exceeds Appropriate EQSs?	Maximum Concentration (or range) in Water	Most onerous EA EQS limit			
			Drinking Water	Freshwater*	Surface Water*	Surface Water Intended for Abstraction for Drinking Water*
Metals and Semi-Metals						
Antimony	Yes	2.1 µg/l	-	-	-	-
Arsenic	No	22 µg/l	10 µg/l	-	50 µg/l	50 µg/l
Boron	No	990 µg/l	500 µg/l	-	1000 µg/l	1000 µg/l
Cadmium	Yes	3.4 µg/l	5 µg/l	0.08 µg/l	0.08 µg/l	5 µg/l
Copper	Yes	48 µg/l	2000 µg/l	5 µg/l	20 µg/l	20 µg/l
Nickel	No	32 µg/l	20 µg/l	-	50 µg/l	-
Lead	No	2.6 µg/l	10 µg/l	-	4 µg/l	50µg/l
Selenium	Yes	56 µg/l	10 µg/l	-	-	10 µg/l
Vanadium	Yes	56 µg/l	-	-	20 µg/l	-
Zinc	Yes	230 µg/l	-	30 µg/l	30 µg/l	3000 µg/l

*Dependant on water hardness and fish species present, most onerous value shown.

In the context of the water testing, it should be appreciated that the following determinants were below detection limits;

- Some metals (Beryllium, Chromium, Cyanide and Mercury).
- Some non-metals (Sulphide).
- Thiocyanate.
- All PAHs.
- All TPHs.
- Total Phenols.

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With regards to those contaminants above detection limit, it should be appreciated that the Environment Agency have provided limits for Environmental Quality Standards[6] (EQS) which should be met in respect to a variety of media.

The results of the water testing site should be compared to the most appropriate EQS values. Given the nature of the site, EQS for *freshwater* and/or *surface water* media types are considered the most appropriate. Where no EQS values are available for the aforementioned parameters, then EQSs for *UK Drinking Water Standards* and/or *Surface Water Intended for Abstraction for Drinking Water* should be utilised. Where no current EQS exists, results should be compared to existing background quality or taken as the limit of detection.

In light of the above, elevated levels of Antimony, Cadmium, Copper, Selenium, Vanadium and Zinc appear to be present within the groundwater at the site, although there was some notable variation in concentration between positions.

Notwithstanding the above, given that elevated levels of these heavy metal contaminants were not noted within the soils on site it is considered unlikely that the original source of this contamination remains present on site, and thus this contamination is likely to represent a diminishing source. Furthermore, in light of the industrial nature of the surrounding area, it is possible that this contamination may have originated off-site.

In addition to the above, given the significant thicknesses of low permeability cohesive materials underlying the made ground at the site, it is considered unlikely that this water contamination would represent a significant risk to the underlying chalk aquifer within the solid geology.

9.1.3 Gas Concentrations

With respect to ground gas, the results of the monitoring visits indicated a maximum concentration of 1.8% methane, with concentrations of carbon dioxide ranging between 0.1% and 6.8%, in association with oxygen levels of between 2.4% and 20.8%. It should be appreciated that on non contaminated sites there is generally about 20% by volume of oxygen, associated with low levels of carbon dioxide. In addition, a maximum flow rate of 0.4 litres per hour was recorded and will be employed in the following calculations.

The principal driving force for initiating the movement of gas in the ground is a change in barometric pressure. The most onerous gas condition on a site is usually observed on days of low and/or falling barometric pressure, preferably below 1000mb. It has been noted that measurements undertaken solely during high pressure conditions may be of lesser value. At this site the readings undertaken to date were at atmospheric pressures of between 1011mb and 1021mb.

In order to establish the gas screening value (GSV) for carbon dioxide or methane, the maximum gas concentration (expressed as a decimal) is multiplied by the borehole flow rate (l/hr). In this case 1.8% (0.018) methane was recorded along with 6.8% (0.068) carbon dioxide, in association with a maximum flow rate of 0.4 l/hr. This results in a GSV of 0.0072 l/hr for methane and a GSV of 0.0272 l/hr for carbon dioxide.

[6] Environment Agency Chemical Standards Database [*online resource http://evidence.environment-agency.gov.uk/ChemicalStandards/Home.aspx]*

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In accordance with Table 8.5, Modified Wilson and Card classification of the CIRIA report C665, Assessing risks posed by ground gasses to building, the site may be classified as *Characteristic Situation Level 1*. However, as levels of methane exceed 1% and levels of carbon dioxide exceeded 5%, the site should be upgraded to *Characteristic Situation Level 2*. Therefore, it is considered that there is some risk of harm (albeit low) to end users and some protection measures are required.

With regard to the number of monitoring visits required reference is made to Tables 5.5a and 5.5b of CIRIA report C665 (2007)[7]. Accepting that the proposed development is of low sensitivity and that the generation potential is very low, these tables suggest that 4 readings could be undertaken over a period of 1 month. However, C665 notes that *not all sites will require gas monitoring for the period and frequency indicated in Tables 5.5a and 5.5b.*

In this case, a total of 4 monitoring visits were undertaken over a 4 week time period and for the purposes of this assessment, it is considered that the site can be classified as *Characteristic Situation Level 2*.

9.1.4 Effect of Sulphates

In view of the nature of the underlying soils it is considered that the design sulphate class be assessed with reference to Table C2[8], which is provided in BRE Special Digest 1, *Concrete in aggressive ground*: Part C. On the basis of this table and considering the soluble sulphate contents recorded, it can be shown that well compacted buried concrete should be designed in accordance with Class DS-2 requirements. Assuming mobile groundwater, the table also indicates that the aggressive chemical environment for concrete (ACEC) classification is AC-2.

In order to evaluate the design chemical (DC) class for the buried concrete at this site reference should be made to Table D1[9], which can be found in Part D, *Specifying concrete for general cast-in-situ use,* of BRE Special Digest 1. From this table it may be shown that for an intended working life of at least 50 years the concrete design class DC-2 is required.

9.2 Site Specific Risk Assessment

9.2.1 Approach

The presence of contamination hazards and the risks associated with them should be assessed in accordance with industry practice and the 'suitable for use' approach. This has been conducted with reference to The Department for Environment, Food and Rural Affairs (DEFRA) and The Environment Agency[10] advice on the assessment of risks arising from the presence of contamination in soils and using the source-pathway-receptor approach.[11] This method dictates that there must be a risk of contaminant produced at a 'source' in sufficient concentration to cause

[7] Adapted from tables 5.5a and 5.5b of CIRIA C665, 2007, *Assessing risks posed by hazardous ground gas to buildings, p60.*
[8] Table C2, *Aggressive Chemical Environment for Concrete (ACEC) classification for brownfield locations*
[9] Table D1, *Selection of the DC Class and the number of APMs for concrete elements where the hydraulic gradient due to groundwater is 5 or less: for general in-situ use of concrete.*
[10] R&D Publication CLR 8, 'Assessment of Risks to Human Health from Land Contamination: An overview of the Development of Soil Guideline Values and Related Research'.
[11] The pollution linkage approach was developed by 'Circular 2/2000 Contaminated Land: Implementation of Part II of The Environmental Protection Act 1990' which provides meanings for the terms contained in The Environmental Protection Act 1990 Part IIA, the primary legislation for addressing the issues of contaminated land.

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harm and there must be a 'pathway' for the contaminant to reach an identifiable 'receptor' for the linkage to be proved and a contamination hazard to be considered present. Not all substances are contaminants and not all contaminants are considered to be a risk. Indeed DEFRA and The Environment Agency state that 'a contaminant is a substance which has the potential to cause harm, while a risk itself is considered to exist if such a substance is present in sufficient concentration to cause harm and a pathway exists for a receptor to be exposed to the substance.'[12]

9.2.2 Conceptual Ground Model and Risk Assessment

In view of the results of the chemical testing undertaken the conceptual site model is presented accordingly as Table 5. Sources of contamination include the following:

On-site – Made Ground (Asbestos). Bulk Ground Gasses (CO_2 and CH_4). Heavy metal contamination within groundwater.

The preliminary risk assessment has been evaluated with reference to the following ratings and definitions:

N/A -	A source-pathway-receptor linkage is not considered to exist and therefore a risk assessment is not required.
Low -	A pollution linkage is unlikely and/or the likelihood of harm occurring is low and of minor consequence.
Moderate -	The linkage exists but the likelihood of harm occurring is not considered to be significant although remedial action may be necessary
High -	The linkage exists and the available data indicates that significant harm may be caused and remedial action could be necessary.

The results of the risk assessment are presented in Table 7.

[12] See 'Circular 2/2000 Contaminated Land: Implementation of Part II of The Environmental Protection Act 1990', appendix A.

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Table 7: Conceptual Site Model and Site Specific Risk Assessment

Conceptual Site Model			Site Specific Risk Assessment	
Pathways	**Receptor**	**Linkage Present?**	**Risk Rating**	**Notes**
Direct contact/dermal absorption/soil ingestion	Operative	Yes – a hotspot of asbestos found to be present at the site and contact with soil likely during works.	High	A hotspot of asbestos contamination by lead and asbestos is present within the made ground underlying the site. Precautionary measures will be required during the construction phase. Remediation will be required to either remove the contamination or break pathways.
	End User	Yes – a hotspot of asbestos found to be present at the site and site to be developed into a commercial facility.	High	
	Neighbours	No – no residential (or garden) areas adjoin the site.	N/A	
Inhalation of Dust/Vapours	Operative	Yes – dust may be derived from contaminated soils. However, asbestos contamination is not considered likely to represent a significant vapour risk.	High (Dust) Low (Vapours)	A hotspot of asbestos contamination is present within the made ground underlying the site. Precautionary measures will be required during the construction phase. Remediation will be required to either remove the contamination or break pathways.
	End User	Yes – dust may be derived from contaminated soils. However, asbestos contamination is not considered likely to represent a significant vapour risk.	High (Dust) Low (Vapours)	
	Neighbours	Yes – a hotspot of asbestos found to be present at the site and commercial properties located within 250m radius of the site. Possible inhalation of dust during the works.	High (Dust) Low (Vapours)	
Ingestion of fruit/vegetables and/or waters	Operative	No – no edible plants or contained water sources in the area of the proposed new works.	N/A	
	End User	No – no garden areas are proposed as part of the current development plans.	N/A	
	Neighbours	No – no residential (or garden) areas adjoin the site. Furthermore, asbestos contamination is not expected to affect plants.	N/A	

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Migration of hazardous gases via permeable strata or shallow mining activity	Operative	Yes – concentrations of methane and carbon dioxide have been found to be present at the site (considering Characteristic Situation Level 2).	High	Concentrations of harmful gases (methane and carbon dioxide) were detected at the site, some remediation will be required.
	End User		High	
	Neighbours		High	
Spillage/loss/run off direct to receiving water	Controlled Waters	Yes – known controlled waters within 250m. However, given the significant thicknesses of low permeability cohesive materials underlying the site it is considered unlikely the heavy metal contamination observed within the shallow groundwater would represent a significant risk to controlled waters. Furthermore, it is considered that the heavy metal contamination represents a diminishing source.	Low	
Migration via permeable unsaturated strata	Controlled Waters	Yes – a Principal aquifer is present within the solid geology beneath the site. However, given the significant thicknesses of low permeability cohesive materials underlying the site it is considered unlikely the heavy metal contamination observed within the shallow groundwater would represent a significant risk to the underlying aquifer.	Low	
Run off via drainage/sewers etc	Controlled Waters	Yes – redundant services may be present on site. However, it is considered that heavy metal contamination represents a diminishing source.	Moderate	Redundant services to be removed or capped.
Direct contact with contaminated soils	Plants	Yes – some areas of soft landscaping may be present as part of site development plans. However, asbestos contamination is not expected to affect plants.	Low	
Uptake via root system			Low	
Direct contact with contaminated soils	Building Materials	Yes – asbestos and heavy metal contamination is not anticipated to represent a risk to building materials or plastic water pipes. Testing indicates that the aggressive chemical environment for concrete classification is AC-2.	Low (plastic services) Moderate (buried concrete)	Please see section 9.3.3 for information on good building practice.
Direct contact with contaminated groundwater				
Exposure to Radon	Operative	No – not in a radon affected area.	N/A	The publication BR211 states that no protection measures are necessary.
	End User			

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9.3 Indicative Remediation Strategy

In view of the site specific risk assessment it is considered that remediation will be required at this site. Such a strategy should include the following main elements.

9.3.1 Remediation Objectives

Based on the site specific risk assessment the object of the remediation is likely to be as follows.

- To protect the site operatives during the construction process from the ingestion of soil or dust, dermal contact with the soil and inhalation of dust.
- To protect the end user from the ingestion of soil or dust, dermal contact with the soil and inhalation of dust.
- To protect the end user from the elevated levels of bulk ground gasses (methane and carbon dioxide).
- To protect neighbours from the inhalation and ingestion of dust during the construction process.
- To protect end users from elevated levels of carbon dioxide.

9.3.2 Development Requirements

Whilst the precise nature of this development has not been finalised, it is understood that it is to be developed by the construction of a new commercial facility with buildings, bunkers and a sub-station. In view of the above a site specific remediation strategy should be undertaken after the proposed development has been finalised. However, for preliminary design and costing the following remediation proposals are offered.

9.3.3 Outline Strategy

In order to fulfil the objectives defined above it is likely that the following remedial strategy could be utilised. It is recommended that a pragmatic approach be undertaken, with observational techniques being employed at each stage of the work.

Ground-works

During the ground-works phase of the development, protection to the site operatives is required. The risk to site operatives is considered under the Health and Safety at Work Act 1974, together with regulations made under the act, which includes the Control of Substances Hazardous to Health (COSHH) regulations. Therefore the risks to site personnel must be considered under the Construction Design and Management (CDM) regulations at the planning stage and be included in

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the contractor's Health and Safety Plan and site specific Method Statements. These documents should include the following main elements.

- Site operatives at all levels should be made aware of the hazards of working with contaminated soils and the potential hazards associated with materials containing asbestos.
- Site operatives at all levels should be made aware of the hazards of working in an area where accumulations of bulk ground gasses (methane or carbon dioxide) could occur.
- Access to the site by the general public should be restricted until remediation has taken place.
- Personal hygiene facilities, including washing and messing, must be provided and site operatives be encouraged to use them.
- Where work is undertaken in dry weather the site should be dampened down to avoid dust.
- Dust masks must be provided to all site operatives for at all times.
- In order for contaminated soils to be disposed of to an appropriate landfill, it may be necessary to carry out Waste Acceptance Criteria (WAC) testing in accordance with BS EN 12457.
- Any stockpiles of contaminated soil on site should be sheeted over to prevent excessive amounts of airborne dust and cross contamination of imported fill.
- Where vehicles are transferring soil to the landfill site they should be covered to prevent contamination of the surrounding area by dust.
- Where work is undertaken in wet weather, vehicle and wheel washing facilities are required to ensure that the vehicles leaving the site do not transfer contamination to surrounding areas.

On completion of the ground-works a careful site inspection of the sub-grade would be required. Should visual or olfactory evidence of contamination be revealed then further testing may become necessary.

Construction

During the construction phase of the contract the following items are required to protect the end user from the potential contaminants revealed at this site.

- Beneath buildings, pavements and hard-standings clean inert granular sub-base should be employed.
- Any redundant services revealed at this site should be de-commissioned and piped services sealed. Any existing services that are to be employed in the new development should be carefully inspected to ensure that they are serviceable.
- New plastic services should be constructed in a surround of clean inert material and selected in accordance with the recommendation given in the United Kingdom Water Industry Research (UKWIR) website under Report Ref. No. 10/WM/03/21 - 'Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites'. The statutory water authority for the area in which site is located may have a risk assessment form to complete which allows these recommendations to be met. However, further determinand specification contamination testing may be necessary.
- For buried concrete the results of the sulphate and pH testing indicate that the design sulphate class for the site should be DS-1.

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Asbestos Hotspot Area

Should the area around TP3 be overlain by permanent hard-standing, this would break the pathway between the end user and the asbestos contamination. Therefore, no further remediation is considered to be necessary beneath any permanent hard-standing, which includes building footprints.

However, any part of the hotspot area is to comprise soft landscaping would require some remediation. Remediation for soft landscaped areas could include the provision of a clean cover system. For grassed areas this system would need to employ a capping layer of say 350mm of inert material, which will put the contaminated ground out of the end users' dig range. At the base of this layer, a granular capillary break of say 100mm of free draining granular soil should be placed in order to provide a no dig layer and prevent mobile contamination rising upward. This expedient should also provide a suitable root barrier to isolate the plants from the underlying contaminated ground.

Where grass and shrubs are present, this capping layer would need to be deepened to say 500mm of inert material, at the base of this layer, a granular capillary break of say 100mm of free draining granular soil should be placed.

Notwithstanding the above, prior to undertaking these remediation measures it is recommended that further testing is undertaken to determine the exact extent of the asbestos hotspot surrounding TP3. It would also be prudent to undertake additional testing in the wider site area.

Gas Protection Measures

In order to assess the protection measures required BS8485: 2015+A1:2019: *Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings* will need to be employed in design. In accordance with Table 3, *Building types,* of the code, the development may be considered to conform to Type D. Therefore, on the basis of Table 4 *Gas protection score by CS and type of building,* the minimum gas protection score (points) is 1.5. The gas protection system should consist of at least two different elements. The elements work independently and collaboratively, and a single element should not be used because there would be no redundancy to allow for defects in the component.

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9.4 Fill Materials

It should also be appreciated that any fill material, either site-won or imported, to be employed at the site should be subjected to the following assessment to determine its suitability.

Fill materials should be initially screened, by a suitably qualified engineer to establish that:

- It is a suitable growing media if it is to be employed as such, including compliance with BS3882 (2015)
- It is free from obvious contamination i.e. visual or olfactory evidence
- It has not come from areas where Japanese Knotweed or other invasive or injurious plants are suspected to be growing
- It is not a statutory nuisance, such as being odorous
- It is free from unsuitable material i.e. whole bricks, brick ties, timber or glass.

It should also be appreciated that any fill should be subjected to validation testing to assess its suitability. The following table has been taken from YALPAG[13] documentation and may be used as a guide. Depending on the origin and nature of the material, not all fill will require the sampling frequency and testing indicated, although this should be in agreement with any regulatory bodies (such as the Local Authority).

Table 8: Validation Sampling and Testing

Fill Type	Frequency	Minimum Determinands
Virgin Quarried Material	1 or 2 depending on the type of stone (to confirm the inert nature of the material)	Standard metals/metalloids (As, Cd, Cr, Cr(VI), Cu, Hg, Ni, Pb, Se, Zn)
Crushed Hardcore, Stone, Brick	Minimum 1 per 1000m³	Standard metals/metalloids as above plus PAH (16 USEPA) and Asbestos
Greenfield/ Manufactured Soils	The greater of a minimum of 3 or 1 per 250m³	Standard metals/metalloids as above plus PAH (16 USEPA) and Asbestos
Brownfield/ Screened Soils	The greater of a minimum of 6 or 1 per 100m³	Standard metals/metalloids as above plus PAH (16 USEPA), TPH (CWG banded) and Asbestos Any additional analysis dependant on the history of the donor site.

The screening values for the above regime should also be agreed with any regulatory bodies; however, the following is recommended in the first instance.

[13] *YALPAG Technical Guidance for Developers, Landowners and Consultants – Verification Requirements for Cover Systems V3.3* Appendix 1a, October 2016.

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Table 9: Fill Screening Values			
Contaminant	Screening Value (Commercial) (mg/kg)		Reference
	1% SOM	6% SOM	
As	635	635	Atrisk^{SOIL} SSVs
Cd	410	410	Atrisk^{SOIL} SSVs
Cr(VI)	19.7	19.7	Atrisk^{SOIL} SSVs
Cu	106000	106000	Atrisk^{SOIL} SSVs
Hg	350	405	Atrisk^{SOIL} SSVs
Ni	1770	1770	Atrisk^{SOIL} SSVs
Pb	2310	2310	Atrisk^{SOIL} SSVs
V	7490	7490	Atrisk^{SOIL} SSVs
Zn	1100000	1100000	Atrisk^{SOIL} SSVs
TPH CWG	See attached summary sheet		Atrisk^{SOIL} SSVs
PAH 16 USEPA	See attached summary sheet		Atrisk^{SOIL} SSVs

Please see summary sheet within Appendix 6 for full screening values including PAHs & TPHs.

The above screening values should be considered with respect to the Soil Organic Matter (SOM) of the subject material i.e. 1% SOM would be typical for granular fill and 6% SOM for topsoil. Testing should comply with UKAS and MCERTS, where applicable, and undertaken by an accredited laboratory.

Where the material has been derived from a commercial company, certificates or other industry quality protocol compliance i.e. WRAP should be obtained. However, it will be necessary to ensure that this documentation specifically related to the material being imported, it is no more than two months old and complies with the screening and frequency requirements given above.

Suitable fill materials should be either placed immediately or sufficiently quarantined to prevent cross-contamination. If it is necessary, the quarantined material should be placed on appropriate sheeting and covered to prevent it becoming mixed with contaminated soils or dust, or penetrated by mobile contaminants.

9.5 Verification Report

In order to demonstrate that the remedial works and provision of clean cover has been sufficiently carried out where applicable, it will be necessary to produce a verification report for submission to any statutory authorities.

It will be necessary for this report to include the following:

Remediation of Asbestos Hotspot and Imported Fill Materials

- Further assessment of the extents and quantification of the asbestos hotpot around TP3.
- Photographic evidence of the installation of hardstanding over the hotspot area.

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- Characterisation of the suitability of the clean material including the derivation of the material, comments from a visual screen, the tests results of chemical screening, delivery tickets where appropriate and the conditions by which the clean material has been stored and handled on site.
- Photographic and logged evidence the clean material has been handled on site and placed in a sufficient thickness over areas where made ground remains. This may be either at the time of placement or after placement by means of hand excavated trialpits. Photographs should include visual site references or reference boards to prove the location and date taken. A measurement reference should be visible in the photographs to substantiate the thickness of material placed. Please note that it may also be necessary to undertake a topographical survey and the requirement for which should be checked with any statutory authorities.

Ground Gas Protection System

- Details of the verification process including the dates of inspections and findings.
- Signed statements to confirm that protection measures were constructed as agreed. These statements shall also include confirmation that:
  - Membranes were free from tears and punctures and installed in accordance within manufacturer guidelines.
  - Underfloor voids were clear and free from debris.
- Clear photographic evidence of the construction of membranes and/or underfloor voids, which should include key details such as air vents, membrane penetrations etc.
- Details of non-conformances and how they were rectified.
- A declaration that remedial objectives set out in the conceptual site model have been achieved.
- The qualifications or relevant experience/training of the persons carrying out the installation.
- The independence of the person carrying out the verification, along with evidence of their qualifications or relevant experience/training.

10. Recommendations for Further Work

- This report should be forwarded to the relevant authorities as soon as practicable to ensure they have sufficient time to review and discuss any issues.
- Completion of the recommended additional asbestos testing.
- Production of a remediation statement.
- Discussions with ground work contractors in relation to the requirement for testing of materials to be disposed off-site (Waste Acceptance Criteria) and the suitability of imported materials.
- Produce a validation report to demonstrate that the environmental risks discussed in this report have been mitigated.

Clearly Rogers Geotechnical Services Ltd would be happy to offer advice with respect to the above and assist where necessary.

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11. References

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Appendix 1

Site Plan

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Project Id:	C700/20/E/1077	Title:	Site Plan
Project Title:	Immingham EFW Netherlands	Scale:	1:1500
Location:	Way, Immingham	Engineer:	RAP
Client:	TEGCO LTD	Contractor:	

Legend Key

- Locations By Type - Empty
- Locations By Type - TP
- Locations By Type - WLS
- Locations By Type - CP

Environmental Geotechnical Specialists

Appendix 2

Borehole Records

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Borehole Log

Borehole No. **CP01**

Sheet 1 of 2

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords:	520781.98E - 414396.86N	Hole Type CP
Location:	Netherlands Way, Immingham		Level:	3.08m aOD	Scale 1:50
Client:	TEGCO LTD		Dates:	12/05/2020 - 13/05/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D					MADE GROUND (Brown sandy GRAVEL of brick, concrete and rail ballast. Medium to high cobble content).
		0.40	D					
		0.60	D					
		0.60 - 1.20	B					
					1.10	1.98		
		1.20 - 1.65	D					MADE GROUND (Soft dark grey CLAY with occasional brick and stone).
		1.20 - 1.70	B					
		1.20	SPT	N=8 (3,5/2,2,2,2)				
					1.90	1.18		
		2.00	D					Very soft brown silty CLAY.
		2.00 - 2.45	UT	Ublow=33				
		2.50	D					
					2.80	0.28		
		3.00 - 3.45	D					Very soft dark brown mottled grey silty CLAY with occasional organic inclusions/horizons.
		3.00 - 3.50	B					
		3.00	SPT	2 (1,/1,,,1)				
		3.50	D					
		4.00 - 4.45	UT	Ublow=27				
					4.30	-1.22		
		4.50	D					Very soft dark grey silty CLAY. Locally slightly sandy - fine sand.
		5.00 - 5.45	D					
		5.00 - 5.50	B					
		5.00	SPT	2 (1,/1,,1,)				
		5.50	D					
		6.00 - 6.45	UT	Ublow=20				
		7.00	D					
		7.50 - 7.95	D					
		7.50 - 8.00	B					
		7.50	SPT	2 (1,/1,,,1)				
		8.50	D					
		9.00	D		9.00	-5.92		
		9.00 - 9.50	B					Loose light brown clayey silty slightly gravelly predominantly fine but also medium and coarse SAND. Gravel is sub-rounded fine of chalk.
		9.00	SPT	4 (1,1/1,,1,2)				
					9.80	-6.72		Soft brown slightly gravelly silty CLAY. Gravel
		10.00	D					

Continued on Next Sheet

Remarks

General; Spt @9.5m no recovery. General; Chalk gravel blowed up to 16.9m. General; 1m bento plug bottom of hole.

Borehole Log

Borehole No. **CP01** Sheet 2 of 2

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520781.98E - 414396.86N	Hole Type CP
Location:	Netherlands Way, Immingham		Level: 3.08m aOD	Scale 1:50
Client:	TEGCO LTD		Dates: 12/05/2020 - 13/05/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								is sub-angular and sub-rounded predominantly fine and medium of chalk and flint.
		10.50 - 10.95	UF	Ublow=100				
		10.50 - 11.00	B					
		11.00 - 11.45	D					
		11.00	SPT	N=8 (2,2/2,2,1,3)				
		11.50	D					
		12.00 - 12.45	U	Ublow=100				
					12.40	-9.32		
		12.50 - 13.00	B					Loose brown clayey silty very sandy sub-angular and angular fine to coarse GRAVEL of flint and quartz. Sand is fine to coarse.
		13.00	D					
		13.50 - 13.95	D		13.50	-10.42		
		13.50 - 14.00	B					Soft to firm becoming firm brown slightly gravelly silty CLAY. Gravel is sub-angular and sub-rounded predominantly fine and medium of chalk and flint.
		13.50	SPT	N=14 (2,2/2,2,4,6)				
		14.50	D					
		15.00 - 15.45	U	Ublow=100				
		16.00	D					
		16.50 - 16.95	D					
		16.50 - 17.00	B					
		16.50	SPT	N=22 (3,4/4,4,6,8)				
		17.50	D					
		18.00 - 18.45	U	Ublow=100				
		19.00	D					
					19.30	-16.22		
					19.30	-16.22		Weathered CHALK recovered as brown very gravelly fine to coarse SAND. Gravel is sub-angular and angular fine to coarse of chalk and flint.
								End of Borehole at 19.300m

Remarks

General; Spt @9.5m no recovery. General; Chalk gravel blowed up to 16.9m. General; 1m bento plug bottom of hole.

Borehole Log

Borehole No. **CP02**

Sheet 1 of 4

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520787.98E - 414438.57N	Hole Type CP
Location: Netherlands Way, Immingham		Level: 3.25m aOD	Scale 1:50
Client: TEGCO LTD		Dates: 13/05/2020 - 15/05/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D					MADE GROUND (Brown sandy GRAVEL of brick, concrete ash and rail ballast. Medium to high cobble content).
		0.40	D					
		0.60	D					
		0.60 - 1.20	B					
		1.20	D					
		1.20 - 1.70	B		1.40	1.85		
		1.20	SPT	N=12 (5,6/5,3,3,1)				Soft to firm dark brown mottled grey silty CLAY. Occasionally organic.
		1.80	D					
		2.00 - 2.45	UT	Ublow=25				
		2.50	D					
					2.80	0.45		
		3.00 - 3.45	D					Very soft dark grey silty CLAY. Occasionally organic.
		3.00 - 3.50	B					
		3.00	SPT	2 (1,/1,,,1)				
		3.50	D					
		4.00 - 4.45	UT	Ublow=22				
		4.50	D					
		5.00 - 5.45	D					
		5.00 - 5.50	B					
		5.00	SPT	1 (1,/1,,,)				
		5.50	D					
		6.00 - 6.45	UT	Ublow=18				
		6.50	D					
		7.00 - 7.45	D					
		7.00 - 7.50	B					
		7.00	SPT	2 (1,1/1,,,1)				
		7.50	D					
		7.80	D		7.80	-4.55		
		8.00 - 8.45	UT	Ublow=48				Soft brown slightly sandy silty CLAY.
		8.50	D					
					8.90	-5.65		
		9.00 - 9.45	D					Loose brown SAND.
		9.00 - 9.50	B		9.20	-5.95		
		9.00	SPT	N=11 (1,2/2,2,3,4)				Soft becoming firm brown slightly gravelly silty CLAY. Gravel is sub-angular and sub-rounded predominantly fine and medium of chalk and flint.
		10.00	D					

Continued on Next Sheet

Remarks

General; 30min getting 8inch lead through madeground. General; chalk gravel blew upto 16m. General; bento seal 16m to 15m 30min

Borehole Log

Borehole No. **CP02**

Sheet 2 of 4

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords:	520787.98E - 414438.57N	Hole Type CP
Location:	Netherlands Way, Immingham		Level:	3.25m aOD	Scale 1:50
Client:	TEGCO LTD		Dates:	13/05/2020 - 15/05/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		10.50 - 10.95	U	Ublow=100				
		11.50	D					
		12.00 - 12.45	D					
		12.00 - 12.50	B					
		12.00	SPT	N=15 (2,2/2,3,4,6)				
	▽	13.00	D					*13m : 100mm gravel lens.*
		13.50 - 13.95	D					
		13.50 - 14.00	B					
		13.50	SPT	N=16 (2,2/3,4,4,5)				
		14.50	D					
		15.00 - 15.45	U	Ublow=100				
		16.00	D					
		16.50 - 16.95	D					
		16.50 - 17.00	B					
		16.50	SPT	N=19 (2,2/3,4,6,6)				
	▼ ▽	17.50	D					
		18.00 - 18.45	UF	Ublow=100				
		18.00 - 18.50	B					
		18.50 - 18.95	D					
		18.50	SPT	N=16 (2,2/2,4,4,6)				
	▽	19.00	D					
		19.50	D		19.20	-15.95		Weathered CHALK recovered as brown very gravelly fine to coarse SAND. Gravel is sub-angular and angular fine to coarse of chalk and flint. (Driller noted blowing)
		19.50 - 20.00	B					
		19.50	SPT	N=14 (2,2/2,4,4,4)				

Continued on Next Sheet

Remarks

General; 30min getting 8inch lead through madeground. General; chalk gravel blew upto 16m. General; bento seal 16m to 15m 30min

Borehole Log

Borehole No. **CP02**

Sheet 3 of 4

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520787.98E - 414438.57N	Hole Type CP
Location: Netherlands Way, Immingham		Level: 3.25m aOD	Scale 1:50
Client: TEGCO LTD		Dates: 13/05/2020 - 15/05/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		20.50	D						
		21.00	D						21
		21.00 - 21.50	B						
		21.00	SPT	N=14 (2,3/3,3,3,5)					
		22.00	D						22
		22.50	D						
		22.50 - 23.00	B						
		22.50	SPT	N=17 (2,3/4,4,5,4)					23
		23.50	D		23.40	-20.15		Structureless CHALK composed of soft creamish brown, sandy slightly gravelly CLAY/ SILT. Gravel is very weak, sub-angular to sub-rounded, fine to medium of chalk. [FLAMBOROUGH CHALK FORMATION, Grade Dm].	
		24.00	D						
		24.00 - 24.50	B						24
		24.00	SPT	N=16 (3,3/3,4,4,5)					
		25.00	D						25
		25.50 - 25.95	D						
		25.50 - 26.00	B						
		25.50	SPT	N=21 (3,4/3,5,5,8)					26
		26.50	D						
		27.00 - 27.45	D						27
		27.00 - 27.50	B						
		27.00	SPT	N=25 (3,4/5,5,7,8)					
		28.00	D						28
		28.50 - 28.95	D						
		28.50 - 29.00	B						
		28.50	SPT	N=23 (3,3/4,6,5,8)					29
		29.50	D						
		30.00 - 30.45	D						30

Continued on Next Sheet

Remarks

General; 30min getting 8inch lead through madeground. General; chalk gravel blew upto 16m. General; bento seal 16m to 15m 30min

Borehole Log

Borehole No. **CP02**

Sheet 4 of 4

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords:	520787.98E - 414438.57N	Hole Type CP
Location:	Netherlands Way, Immingham		Level:	3.25m aOD	Scale 1:50
Client:	TEGCO LTD		Dates:	13/05/2020 - 15/05/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		30.00	SPT	N=23 (3,4/5,3,7,8)	30.45	-27.20		End of Borehole at 30.450m

31 32 33 34 35 36 37 38 39 40

Remarks

General; 30min getting 8inch lead through madeground. General; chalk gravel blew upto 16m. General; bento seal 16m to 15m 30min

Borehole Log

Borehole No. **CP03**

Sheet 1 of 2

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520783.83E - 414486.68N	Hole Type CP
Location: Netherlands Way, Immingham		Level: 3.12m aOD	Scale 1:50
Client: TEGCO LTD		Dates: 18/05/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D					MADE GROUND (Brown sandy GRAVEL of brick, concrete ash and rail ballast. Medium to high cobble content).
		0.40	D					
		0.60	D					
		0.60 - 1.20	B					
		1.20 - 1.65	D					
		1.20 - 1.70	B		1.40	1.72		
		1.20	SPT	N=10 (1,2/3,2,2,3)				MADE GROUND (Soft grey clay (Re-worked)).
		1.80	D		1.70	1.42		Soft brown silty CLAY.
		2.00 - 2.45	UT	Ublow=22				
		2.50	D					
		3.00 - 3.45	D		2.80	0.32		Very soft brown silty CLAY. Occasional organic horizons.
		3.00 - 3.50	B					
		3.00	SPT	1 (1,/1,,,)				
		3.50	D					
		4.00 - 4.45	UT	Ublow=18				
		4.50	D					
		5.00 - 5.45	D					
		5.00 - 5.50	B					
		5.00	SPT	2 (1,/1,,,1)				
		5.50	D					
		6.00 - 6.45	UT	Ublow=28				
		7.00	D					
		7.50 - 7.95	D					
		7.50 - 8.00	B		7.70	-4.58		
		7.50	SPT	N=8 (1,/1,2,2,3)				Soft brown slightly gravelly silty CLAY. Gravel is sub-angular and sub-rounded predominantly fine and medium of chalk and flint.
		8.50	D					
		9.00 - 9.45	UT	Ublow=100				
		9.50	D					
		10.00 - 10.45	D					

Continued on Next Sheet

Remarks

Borehole Log

Borehole No. **CP03**

Sheet 2 of 2

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords:	520783.83E - 414486.68N	Hole Type CP
Location:	Netherlands Way, Immingham		Level:	3.12m aOD	Scale 1:50
Client:	TEGCO LTD		Dates:	18/05/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		10.00	SPT	N=13 (1,2/2,3,3,5)	10.45	-7.33		End of Borehole at 10.450m

Remarks

Borehole Log

Borehole No. **CP04**

Sheet 1 of 4

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords:	520681.18E - 414427.80N	Hole Type CP
Location:	Netherlands Way, Immingham		Level:	8.29m aOD	Scale 1:50
Client:	TEGCO LTD		Dates:	29/05/2020 - 02/06/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D					MADE GROUND (Brown sandy GRAVEL of brick, concrete ash and rail ballast. Medium to high cobble content).
		0.40	D					
		0.60	D					
		0.60 - 1.20	B					
		1.20 - 1.65	D					
		1.20 - 1.70	B					
		1.20	SPT	4 (1,1/1,,2,1)	1.50	6.79		
		1.80	D					Soft dark brown mottled grey silty clay.
		2.00 - 2.45	UT	Ublow=30				
		2.50	D					
		3.00 - 3.45	D		2.90	5.39		
		3.00 - 3.50	B					Very soft brown mottled grey slightly organic silty CLAY.
		3.00	SPT	2 (1,/1,,,1)				
		3.50	D					
		4.00 - 4.45	UT	Ublow=19				
		4.50	D					
		5.00 - 5.45	D					
		5.00 - 5.50	B					
		5.00	SPT	1 (1,/,1,,)				
		5.50	D					
		6.00 - 6.45	UT	Ublow=35				
		6.50 - 7.00	B		6.50	1.79		
		7.00	D					Soft brown very organic silty CLAY with frequent pseudo-fibrous PEAT horizons and rare shell fragments.
		7.50 - 7.95	D		7.30	0.99		
		7.50 - 8.00	B					Soft to firm becoming firm brown slightly gravelly silty CLAY. Gravel is sub-angular and sub-rounded predominantly fine and medium of chalk and flint.
		7.50	SPT	N=6 (1,1/1,2,2,1)				
		8.50	D					
		9.00 - 9.45	U	Ublow=100				
		10.00	D					

Continued on Next Sheet

Remarks

General; 30min getting 8inch lead through compacted madeground. General; Chalk gravel blew up to 17.5m. General; 30min bento seal from 17.5m to 16.5m. General; 09.15 to 09.45 pulling casing. General; 10am to 10.25am pulling casing. Vibrating wire piezometer installed.

Borehole Log

Borehole No. **CP04**

Sheet 2 of 4

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords:	520681.18E - 414427.80N	Hole Type CP
Location:	Netherlands Way, Immingham		Level:	8.29m aOD	Scale 1:50
Client:	TEGCO LTD		Dates:	29/05/2020 - 02/06/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		10.50 - 10.95	D					
		10.50 - 11.00	B					
		10.50	SPT	N=15 (2,2/3,4,4,4)				
		11.50	D					
		12.00 - 12.45	U	Ublow=100				
		13.00	D					
		13.50 - 13.95	D					
		13.50 - 14.00	B					
		13.50	SPT	N=9 (1,1/2,1,3,3)				
		14.50	D					
		15.00 - 15.45	U	Ublow=100				
		16.00	D					
		16.50 - 16.95	D					
		16.50 - 17.00	B					
		16.50	SPT	N=15 (1,1/3,4,4,4)				
		17.50	D					
		18.00 - 18.45	UF	Ublow=100				
		18.00 - 18.50	B					
		18.50 - 18.95	D					
		18.50	SPT	N=17 (2,2/4,4,5,4)				
		19.00	D					
					19.30	-11.01		Weathered CHALK recovered as brown very gravelly fine to coarse SAND. Gravel is sub-angular and angular fine to coarse of chalk and flint.
		19.50	D					
		19.50 - 20.00	B					
		19.50	SPT	N=7 (1,/1,1,3,2)				

Continued on Next Sheet

Remarks

General; 30min getting 8inch lead through compacted madeground. General; Chalk gravel blew up to 17.5m. General; 30min bento seal from 17.5m to 16.5m. General; 09.15 to 09.45 pulling casing. General; 10am to 10.25am pulling casing. Vibrating wire piezometer installed.

Borehole Log

Borehole No. **CP04**

Sheet 3 of 4

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords:	520681.18E - 414427.80N	Hole Type CP
Location:	Netherlands Way, Immingham		Level:	8.29m aOD	Scale 1:50
Client:	TEGCO LTD		Dates:	29/05/2020 - 02/06/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		20.50	D					
		21.00	D					
		21.00 - 21.50	B					
		21.00	SPT	N=9 (1,2/2,2,1,4)				
		22.00	D					
		22.50	D					
		22.50 - 23.00	B					
		22.50	SPT	N=17 (2,2/4,4,3,6)	22.90	-14.61		Structureless CHALK composed of soft creamish brown, sandy gravelly CLAY/SILT. Gravel is very weak, sub-angular to sub-rounded, fine to medium of chalk. [FLAMBOROUGH CHALK FORMATION, Grade Dm].
		23.50	D					
		24.00 - 24.45	D					
		24.00 - 24.50	B					
		24.00	SPT	N=12 (1,1/2,3,3,4)	24.50	-16.21		Structureless CHALK composed of soft creamish white, sandy slightly gravelly CLAY/ SILT. Gravel is very weak, sub-angular to sub-rounded, fine to medium of chalk. Rare angular flint gravel [FLAMBOROUGH CHALK FORMATION, Grade Dm].
		25.00	D					
		25.50 - 25.95	D					
		25.50 - 26.00	B					
		25.50	SPT	N=13 (1,2/2,5,3,3)				
		26.50	D					
		27.00 - 27.45	D					
		27.00 - 27.50	B					
		27.00	SPT	N=32 (6,6/6,8,8,10)				
		28.00	D					
		28.50 - 28.95	D					
		28.50 - 29.00	B					
		28.50	SPT	N=37 (4,7/7,9,9,12)				
		29.50	D					
?		30.00 - 30.45	D					

Continued on Next Sheet

Remarks

General; 30min getting 8inch lead through compacted madeground. General; Chalk gravel blew up to 17.5m. General; 30min bento seal from 17.5m to 16.5m. General; 09.15 to 09.45 pulling casing. General; 10am to 10.25am pulling casing. Vibrating wire piezometer installed.

Borehole Log

Borehole No. **CP04**

Sheet 4 of 4

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords:	520681.18E - 414427.80N	Hole Type CP
Location:	Netherlands Way, Immingham		Level:	8.29m aOD	Scale 1:50
Client:	TEGCO LTD		Dates:	29/05/2020 - 02/06/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		30.00	SPT	N=43 (6,7/9,9,11,14)	30.45	-22.16		End of Borehole at 30.450m

Remarks

General; 30min getting 8inch lead through compacted madeground. General; Chalk gravel blew up to 17.5m. General; 30min bento seal from 17.5m to 16.5m. General; 09.15 to 09.45 pulling casing. General; 10am to 10.25am pulling casing. Vibrating wire piezometer installed.

Borehole Log

Borehole No. **CP05**

Sheet 1 of 2

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520624.15E - 414386.76N	Hole Type CP
Location: Netherlands Way, Immingham		Level: 4.03m aOD	Scale 1:50
Client: TEGCO LTD		Dates: 18/05/2020 - 19/05/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D					MADE GROUND (Brown sandy GRAVEL of brick, concrete ash and rail ballast. Medium to high cobble content).
		0.40	D					
		0.60	D					
		0.60 - 1.20	B					
		1.20 - 1.65	D					
		1.20 - 1.70	B		1.30	2.73		
		1.20	SPT	3 (1,/1,,1,1)				Soft brown mottled grey silty CLAY.
		1.80	D		1.60	2.43		
		2.00 - 2.45	UT	Ublow=22				Soft brown mottled grey slightly sandy silty CLAY. Sand is fine.
		2.50	D					
		3.00 - 3.45	D		2.80	1.23		
		3.00 - 3.50	B					Very soft brown mottled grey silty CLAY. Occasionally organic.
		3.00	SPT	1 (1,/,1,,)				
		3.50	D					
		4.00 - 4.45	UT	Ublow=20				
		4.50	D					
		5.00 - 5.45	D		4.70	-0.67		
		5.00 - 5.50	B					Very soft brown streaked dark brown slightly organic silty CLAY with occasional pseudo-fibrous PEAT horizons.
		5.00	SPT	4 (1,/1,,1,2)				
		5.50	D					
		6.00 - 6.45	UT	Ublow=26				
		6.50 - 7.00	B		6.10	-2.07		Soft greyish brown streaked dark brown slightly organic silty CLAY with rare chalk gravel.
		7.00	D		7.00	-2.97		
	▼	7.50 - 7.95	D					Soft to firm brown slightly sandy slightly gravelly silty CLAY. Gravel is sub-angular and sub-rounded predominantly fine and medium of chalk and flint.
		7.50 - 8.00	B					
	▽	7.50	SPT	N=10 (1,1/1,1,4,4)	7.80	-3.77		Loose brown SAND.
		8.50	D		8.10	-4.07		Loose to medium dense brown slightly sandy slightly gravelly silty CLAY. Occasional sand horizons. Gravel is sub-angular and sub-rounded predominantly fine and medium of chalk and flint.
		9.00 - 9.45	D					
		9.00 - 9.50	B					
		9.00	SPT	N=8 (1,2/2,2,1,3)				
		9.50	D					
		10.00 - 10.45	D					

Continued on Next Sheet

Remarks

General; 15min fetching install gear.

Borehole Log

Borehole No. **CP05**

Sheet 2 of 2

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords:	520624.15E - 414386.76N	Hole Type CP
Location:	Netherlands Way, Immingham		Level:	4.03m aOD	Scale 1:50
Client:	TEGCO LTD		Dates:	18/05/2020 - 19/05/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		10.00	SPT	N=11 (1,2/2,3,3,3)	10.45	-6.42		End of Borehole at 10.450m

Remarks

General; 15min fetching install gear.

Borehole Log

Borehole No. **CP06**

Sheet 1 of 1

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords:	520648.70E - 414305.62N	Hole Type CP
Location:	Netherlands Way, Immingham		Level:	3.20m aOD	Scale 1:50
Client:	TEGCO LTD		Dates:	26/05/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D					MADE GROUND.
		0.40	D					
		0.60	D					
		0.60 - 1.20	B					
					1.20	2.00		Obstruction. Borehole moved to 6A.
					1.20	2.00		End of Borehole at 1.200m

Remarks

General; ending hole dropping rig moving forward 2m CP6A

Borehole Log

Borehole No. **CP06A**

Sheet 1 of 4

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520647.34E - 414304.33N	Hole Type CP
Location: Netherlands Way, Immingham		Level: 3.21m aOD	Scale 1:50
Client: TEGCO LTD		Dates: 26/05/2020 - 28/05/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D					MADE GROUND (Brown sandy GRAVEL of brick, concrete ash and rail ballast. Rare slate and metal. Medium to high cobble content).
		0.40	D					
		0.60	D					
		0.60 - 1.20	B					
	▼	1.20	D					
	▽	1.20 - 1.70	B					
		1.20	SPT	N=22 (7,9/6,4,6,6)				
					1.90	1.31		
		2.00	D					Soft brown mottled grey silty CLAY. Occasional organic streaks.
		2.00 - 2.45	UTF	Ublow=40				
		2.00 - 2.50	B					
					2.40	0.81		
		2.50 - 2.95	D					Soft brown mottled grey silty CLAY. Rare organic streaks and sub-rounded gravels.
		2.50 - 3.00	B					
		2.50	SPT	3 (1,/1,1,,1)				
		3.00 - 3.45	D					
		3.00 - 3.50	B					
		3.00	SPT	2 (1,/1,1,,)	3.30	-0.09		
		3.50	D					Very soft brown mottled grey silty CLAY.
		4.00 - 4.45	UT	Ublow=22				
		4.50	D					
		5.00 - 5.45	D					
		5.00 - 5.50	B					
		5.00	SPT	1 (1,/,,1,)				
		5.50	D					
		6.00 - 6.45	UT	Ublow=42				
					6.30	-3.09		
		6.50 - 7.00	B					Soft brown streaked dark brown very organic silty CLAY with frequent pseudo-fibrous PEAT horizons.
		7.00	D					
					7.20	-3.99		
		7.50 - 7.95	D					Soft brown and grey slightly sandy silty CLAY. Sand is fine to coarse of broken chalk.
		7.50 - 8.00	B		7.70	-4.49		
		7.50	SPT	N=12 (1,2/2,3,3,4)				Firm greyish brown and brown sandy slightly gravelly silty CLAY. Gravel is sub-angular and sub-rounded predominantly fine and medium of chalk and flint.
		8.50	D					
		9.00 - 9.45	UF	Ublow=100				
		9.00 - 9.50	B					
		9.50 - 9.95	D					
		9.50	SPT	N=16 (2,2/3,4,4,5)				
		10.00	D					

Continued on Next Sheet

Remarks

General; 30min getting 8inch lead through compacted madeground. General; chalk gravel blew upto 18m. General; 30min bento seal from 18m to 17m. Vibrating wire piezometer installed.

Borehole Log

Borehole No. **CP06A**

Sheet 2 of 4

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords:	520647.34E - 414304.33N	Hole Type CP
Location:	Netherlands Way, Immingham		Level:	3.21m aOD	Scale 1:50
Client:	TEGCO LTD		Dates:	26/05/2020 - 28/05/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		10.50 - 10.95	D					
		10.50 - 11.00	B					
		10.50	SPT	N=13 (2,2/2,4,4,3)				
		11.50	D					
		12.00 - 12.45	U	Ublow=100				
		13.00	D					
		13.50 - 13.95	D					
		13.50 - 14.00	B					
		13.50	SPT	N=16 (1,2/3,3,5,5)				
		14.50	D					*14m: Becomes sandy.*
		15.00 - 15.45	U	Ublow=100				
		16.00	D					
		16.50 - 16.95	D					
		16.50 - 17.00	B					
		16.50	SPT	N=21 (2,3/4,4,6,7)				
		17.50	D					
	▼	18.00 - 18.45	UF	Ublow=100				
	▼	18.00 - 18.50	B					
		18.50 - 18.95	D					
		18.50	SPT	N=23 (3,3/4,6,6,7)				
		19.00	D					
	▽				19.30	-16.09		Weathered CHALK recovered as brown very gravelly fine to coarse SAND. Gravel is sub-angular and angular fine to coarse of chalk and flint.
		19.50	D					
		19.50 - 20.00	B					
		19.50	SPT	N=9 (1,/1,2,4,2)				

Continued on Next Sheet

Remarks

General; 30min getting 8inch lead through compacted madeground. General; chalk gravel blew upto 18m. General; 30min bento seal from 18m to 17m. Vibrating wire piezometer installed.

Borehole Log

Borehole No. **CP06A**

Sheet 3 of 4

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520647.34E - 414304.33N	Hole Type CP
Location: Netherlands Way, Immingham		Level: 3.21m aOD	Scale 1:50
Client: TEGCO LTD		Dates: 26/05/2020 - 28/05/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		20.50	D					
		21.00	D					
		21.00 - 21.50	B					
		21.00	SPT	N=15 (2,3/3,3,5,4)	21.30	-18.09		
								Structureless CHALK composed of soft creamish brown, sandy gravelly CLAY/SILT. Gravel is very weak, sub-angular to sub-rounded, fine to medium of chalk. [FLAMBOROUGH CHALK FORMATION, Grade Dm].
		22.00	D					
		22.50 - 22.95	D					
		22.50 - 23.00	B					
		22.50	SPT	N=15 (3,4/3,3,5,4)				
		23.50	D					
		24.00 - 24.45	D					
		24.00 - 24.50	B					
		24.00	SPT	N=19 (2,3/4,4,6,5)				
		25.00	D					
		25.50 - 25.95	D					
		25.50 - 26.00	B					
		25.50	SPT	N=47 (11,9/11,11,12,13)				
		26.50	D		26.50	-23.29		
								Structureless CHALK composed of soft creamish white, sandy slightly gravelly CLAY/ SILT. Gravel is very weak, sub-angular to sub-rounded, fine to medium of chalk. Rare angular flint gravel and cobbles [FLAMBOROUGH CHALK FORMATION, Grade Dm].
		27.00 - 27.45	D					
		27.00 - 27.50	B					
		27.00	SPT	N=43 (7,11/9,11,11,12)				
		28.00	D					
		28.50 - 28.95	D					
		28.50 - 29.00	B					
		28.50	SPT	N=46 (9,10/10,11,13,12)				
		29.50	D					
?		30.00 - 30.45	D					

Continued on Next Sheet

Remarks

General; 30min getting 8inch lead through compacted madeground. General; chalk gravel blew upto 18m. General; 30min bento seal from 18m to 17m. Vibrating wire piezometer installed.

Borehole Log

Borehole No. **CP06A**

Sheet 4 of 4

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords:	520647.34E - 414304.33N	Hole Type CP
Location:	Netherlands Way, Immingham		Level:	3.21m aOD	Scale 1:50
Client:	TEGCO LTD		Dates:	26/05/2020 - 28/05/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		30.00	SPT	N=44 (8,9/9,12,12,11)	30.45	-27.24		End of Borehole at 30.450m

31 32 33 34 35 36 37 38 39 40

Remarks

General; 30min getting 8inch lead through compacted madeground. General; chalk gravel blew upto 18m. General; 30min bento seal from 18m to 17m. Vibrating wire piezometer installed.

Borehole Log

Borehole No. **CP07**

Sheet 1 of 1

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords:
Location:	Netherlands Way, Immingham		Level:
Client:	TEGCO LTD		Dates: 19/05/2020

Hole Type: CP

Scale: 1:50

Logged By: RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.30			MADE GROUND.
					0.40			CONCRETE.
								MADE GROUND.
					0.80			CONCRETE.
					0.80			End of Borehole at 0.800m

Remarks

General; Hole called off due to concrete at 0.8m

Borehole Log

Borehole No. **CP07A**

Sheet 1 of 4

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520592.29E - 414322.35N	Hole Type CP
Location: Netherlands Way, Immingham		Level: 3.07m aOD	Scale 1:50
Client: TEGCO LTD		Dates: 19/05/2020 - 21/05/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D					MADE GROUND (Brown sandy GRAVEL of brick, concrete ash and rail ballast. Medium to high cobble content. Boulders and possible voids from 0.8m).
		0.40	D					
		0.60	D					
		0.80 - 2.00	B					
		2.00 - 2.50	B					
		2.00	SPT	N=4 (2,2/1,1,1,1)	2.10	0.97		
		2.50	D					Soft brown silty CLAY.
		3.00	D		2.80	0.27		
		3.00 - 3.45	UT	Ublow=17				Very soft dark grey slightly organic silty CLAY.
		3.50	D					
		4.00 - 4.45	D					
		4.00 - 4.50	B					
		4.00	SPT	1 (1,/,,1,)				
		4.50	D					
		5.00 - 5.45	UT	Ublow=10				
		5.50	D					
		6.00 - 6.45	D					
		6.00 - 6.50	B					
		6.00	SPT	1 (1,/,,,1)				
		7.00	D					
		7.50 - 7.95	UT	Ublow=80	7.40	-4.33		Firm brown slightly gravelly silty CLAY.
		8.50	D					
		9.00 - 9.45	D					
		9.00 - 9.50	B					
		9.00	SPT	N=12 (1,2/2,3,3,4)				
		10.00	D					

Continued on Next Sheet

Remarks

General; 20min breaking through possible drainage. General; Spt @2m no recovery. General; Chalk gravel blowed up to 17.9m. General; 30min bento seal from 17.9m to 16.9m. General; 15min moving rig and gear to CP9.

Borehole Log

Borehole No. **CP07A**

Sheet 2 of 4

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords:	520592.29E - 414322.35N	Hole Type CP
Location:	Netherlands Way, Immingham		Level:	3.07m aOD	Scale 1:50
Client:	TEGCO LTD		Dates:	19/05/2020 - 21/05/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		10.50 - 10.95	U	Ublow=100				
		11.50	D					
		12.00 - 12.45	D					
		12.00 - 12.50	B					
		12.00	SPT	N=15 (2,2/3,3,4,5)				
		13.00	D					
		13.50 - 13.95	U	Ublow=100				
		14.50	D					
		15.00 - 15.45	D					
		15.00 - 15.50	B					
		15.00	SPT	N=19 (2,3/3,4,6,6)				
		16.00	D					
		16.50 - 16.95	U	Ublow=100				
		17.50	D					
		18.00 - 18.45	D					
		18.00 - 18.50	B					
		18.00	SPT	N=27 (3,3/5,6,8,8)				
		19.00	D					
					19.20	-16.13		Weathered CHALK recovered as brown very gravelly fine to coarse SAND. Gravel is sub-angular and angular fine to coarse of chalk and flint.
		19.50	D					
		19.50 - 20.00	B					
		19.50	SPT	N=8 (1,2/3,1,1,3)				

Continued on Next Sheet

Remarks

General; 20min breaking through possible drainage. General; Spt @2m no recovery. General; Chalk gravel blowed up to 17.9m. General; 30min bento seal from 17.9m to 16.9m. General; 15min moving rig and gear to CP9.

Borehole Log

Borehole No. **CP07A**

Sheet 3 of 4

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520592.29E - 414322.35N	Hole Type CP
Location: Netherlands Way, Immingham		Level: 3.07m aOD	Scale 1:50
Client: TEGCO LTD		Dates: 19/05/2020 - 21/05/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		20.50	D					
		21.00	D					
		21.00 - 21.50	B					
		21.00	SPT	N=14 (2,3/3,5,3,3)				
					21.80	-18.73		White CHALK with flint gravel and putty chalk.
		22.00	D					
		22.50 - 22.95	D					
		22.50 - 23.00	B					
		22.50	SPT	N=26 (6,6/7,5,7,7)				
		23.50	D					
		24.00 - 24.45	D					
		24.00 - 24.50	B					
		24.00	SPT	N=21 (5,5/4,6,6,5)				
		25.00	D					
		25.50 - 25.95	D					
		25.50 - 26.00	B					
		25.50	SPT	N=20 (3,4/4,5,5,6)				
		26.50	D					
		27.00 - 27.45	D					
		27.00 - 27.50	B					
		27.00	SPT	N=23 (2,6/5,7,7,4)				
		28.00	D					
		28.50 - 28.95	D					
		28.50 - 29.00	B					
		28.50	SPT	N=41 (7,9/9,9,11,12)				
		29.50	D					
		30.00 - 30.45	D					

Continued on Next Sheet

21 22 23 24 25 26 27 28 29 30

Remarks

General; 20min breaking through possible drainage. General; Spt @2m no recovery. General; Chalk gravel blowed up to 17.9m. General; 30min bento seal from 17.9m to 16.9m. General; 15min moving rig and gear to CP9.

Borehole Log

Borehole No. **CP07A**

Sheet 4 of 4

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords:	520592.29E - 414322.35N	Hole Type CP
Location:	Netherlands Way, Immingham		Level:	3.07m aOD	Scale 1:50
Client:	TEGCO LTD		Dates:	19/05/2020 - 21/05/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		30.00	SPT	N=45 (8,9/9,11,11,14)	30.45	-27.38		End of Borehole at 30.450m

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Remarks

General; 20min breaking through possible drainage. General; Spt @2m no recovery. General; Chalk gravel blowed up to 17.9m. General; 30min bento seal from 17.9m to 16.9m. General; 15min moving rig and gear to CP9.

Borehole Log

Borehole No. **CP08**

Sheet 1 of 1

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords:	520704.46E - 414342.16N	Hole Type CP
Location:	Netherlands Way, Immingham		Level:	3.30m aOD	Scale 1:50
Client:	TEGCO LTD		Dates:	22/05/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D					MADE GROUND (Brown sandy GRAVEL of brick, concrete ash and rail ballast. Medium to high cobble content).
		0.40	D					
		0.60	D					
		0.60 - 1.20	B					
		1.20 - 1.65	D					
		1.20 - 1.70	B					
		1.20	SPT	N=6 (3,2/2,1,2,1)	1.50	1.80		
		1.80	D					Soft to firm brown mottled grey silty CLAY. Rare organic horizons.
		2.00 - 2.45	UT	Ublow=28				
		2.50	D					
		3.00 - 3.45	D					
		3.00 - 3.50	B					
		3.00	SPT	2 (1,/1,,1,)	3.30	0.00		
		3.50	D					Very soft brown mottled grey silty CLAY. Occasional organic streaks.
		4.00 - 4.45	UT	Ublow=22				
		4.50	D					
		5.00 - 5.45	D					
		5.00 - 5.50	B					
		5.00	SPT	1 (1,/,,1,)				
		5.50	D					
		6.00 - 6.45	UT	Ublow=30				
					6.80	-3.50		
		7.00	D					Soft greyish brown streaked dark brown very organic silty CLAY with frequent pseudo-fibrous PEAT horizons.
		7.00 - 7.50	B					
		7.50 - 7.95	D					
		7.50 - 8.00	B		7.60	-4.30		
		7.50	SPT	N=6 (1,/1,1,2,2)				Soft to firm brown slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is sub-angular and sub-rounded predominantly fine and medium of chalk and flint.
		8.50	D					
		9.00 - 9.45	UF	Ublow=100				
		9.00 - 9.50	B					
		9.50 - 9.95	D					
		9.50	SPT	N=11 (1,2/2,3,3,3)				
		10.00	D		10.00	-6.70		End of Borehole at 10.000m

Remarks

Borehole Log

Borehole No. **CP09**

Sheet 1 of 2

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords:	520677.04E - 414303.26N	Hole Type CP
Location:	Netherlands Way, Immingham		Level:	2.71m aOD	Scale 1:50
Client:	TEGCO LTD		Dates:	21/05/2020 - 22/05/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D					MADE GROUND (Brown sandy GRAVEL of brick, concrete ash and rail ballast. Medium to high cobble content).
		0.40	D					
		0.60	D					
		0.60 - 1.20	B					
					1.10	1.61		
		1.20 - 1.65	D					MADE GROUND (Soft brown silty CLAY (Re-worked)).
		1.20 - 1.70	B		1.40	1.31		
		1.20	SPT	N=5 (1,1/2,1,1,1)				Soft brown mottled grey silty CLAY. Locally sandy (fine).
		1.80	D					
		2.00 - 2.45	UT	Ublow=25				
		2.50	D					
					2.80	-0.09		
		3.00 - 3.45	D					Very soft dark grey mottled greyish brown slightly organic slightly sandy CLAY/SILT. Sand is fine and medium.
		3.00 - 3.50	B					
		3.00	SPT	1 (1,/,1,,)				
		3.50	D					
		4.00 - 4.45	UT	Ublow=17				
		4.50	D					
		5.00 - 5.45	D					
		5.00 - 5.50	B					
		5.00	SPT	1 (1,/,1,,)				
		6.00 - 6.45	UT	Ublow=33				
					6.30	-3.59		
		6.50 - 7.00	B					Soft greyish brown streaked dark brown very organic silty CLAY with frequent pseudo-fibrous PEAT horizons.
		7.00	D					
					7.20	-4.49		
		7.50 - 7.95	D					Soft brown slightly gravelly silty CLAY. Rare organic horizons in upper levels. Gravel is sub-rounded predominantly fine and medium chalk.
		7.50 - 8.00	B					
		7.50	SPT	N=6 (1,/1,1,2,2)				
		8.50	D					
		9.00 - 9.45	U	Ublow=100				
		9.50	D					
		10.00 - 10.45	D					

Continued on Next Sheet

Remarks

General; 15min fetching install gear

Borehole Log

Borehole No. **CP09**

Sheet 2 of 2

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords:	520677.04E - 414303.26N	Hole Type CP
Location:	Netherlands Way, Immingham		Level:	2.71m aOD	Scale 1:50
Client:	TEGCO LTD		Dates:	21/05/2020 - 22/05/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		10.00	SPT	N=16 (2,2/3,4,5,4)	10.45	-7.74		End of Borehole at 10.450m

Remarks

General; 15min fetching install gear

Borehole Log

Borehole No. **CP10**

Sheet 1 of 3

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520820.86E - 414399.84N	Hole Type CP
Location: Netherlands Way, Immingham		Level: 2.73m aOD	Scale 1:50
Client: TEGCO LTD		Dates: 02/06/2020 - 04/06/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D					MADE GROUND (Brown sandy GRAVEL of brick, concrete ash and rail ballast. Medium to high cobble content. Slight hydrocarbon odour at 0.5m).
		0.40	D					
		0.60	D					
		0.60 - 1.20	B					
					1.00	1.73		MADE GROUND (Soft brown silty CLAY (Possibly re-worked).
		1.20 - 1.65	D					
		1.20 - 1.70	B					
		1.20	SPT	3 (1,1/1,,1,1)	1.50	1.23		Soft brown mottled grey silty CLAY.
		1.80	D					
		2.00 - 2.45	UT	Ublow=19				
					2.30	0.43		Very soft dark grey slightly organic silty CLAY.
		2.50	D					
		3.00 - 3.45	D					
		3.00 - 3.50	B					
		3.00	SPT	1 (1,/1,,,)				
		3.50	D					
		4.00 - 4.45	UT	Ublow=21				
		4.50	D					
		5.00 - 5.45	D					
		5.00 - 5.50	B					
		5.00	SPT	3 (1,/1,,1,1)				
		5.50	D					
		6.00 - 6.45	UT	Ublow=33				
					6.20	-3.47		Soft dark brown very organic silty CLAY with abundant pseudo-fibrous PEAT horizons.
		6.50 - 7.00	B					
		7.00	D					
					7.20	-4.47		Soft greyish brown sandy silty CLAY.
	▼				7.40	-4.67		Soft brown slightly gravelly silty CLAY. Gravel is sub-rounded fine of chalk.
	▼	7.50 - 7.95	D					
		7.50 - 8.00	B					
	▽	7.50	SPT	N=6 (1,1/2,1,2,1)	7.80	-5.07		Loose greyish brown clayey silty fine SAND.
		8.50	D					
		8.50 - 9.00	B					
		9.00 - 9.45	D					
		9.00 - 9.50	B					
		9.00	SPT	N=10 (1,1/2,2,3,3)	9.20	-6.47		Firm brown slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is sub-rounded fine and medium of chalk.
		10.00	D					

Continued on Next Sheet

Remarks

General; 25min getting 8inch lead through compacted madeground. General; chalk gravel blew upto 16.9m. General; bento seal 16.9m to 15.9m. General; 10min fetching install gear. General; Chalk gravel kept blowing up to 14m inside 6inch casings

Borehole Log

Borehole No. **CP10**

Sheet 2 of 3

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords:	520820.86E - 414399.84N	Hole Type CP
Location:	Netherlands Way, Immingham		Level:	2.73m aOD	Scale 1:50
Client:	TEGCO LTD		Dates:	02/06/2020 - 04/06/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		10.50 - 10.95	U	Ublow=100				
		11.50	D					
		12.00 - 12.45	D					
		12.00 - 12.50	B					
		12.00	SPT	N=14 (2,2/2,4,4,4)				
		13.00	D					
		13.50 - 13.95	U	Ublow=100				
		14.50	D					
		15.00 - 15.45	D					
		15.00 - 15.50	B					
		15.00	SPT	N=15 (1,2/3,3,5,4)				
		16.00	D					
		16.50 - 16.95	U	Ublow=100				
		17.50	D					
		18.00 - 18.45	D					
		18.00 - 18.50	B					
		18.00	SPT	N=17 (2,3/3,4,4,6)				
	▽	19.00	D					
					19.20	-16.47		Weathered CHALK recovered as brown very gravelly fine to coarse SAND. Gravel is sub-angular and angular fine to coarse of chalk and flint. (Driller noted blowing)
		19.50	D					
		19.50 - 20.00	B					
		19.50	SPT	N=10 (1,/1,3,3,3)				

Continued on Next Sheet

Remarks

General; 25min getting 8inch lead through compacted madeground. General; chalk gravel blew upto 16.9m. General; bento seal 16.9m to 15.9m. General; 10min fetching install gear. General; Chalk gravel kept blowing up to 14m inside 6inch casings

Borehole Log

Borehole No. **CP10**

Sheet 3 of 3

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords:	520820.86E - 414399.84N	Hole Type CP
Location:	Netherlands Way, Immingham		Level:	2.73m aOD	Scale 1:50
Client:	TEGCO LTD		Dates:	02/06/2020 - 04/06/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		20.50	D					
		21.00	D					
		21.00 - 21.50	B					
		21.00	SPT	N=13 (2,2/2,5,3,3)				
		22.00	D					
		22.50	D					
		22.50 - 23.00	B					
		22.50	SPT	N=20 (3,3/5,5,6,4)				
		23.50	D					
		24.00	D					
		24.00 - 24.50	B		24.20	-21.47		
		24.00	SPT	N=23 (2,3/5,5,7,6)				Structureless CHALK composed of soft creamish brown, sandy gravelly CLAY/SILT. Gravel is very weak, sub-angular to sub-rounded, fine to medium of chalk. [FLAMBOROUGH CHALK FORMATION, Grade Dm].
		24.50	SPT	50 (25 for 30mm/50 for 10mm)	24.54	-21.81		
								End of Borehole at 24.540m

Remarks

General; 25min getting 8inch lead through compacted madeground. General; chalk gravel blew upto 16.9m. General; bento seal 16.9m to 15.9m. General; 10min fetching install gear. General; Chalk gravel kept blowing up to 14m inside 6inch casings

Borehole Log

Borehole No. **WS01**

Sheet 1 of 1

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520830.90E - 414394.27N	Hole Type WLS
Location: Netherlands Way, Immingham		Level: 2.85m aOD	Scale 1:50
Client: TEGCO LTD		Dates: 11/05/2020	Logged By DnG

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
				80	100		0.70	2.15		MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
		1.00	SPT			N=5 (1,1/1,1,1,2)				Initially firm becoming soft brown mottled grey slightly organic silty CLAY.
				80	100					
		2.00 - 2.40	U							
		2.00	SPT			0 (0 for 450mm/0 for 0mm)				
				70	80					
		3.00	SPT			0 (0 for 450mm/0 for 0mm)				
				70	100					
		4.00	SPT			0 (0 for 450mm/0 for 0mm)	4.00	-1.15		End of Borehole at 4.00m

Remarks

Borehole Log

Borehole No. **WS02**

Sheet 1 of 1

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520730.52E - 414333.05N	Hole Type WLS
Location: Netherlands Way, Immingham		Level: 2.75m aOD	Scale 1:50
Client: TEGCO LTD		Dates: 11/05/2020	Logged By DnG

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
				80	100		0.70	2.05		MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
		1.00	SPT			N=6 (1,1/1,1,2,2)				Initially firm becoming soft brown mottled grey slightly organic silty CLAY.
				80	90					
		2.00	SPT			0 (0 for 450mm/0 for 0mm)				
				70	80					
		3.00	SPT			0 (0 for 450mm/0 for 0mm)				
				70	100					
		4.00 - 4.40	U							
							4.40	-1.65		End of Borehole at 4.40m

1 2 3 4 5 6 7 8 9 10

Remarks

Borehole Log

Borehole No. **WS03**

Sheet 1 of 1

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520692.81E - 414307.06N	Hole Type WLS
Location: Netherlands Way, Immingham		Level: 2.65m aOD	Scale 1:50
Client: TEGCO LTD		Dates: 12/05/2020	Logged By DnG

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
				80	100		0.90	1.75		MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
		1.00	SPT			25 (1 for 75mm/25 for 40mm)	1.00	1.65		MADE GROUND (Brick Cobble).
										End of Borehole at 1.00m

Remarks

Borehole Log

Borehole No. **WS04**

Sheet 1 of 1

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520635.39E - 414276.94N	Hole Type WLS
Location: Netherlands Way, Immingham		Level: 2.71m aOD	Scale 1:50
Client: TEGCO LTD		Dates: 12/05/2020	Logged By DnG

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
				80	100		0.20	2.51		MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
							0.50	2.21		
		1.00	SPT			N=10 (1,2/2,2,3,3)	1.00	1.71		MADE GROUND (Dense white slightly sandy sub-angular fine to coarse Chalk GRAVEL).
				80	80					MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
		2.00	SPT			0 (0 for 450mm/0 for 0mm)				Initially stiff becoming soft brown mottled grey slightly organic silty CLAY.
				70	90					
		3.00	SPT			0 (0 for 450mm/0 for 0mm)				
				70	75					
		4.00 - 4.40	U							
							4.40	-1.69		End of Borehole at 4.40m

Remarks

Borehole Log

Borehole No. **WS05**

Sheet 1 of 1

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520604.73E - 414305.86N	Hole Type WLS
Location: Netherlands Way, Immingham		Level: 2.90m aOD	Scale 1:50
Client: TEGCO LTD		Dates: 13/05/2020	Logged By DnG

Well	Water Strikes	Samples and In Situ Testing					Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Dia. (mm)	TCR (%)	Results				
		0.80	SPT	80	100	10 (0 for 0mm/10 for 0mm)	0.80	2.10		MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
										End of Borehole at 0.80m

Remarks

Borehole Log

Borehole No. **WS06**

Sheet 1 of 1

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520588.41E - 414315.98N
Location:	Netherlands Way, Immingham		Level: 2.97m aOD
Client:	TEGCO LTD		Dates: 13/05/2020

Hole Type: WLS

Scale: 1:50

Logged By: DnG

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
				80	100					MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
		1.00	SPT			N=9 (1,1/2,2,2,3)	1.00	1.97		
				80	100					Initially firm becoming soft brown mottled grey slightly organic silty CLAY.
		2.00	SPT			0 (0 for 450mm/0 for 0mm)				
				70	75					
		3.00	SPT			0 (0 for 450mm/0 for 0mm)				
				70	60					
		4.00 - 4.40	U							
							4.40	-1.43		End of Borehole at 4.40m

Remarks

Borehole Log

Borehole No. **WS07**

Sheet 1 of 1

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520577.99E - 414350.58N	Hole Type WLS
Location: Netherlands Way, Immingham		Level: 2.93m aOD	Scale 1:50
Client: TEGCO LTD		Dates: 14/05/2020	Logged By DnG

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
				80	60					MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
		1.00	SPT			N=4 (1,1/1,1,1,1)	1.00	1.93		
				80	60					Soft brown mottled grey slightly organic silty CLAY.
		2.00	SPT			0 (0 for 450mm/0 for 0mm)	2.00	0.93		
				70	0					No recovery.
		3.00	SPT			0 (0 for 450mm/0 for 0mm)	3.00	-0.07		End of Borehole at 3.00m

Remarks

Borehole Log

Borehole No. **WS08**

Sheet 1 of 1

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520612.95E - 414379.35N	Hole Type WLS
Location: Netherlands Way, Immingham		Level: 3.03m aOD	Scale 1:50
Client: TEGCO LTD		Dates: 14/05/2020	Logged By DnG

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
				80	100					MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
		1.00	SPT			N=4 (1,0/1,1,1,1)	1.10	1.93		
				80	80					Soft brown mottled grey slightly organic silty CLAY.
		2.00	SPT			0 (0 for 450mm/0 for 0mm)				
				70	40					
		3.00	SPT			0 (0 for 450mm/0 for 0mm)				
				70	60					
		4.00 - 4.40	U							
							4.40	-1.37		End of Borehole at 4.40m

1 2 3 4 5 6 7 8 9 10

Remarks

Borehole Log

Borehole No. **WS09**

Sheet 1 of 1

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520650.66E - 414423.49N	Hole Type WLS
Location: Netherlands Way, Immingham		Level: 3.20m aOD	Scale 1:50
Client: TEGCO LTD		Dates: 15/05/2020	Logged By DnG

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
				80	90		0.60	2.60		MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
		1.00	SPT			N=6 (2,1/1,1,2,2)	0.90	2.30		MADE GROUND (Dense white slightly sandy sub-angular fine to coarse Chalk GRAVEL).
				80	20		1.20	2.00		MADE GROUND (Concrete pad). No recovery; cobble blocking sampling tube.
		2.00	SPT			0 (0 for 450mm/0 for 0mm)	2.00	1.20		Soft brown mottled grey slightly organic silty CLAY.
				70	90					
		3.00	SPT			0 (0 for 450mm/0 for 0mm)				
				70	65					
		4.00 - 4.40	U				4.40	-1.20		End of Borehole at 4.40m

Remarks

Borehole Log

Borehole No. **WS10**

Sheet 1 of 1

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520728.64E - 414456.70N	Hole Type WLS
Location: Netherlands Way, Immingham		Level: 3.36m aOD	Scale 1:50
Client: TEGCO LTD		Dates: 15/05/2020	Logged By DnG

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
				80	90					MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
		1.00	SPT			N=6 (2,1/1,1,2,2)	1.20	2.15		
				80	100					Initially soft to firm becoming soft brown mottled grey slightly organic silty CLAY.
		2.00	SPT			0 (0 for 450mm/0 for 0mm)				
				70	90					
		3.00	SPT			0 (0 for 450mm/0 for 0mm)				
				70	45					
		4.00 - 4.40	U							
							4.40	-1.04		End of Borehole at 4.40m

Remarks

Appendix 3

Trial Pit Records

Rogers Geotechnical Services Ltd Telephone 0843 50 666 87 Fax 0843 51 599 30
Email enquiries@rogersgeotech.co.uk www.rogersgeotech.co.uk

Trial Pit Log

Trialpit No **TP01**

Sheet 1 of 1

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520657.72 - 414283.68 Level: 2.62	Date 20/05/2020
Location: Netherlands Way, Immingham		Dimensions (m): Depth 3.85	Scale 1:50
Client: TEGCO LTD			Logged DnG

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.00 - 0.90	B					MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
				0.90	1.72		Soft to firm dark grey very organic silty CLAY.
				1.10	1.52		Initially stiff becoming soft to firm at 1.5m and very soft at 3.8m brown mottled grey slightly organic silty CLAY.
			HVR=33				
			HVR=33				
			HVR=13	3.85	-1.23		End of pit at 3.85 m

Remarks:

Stability: Initially poor within made ground

Trial Pit Log

Trialpit No **TP02**

Sheet 1 of 1

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520676.12 - 414325.40 Level: 3.26	Date 20/05/2020
Location: Netherlands Way, Immingham		Dimensions (m): Depth 3.65	Scale 1:50
Client: TEGCO LTD			Logged DnG

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.00 - 1.70	B					MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast and shaley mudstone with low cobble content).
				1.70	1.56		Initially stiff becoming soft to firm at 2.5m brown mottled grey slightly organic silty CLAY.
			HVR=29				
			HVR=28				
			HVR=23				
				3.65	-0.39		End of pit at 3.65 m

Remarks: Perched water infilling from above impermeable strata.

Stability: Initially poor within made ground

Trial Pit Log

Trialpit No **TP03**

Sheet 1 of 1

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520723.46 - 414354.62 Level: 3.33	Date 20/05/2020
Location: Netherlands Way, Immingham		Dimensions (m): Depth 3.20	Scale 1:50
Client: TEGCO LTD			Logged DnG

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 1.20	B					MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast and shaley mudstone with low cobble content).
				1.20	2.13		
				1.40	1.93		MADE GROUND (Dense white slightly sandy sub-angular fine to coarse Chalk GRAVEL. (Very high water content)). Initially stiff becoming soft to firm at 2.0m brown mottled grey slightly organic silty CLAY.
			HVR=36				
			HVR=30				
			HVR=28				
				3.20	0.13		End of pit at 3.20 m

Remarks:

Stability: Initially poor within made ground

Trial Pit Log

Trialpit No **TP04** Sheet 1 of 1

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520823.66 - 414419.03 Level: 2.86	Date 20/05/2020
Location: Netherlands Way, Immingham		Dimensions (m): Depth 3.20	Scale 1:50
Client: TEGCO LTD			Logged DnG

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 0.70	B		0.70	2.16		MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
				0.80	2.06		Reinforced Concrete Pad.
				1.20	1.66		MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
			HVR=37				Initially stiff becoming soft to firm at 1.5m brown mottled grey slightly organic silty CLAY.
			HVR=30				
			HVR=19				
				3.20	-0.34		End of pit at 3.20 m

Remarks:

Stability: Initially poor within made ground

Trial Pit Log

Trialpit No **TP05**

Sheet 1 of 1

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520809.75 - 414452.18 Level: 3.18	Date 20/05/2020
Location: Netherlands Way, Immingham		Dimensions (m): Depth 2.60	Scale 1:50
Client: TEGCO LTD			Logged DnG

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 1.40	B					MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
				1.40	1.78		Soft to firm dark grey very organic silty CLAY.
				1.60	1.58		Initially stiff becoming soft to firm at 1.8m brown mottled grey slightly organic silty CLAY.
			HVR=36				
			HVR=26				
				2.60	0.58		End of pit at 2.60 m

Remarks:

Stability: Initially poor within made ground

Trial Pit Log

Trialpit No **TP06**

Sheet 1 of 1

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520634.73 - 414335.52 Level: 4.67	Date 21/05/2020
Location: Netherlands Way, Immingham		Dimensions (m): Depth 3.10	Scale 1:50
Client: TEGCO LTD			Logged DnG

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.00 - 0.70	B					MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
				0.70	3.97		Bituminous Pavement.
				0.80	3.87		MADE GROUND (Dense compacted crushed limestone GRAVEL (Sub-base material)).
				1.00	3.67		MADE GROUND (Very dense dark greyish brown sandy slightly clayey sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
				1.30	3.37		MADE GROUND (Dense white slightly sandy sub-angular fine to coarse Chalk GRAVEL).
				1.50	3.17		MADE GROUND (Dense very dark grey/black sandy sub-angular to sub-rounded fine to coarse GRAVEL of various lithologies (Railway ballast)).
				2.00	2.67		Initially stiff becoming soft to firm at 2.5m brown mottled grey slightly organic silty CLAY.
			HVR=40				
			HVR=38				
				3.10	1.57		End of pit at 3.10 m

Remarks: Perched water infilling from above impermeable strata.

Stability: Initially poor within made ground

Trial Pit Log

Trialpit No **TP07** Sheet 1 of 1

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520644.66 - 414367.18 Level: 2.99
Location:	Netherlands Way, Immingham	Dimensions (m): Depth 3.00	Date 21/05/2020 Scale 1:50
Client:	TEGCO LTD		Logged DnG

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 0.70	B		0.70	2.29		MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
				0.80	2.19		Reinforced Concrete Pad.
				1.50	1.49		MADE GROUND (Very dense dark greyish brown sandy slightly clayey sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
			HVR=40				Initially stiff becoming soft to firm at 1.7m brown mottled grey slightly organic silty CLAY.
			HVR=33				
			HVR=29	3.00	-0.01		End of pit at 3.00 m

Remarks: Perched water infilling from above impermeable strata.

Stability: Initially poor within made ground

Trial Pit Log

Trialpit No **TP08**

Sheet 1 of 1

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520715.53 - 414389.94 Level: 11.32	Date 21/05/2020
Location: Netherlands Way, Immingham		Dimensions (m): Depth 2.50	Scale 1:50
Client: TEGCO LTD			Logged DnG

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
							MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
				1.00	10.32		Bituminous Pavement.
				1.10	10.22		MADE GROUND (Dense compacted crushed limestone GRAVEL (Sub-base material)).
	1.30 - 1.50	B		1.30	10.02		MADE GROUND (Very dense dark greyish brown sandy slightly clayey sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
				1.50	9.82		MADE GROUND (Dense white slightly sandy sub-angular fine to coarse Chalk GRAVEL).
				1.60	9.72		MADE GROUND (Dense very dark grey/black sandy sub-angular to sub-rounded fine to coarse GRAVEL of various lithologies (Railway ballast)).
				1.80	9.52		Initially stiff becoming soft to firm at 2.0m brown mottled grey slightly organic silty CLAY.
			HVR=38				End of pit at 2.50 m
			HVR=33	2.50	8.82		

Remarks:

Stability: Initially poor within made ground

Trial Pit Log

Trialpit No **TP09**

Sheet 1 of 1

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520712.61 - 414400.91 Level: 10.30	Date 21/05/2020
Location: Netherlands Way, Immingham		Dimensions (m): Depth 2.70	Scale 1:50
Client: TEGCO LTD			Logged DnG

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
							MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
				0.90	9.40		Reinforced Concrete Pad.
	1.00 - 1.40	B		1.00	9.30		MADE GROUND (Very dense dark greyish brown sandy slightly clayey sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
				1.40	8.90		MADE GROUND (Dense white slightly sandy sub-angular fine to coarse Chalk GRAVEL).
				1.70	8.60		Initially stiff becoming soft to firm at 2.0m brown mottled grey slightly organic silty CLAY. (Very organic 1.9m - 2.1m).
			HVR=39				
			HVR=34				
				2.70	7.60		End of pit at 2.70 m

Remarks:

Stability: Initially poor within made ground

Trial Pit Log

Trialpit No **TP10** Sheet 1 of 1

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520672.25 - 414416.98 Level: 6.37	Date 22/05/2020
Location: Netherlands Way, Immingham		Dimensions (m): Depth 3.00	Scale 1:50
Client: TEGCO LTD			Logged DnG

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 0.80	B					MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with high cobble content).
				0.80	5.56		MADE GROUND (Dense white slightly sandy sub-angular fine to coarse Chalk GRAVEL).
				1.30	5.07		Soft to firm dark grey very organic silty CLAY.
				1.50	4.86		Initially stiff becoming soft to firm at 1.6m brown mottled grey slightly organic silty CLAY.
			HVR=40				
			HVR=38				
			HVR=19	3.00	3.36		End of pit at 3.00 m

Remarks:

Stability: Initially poor within made ground

AGS

Trial Pit Log

Trialpit No **TP11**

Sheet 1 of 1

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520599.13 - 414367.94 Level: 3.29	Date 22/05/2020
Location: Netherlands Way, Immingham		Dimensions (m): Depth 1.80	Scale 1:50
Client: TEGCO LTD			Logged DnG

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.00 - 1.60	B					MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with high cobble content).
				1.60	1.69		Initially stiff becoming soft to firm brown mottled grey slightly organic silty CLAY.
				1.80	1.49		End of pit at 1.80 m

Remarks: Perched water infilling from above impermeable strata. Position terminated at 1.8m due to discovery of drainage service.

Stability: Initially poor within made ground

Trial Pit Log

Trialpit No **TP12**

Sheet 1 of 1

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520726.93 - 414450.43 Level: 2.25	Date 22/05/2020
Location: Netherlands Way, Immingham		Dimensions (m): Depth 1.90	Scale 1:50
Client: TEGCO LTD			Logged DnG

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 1.10	B		1.10	1.15		MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with high cobble content).
				1.70	0.55		MADE GROUND (Very dense dark greyish brown sandy slightly clayey sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
				1.90	0.35		Initially stiff becoming soft to firm brown mottled grey slightly organic silty CLAY.
							End of pit at 1.90 m

Remarks: Position terminated at 1.9m due to discovery of drainage service.

Stability: Initially poor within made ground

Appendix 4

Laboratory Testing

Rogers Geotechnical Services Ltd Telephone 0843 50 666 87 Fax 0843 51 599 30
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Environmental
Geotechnical
Specialists

LABORATORY REPORT

job number C700/20/E/1077	client ref
site address Netherlands Way Stallingborough, Immingham, DN41 8DF	client address TEGCO LTD
consultant	
date scheduled 17/06/2020	date issued 11/09/2020
issued by C J Norcliffe	job title Laboratory Manager

Rogers Geotechnical Services Ltd Telephone **01484 607 977**
Email **jude.norcliffe@rogersgeotech.co.uk** www.**rogersgeotech.co.uk**
Offices 1 & 2, Barncliffe Business Park, Near Bank, Shelley,
Huddersfield, West Yorkshire HD8 8LU.

GEOTECHNICAL ENVIRONMENTAL

Schedule of UKAS Accredited Laboratory Tests

		Accredited (A)	Unaccredited (U)
1. CLASSIFICATION OF SOIL	**BS 1377-2:1990**		
1.1 Moisture content determination			
i) Oven drying	Pt 2 : 3.2	**A**	
ii) Saturation m/c of chalk	Pt 2 : 3.3		U
1.2 Index Properties			
i) Liquid limit – cone penetrometer	Pt 2 : 4.3	**A**	
ii) Plastic limit	Pt 2 : 5.3	**A**	
iii) Shrinkage limit	Pt 2 : 6.3		U
iv) Linear shrinkage	Pt 2 : 6.5	**A**	
1.3 Particle Density			
i) Gas jar	Pt 2 : 8.2		U
ii) Large pyknometer	Pt 2 : 8.3		U
iii) Small pyknometer	Pt 2 : 8.4		U
1.4 Density Tests			
i) Linear measurement	Pt 2 : 7.2	**A**	
ii) Immersion in water	Pt 2 : 7.3		U
iii) Water displacement	Pt 2 : 7.4		U
iv) Sand replacement	Pt 9 : 2.1, 2.2		U
v) Core cutter	Pt 9 : 2.4		U
1.5 Particle Size Distribution			
i) Dry Sieve	Pt 2 : 9.2	**A**	
ii) Wet Sieve	Pt 2 : 9.3	**A**	
iii) Sedimentation by pipette	Pt 2 : 9.4	**A**	
iv) Sedimentation by hydrometer	Pt 2 : 9.5		U
2. CHEMICAL TESTS	**BS 1377-3:2018**		
ii) Mass loss on ignition	Pt 3 : 4		U
3. COMPACTION RELATED TESTS	**BS 1377-4:1990**		
3.1 Dry density/moisture relationship			
i) 2.5kg rammer – 1 litre mould	Pt 4 : 3		U
- CBR mould	Pt 4 : 3		U
ii) 4.5kg rammer – 1 litre mould	Pt 4 : 3		U
- CBR mould	Pt 4 : 3		U
3.2 Moisture Condition Value			
i) Single point test	Pt 4 : 5.4		U
ii) MCV/moisture content relationship	Pt 4 : 5.5		U
3.3 California Bearing Ratio			
i) Undisturbed sample	Pt 5 : 7		U
ii) Recompacted sample	Pt 5 : 7		U
iii) Soaked, inc measurement of swell	Pt 5 : 7		U
4. COMPRESSIBILITY OF SOIL	**BS 1377-5:1990**		
i) One dimensional consolidation	Pt 5 : 3		U
ii) Swelling pressure test	Pt 5 : 3		U
5. SHEAR STRENGTH OF SOIL	**BS 1377-7:1990**		
i) Hand shear vane	Makers instructions		U
ii) Shear box (100mm square sample)	BS 1377 : Pt 7 : 4		U
iii) Triaxial – quick undrained	BS 1377 : Pt 7 : 8, 9		U
6. PERMEABILITY			
i) Falling head	K. H. Head Vol 2		U
ii) Constant head	BS 1377 : Pt 6 : 6		U
iii) Triaxial cell	BS 1377 : Pt 6 : 6		U
7. ROCK TESTS			
7.1 Classification Tests			
i) Natural moisture content	-		U
ii) Saturated moisture content	-		U
iii) Natural density	-		U
iv) Porosity	-		U
7.2 Strength Tests			
i) Point load index	ISRM '85		U
ii) Uniaxial compression test	ISRM '81		U

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Environmental
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ENVIRONMENTAL LAB RESULTS

GEOTECHNICAL
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Final Report

Report No.:	20-15253-1
Initial Date of Issue:	23-Jun-2020
Client	Rogers Geotechnical Services Ltd
Client Address:	Unit 4, Barncliffe Business Park Near Bank Shelley Huddersfield West Yorkshire HD8 8LU
Contact(s):	Rob Palmer
Project	C700/20/E - Immingham
Quotation No.:	Q20-19998
Order No.:	PO-0750
No. of Samples:	12
Turnaround (Wkdays):	5
Date Approved:	23-Jun-2020
Approved By:	
Details:	Glynn Harvey, Technical Manager

Date Received:	17-Jun-2020
Date Instructed:	17-Jun-2020
Results Due:	23-Jun-2020

Chemtest
The right chemistry to deliver results

Results - Soil

Project: C700/20/E - Immingham

Client: Rogers Geotechnical Services Ltd		**Chemtest Job No.:**			20-15253	20-15253	20-15253	20-15253	20-15253	20-15253	20-15253	20-15253
Quotation No.: Q20-19998		**Chemtest Sample ID.:**			1018316	1018317	1018318	1018319	1018320	1018321	1018322	1018323
		Sample Location:			CP04	CP04	CP06A	CP06A	CP07A	CP07A	CP08	CP08
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.60	2.50	0.60	2.00	0.80	3.00	0.60	2.50
		Bottom Depth (m):			1.20		1.50	2.50	2.00			
		Date Sampled:			12-Jun-2020	12-Jun-2020	12-Jun-2020	12-Jun-2020	12-Jun-2020	12-Jun-2020	12-Jun-2020	12-Jun-2020
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
Moisture	N	2030	%	0.020	8.9	25	9.2	18	16	25	7.1	25
Soil Colour	N	2040		N/A	Brown	Brown	Brown	Brown	Brown	Brown	Grey	Brown
Other Material	N	2040		N/A	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones
Soil Texture	N	2040		N/A	Sand	Clay	Sand	Clay	Clay	Clay	Sand	Clay
pH	M	2010		4.0	9.7	8.4	9.6	8.1	10.1	8.3	8.3	8.3
Cyanide (Complex)	M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cyanide (Free)	M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cyanide (Total)	M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Sulphate (Total)	M	2430	mg/kg	100	6300	930	15000	1100	2900	13000	31000	750
Arsenic	M	2450	mg/kg	1.0	20	15	32	13	18	9.7	55	11
Beryllium	U	2450	mg/kg	1.0	2.6	1.1	3.4	1.9	1.3	< 1.0	1.5	< 1.0
Cadmium	M	2450	mg/kg	0.10	0.24	0.16	0.30	0.64	0.51	0.12	0.55	< 0.10
Antimony	N	2450	mg/kg	2.0	< 2.0	< 2.0	2.6	< 2.0	< 2.0	< 2.0	2.8	< 2.0
Copper	M	2450	mg/kg	0.50	77	40	72	16	36	12	47	15
Mercury	M	2450	mg/kg	0.10	0.28	< 0.10	0.19	< 0.10	0.18	< 0.10	0.21	< 0.10
Nickel	M	2450	mg/kg	0.50	19	45	30	35	23	29	38	37
Lead	M	2450	mg/kg	0.50	68	34	92	23	43	14	58	18
Selenium	M	2450	mg/kg	0.20	< 0.20	0.28	0.47	0.28	< 0.20	< 0.20	1.8	0.25
Vanadium	U	2450	mg/kg	5.0	37	45	72	43	39	34	32	41
Zinc	M	2450	mg/kg	0.50	330	110	280	78	150	57	110	71
Chromium (Trivalent)	N	2490	mg/kg	1.0	18	39	33	31	48	24	16	31
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	M	2625	%	0.40	1.9	1.3	7.1	1.1	7.1	1.4	17	1.3
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0	130	< 1.0	75	< 1.0	< 1.0	< 1.0	27	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	130	< 5.0	75	< 5.0	< 5.0	< 5.0	27	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0	< 1.0	6.9	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	M	2680	mg/kg	1.0	15	< 1.0	100	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	160	< 1.0	1200	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Chemtest
The right chemistry to deliver results

Results - Soil

Project: C700/20/E - Immingham

Client: Rogers Geotechnical Services Ltd					Chemtest Job No.:	20-15253	20-15253	20-15253	20-15253	20-15253	20-15253	20-15253	20-15253
Quotation No.: Q20-19998					Chemtest Sample ID.:	1018316	1018317	1018318	1018319	1018320	1018321	1018322	1018323
					Sample Location:	CP04	CP04	CP06A	CP06A	CP07A	CP07A	CP08	CP08
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	0.60	2.50	0.60	2.00	0.80	3.00	0.60	2.50
					Bottom Depth (m):	1.20		1.50	2.50	2.00			
					Date Sampled:	12-Jun-2020	12-Jun-2020	12-Jun-2020	12-Jun-2020	12-Jun-2020	12-Jun-2020	12-Jun-2020	12-Jun-2020
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0		710	< 1.0	2600	< 1.0	< 1.0	< 1.0	43	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0		< 1.0	< 1.0	89	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0		880	< 5.0	4000	< 5.0	< 5.0	< 5.0	43	< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0		1000	< 10	4100	< 10	< 10	< 10	70	< 10
Naphthalene	M	2700	mg/kg	0.10		1.4	< 0.10	7.6	0.16	0.17	< 0.10	6.0	< 0.10
Acenaphthylene	M	2700	mg/kg	0.10		0.88	< 0.10	1.1	0.12	< 0.10	< 0.10	0.75	< 0.10
Acenaphthene	M	2700	mg/kg	0.10		5.3	< 0.10	26	0.88	0.52	< 0.10	0.49	< 0.10
Fluorene	M	2700	mg/kg	0.10		7.6	< 0.10	32	1.0	0.59	< 0.10	1.3	< 0.10
Phenanthrene	M	2700	mg/kg	0.10		45	0.20	240	7.3	4.0	< 0.10	2.6	< 0.10
Anthracene	M	2700	mg/kg	0.10		14	< 0.10	65	1.8	1.3	< 0.10	0.31	< 0.10
Fluoranthene	M	2700	mg/kg	0.10		46	0.25	280	8.6	6.2	< 0.10	2.4	< 0.10
Pyrene	M	2700	mg/kg	0.10		43	0.26	250	7.8	5.9	< 0.10	2.5	< 0.10
Benzo[a]anthracene	M	2700	mg/kg	0.10		18	< 0.10	81	2.7	2.5	< 0.10	< 0.10	< 0.10
Chrysene	M	2700	mg/kg	0.10		16	< 0.10	77	2.2	2.3	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	M	2700	mg/kg	0.10		19	< 0.10	57	2.3	2.3	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	M	2700	mg/kg	0.10		7.9	< 0.10	29	1.3	0.92	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	M	2700	mg/kg	0.10		15	< 0.10	55	2.1	1.9	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10		9.2	< 0.10	29	1.2	1.3	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10		2.7	< 0.10	10	0.32	0.54	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10		8.1	< 0.10	24	1.0	1.2	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	M	2700	mg/kg	2.0		260	< 2.0	1300	41	32	< 2.0	16	< 2.0

Chemtest
The right chemistry to deliver results

Results - Soil

Project: C700/20/E - Immingham

Client: Rogers Geotechnical Services Ltd		**Chemtest Job No.:**			20-15253	20-15253	20-15253	20-15253
Quotation No.: Q20-19998		**Chemtest Sample ID.:**			1018324	1018325	1018326	1018327
		Sample Location:			CP10	TP07	TP11	TP12
		Sample Type:			SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.60	0.00	0.00	0.00
		Bottom Depth (m):			1.20	0.70	1.60	1.10
		Date Sampled:			12-Jun-2020	12-Jun-2020	12-Jun-2020	12-Jun-2020
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
Moisture	N	2030	%	0.020	14	11	9.0	7.7
Soil Colour	N	2040		N/A	Brown	Brown	Brown	Brown
Other Material	N	2040		N/A	Stones	Stones	Stones	Stones
Soil Texture	N	2040		N/A	Clay	Sand	Sand	Sand
pH	M	2010		4.0	9.5	9.3	11.4	10.2
Cyanide (Complex)	M	2300	mg/kg	0.50	< 0.50	0.70	< 0.50	< 0.50
Cyanide (Free)	M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cyanide (Total)	M	2300	mg/kg	0.50	< 0.50	0.70	< 0.50	< 0.50
Sulphate (Total)	M	2430	mg/kg	100	10000	14000	6100	11000
Arsenic	M	2450	mg/kg	1.0	14	53	10	18
Beryllium	U	2450	mg/kg	1.0	4.3	2.2	2.2	3.3
Cadmium	M	2450	mg/kg	0.10	0.35	3.7	0.30	0.54
Antimony	N	2450	mg/kg	2.0	< 2.0	2.5	< 2.0	< 2.0
Copper	M	2450	mg/kg	0.50	15	56	15	16
Mercury	M	2450	mg/kg	0.10	< 0.10	1.2	0.11	0.10
Nickel	M	2450	mg/kg	0.50	24	45	14	20
Lead	M	2450	mg/kg	0.50	25	320	51	54
Selenium	M	2450	mg/kg	0.20	0.22	< 0.20	< 0.20	< 0.20
Vanadium	U	2450	mg/kg	5.0	74	180	56	63
Zinc	M	2450	mg/kg	0.50	72	600	110	110
Chromium (Trivalent)	N	2490	mg/kg	1.0	30	150	22	26
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	M	2625	%	0.40	2.8	3.6	1.5	1.9
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0	12	< 1.0	< 1.0	88
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	12	< 5.0	< 5.0	88
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	43	< 1.0	< 1.0	< 1.0

Chemtest
The right chemistry to deliver results

Results - Soil

Project: C700/20/E - Immingham

Client: Rogers Geotechnical Services Ltd		**Chemtest Job No.:**			20-15253	20-15253	20-15253	20-15253
Quotation No.: Q20-19998		**Chemtest Sample ID.:**			1018324	1018325	1018326	1018327
		Sample Location:			CP10	TP07	TP11	TP12
		Sample Type:			SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.60	0.00	0.00	0.00
		Bottom Depth (m):			1.20	0.70	1.60	1.10
		Date Sampled:			12-Jun-2020	12-Jun-2020	12-Jun-2020	12-Jun-2020
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0	130	< 1.0	< 1.0	780
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	170	< 5.0	< 5.0	780
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	180	< 10	< 10	870
Naphthalene	M	2700	mg/kg	0.10	0.16	1.9	0.24	0.15
Acenaphthylene	M	2700	mg/kg	0.10	< 0.10	0.99	0.29	0.12
Acenaphthene	M	2700	mg/kg	0.10	0.94	2.5	0.71	0.13
Fluorene	M	2700	mg/kg	0.10	1.2	3.1	0.65	0.18
Phenanthrene	M	2700	mg/kg	0.10	9.0	19	7.3	1.3
Anthracene	M	2700	mg/kg	0.10	2.5	7.0	1.9	0.53
Fluoranthene	M	2700	mg/kg	0.10	11	23	11	2.8
Pyrene	M	2700	mg/kg	0.10	10	21	11	3.6
Benzo[a]anthracene	M	2700	mg/kg	0.10	3.2	9.3	5.1	1.7
Chrysene	M	2700	mg/kg	0.10	2.8	8.4	5.0	1.4
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	2.4	11	6.0	0.89
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	1.1	4.4	2.5	0.50
Benzo[a]pyrene	M	2700	mg/kg	0.10	1.9	7.8	4.4	1.2
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	0.96	5.3	2.9	1.1
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	0.47	1.7	0.94	0.23
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	1.0	5.1	2.9	2.3
Total Of 16 PAH's	M	2700	mg/kg	2.0	49	130	63	18

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

eurofins | Chemtest
Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	20-18860-1
Initial Date of Issue:	28-Jul-2020
Client	Rogers Geotechnical Services Ltd
Client Address:	Unit 4, Barncliffe Business Park Near Bank Shelley Huddersfield West Yorkshire HD8 8LU
Contact(s):	Jude Norcliffe
Project	C700/20/ E/1077 Immingham
Quotation No.:	Q20-19998
Order No.:	PO-0080
No. of Samples:	5
Turnaround (Wkdays):	5
Date Approved:	28-Jul-2020
Approved By:	
Details:	Glynn Harvey, Technical Manager

Date Received:	22-Jul-2020
Date Instructed:	22-Jul-2020
Results Due:	28-Jul-2020

Results - Soil

Project: C700/20/ E/1077 Immingham

Client: Rogers Geotechnical Services Ltd		**Chemtest Job No.:**			20-18860	20-18860	20-18860	20-18860	20-18860
Quotation No.: Q20-19998		**Chemtest Sample ID.:**			1035576	1035577	1035578	1035579	1035580
		Client Sample ID.:			D1	D1	D1	D1	D1
		Sample Location:			TP1	TP3	TP4	TP5	TP8
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.0	0.0	0.0	0.0	1.3
		Bottom Depth (m):			0.9	1.2	0.7	0.8	1.5
		Date Sampled:			16-Jul-2020	16-Jul-2020	16-Jul-2020	16-Jul-2020	16-Jul-2020
		Asbestos Lab:			DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
Cadmium	M	2450	mg/kg	0.10	5.1	1.6	1.4	0.76	0.32
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Copper	M	2450	mg/kg	0.50	130	130	110	160	41
Mercury	M	2450	mg/kg	0.10	0.67	0.93	0.72	0.20	0.32
Nickel	M	2450	mg/kg	0.50	250	45	38	47	25
Lead	M	2450	mg/kg	0.50	150	140	200	83	96
Zinc	M	2450	mg/kg	0.50	810	690	590	450	180
Vanadium	U	2450	mg/kg	5.0	97	120	410	61	73
Arsenic	M	2450	mg/kg	1.0	29	33	25	36	35
Selenium	M	2450	mg/kg	0.20	0.39	0.25	< 0.20	0.43	< 0.20
Cyanide (Free)	M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Naphthalene	M	2700	mg/kg	0.10	0.45	1.3	0.48	< 0.10	2.0
Acenaphthylene	M	2700	mg/kg	0.10	0.15	0.20	0.26	< 0.10	2.5
Acenaphthene	M	2700	mg/kg	0.10	1.6	0.85	0.75	< 0.10	3.0
Fluorene	M	2700	mg/kg	0.10	2.0	1.3	0.86	< 0.10	6.4
Phenanthrene	M	2700	mg/kg	0.10	24	11	8.1	0.83	21
Anthracene	M	2700	mg/kg	0.10	9.7	4.2	2.6	0.37	7.2
Fluoranthene	M	2700	mg/kg	0.10	64	26	18	1.8	30
Pyrene	M	2700	mg/kg	0.10	78	26	18	1.6	33
Benzo[a]anthracene	M	2700	mg/kg	0.10	26	11	6.7	0.80	14
Chrysene	M	2700	mg/kg	0.10	26	10	6.4	1.1	15
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	25	10	6.4	< 0.10	13
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	12	4.0	2.9	< 0.10	6.2
Benzo[a]pyrene	M	2700	mg/kg	0.10	23	8.5	6.3	< 0.10	12
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	12	4.8	3.7	< 0.10	7.6
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	3.5	1.3	1.0	< 0.10	2.5
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	11	6.0	4.8	< 0.10	8.5
Total Of 16 PAH's	M	2700	mg/kg	2.0	320	130	87	6.5	180
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	190
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	3400
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0	36	< 1.0	39	170	1900
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	43	< 1.0	< 1.0	< 1.0	< 1.0

Results - Soil

Project: C700/20/ E/1077 Immingham

Client: Rogers Geotechnical Services Ltd			**Chemtest Job No.:**		20-18860	20-18860	20-18860	20-18860	20-18860
Quotation No.: Q20-19998			**Chemtest Sample ID.:**		1035576	1035577	1035578	1035579	1035580
			Client Sample ID.:		D1	D1	D1	D1	D1
			Sample Location:		TP1	TP3	TP4	TP5	TP8
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.0	0.0	0.0	0.0	1.3
			Bottom Depth (m):		0.9	1.2	0.7	0.8	1.5
			Date Sampled:		16-Jul-2020	16-Jul-2020	16-Jul-2020	16-Jul-2020	16-Jul-2020
			Asbestos Lab:		DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	79	< 5.0	39	170	5500
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	M	2680	mg/kg	1.0	5.1	5.3	< 1.0	< 1.0	160
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	510	110	110	< 1.0	360
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0	890	290	480	240	790
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	25	< 1.0	< 1.0	< 1.0	21
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	1400	400	580	240	1300
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	1500	400	620	420	6800
pH	M	2010		4.0	10.4	10.2	10.0	10.6	9.2
ACM Type	U	2192		N/A	-	Fibres/Clumps	-	-	-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected	Amosite	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-	Stereo Microscopy	-	-	-
Asbestos by Gravimetry	U	2192	%	0.001		<0.001			
Total Asbestos	N	2192	%	0.001		<0.001			
Moisture	N	2030	%	0.020	5.1	9.9	6.5	3.1	14
Soil Colour	N	2040		N/A	Brown	Brown	Brown	Brown	Brown
Other Material	N	2040		N/A	Stones	Stones	Stones	Stones	Stones
Soil Texture	N	2040		N/A	Sand	Loam	Sand	Sand	Loam
Cyanide (Complex)	M	2300	mg/kg	0.50	< 0.50	0.60	< 0.50	< 0.50	< 0.50
Cyanide (Total)	M	2300	mg/kg	0.50	< 0.50	0.60	< 0.50	< 0.50	< 0.50
Ammonium (Extractable)	M	2425	mg/kg	0.50	3.9	3.9	1.6	1.0	1.0
Ammoniacal Nitrogen	M	2425	mg/kg	0.50	3.0	3.0	1.2	0.78	0.78
Ammonium (Water Soluble)	M	2120	g/l	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Sulphate (Total)	M	2430	mg/kg	100	18000	15000	9700	18000	9700
Beryllium	U	2450	mg/kg	1.0	4.7	3.7	2.7	3.2	1.5
Antimony	N	2450	mg/kg	2.0	2.7	3.6	3.2	2.4	< 2.0
Chromium (Trivalent)	N	2490	mg/kg	1.0	140	240	63	37	28
Organic Matter	M	2625	%	0.40	3.3	4.3	4.1	5.9	11

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2425	Extractable Ammonium in soils	Ammonium	Extraction with potassium chloride solution / analysis by 'Aquakem 600' Discrete Analyser using sodium salicylate and sodium dichloroisocyanurate.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

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Final Report

Report No.:	20-20171-1		
Initial Date of Issue:	12-Aug-2020		
Client	Rogers Geotechnical Services Ltd		
Client Address:	Unit 4, Barncliffe Business Park Near Bank Shelley Huddersfield West Yorkshire HD8 8LU		
Contact(s):	Jude Norcliffe		
Project	C700/20/E Netherlands Way		
Quotation No.:	Q20-19998	**Date Received:**	03-Aug-2020
Order No.:	0832	**Date Instructed:**	04-Aug-2020
No. of Samples:	3		
Turnaround (Wkdays):	7	**Results Due:**	12-Aug-2020
Date Approved:	12-Aug-2020		
Approved By:			
Details:	Glynn Harvey, Technical Manager		

Results - Water

Project: C700/20/E Netherlands Way

Client: Rogers Geotechnical Services Ltd		**Chemtest Job No.:**			20-20171	20-20171	20-20171
Quotation No.: Q20-19998		**Chemtest Sample ID.:**			1042108	1042109	1042110
			Client Sample ID.:		D1	D1	D1
			Sample Location:		BH06	BH09	BH01
			Sample Type:		WATER	WATER	WATER
			Top Depth (m):		1.50	1.50	1.50
			Date Sampled:		30-Jul-2020	30-Jul-2020	30-Jul-2020
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Chromium (Hexavalent)	U	1490	µg/l	20	< 20	< 20	< 20
Cyanide (Free)	U	1300	mg/l	0.050	< 0.050	< 0.050	< 0.050
Total Phenols	U	1920	mg/l	0.030	< 0.030	< 0.030	< 0.030
Naphthalene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Fluorene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Anthracene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Pyrene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Chrysene	N	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	N	1700	µg/l	2.0	< 2.0	< 2.0	< 2.0
Aliphatic TPH >C5-C6	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C6-C8	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Total Aliphatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C7-C8	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Total Aromatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	< 5.0	< 5.0

Results - Water

Project: C700/20/E Netherlands Way

Client: Rogers Geotechnical Services Ltd		**Chemtest Job No.:**			20-20171	20-20171	20-20171
Quotation No.: Q20-19998		**Chemtest Sample ID.:**			1042108	1042109	1042110
				Client Sample ID.:	D1	D1	D1
				Sample Location:	BH06	BH09	BH01
				Sample Type:	WATER	WATER	WATER
				Top Depth (m):	1.50	1.50	1.50
				Date Sampled:	30-Jul-2020	30-Jul-2020	30-Jul-2020
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Total Petroleum Hydrocarbons	N	1675	µg/l	10	< 10	< 10	< 10
pH	U	1010		N/A	7.5	9.6	8.1
Cyanide (Total)	U	1300	mg/l	0.050	< 0.050	< 0.050	< 0.050
Thiocyanate	U	1300	mg/l	0.50	< 0.50	< 0.50	< 0.50
Cyanide (Complex)	U	1300	mg/l	0.050	< 0.050	< 0.050	< 0.050
Sulphide	U	1325	mg/l	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
Arsenic (Dissolved)	U	1450	µg/l	1.0	16	22	14
Boron (Dissolved)	U	1450	µg/l	20	740	210	990
Beryllium (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0	< 1.0
Cadmium (Dissolved)	U	1450	µg/l	0.080	0.084	< 0.080	3.4
Copper (Dissolved)	U	1450	µg/l	1.0	6.5	22	48
Mercury (Dissolved)	U	1450	µg/l	0.50	< 0.50	< 0.50	< 0.50
Nickel (Dissolved)	U	1450	µg/l	1.0	32	11	21
Lead (Dissolved)	U	1450	µg/l	1.0	2.6	< 1.0	2.2
Antimony (Dissolved)	U	1450	µg/l	1.0	< 1.0	2.1	2.1
Selenium (Dissolved)	U	1450	µg/l	1.0	56	9.7	23
Vanadium (Dissolved)	U	1450	µg/l	1.0	9.1	56	21
Zinc (Dissolved)	U	1450	µg/l	1.0	71	4.4	230
Chromium (Trivalent)	N	1490	µg/l	20	< 20	< 20	< 20

Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request.The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
1042108		D1	BH06	30-Jul-2020	B	Coloured Winchester 1000ml
1042108		D1	BH06	30-Jul-2020	B	EPA Vial 40ml
1042108		D1	BH06	30-Jul-2020	B	Plastic Bottle 1000ml
1042109		D1	BH09	30-Jul-2020	B	Coloured Winchester 1000ml
1042109		D1	BH09	30-Jul-2020	B	EPA Vial 40ml
1042109		D1	BH09	30-Jul-2020	B	Plastic Bottle 1000ml
1042110		D1	BH01	30-Jul-2020	B	Coloured Winchester 1000ml
1042110		D1	BH01	30-Jul-2020	B	EPA Vial 40ml
1042110		D1	BH01	30-Jul-2020	B	Plastic Bottle 1000ml

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1325	Sulphide in Waters	Sulphides	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using N,N–dimethyl-pphenylenediamine.
1450	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1490	Hexavalent Chromium in Waters	Chromium [VI]	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
1675	TPH Aliphatic/Aromatic split in Waters by GC-FID(cf. Texas Method 1006 / TPH CWG)	Aliphatics: >C5–C6, >C6–C8, >C8– C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Pentane extraction / GCxGC FID detection
1700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
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All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com

Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	20-23607-1
Initial Date of Issue:	10-Sep-2020
Client	Rogers Geotechnical Services Ltd
Client Address:	Unit 4, Barncliffe Business Park Near Bank Shelley Huddersfield West Yorkshire HD8 8LU
Contact(s):	Harry Letch
Project	C700/20/E Immingham
Quotation No.:	
Order No.:	PO-0891
No. of Samples:	5
Turnaround (Wkdays):	7
Date Approved:	10-Sep-2020
Approved By:	
Details:	Glynn Harvey, Technical Manager

Date Received:	04-Sep-2020
Date Instructed:	04-Sep-2020
Results Due:	14-Sep-2020

Results - Soil

Project: C700/20/E Immingham

Client: Rogers Geotechnical Services Ltd				**Chemtest Job No.:**	20-23607	20-23607	20-23607	20-23607	20-23607
Quotation No.:				**Chemtest Sample ID.:**	1059161	1059162	1059163	1059164	1059165
				Client Sample ID.:	D1	D1	D1	D1	D1
				Sample Location:	CP04	CP04	CP07	CP7A	CP08
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	0.60	2.50	0.00	3.00	1.80
				Bottom Depth (m):	1.20		0.70		
				Date Sampled:	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
pH	M	2010		4.0	8.2	8.2	10.6	8.6	8.7
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	0.63	1.2	1.4	1.2	0.29
Moisture	N	2030	%	0.020	21	25	8.1	28	28
Soil Colour	N	2040		N/A	Grey	Brown	Brown	Brown	Brown
Other Material	N	2040		N/A	Stones	None	Stones	None	None
Soil Texture	N	2040		N/A	Clay	Clay	Sand	Clay	Clay

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES

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Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

2183

Final Report

Report No.:	20-25600-1		
Initial Date of Issue:	29-Sep-2020		
Client	Rogers Geotechnical Services Ltd		
Client Address:	Unit 4, Barncliffe Business Park Near Bank Shelley Huddersfield West Yorkshire HD8 8LU		
Contact(s):	Harry Letch		
Project	C700/20/E Immingham		
Quotation No.:		**Date Received:**	24-Sep-2020
Order No.:	PO-0924	**Date Instructed:**	24-Sep-2020
No. of Samples:	4		
Turnaround (Wkdays):	7	**Results Due:**	02-Oct-2020
Date Approved:	29-Sep-2020		
Approved By:			
Details:	Glynn Harvey, Technical Manager		

Results - Soil

Project: C700/20/E Immingham

Client: Rogers Geotechnical Services Ltd		**Chemtest Job No.:**			20-25600	20-25600	20-25600	20-25600
Quotation No.:		**Chemtest Sample ID.:**			1069314	1069315	1069316	1069317
		Client Sample ID.:			D1	D1	D1	D1
		Sample Location:			TP2	TP7	TP11	TP12
		Sample Type:			SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0	0	0	1
		Bottom Depth (m):			0.7	0.7	1.5	1.1
		Date Sampled:			22-Sep-2020	22-Sep-2020	22-Sep-2020	22-Sep-2020
		Asbestos Lab:			DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
ACM Type	U	2192		N/A	-	-	-	-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-	-	-	-

Test Methods

SOP	Title	Parameters included	Method summary
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry

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End of Report

Rogers Geotechnical Services Ltd
Office 1 & 2 Barncliffe Business Park,
Near Bank, Shelley, Huddersfield, HD8 8LU

Telephone 01484 607977
Company No: 5130864

Appendix 5

Fill Screening Values

Rogers Geotechnical Services Ltd Telephone 0843 50 666 87 Fax 0843 51 599 30
Email enquiries@rogersgeotech.co.uk www.rogersgeotech.co.uk

Rogers Geotechnical Services Ltd.

Atkins ATRISK Soil Screening Values (SSVs) - Commercial Landuse

Tox Data Report No.	Compound	Commercial (mg/kg)				Reference
	Metals	1% SOM		6% SOM		
3	Cadmium	410		410		C
4	Chromium VI	19.7	49.1	19.7	49.1	B/C
	Copper	106000		106000		A+
7	Mercury	350.00		405.00		A/D
8	Nickel	1770		1770		A+
	Lead	2310		2310		C
	Zinc	1100000		1100000		A+
	Vanadium	7490		7490		A+
	Semi and Non Metals					
1	Arsenic	635		635		C
10	Selenium	13000		13000		A
	Free Cyanide	373		373		A
9	Phenols (total)	685		3170		A
	Poly Aromatic Hydrocarbons	Free product	No free produc	Free product	No free product	
20	Naphthalene	75	90.1	432	1050	A+
	Acenaphthene	156.8	83600	106000		A+
	Fluorene	66500		72000		A+
	Anthracene	535000		544000		A+
	Fluoranthene	72200		72600		A+
	Pyrene	54100		54400		A+
	Benzo(a)anthracene	1.71	131	10.3	142	A
2	Chrysene	0.44	14000	2.64	14300	A
2	Benzo(b)fluoranthene	1.22	142	7.29	144	A
2	Benzo(k)fluoranthene	0.686	1430	4.12	1440	A
2	Benzo(a)pyrene	26.1	76.3	26.2	76.3	B/C
2	Dibenz(a,h)anthracene	0.00393	14.3	0.0236	14.4	A*
2	Indeno(1,2,3-cd)pyrene	0.0614	142	0.368	144	A*
2	Benzo(g,h,i)perylene	0.0187	1440	0.112	1450	A*
	Petroleum Hydrocarbons					
	Aliphatic C5-C6	327	4490	1100	29400	A+
	Aliphatic C6-C8	157	10400	769	98200	A+
	Aliphatic C8-C10	82.4	1370	476	14800	A+
	Aliphatic C10-C12	49.9	7900	297	69500	A+
	Aliphatic C12-C16	20.9	34000	126	139000	A+
	Aliphatic C16-C21	3620000		3620000		A+
	Aliphatic C21-C35	3620000		3620000		A+
	Aromatic C5-C7 (Benzene)	12.5		98		A+
	Aromatic C7-C8 (Toluene)	834	27900	4360	183000	A+
	Aromatic C8-C10	613	2210	3600	20800	A+
	Aromatic C10-C12	369	12300	2190	53800	A+
	Aromatic C12-C16	155	41300	65400		A+
	Aromatic C16-C21	28400		28400		A+
	Aromatic C21-C35	28400		28400		A+
	Others					
	pH	-		-		-
	Organic Content (%)	-		-		-
	Soluble Sulphate (mg/l)	-		-		-
	Total Sulphate (%)	-		-		-
	Asbestos	-		-		-

A = WS ATKINS PLC, ATRISK SOIL SCREENING VALUES BASED ON 1% SOIL ORGANIC MATTER

A+ = Values updated June 2017.

A* Atrisk's SSV is lower than Chemtest's detectable limit for this compound.

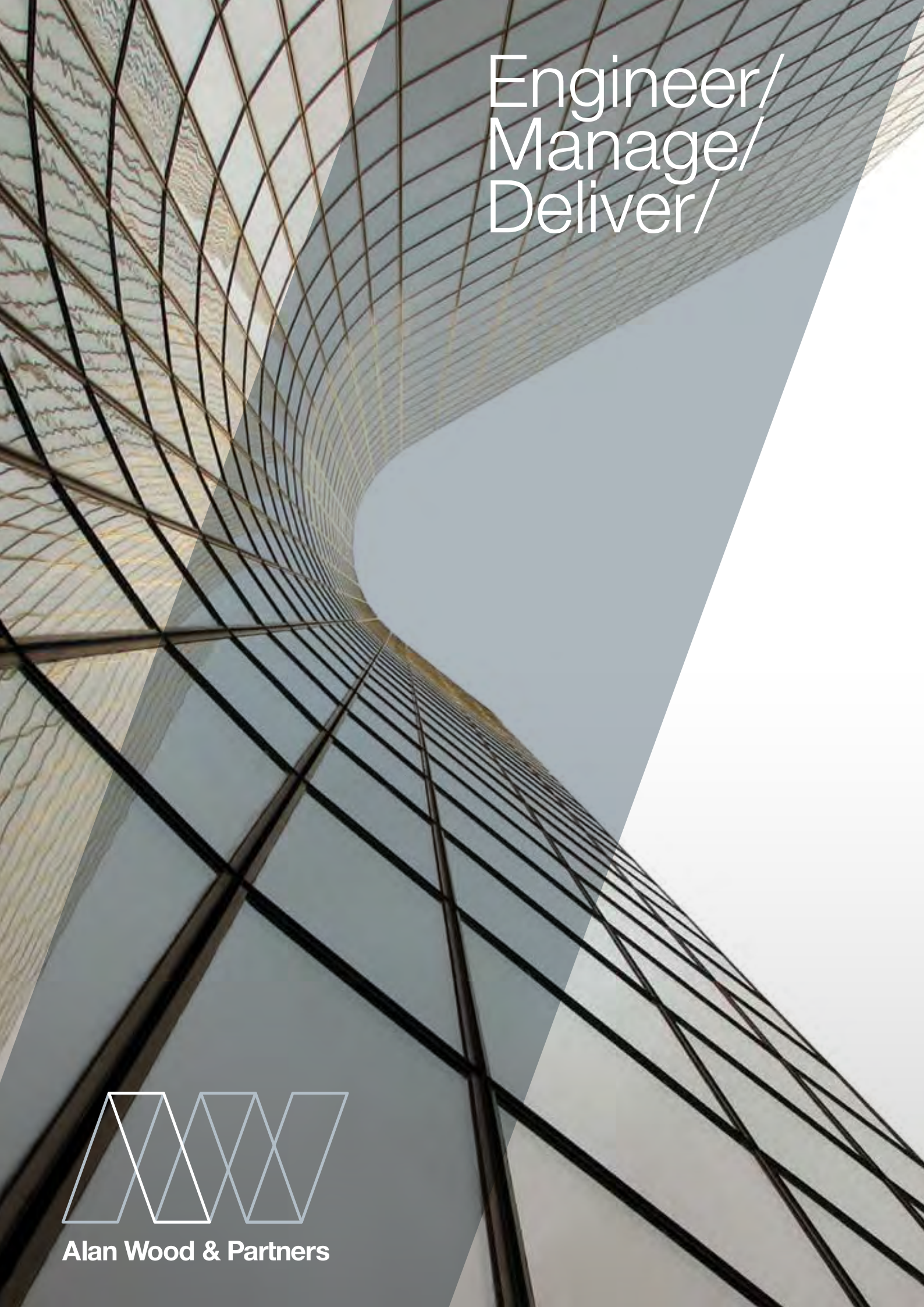
B = health criterion values, which are available from toxicological reviews published in the C4SL project methodology report.

C = Category 4 Screening Levels (C4SLs) based on 1% soil organic matter.

D - Value provided is based on Methyl Mercury. Should elemental mercury be observed or a source be known then a limit of 7.95 should be used.

Appendix 3

Remediation Strategy (Alan Wood and Partners)



Engineer/
Manage/
Deliver/

Alan Wood & Partners

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Email: eng@alanwood.co.uk
Website: www.alanwood.co.uk

IMMINGHAM WASTE TO ENERGY FACILITY, STALLINGBOROUGH, NORTH EAST LINCOLNSHIRE, DN41 8DU

REMEDIATION STRATEGY

for

TEGCO Ltd

Project Reference: JS/AC/44466-Rp003

Prepared by: **A. Clark** *BSc (Hons) MSc FGS*

Signed:

Date: 11th December 2020

Approved by: **J. M. Saunders**, *BSc (Hons) MSc (Eng) CEng MIMMM FGS*

Signed:

Date: 11th December 2020

Issue	Revision	Revised by	Approved by	Revised Date

CONTENTS

APPENDICES

1 INTRODUCTION

1.1 Appointment

1.1.1 Alan Wood & Partners (AWP) was appointed by TEGCO Ltd (the 'Client') to provide technical services associated with the remediation of the redevelopment of land at Netherlands Way, Stallingborough, with a new commercial development.

1.1.2 This remediation strategy should be read in conjunction with the following documentation:

- Phase II Environmental Investigation Report, Netherlands Way, Stallingborough, Immingham, C700/20/E/1077, 8th October 2020.

1.1.3 This report has been prepared for the sole use and reliance of TEGCO Ltd.

1.1.4 No other third party may rely on, reproduce or redistribute any content of this report without the prior written consent of Alan Wood and Partners. Any unauthorised third parties using the information presented in this report do so entirely at their own risk and are duly excluded from any warranty, duty of care or skill.

1.2 Objectives

1.2.1 The redevelopment of the site is to comprise a new power generation facility (power plant) including the construction of buildings, bunkers and an associated sub-station.

1.2.2 The site has been subject to intrusive investigation works carried out by Rogers Geotechnical Services Ltd in June 2020. The intrusive works and associated laboratory testing and monitoring have identified the following conditions which may present a potential risk to end users and require measures to ensure long terms risks to health and the environment are mitigated. Made ground and shallow natural strata has been found to contain elevated PAHs at numerous locations. The recorded concentrations may present a potential risk to end users if present within surface soils of the finished development. Asbestos was also recorded within the made ground at one location. As

such remediation has been recommended to minimise potential risks to human health during normal site occupancy and use following redevelopment.

1.2.3 This report presents the evaluation and identification of environmental remediation options for the site. Specifically, the report presents:

- A summary of the site setting.
- Recommended environmental remediation strategy with proposals for validation.
- Requirements of a verification report.

1.2.4 As part of this remediation strategy we have not re-evaluated contaminant levels and all results are as presented within the Rogers Geotechnical Phase II report.

2 SITE DETAILS AND DESCRIPTION

2.1 Site Location

2.1.1 The site is located off Netherlands Way, Stallingborough, approximately 2.5km to the west of Immingham. The site is centred at National Grid Reference (NGR) 520683mE, 414381mN. The site location is presented as Figure 44466/001.

2.1.2 The site is currently accessed from Netherlands Way on the south western boundary.

2.1.3 The site is bounded by the North Beck Drain to the north and west with Immingham landfill beyond, vacant brownfield land to the east with a railway line beyond, and Redwood Industrial Park to the south.

2.2 Site History

2.2.1 A full record of the historical period reviewed is presented in with the Rogers Geotechnical Phase I Desk Study (document ref. C700/20/E/1078, dated May 2020), however, this report has not been made available to Alan Wood and Partners for review.

3 GROUND CONDITIONS

3.1.1 Reference should be made to the Phase 2 Geo-Environmental Investigation Report, which accompanies this report (Appendix A) for full details of the ground conditions encountered.

3.1.2 The Rogers Geotechnical ground investigation comprised the construction of 10 cable percussive boreholes, 4 windowless sampler boreholes, 12 mechanically excavated trial pits, 2 vibrating wire piezometers and 8 ground gas/groundwater monitoring standpipes. Insitu standard penetration tests (SPT) were carried out at regular intervals within the boreholes.

3.1.3 A summary of the ground conditions that prevail on site is given below. Reference should be made to the document referenced above for details of strata encountered at specific locations.

3.1.4 **Made Ground**: Made Ground was present across the site to a maximum depth of 2.1mbgl in which the material typically comprised either granular deposits (gravel and cobbles) or cohesive material.

3.1.5 **Natural Strata**: The underlying natural strata comprises Tidal Flat Deposits comprising silty, locally organic, clays. This material was recorded to depths of between 2.3m and 7.4mbgl. In some exploratory locations (CP04-06a and CP8-10) organic clays with horizons of peat were recorded at depths of between 6.1mbgl and 7.6mbgl. Gravelly silty clay, with gravel of chalk and flint, was recorded between 19.2m and 19.3m in nearly all boreholes. Weathered chalk was then present below this.

3.1.6 **Groundwater**: Groundwater strikes were recorded at numerous depths during the boring process, typically in granular horizons and at the top of rockhead.

3.1.7 It should be noted that the groundwater levels were recorded at the time of the intrusive ground investigation and subsequent gas monitoring do not take into account seasonal changes in levels over time.

3.1.8 No visual or olfactory evidence of gross contamination, such as hydrocarbons, was recorded during the ground investigation.

4 IDENTIFIED CONTAMINATION ISSUES

4.1.1 18 No. representative samples of soil from within the near surface and at depth were analysed for:

- Metals – Be, Cd, Cr(III), Cr(VI), Cu, Hg, Ni, Pb, V and Zn;
- Semi and Non-Metals – As, Sb, Se, Total, Complex and Free CN;
- Polycyclic Aromatic Hydrocarbons (PAHs);
- Petroleum Hydrocarbons (TPHs);
- pH, Organic Content and Total/Soluble SO_4;
- Asbestos Screen on selected samples.

4.1.2 Rogers Geotechnical have analysed the chemical test results against ATRISK soil screening values (SSVs). No exceedances above the SSVs for a commercial end use have been recorded.

4.1.3 Asbestos was identified in a single sample from TP3. This was quantified as Amosite with a total value of <0.001%.

4.1.4 Water samples were also tested for a range of contaminants, in which elevated Antimony, Cadmium, Copper, Selenium, Vanadium and Zinc were recorded to be present. Given the elevated levels were not reflected in the soil samples, it was deemed unlikely that the contamination source remains on site and that the contamination is likely to represent a diminishing source.

5 HAZARDOUS GROUND GASES

5.1 Preamble

5.1.1 The available information regarding the ground conditions at the site indicated a potential source of hazardous ground gases. A period of gas monitoring was undertaken with measurements of gas concentrations and flow rates taken on 4 occasions.

5.2 Recorded Ground Gas Values

5.2.1 The peak concentration of carbon dioxide (CO_2) was detected in WS02 on the 19th June 2020 at 6.80%v/v.

5.2.2 A maximum peak flow reading of 0.40l/hr was recorded within WS06 and WS09 on the 19th June 2020.

5.2.3 Ground gas monitoring visits were undertaken during barometric pressures of between 1011mb and 1021mb.

5.3 Results

5.3.1 The results of the monitoring indicate that a GSV of 0.0272 l/hr applies for carbon dioxide based on the highest recorded CO_2 concentration.

5.3.2 The worst case GSV indicates that the ground gas regime complies with Characteristic Situation 1, however, given that elevated Carbon Dioxide in excess of 5% has been recorded, the site should be upgraded to Characteristic Situation 2.

5.3.3 Gas protection measures are therefore required for the proposed development.

6 RISK ASSESSMENT

6.1 Introduction

6.1.1 Current UK legislation on contaminated land is principally contained in Sections 78(A) to (YC) in Part 2A of the Environmental Protection Act 1990, which was retrospectively inserted by Section 57 of the Environment Act 1995. The Contaminated Land Regulations 2000 were amended in 2005. The Environmental Protection Act 1990: Part 2A Contaminated Land, Statutory Guidance, Edition 2, 2006, promulgates the revised statutory guidance with respect to the operation of the Contaminated Land Regime following the implementation of the Contaminated Land Regulations, 2005.

6.1.2 The definition of contaminated land is central to the operation of Part 2A. Legislation adopts the principle of a 'suitable for use' approach for the assessment of contaminated land, the rationale reflected in the site-specific risk assessment and determination of remedial strategy. Action is only required if unacceptable risks are posed to human health or to the environment, taking into account the current land use and geo-environmental setting.

6.1.3 The legislation places a responsibility on the Local Authority to determine whether the land under its jurisdiction is contaminated by consideration of whether:

- Significant harm is being caused.
- There is a significant possibility of significant harm being caused.
- Significant pollution of controlled waters is being caused or is likely to be caused.

6.2 Assessment Framework

6.2.1 The statutory guidance describes a risk assessment methodology in terms of ‘significant contaminants’ and ‘contaminant linkages’, using ‘source-pathway-receptor’ scenarios for the site. Contaminant linkages are formed when there is a linkage between a contaminant source and a receptor by means of a pathway. Each element has to be present, or no linkage can be formed.

6.2.2 Risk assessment and the procedure of identifying sources, pathways and receptors is recognised as an approach to determine the extent and significance of contamination either within the context of Part 2A (when assessing current site status or when considering the acquisition of an existing development) or the planning process (for the redevelopment of an existing site, or when considering the acquisition of a site for

redevelopment purposes). Either way, the 'suitable for use' approach is adopted when assessing risk and the source-pathway-receptor assessment defines the conceptual model for the site.

6.2.3 Within the context of this report therefore, the risk assessment has been undertaken on the basis that the 'suitable for use' approach remains aligned with the site being redeveloped for the end uses given above.

6.3 Summary of Identified Contaminant Linkages

6.3.1 On the basis of the ground investigation and laboratory test results, no contaminants have been identified which present a potential risk to site end users. Therefore, no specific remediation is required.

6.3.2 There is the potential for unforeseen contamination to be present on site.

7 UNFORSEEN CONTAMINATION REMEDIATION STRATEGY

7.1 Introduction

7.1.1 There is the potential for unforeseen contamination to be encountered during the enabling works and construction phase of the development.

7.1.2 Should visual or olfactory evidence be encountered during the site works, the following procedures should be adopted.

7.2 Hydrocarbon Contamination

7.2.1 Should hydrocarbon contamination be encountered during the site works, this material should be excavated under the supervision of a suitably qualified geo-environmental engineer. Contamination should be chased out both vertically and horizontally where possible.

7.2.2 Excavated material should be placed on an impermeable membrane, with surrounding bunding to prevent run off, while the laboratory testing confirming the limits of the excavation are free from contamination have been received.

7.2.3 Samples should be obtained from the base of the excavation, and each extent of the excavation to determine that sufficient material has removed, and the contamination successfully excavated from the ground.

7.2.4 The supervising engineer shall advise of the testing requirements to adequately characterise the materials for potential re-use or removal from site based on an assessment of risk to potential receptors (human health and controlled waters).

7.2.5 The extents of the excavation should be surveyed in and added to a drawing of the site to highlight where contamination was encountered and remediated.

7.2.6 The sides of the excavation shall be battered back to a minimum grade of 1v:1h and engineered fill placed and compacted back into the excavation to a method to suite the material grading and in accordance with the Specification for Highways Works Series 600.

7.2.7 Plate Load Testing, sand replacement tests and / or nuclear density gauge testing shall be undertaken on the finished surface of the fill and at suitable points vertically, as determined by the engineer, during the fill process to confirm that material compaction

is adequate and the placed fill will have the required load bearing capacity. The material shall be considered to have been placed adequately, if compacted fill achieves a dry density of 95% of the maximum dry density determined from the laboratory testing and that a CBR of 15% or greater is achieved. Where cohesive material is placed, the air voids in the placed fill should be no greater than 5% and within granular fill this should be 10%.

7.2.8 If volumes of material on site are such that there is a deficit, and it is necessary to import material this should be validated through further environmental laboratory analysis prior to importation or placement in accordance with YALPAG Guidance for Verification. Requirements for Cover Systems, Version 3.4, November 2017 (included as Appendix B).

7.3 Asbestos Contamination

7.3.1 Should evidence of asbestos contamination be encountered within the works, work within the area of suspected contamination should stop immediately.

7.3.2 Within any excavations where asbestos, or possible asbestos, is encountered, these should be backfilled to ensure the risk of fibre release is as low as possible.

7.3.3 The area should be fenced off and no site personnel should enter the area.

7.3.4 A specialist contractor should be contacted to determine the best course of action. It is likely that the material will need to be excavated and removed from site. Excavation of the material should be undertaken and witnessed by suitably qualified site personnel.

7.3.5 Samples of the excavation extents and base should be obtained by a geo-environmental engineer to ensure full removal of all asbestos fibres.

7.3.6 The extents of the excavation should be surveyed in and added to a drawing of the site to highlight where contamination was encountered and remediated.

7.3.7 Samples of the excavated material should also be obtained to allow for disposal at a suitably licensed waste disposal site. Material should be transported to site by a suitably licensed waste carrier.

7.3.8 Appropriate PPE should be worn by all members of site staff, and toolbox talks should be carried out to ensure all members of staff area aware of the risks of asbestos.

7.3.9 The sides of the excavation shall be battered back to a minimum grade of 1v:1h and engineered fill placed and compacted back into the excavation to a method to suite the material grading and in accordance with the Specification for Highways Works Series 600.

7.3.1 Plate Load Testing, sand replacement tests and / or nuclear density gauge testing shall be undertaken on the finished surface of the fill and at suitable points vertically, as determined by the engineer, during the fill process to confirm that material compaction is adequate and the placed fill will have the required load bearing capacity. The material shall be considered to have been placed adequately, if compacted fill achieves a dry density of 95% of the maximum dry density determined from the laboratory testing and that a CBR of 15% or greater is achieved. Where cohesive material is placed, the air voids in the placed fill should be no greater than 5% and within granular fill this should be 10%.

7.3.2 If volumes of material on site are such that there is a deficit, and it is necessary to import material this should be validated through further environmental laboratory analysis prior to importation or placement in accordance with YALPAG Guidance for Verification.

8 VERIFICATION AND REPORTING

8.1.1 Should remediation measures be required at the site for the protection of human health, it will be necessary to prepare a validation report to show that remediation measures have been completed, that contamination issues have been successfully addressed and that material has been managed in the agreed way. Following completion of the remediation works therefore, a validation report will be submitted to the Local Authority for approval and in support of the application to discharge planning conditions and CL:AIRE.

8.1.2 A verification report for all remedial works will be prepared by a suitably qualified, experienced Environmental Engineer in accordance with the requirements of the local regulatory requirements, YALPAG and CL:AIRE.

8.1.3 The verification report shall include:

- A description of the works undertaken,
- Records of the works,
- Progress photographs,
- Waste Transfer Notes,
- Details of any unforeseen contamination encountered, along with confirmation of how these were assessed and identified risks mitigated,
- Chemical and geotechnical validation test results,
- Surveys of the works, as built surveys and interim surveys including base of excavation and cover system surfaces; and
- A statement that the works have been undertaken in accordance with the agreed specification.

9 GENERAL CONSIDERATIONS

9.1 Site Safety

9.1.1 The Project Manager on site will retain the Health and Safety Documents. The document, 'Protection of workers and the general public during the development of contaminated land' will also be held on site. The guidance, standards and legislation followed will include the CDM Regulation (1994), HSW Act (1974) and COSHH Regulations (1988).

9.2 Health and Safety

9.2.1 All parties involved in groundworks will be required, as a minimum, to adhere to basic health and hygiene precautions, as groundworks may bring personnel and others into direct contact with the ground, potentially exposing them to harmful contaminants via the pathways of ingestion, inhalation (fibres and dust) and skin contact.

9.2.2 The site ground works will, therefore, be inspected by experienced personnel who will ensure that appropriate Health and Safety and good site management procedures are adopted throughout. Such procedures should be based upon published guidance, such as provided within the HSE document "*Protection of Workers and the General Public During the Redevelopment of Contaminated Land*".

9.3 Unsuitable Materials

9.3.1 The Contractor shall ensure that machine drivers and supervisory personnel shall closely observe the formation for unusual materials such as: odorous solids or liquids, friable, fibrous or 'dusty' material, in particular asbestos accumulations or seepages of liquids which are:

- Tarry or oily.
- Fuming or bubbling.
- Coloured materials exhibiting any changes in colouration of the ground materials after exposure or excavation.

10 REGULATORY APPROVAL

10.1.1 The conclusions and recommendations presented in this report are considered reasonable on the basis of available information and the assessment of the site as carried out by Alan Wood and Partners.

10.1.2 It should be noted however that the proposals presented herein cannot be guaranteed to gain approval by the Regulatory Authorities and your Warranty Provider, so copies of this report should be made available to the relevant organisations (as appropriate) for their comment and approval, prior to undertaking any irrecoverable works associated with the site.

11 REFERENCES

1 Environment Agency CLR 11 Model Procedures for Managing Contaminated Land

2 Environment Agency (2010), Remediation position statements. Operational Position Statement 226_06.

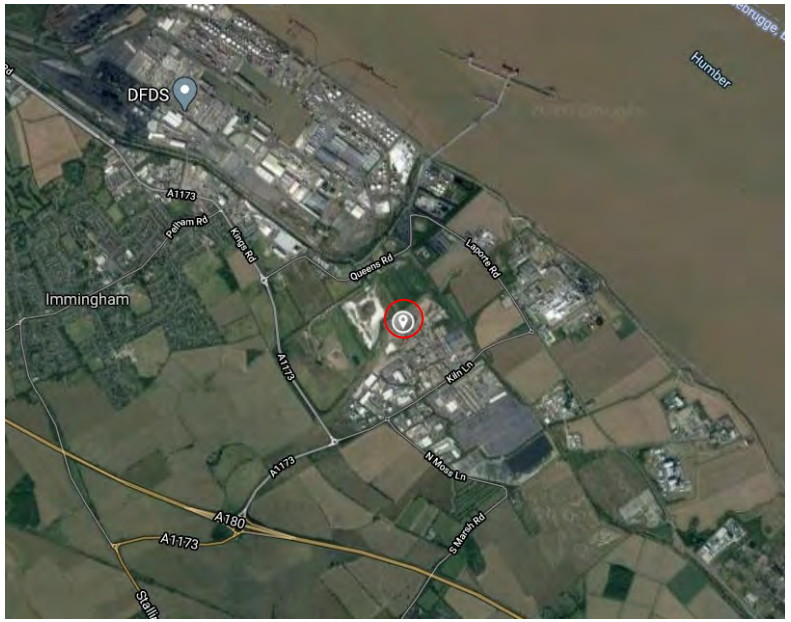
3 YALPAG (2016), Verification Requirements for Cover Systems. Technical Guidance for Developers, Landowners and Consultants.

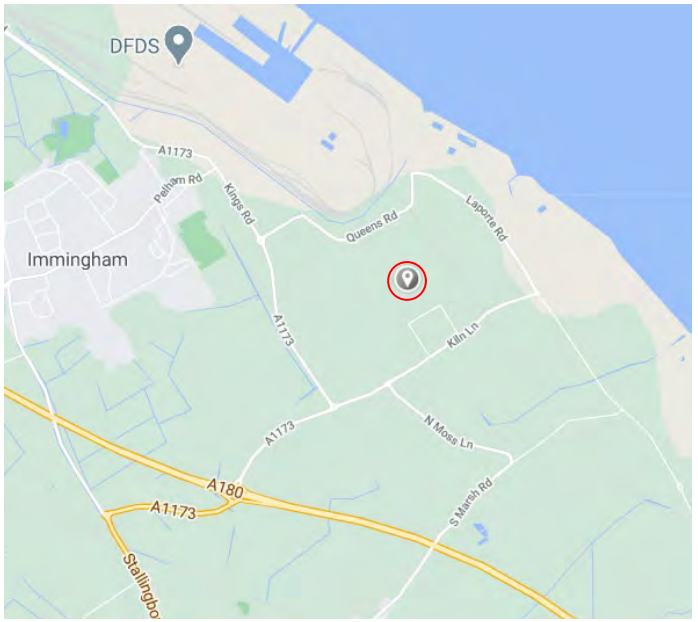
FIGURES

DO NOT SCALE

Approximate Site Location

Approximate Red Line Site Boundary





Alan Wood & Partners

Client.	**TEGCO Ltd**		
Project.	**Immingham Waste to Energy Facility, Europa Way, Stallingborough**		
Drawing.	**Site Location Plan**		
Date. **11.12.20**		Scale. **NTS**	
Drawn by. **AC**	Check by. **JMS**	Approved by. **JMS**	
Status:	**FINAL**		
Job no. **44466**	Fig. no. **001**	Rev.	

APPENDIX A

ROGERS GEOTECHNICAL LIMITED, PHASE II ENVIRONMENTAL INVESTIGATION REPORT, NETHERLANDS WAY, STALLINGBOROUGH, IMMINGHAM, C700/20/E/1077, 8TH OCTOBER 2020.

Environmental
Geotechnical
Specialists

GEOTECHNICAL ENVIRONMENTAL

PHASE 2 ENVIRONMENTAL REPORT

job number C700/20/E/1078	date 06/05/2020

site address
Immingham EFW Sites 1 and 2,
Scandinavian Way,
Stallingborough,
Grimsby, North East Lincolnshire, DN41 8DT

written by M.Cook	checked by C.Mason
issued by M.Cook	

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Environmental Geotechnical Specialists

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Environmental Geotechnical Specialists

Appendices

1.	Site Plan
2.	Borehole Records
3.	Trialpit Records
4.	Laboratory Testing
5.	Fill Screening Values

Environmental Geotechnical Specialists

Report on a Phase 2 Environmental Investigation

Location:	Netherlands Way Stallingborough, Immingham DN41 8DF
For:	TEGCO LTD
Consultants:	Ray Postolowsky
Report No.	C700/20/E/1077 Report date: September 2020

For and on behalf of **Rogers Geotechnical Services Ltd**

Dr Mike Cook BSc PHD
Environmental Engineer

Imran Sakoor BEng FGS
Geo-environmental Engineer

Report Summary[1]

Item	Comments	Section
Development	Construction of a new commercial facility	1.
Geology	Superficial geology – Tidal Flat Deposits. Solid geology – Flamborough Chalk Formation.	5.
Strata Conditions	In general, limited a depth of made ground was revealed over silty clays. Underlain by weathered chalk.	6.1
Groundwater	Refer to factual report.	6.2
Contamination	Asbestos contamination identified within site soils, heavy metal contamination identified within groundwater.	9.1.1
Bulk Ground Gasses	Characteristic Situation level 2 adopted.	9.1.2
Effect of Sulphates	DC-2 concrete.	9.1.3

[1] This summary should not be relied upon to provide a comprehensive review. All of the information contained in this document should be considered.

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1. Introduction

It is understood that the site is to be developed by the construction of a commercial facility that will be occupied by Newton Energi. Plans are yet to be finalised, however it is understood that the development will include new buildings, bunkers and an associated sub-station.

Consequently, a site investigation has been undertaken in accordance with the instruction from the client. This work was required in order to determine the nature of the underlying soils and to take into consideration the risk of any contamination present. This report describes the work undertaken, presents the data obtained and discusses the ground conditions in relation to the proposed works.

It should be appreciated that this report focuses on the environmental aspects of the work undertaken and does not include any geotechnical information or recommendations for foundations.

2. Limitations

The recommendations made and opinions expressed in this report are based on the ground conditions revealed by the site works, together with an assessment of the site and of the laboratory test results. Whilst opinions may be expressed relating to sub-soil conditions in parts of the site not investigated, for example between borehole positions, these are for guidance only and no liability can be accepted for their accuracy.

This report has been prepared in accordance with our understanding of current best practice. However, new information or legislation, or changes to best practice may necessitate revision of the report after the date of issue.

3. Previous Reports

A Phase 1 Desk Study has been undertaken by Rogers Geotechnical Services (RGS) and the results were presented as report number C700/20/E/1078 in May 2020. A Factual Report on the intrusive investigation was also presented by RGS as report number C700/20/E/1077 in September 2020. Information obtained from these reports have been used within this Environmental Report.

4. Fieldworks

The fieldworks were undertaken between the 11th of May and the 4th of June 2020 and included the following:

- Ten light cable percussive boreholes.
- Four windowless sample boreholes.
- Twelve machine excavated trialpits.
- Two piezometer installations.
- Eight gas/water monitoring standpipes.

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The investigatory locations are shown on the site plan which is presented in Appendix 1 to this report.

4.1 Cable Percussive Boreholes

The boreholes were sunk using a 1.5 tonne capacity light cable percussive (shell and auger) drilling rig with 150mm diameter tools and casing.

During the boring operations, representative disturbed samples of the arisings were taken at regular depth intervals and sealed in plastic bags. Standard penetration tests (SPTs) were undertaken at regular depth increments. The SPTs were conducted in accordance with the procedures given in BS EN ISO 22476: Part 3: 2005 +A1: 2011, and the results are summarised on the borehole records. During this work an automatic trip hammer of 63.5kg falling through 760mm was employed to drive either a cone or split barrel sampler assembly into the ground, the barrel samples were retained in air tight plastic containers. Groundwater levels were recorded when struck and boring stopped for a period of time to allow the water level to be monitored.

All recovered samples were returned to the laboratory for subsequent logging and testing. The soils were described in general accordance with BS5930: 2015 + A1: 2020 and full descriptions are given on the borehole records, which are presented in Appendix 2. Also included on these records are the water levels, casing details, standard penetration test results and a record of samples taken.

4.2 Windowless Sample Boreholes

These boreholes were sunk using a drive-in windowless sampler. The cores were undertaken in 1m lengths and typically reduced in diameter from 80mm for the first 1m through 70mm and 60mm for subsequent 1m increments. The recovered cores were sealed and returned to the laboratory for logging and subsequent testing. The soils were described in general accordance with BS5930: 2015 +A1: 2020 and full descriptions are given on the windowless sample records which are presented in Appendix 2. Also included on these records are the core diameters and percentages of core recovered.

4.3 Machine Excavated Trialpits

Twelve trialpits were excavated in order to collect sufficient samples of the coarse made ground and assess the stability of the underlying soils that formed the sides of the excavation. The soils exposed in the trialpits were again logged on site in general accordance with BS5930: 2015 +A1: 2020, and full descriptions are given on the trialpit records which are presented in Appendix 4.

Once excavations were completed, the trialpits were carefully re-instated with the arisings. Whilst every care was taken during the infilling process, including compacting of the infill at regular intervals with the back acting arm of the excavator, it should be appreciated that some mounding of the surface may have resulted. Moreover, the infilled soils may be subjected to settlement over time, such that a depression in the surface may also occur. Therefore, the locations of any pits undertaken in this investigation should be conveyed to the current site user, as the mounds or depressions associated with the pits may present a risk to current site operations. Furthermore, it must be realised that the infilled pits represent an area of disturbance within the site soils, thus the

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soils at the pit locations may vary characteristically compared to the undisturbed ground. As such, foundations placed in this disturbed material may not perform as anticipated.

4.4 Gas/Groundwater Monitoring Standpipes and Piezometers

Standpipes were installed within eight of the windowless sample boreholes and the details of the installations are shown on the appropriate borehole records. In all cases, the monitoring standpipe consisted of a perforated pipe from the base of the borehole to between 1.0m below surface, with a non-perforated pipe to ground level. The response zone was filled with pea gravel, with a bentonite seal above and the installation was capped with a stop box cover in a concrete surround.

Geosense VWP-300 vibrating wire piezometers were installed within cable percussive boreholes CP4 and CP6A, the details and results of which are presented within Appendix 5 of the factual report.

5. Geology

The available published geological data for the site has been examined and the following table presents the anticipated geology.

Table 1: Geological Data for the Site

Strata Type	Strata Name[2]	Previous Name[3]	Description[2]
Artificial Ground	Made Ground	-	Made ground is an area where the pre-existing land surface is raised by artificial deposits. The purpose of the made ground is unspecified. Variable composition.
Superficial Geology	Tidal Flat Deposits	Estuarine Alluvium	Tidal flat deposits, including mud flat and sand flat deposits, are deposited on extensive nearly horizontal marshy land in the intertidal zone that is alternately covered and uncovered by the rise and fall of the tide. They consist of unconsolidated sediment, mainly mud and/or sand. They may form the top surface of a deltaic deposit. A normally consolidated soft silty clay, with layers of sand, gravel and peat. Characteristically low relief.
Solid Geology	Flamborough Chalk Formation	Chalk Without Flints Upper Chalk	White, well-bedded, flint-free chalk with common marl seams (typically about one per metre). Common stylolitic surfaces and pyrite nodules.

[2] Sources: British Geological Survey (NERC) Map Sheets 81; Patrington; Solid and Drift Edition, and Geology of Britain Viewer [*online resource from www.bgs.ac.uk*]
[3] Sources: British Geological Survey (NERC) Lexicon of Named Rock Units [*online resource from www.bgs.ac.uk*]

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6. Strata Conditions

The succession has been shown to include the following:

Table 2: Generalised Strata Profile

Depth m below ground level to underside of layer	Strata Type	Positions Layer
0.7 – 2.1	MADE GROUND (GRAVEL/COBBLES)	ALL
1.4 – 1.9	MADE GROUND (Cohesive)	CP01, CP03, CP09, CP10
2.3 – 9.0	Silty CLAY	CP01, CP02, CP03, CP04, CP06a, CP07a, CP09, CP10
+1.8 – 7.4	Slightly organic CLAY	CP01, CP02, CP04, CP05, CP07a, CP08, CP09, CP10 TP01 to TP12 WS01, WS02, WS04, WS06, WS07, WS08, WS09, WS10
6.1 – 7.6	Organic CLAY/PEAT	CP04, CP05, CP06a, CP08, CP09, CP10
9.2	SILT/SAND	CP10
+10 – 19.3	Gravelly silty CLAY	CP01 to CP10
+19.3 – +30.45	CHALK	CP01, CP02, CP04, CP06a, CP07a, CP10

'+' denotes that the strata extended below the termination depth of the investigated positions, thus the extent of the deposit is only proven to the depths indicated.

6.1 General Strata

In general, the borehole records indicate that a 0.7m to 2.1m capping of made ground was present at all positions. Beneath the made ground, silty locally organic clays were then revealed to depths of between 2.3m and 7.4m below ground level (bgl) at CP01-CP05, CP06a, CP07a, CP08-CP10, TP1 to TP12, WS1-WS4, WS6 and WS7 to WS10.

Below the above strata, organic clays with horizons of peat were then revealed to depths of between 6.1m and 7.6m bgl at positons CP04, CP05, CP6a, CP08, CP9 and CP10. With respect to the published geological data for the site, it is considered that these soils represent Tidal Flat Deposits, which are indicated to be present below the site.

Underlying the Tidal Flat Deposits, gravelly silty clay (gravel is of chalk and flint) was encountered to between 19.2m and 19.3m within CP01, CP02, CP04, CP6a, CP7a and CP10 to the termination depth of CP3, CP5, CP8, CP9. Underlying the gravelly silty clay, weathered chalk was then present to the termination of CP01, CP02, CP04, CP06a, CP07a and CP10. With respect to the available published geological data for the site, this stratum is anticipated to represent the upper weathered fraction of the Flamborough Chalk Formation.

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6.2 Groundwater

Groundwater strikes were observed at numerous positions during the site investigation, these are noted on the appropriate borehole and trial pit logs within Appendices 2, 3 and 4. However, it should be appreciated that the normal rate of boring does not permit the recording of an equilibrium water level for any one strike, moreover, groundwater levels are subject to seasonal variation or changes on local drainage conditions.

In addition to the above, readings from the vibrating wire piezometers are presented within Appendix 5 of the factual report.

7. Insitu Testing

7.1 Standpipe Monitoring

The standpipes were monitored between the 19th of June and 17th July 2020. The results of the gas monitoring undertaken to date are tabulated below:

Table 3: Standpipe Monitoring

Borehole No.	Date	CH_4 (%)	CO_2 (%)	O_2 (%)	Flow (l/hr)	Barometric Pressure (mb)	Water Level (m bgl)	Standpipe Depth (m)
WS01	19.06.20	1.8	1.1	15.2	0.0	1012↔	1.03	3.58
	03.07.20	1.2	1.0	17.5	0.1	1011↔	1.00	
	10.07.20	0.9	0.9	18.1	0.1	1019↑	0.95	
	17.07.20	0.7	0.9	18.1	0.1	1021↔	1.10	
WS02	19.06.20	0.2	6.8	2.4	0.0	1012↔	0.77	3.75
	03.07.20	1.5	1.0	18.9	0.1	1012↔	0.70	
	10.07.20	0.2	0.3	20.6	0.0	1019↑	0.67	
	17.07.20	0.2	0.4	20.2	0.0	1021↔	0.85	
WS04	19.06.20	0.0	1.1	16.4	0.1	1012↔	1.08	3.77
	03.07.20	0.1	1.0	20.3	0.1	1012↔	0.90	
	10.07.20	0.1	1.4	20.2	0.1	1019↑	0.95	
	17.07.20	0.1	1.5	19.9	0.1	1021↔	1.05	
WS06	19.06.20	0.4	0.1	19.5	0.4	1012↔	0.66	3.30
	03.07.20	0.2	0.2	20.3	0.0	1011↔	0.30	
	10.07.20	0.0	0.2	20.6	0.0	1019↑	0.65	
	17.07.20	0.0	0.2	20.2	0.0	1021↔	0.60	
WS07	19.06.20	*	*	*	*	1012↔	0.00	2.60
	03.07.20	0.0	0.1	20.8	0.0	1011↔	0.00	
	10.07.20	*	*	*	*	1019↑	0.00	
	17.07.20	0.0	0.1	20.5	0.0	1021↔	0.10	
WS08	19.06.20	0.1	0.2	20.0	0.0	1012↔	0.32	3.35
	03.07.20	0.0	0.3	20.3	0.0	1012↔	0.30	
	10.07.20	0.5	0.5	20.1	0.1	1020↑	0.35	
	17.07.20	0.3	0.7	18.7	0.1	1021↔	0.30	
WS09	19.06.20	0.1	0.0	19.3	0.4	1012↔	0.85	3.85
	03.07.20	0.1	0.1	19.7	0.0	1012↔	0.60	
	10.07.20	0.1	0.1	20.8	0.0	1020↑	0.65	
	17.07.20	0.0	0.1	20.4	0.0	1021↔	1.00	

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WS10	19.06.20	0.0	0.1	20.6	0.1	1012↔	1.50	3.85
	03.07.20	0.1	5.5	15.3	0.1	1012↔	1.50	
	10.07.20	0.0	0.1	14.3	0.1	1020↑	1.42	
	17.07.20	0.0	6.1	13.7	0.1	1021↔	1.50	

*water sat at ground level – unable to monitor position.

This work was undertaken using a GA5000 ground gas analyser, serial No G503524 which was last calibrated on the 18th May 2020.

8. Laboratory Testing - Environmental

8.1 Environmental Testing

A suite of testing was conducted by Chemtest Ltd on soil and water samples from across the site and the following regime was undertaken.

- Metals – Be, Cd, Cr(III), Cr(VI), Cu, Hg, Ni, Pb, V and Zn.
- Semi and Non-Metals - As, Sb, Se, Total, Complex and Free CN^-.
- Polycyclic aromatic hydrocarbons (PAHs).
- Petroleum hydrocarbons (TPHs).
- Others – pH, organic content and total/soluble SO_4^{2-}.
- Asbestos screen (restricted to select trialpit samples).

This testing was undertaken by Chemtest Ltd and the results of all of the chemical testing are presented in Appendix 5 of this report. It should be appreciated that the suite and sampling locations were specified by the client.

9. Discussion of Ground Conditions - Environmental

9.1 Discussion of Test Results

It is understood that the site is to be developed by the construction of a new commercial facility with associated buildings, bunkers and an associated sub-station. Consequently, the site may be classified as commercial.

9.1.1 Soil Samples

The results of the chemical testing undertaken on soil samples obtained during this investigation have been compared to the ATRISK soil screening values (SSVs) as compiled by WS Atkins plc. With respect to the results it should be appreciated that the soil organic matter (SOM) content for the samples tested was found to range between 1.1% and 17%, with an average of 4.9%. On this basis, it is considered that the screening values associated with 1% SOM should be adopted. These values have been derived in such a way as to adhere to the principles within the revised CLEA

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model and include the most current release of the SGVs. A list of subscribers is provided within the website[4] and these include many local authorities.

A comparison of the results of the testing, together with the data given above, can be found within Appendix 5. These results indicate the following:

Table 4: Summary of Contaminated Areas

Location	Strata	Depth (m)	Contaminants found to be exceeding SSVs (Commercial)
CP4	MADE GROUND	0.6 – 1.2	PAHs (Benzo[a]anthracene, Chrysene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Benzo[a]pyrene, Indeno(1,2,3-c,d)Pyrene, Dibenz(a,h)Anthracene, Benzo[g,h,i]perylene).
CP4	Silty CLAY	2.5	None.
CP6A	MADE GROUND	0.6 – 1.5	PAHs (Benzo[a]anthracene, Chrysene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Benzo[a]pyrene, Indeno(1,2,3-c,d)Pyrene, Dibenz(a,h)Anthracene, Benzo[g,h,i]perylene).
CP6A	Silty CLAY	2.0 – 2.5	PAHs (Benzo[a]anthracene, Chrysene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Indeno(1,2,3-c,d)Pyrene, Dibenz(a,h)Anthracene, Benzo[g,h,i]perylene).
CP7A	MADE GROUND	0.8 – 2.0	PAHs (Benzo[a]anthracene, Chrysene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Indeno(1,2,3-c,d)Pyrene, Dibenz(a,h)Anthracene, Benzo[g,h,i]perylene).
CP7A	Silty CLAY	3.0	None.
CP8	MADE GROUND	0.6	None.
CP8	Silty CLAY	2.5	None.
CP10	MADE GROUND	0.6 – 1.2	PAHs (Benzo[a]anthracene, Chrysene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Indeno(1,2,3-c,d)Pyrene, Dibenz(a,h)Anthracene, Benzo[g,h,i]perylene).
TP1	MADE GROUND	0 – 0.9	PAHs (Benzo[a]anthracene, Chrysene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Indeno(1,2,3-c,d)Pyrene, Dibenz(a,h)Anthracene, Benzo[g,h,i]perylene).
TP2	MADE GROUND	0 – 0.7	None (asbestos test only).
TP3	MADE GROUND	0 – 1.2	Asbestos. PAHs (Benzo[a]anthracene, Chrysene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Indeno(1,2,3-c,d)Pyrene, Dibenz(a,h)Anthracene, Benzo[g,h,i]perylene).
TP4	MADE GROUND	0 – 0.7	PAHs (Benzo[a]anthracene, Chrysene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Indeno(1,2,3-c,d)Pyrene, Dibenz(a,h)Anthracene, Benzo[g,h,i]perylene).
TP5	MADE GROUND	0 – 0.8	PAHs (Chrysene).
TP7	MADE GROUND	0 – 0.7	PAHs (Benzo[a]anthracene, Chrysene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Indeno(1,2,3-c,d)Pyrene, Dibenz(a,h)Anthracene, Benzo[g,h,i]perylene).
TP8	MADE GROUND	1.3 – 1.5	PAHs (Benzo[a]anthracene, Chrysene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Indeno(1,2,3-c,d)Pyrene, Dibenz(a,h)Anthracene, Benzo[g,h,i]perylene).
TP11	MADE GROUND	0.0 – 1.6	PAHs (Benzo[a]anthracene, Chrysene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Indeno(1,2,3-c,d)Pyrene, Dibenz(a,h)Anthracene, Benzo[g,h,i]perylene).
TP12	MADE GROUND	0.0 – 1.1	PAHs (Chrysene, Indeno(1,2,3-c,d)Pyrene, Dibenz(a,h)Anthracene, Benzo[g,h,i]perylene).

[4] http://www.atrisksoil.co.uk/pages/general/subscribers.asp

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Concentrations of chromium(VI), free cyanide, and total petroleum hydrocarbons (aliphatic C5 to C12; aromatic C5 to C12) were below the detection limits for the tests. Detectable levels of all other contaminants were recorded, but these fell below the associated Atrisk Soil Screening Values.

It should be appreciated that the soil screening values for PAHs (where appropriate) represents vapour saturation limits. The inhalation of vapour pathway contributes less than 10% of total exposure, which is unlikely to significantly affect the combined assessment criterion[5]. In view of this, the ATRISK soil SSVs notes that the users may wish to consider using a combined assessment criterion if free product is not observed, the values for which are also provided on the summary of contamination analysis. It is therefore considered that the criteria for no free product should be adopted for the PAHs. The results of the contaminants found to exceed these screening values are tabulated below:

Table 5: Summary of Contaminated Areas (No free product)

Location	Strata	Depth (m)	Contaminants found to be exceeding SSVs (Commercial)
CP4	MADE GROUND	0.6 – 1.2	None.
CP4	Silty CLAY	2.5	None.
CP6A	MADE GROUND	0.6 – 1.5	None.
CP6A	Silty CLAY	2.0 – 2.5	None.
CP7A	MADE GROUND	0.8 – 2.0	None.
CP7A	Silty CLAY	3.0	None.
CP8	MADE GROUND	0.6	None.
CP8	Silty CLAY	2.5	None.
CP10	MADE GROUND	0.6 – 1.2	None.
TP1	MADE GROUND	0 – 0.9	None.
TP3	MADE GROUND	0 – 1.2	Asbestos.
TP4	MADE GROUND	0 – 0.7	None.
TP5	MADE GROUND	0 – 0.8	None.
TP7	MADE GROUND	0 – 0.7	None.
TP8	MADE GROUND	1.3 – 1.5	None.
TP11	MADE GROUND	0.0 – 1.6	None.
TP12	MADE GROUND	0.0 – 1.1	None.

[5] Ref: ATRISK soil, SSVs derived using CLEA v1.071 for 1% SOM, Commercial land use, 23.06.17

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On the basis of the above information, a 'hotspot' of asbestos contamination has been observed within the made ground at the position of TP3. Notwithstanding the above, the results of the areas of the site away from TP3 appear to be generally uncontaminated with respect to the proposed commercial end use for the site. It should be noted however that due to the limited quantities and/or coarse nature of the samples obtained within the CP boreholes, asbestos testing could not be undertaken at all positions and was restricted to select trialpit positions; TP1, TP2, TP3, TP4, TP5, TP7, TP8, TP11, TP12. Nonetheless, good coverage has been attained across the site.

9.1.2 Water Samples

Table 6: Summary of Water Concentration and Associated EQSs

Determinand	Exceeds Appropriate EQSs?	Maximum Concentration (or range) in Water	Most onerous EA EQS limit			
			Drinking Water	Freshwater*	Surface Water*	Surface Water Intended for Abstraction for Drinking Water*
Metals and Semi-Metals						
Antimony	Yes	2.1 µg/l	-	-	-	-
Arsenic	No	22 µg/l	10 µg/l	-	50 µg/l	50 µg/l
Boron	No	990 µg/l	500 µg/l	-	1000 µg/l	1000 µg/l
Cadmium	Yes	3.4 µg/l	5 µg/l	0.08 µg/l	0.08 µg/l	5 µg/l
Copper	Yes	48 µg/l	2000 µg/l	5 µg/l	20 µg/l	20 µg/l
Nickel	No	32 µg/l	20 µg/l	-	50 µg/l	-
Lead	No	2.6 µg/l	10 µg/l	-	4 µg/l	50µg/l
Selenium	Yes	56 µg/l	10 µg/l	-	-	10 µg/l
Vanadium	Yes	56 µg/l	-	-	20 µg/l	-
Zinc	Yes	230 µg/l	-	30 µg/l	30 µg/l	3000 µg/l

*Dependant on water hardness and fish species present, most onerous value shown.

In the context of the water testing, it should be appreciated that the following determinants were below detection limits;

- Some metals (Beryllium, Chromium, Cyanide and Mercury).
- Some non-metals (Sulphide).
- Thiocyanate.
- All PAHs.
- All TPHs.
- Total Phenols.

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With regards to those contaminants above detection limit, it should be appreciated that the Environment Agency have provided limits for Environmental Quality Standards[6] (EQS) which should be met in respect to a variety of media.

The results of the water testing site should be compared to the most appropriate EQS values. Given the nature of the site, EQS for *freshwater* and/or *surface water* media types are considered the most appropriate. Where no EQS values are available for the aforementioned parameters, then EQSs for *UK Drinking Water Standards* and/or *Surface Water Intended for Abstraction for Drinking Water* should be utilised. Where no current EQS exists, results should be compared to existing background quality or taken as the limit of detection.

In light of the above, elevated levels of Antimony, Cadmium, Copper, Selenium, Vanadium and Zinc appear to be present within the groundwater at the site, although there was some notable variation in concentration between positions.

Notwithstanding the above, given that elevated levels of these heavy metal contaminants were not noted within the soils on site it is considered unlikely that the original source of this contamination remains present on site, and thus this contamination is likely to represent a diminishing source. Furthermore, in light of the industrial nature of the surrounding area, it is possible that this contamination may have originated off-site.

In addition to the above, given the significant thicknesses of low permeability cohesive materials underlying the made ground at the site, it is considered unlikely that this water contamination would represent a significant risk to the underlying chalk aquifer within the solid geology.

9.1.3 Gas Concentrations

With respect to ground gas, the results of the monitoring visits indicated a maximum concentration of 1.8% methane, with concentrations of carbon dioxide ranging between 0.1% and 6.8%, in association with oxygen levels of between 2.4% and 20.8%. It should be appreciated that on non contaminated sites there is generally about 20% by volume of oxygen, associated with low levels of carbon dioxide. In addition, a maximum flow rate of 0.4 litres per hour was recorded and will be employed in the following calculations.

The principal driving force for initiating the movement of gas in the ground is a change in barometric pressure. The most onerous gas condition on a site is usually observed on days of low and/or falling barometric pressure, preferably below 1000mb. It has been noted that measurements undertaken solely during high pressure conditions may be of lesser value. At this site the readings undertaken to date were at atmospheric pressures of between 1011mb and 1021mb.

In order to establish the gas screening value (GSV) for carbon dioxide or methane, the maximum gas concentration (expressed as a decimal) is multiplied by the borehole flow rate (l/hr). In this case 1.8% (0.018) methane was recorded along with 6.8% (0.068) carbon dioxide, in association with a maximum flow rate of 0.4 l/hr. This results in a GSV of 0.0072 l/hr for methane and a GSV of 0.0272 l/hr for carbon dioxide.

[6] Environment Agency Chemical Standards Database [*online resource http://evidence.environment-agency.gov.uk/ChemicalStandards/Home.aspx]*

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In accordance with Table 8.5, Modified Wilson and Card classification of the CIRIA report C665, Assessing risks posed by ground gasses to building, the site may be classified as *Characteristic Situation Level 1*. However, as levels of methane exceed 1% and levels of carbon dioxide exceeded 5%, the site should be upgraded to *Characteristic Situation Level 2*. Therefore, it is considered that there is some risk of harm (albeit low) to end users and some protection measures are required.

With regard to the number of monitoring visits required reference is made to Tables 5.5a and 5.5b of CIRIA report C665 (2007)[7]. Accepting that the proposed development is of low sensitivity and that the generation potential is very low, these tables suggest that 4 readings could be undertaken over a period of 1 month. However, C665 notes that *not all sites will require gas monitoring for the period and frequency indicated in Tables 5.5a and 5.5b.*

In this case, a total of 4 monitoring visits were undertaken over a 4 week time period and for the purposes of this assessment, it is considered that the site can be classified as *Characteristic Situation Level 2*.

9.1.4 Effect of Sulphates

In view of the nature of the underlying soils it is considered that the design sulphate class be assessed with reference to Table C2[8], which is provided in BRE Special Digest 1, *Concrete in aggressive ground*: Part C. On the basis of this table and considering the soluble sulphate contents recorded, it can be shown that well compacted buried concrete should be designed in accordance with Class DS-2 requirements. Assuming mobile groundwater, the table also indicates that the aggressive chemical environment for concrete (ACEC) classification is AC-2.

In order to evaluate the design chemical (DC) class for the buried concrete at this site reference should be made to Table D1[9], which can be found in Part D, *Specifying concrete for general cast-in-situ use,* of BRE Special Digest 1. From this table it may be shown that for an intended working life of at least 50 years the concrete design class DC-2 is required.

9.2 Site Specific Risk Assessment

9.2.1 Approach

The presence of contamination hazards and the risks associated with them should be assessed in accordance with industry practice and the 'suitable for use' approach. This has been conducted with reference to The Department for Environment, Food and Rural Affairs (DEFRA) and The Environment Agency[10] advice on the assessment of risks arising from the presence of contamination in soils and using the source-pathway-receptor approach.[11] This method dictates that there must be a risk of contaminant produced at a 'source' in sufficient concentration to cause

[7] Adapted from tables 5.5a and 5.5b of CIRIA C665, 2007, *Assessing risks posed by hazardous ground gas to buildings, p60.*
[8] Table C2, *Aggressive Chemical Environment for Concrete (ACEC) classification for brownfield locations*
[9] Table D1, *Selection of the DC Class and the number of APMs for concrete elements where the hydraulic gradient due to groundwater is 5 or less: for general in-situ use of concrete.*
[10] R&D Publication CLR 8, 'Assessment of Risks to Human Health from Land Contamination: An overview of the Development of Soil Guideline Values and Related Research'.
[11] The pollution linkage approach was developed by 'Circular 2/2000 Contaminated Land: Implementation of Part II of The Environmental Protection Act 1990' which provides meanings for the terms contained in The Environmental Protection Act 1990 Part IIA, the primary legislation for addressing the issues of contaminated land.

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harm and there must be a 'pathway' for the contaminant to reach an identifiable 'receptor' for the linkage to be proved and a contamination hazard to be considered present. Not all substances are contaminants and not all contaminants are considered to be a risk. Indeed DEFRA and The Environment Agency state that 'a contaminant is a substance which has the potential to cause harm, while a risk itself is considered to exist if such a substance is present in sufficient concentration to cause harm and a pathway exists for a receptor to be exposed to the substance.'[12]

9.2.2 Conceptual Ground Model and Risk Assessment

In view of the results of the chemical testing undertaken the conceptual site model is presented accordingly as Table 5. Sources of contamination include the following:

On-site – Made Ground (Asbestos). Bulk Ground Gasses (CO_2 and CH_4). Heavy metal contamination within groundwater.

The preliminary risk assessment has been evaluated with reference to the following ratings and definitions:

N/A -	A source-pathway-receptor linkage is not considered to exist and therefore a risk assessment is not required.
Low -	A pollution linkage is unlikely and/or the likelihood of harm occurring is low and of minor consequence.
Moderate -	The linkage exists but the likelihood of harm occurring is not considered to be significant although remedial action may be necessary
High -	The linkage exists and the available data indicates that significant harm may be caused and remedial action could be necessary.

The results of the risk assessment are presented in Table 7.

[12] See 'Circular 2/2000 Contaminated Land: Implementation of Part II of The Environmental Protection Act 1990', appendix A.

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Table 7: Conceptual Site Model and Site Specific Risk Assessment

Conceptual Site Model			Site Specific Risk Assessment	
Pathways	**Receptor**	**Linkage Present?**	**Risk Rating**	**Notes**
Direct contact/dermal absorption/soil ingestion	Operative	Yes – a hotspot of asbestos found to be present at the site and contact with soil likely during works.	High	A hotspot of asbestos contamination by lead and asbestos is present within the made ground underlying the site. Precautionary measures will be required during the construction phase. Remediation will be required to either remove the contamination or break pathways.
	End User	Yes – a hotspot of asbestos found to be present at the site and site to be developed into a commercial facility.	High	
	Neighbours	No – no residential (or garden) areas adjoin the site.	N/A	
Inhalation of Dust/Vapours	Operative	Yes – dust may be derived from contaminated soils. However, asbestos contamination is not considered likely to represent a significant vapour risk.	High (Dust) Low (Vapours)	A hotspot of asbestos contamination is present within the made ground underlying the site. Precautionary measures will be required during the construction phase. Remediation will be required to either remove the contamination or break pathways.
	End User	Yes – dust may be derived from contaminated soils. However, asbestos contamination is not considered likely to represent a significant vapour risk.	High (Dust) Low (Vapours)	
	Neighbours	Yes – a hotspot of asbestos found to be present at the site and commercial properties located within 250m radius of the site. Possible inhalation of dust during the works.	High (Dust) Low (Vapours)	
Ingestion of fruit/vegetables and/or waters	Operative	No – no edible plants or contained water sources in the area of the proposed new works.	N/A	
	End User	No – no garden areas are proposed as part of the current development plans.	N/A	
	Neighbours	No – no residential (or garden) areas adjoin the site. Furthermore, asbestos contamination is not expected to affect plants.	N/A	

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Migration of hazardous gases via permeable strata or shallow mining activity	Operative	Yes – concentrations of methane and carbon dioxide have been found to be present at the site (considering Characteristic Situation Level 2).	High	Concentrations of harmful gases (methane and carbon dioxide) were detected at the site, some remediation will be required.
	End User		High	
	Neighbours		High	
Spillage/loss/run off direct to receiving water	Controlled Waters	Yes – known controlled waters within 250m. However, given the significant thicknesses of low permeability cohesive materials underlying the site it is considered unlikely the heavy metal contamination observed within the shallow groundwater would represent a significant risk to controlled waters. Furthermore, it is considered that the heavy metal contamination represents a diminishing source.	Low	
Migration via permeable unsaturated strata	Controlled Waters	Yes – a Principal aquifer is present within the solid geology beneath the site. However, given the significant thicknesses of low permeability cohesive materials underlying the site it is considered unlikely the heavy metal contamination observed within the shallow groundwater would represent a significant risk to the underlying aquifer.	Low	
Run off via drainage/sewers etc	Controlled Waters	Yes – redundant services may be present on site. However, it is considered that heavy metal contamination represents a diminishing source.	Moderate	Redundant services to be removed or capped.
Direct contact with contaminated soils	Plants	Yes – some areas of soft landscaping may be present as part of site development plans. However, asbestos contamination is not expected to affect plants.	Low	
Uptake via root system			Low	
Direct contact with contaminated soils	Building Materials	Yes – asbestos and heavy metal contamination is not anticipated to represent a risk to building materials or plastic water pipes. Testing indicates that the aggressive chemical environment for concrete classification is AC-2.	Low (plastic services) Moderate (buried concrete)	Please see section 9.3.3 for information on good building practice.
Direct contact with contaminated groundwater				
Exposure to Radon	Operative	No – not in a radon affected area.	N/A	The publication BR211 states that no protection measures are necessary.
	End User			

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9.3 Indicative Remediation Strategy

In view of the site specific risk assessment it is considered that remediation will be required at this site. Such a strategy should include the following main elements.

9.3.1 Remediation Objectives

Based on the site specific risk assessment the object of the remediation is likely to be as follows.

- To protect the site operatives during the construction process from the ingestion of soil or dust, dermal contact with the soil and inhalation of dust.
- To protect the end user from the ingestion of soil or dust, dermal contact with the soil and inhalation of dust.
- To protect the end user from the elevated levels of bulk ground gasses (methane and carbon dioxide).
- To protect neighbours from the inhalation and ingestion of dust during the construction process.
- To protect end users from elevated levels of carbon dioxide.

9.3.2 Development Requirements

Whilst the precise nature of this development has not been finalised, it is understood that it is to be developed by the construction of a new commercial facility with buildings, bunkers and a sub-station. In view of the above a site specific remediation strategy should be undertaken after the proposed development has been finalised. However, for preliminary design and costing the following remediation proposals are offered.

9.3.3 Outline Strategy

In order to fulfil the objectives defined above it is likely that the following remedial strategy could be utilised. It is recommended that a pragmatic approach be undertaken, with observational techniques being employed at each stage of the work.

Ground-works

During the ground-works phase of the development, protection to the site operatives is required. The risk to site operatives is considered under the Health and Safety at Work Act 1974, together with regulations made under the act, which includes the Control of Substances Hazardous to Health (COSHH) regulations. Therefore the risks to site personnel must be considered under the Construction Design and Management (CDM) regulations at the planning stage and be included in

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the contractor's Health and Safety Plan and site specific Method Statements. These documents should include the following main elements.

- Site operatives at all levels should be made aware of the hazards of working with contaminated soils and the potential hazards associated with materials containing asbestos.
- Site operatives at all levels should be made aware of the hazards of working in an area where accumulations of bulk ground gasses (methane or carbon dioxide) could occur.
- Access to the site by the general public should be restricted until remediation has taken place.
- Personal hygiene facilities, including washing and messing, must be provided and site operatives be encouraged to use them.
- Where work is undertaken in dry weather the site should be dampened down to avoid dust.
- Dust masks must be provided to all site operatives for at all times.
- In order for contaminated soils to be disposed of to an appropriate landfill, it may be necessary to carry out Waste Acceptance Criteria (WAC) testing in accordance with BS EN 12457.
- Any stockpiles of contaminated soil on site should be sheeted over to prevent excessive amounts of airborne dust and cross contamination of imported fill.
- Where vehicles are transferring soil to the landfill site they should be covered to prevent contamination of the surrounding area by dust.
- Where work is undertaken in wet weather, vehicle and wheel washing facilities are required to ensure that the vehicles leaving the site do not transfer contamination to surrounding areas.

On completion of the ground-works a careful site inspection of the sub-grade would be required. Should visual or olfactory evidence of contamination be revealed then further testing may become necessary.

Construction

During the construction phase of the contract the following items are required to protect the end user from the potential contaminants revealed at this site.

- Beneath buildings, pavements and hard-standings clean inert granular sub-base should be employed.
- Any redundant services revealed at this site should be de-commissioned and piped services sealed. Any existing services that are to be employed in the new development should be carefully inspected to ensure that they are serviceable.
- New plastic services should be constructed in a surround of clean inert material and selected in accordance with the recommendation given in the United Kingdom Water Industry Research (UKWIR) website under Report Ref. No. 10/WM/03/21 - 'Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites'. The statutory water authority for the area in which site is located may have a risk assessment form to complete which allows these recommendations to be met. However, further determinand specification contamination testing may be necessary.
- For buried concrete the results of the sulphate and pH testing indicate that the design sulphate class for the site should be DS-1.

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Asbestos Hotspot Area

Should the area around TP3 be overlain by permanent hard-standing, this would break the pathway between the end user and the asbestos contamination. Therefore, no further remediation is considered to be necessary beneath any permanent hard-standing, which includes building footprints.

However, any part of the hotspot area is to comprise soft landscaping would require some remediation. Remediation for soft landscaped areas could include the provision of a clean cover system. For grassed areas this system would need to employ a capping layer of say 350mm of inert material, which will put the contaminated ground out of the end users' dig range. At the base of this layer, a granular capillary break of say 100mm of free draining granular soil should be placed in order to provide a no dig layer and prevent mobile contamination rising upward. This expedient should also provide a suitable root barrier to isolate the plants from the underlying contaminated ground.

Where grass and shrubs are present, this capping layer would need to be deepened to say 500mm of inert material, at the base of this layer, a granular capillary break of say 100mm of free draining granular soil should be placed.

Notwithstanding the above, prior to undertaking these remediation measures it is recommended that further testing is undertaken to determine the exact extent of the asbestos hotspot surrounding TP3. It would also be prudent to undertake additional testing in the wider site area.

Gas Protection Measures

In order to assess the protection measures required BS8485: 2015+A1:2019: *Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings* will need to be employed in design. In accordance with Table 3, *Building types,* of the code, the development may be considered to conform to Type D. Therefore, on the basis of Table 4 *Gas protection score by CS and type of building,* the minimum gas protection score (points) is 1.5. The gas protection system should consist of at least two different elements. The elements work independently and collaboratively, and a single element should not be used because there would be no redundancy to allow for defects in the component.

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9.4 Fill Materials

It should also be appreciated that any fill material, either site-won or imported, to be employed at the site should be subjected to the following assessment to determine its suitability.

Fill materials should be initially screened, by a suitably qualified engineer to establish that:

- It is a suitable growing media if it is to be employed as such, including compliance with BS3882 (2015)
- It is free from obvious contamination i.e. visual or olfactory evidence
- It has not come from areas where Japanese Knotweed or other invasive or injurious plants are suspected to be growing
- It is not a statutory nuisance, such as being odorous
- It is free from unsuitable material i.e. whole bricks, brick ties, timber or glass.

It should also be appreciated that any fill should be subjected to validation testing to assess its suitability. The following table has been taken from YALPAG[13] documentation and may be used as a guide. Depending on the origin and nature of the material, not all fill will require the sampling frequency and testing indicated, although this should be in agreement with any regulatory bodies (such as the Local Authority).

Table 8: Validation Sampling and Testing

Fill Type	Frequency	Minimum Determinands
Virgin Quarried Material	1 or 2 depending on the type of stone (to confirm the inert nature of the material)	Standard metals/metalloids (As, Cd, Cr, Cr(VI), Cu, Hg, Ni, Pb, Se, Zn)
Crushed Hardcore, Stone, Brick	Minimum 1 per 1000m³	Standard metals/metalloids as above plus PAH (16 USEPA) and Asbestos
Greenfield/ Manufactured Soils	The greater of a minimum of 3 or 1 per 250m³	Standard metals/metalloids as above plus PAH (16 USEPA) and Asbestos
Brownfield/ Screened Soils	The greater of a minimum of 6 or 1 per 100m³	Standard metals/metalloids as above plus PAH (16 USEPA), TPH (CWG banded) and Asbestos Any additional analysis dependant on the history of the donor site.

The screening values for the above regime should also be agreed with any regulatory bodies; however, the following is recommended in the first instance.

[13] *YALPAG Technical Guidance for Developers, Landowners and Consultants – Verification Requirements for Cover Systems V3.3* Appendix 1a, October 2016.

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Table 9: Fill Screening Values			
Contaminant	Screening Value (Commercial) (mg/kg)		Reference
	1% SOM	6% SOM	
As	635	635	Atrisk^{SOIL} SSVs
Cd	410	410	Atrisk^{SOIL} SSVs
Cr(VI)	19.7	19.7	Atrisk^{SOIL} SSVs
Cu	106000	106000	Atrisk^{SOIL} SSVs
Hg	350	405	Atrisk^{SOIL} SSVs
Ni	1770	1770	Atrisk^{SOIL} SSVs
Pb	2310	2310	Atrisk^{SOIL} SSVs
V	7490	7490	Atrisk^{SOIL} SSVs
Zn	1100000	1100000	Atrisk^{SOIL} SSVs
TPH CWG	See attached summary sheet		Atrisk^{SOIL} SSVs
PAH 16 USEPA	See attached summary sheet		Atrisk^{SOIL} SSVs

Please see summary sheet within Appendix 6 for full screening values including PAHs & TPHs.

The above screening values should be considered with respect to the Soil Organic Matter (SOM) of the subject material i.e. 1% SOM would be typical for granular fill and 6% SOM for topsoil. Testing should comply with UKAS and MCERTS, where applicable, and undertaken by an accredited laboratory.

Where the material has been derived from a commercial company, certificates or other industry quality protocol compliance i.e. WRAP should be obtained. However, it will be necessary to ensure that this documentation specifically related to the material being imported, it is no more than two months old and complies with the screening and frequency requirements given above.

Suitable fill materials should be either placed immediately or sufficiently quarantined to prevent cross-contamination. If it is necessary, the quarantined material should be placed on appropriate sheeting and covered to prevent it becoming mixed with contaminated soils or dust, or penetrated by mobile contaminants.

9.5 Verification Report

In order to demonstrate that the remedial works and provision of clean cover has been sufficiently carried out where applicable, it will be necessary to produce a verification report for submission to any statutory authorities.

It will be necessary for this report to include the following:

Remediation of Asbestos Hotspot and Imported Fill Materials

- Further assessment of the extents and quantification of the asbestos hotpot around TP3.
- Photographic evidence of the installation of hardstanding over the hotspot area.

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- Characterisation of the suitability of the clean material including the derivation of the material, comments from a visual screen, the tests results of chemical screening, delivery tickets where appropriate and the conditions by which the clean material has been stored and handled on site.
- Photographic and logged evidence the clean material has been handled on site and placed in a sufficient thickness over areas where made ground remains. This may be either at the time of placement or after placement by means of hand excavated trialpits. Photographs should include visual site references or reference boards to prove the location and date taken. A measurement reference should be visible in the photographs to substantiate the thickness of material placed. Please note that it may also be necessary to undertake a topographical survey and the requirement for which should be checked with any statutory authorities.

Ground Gas Protection System

- Details of the verification process including the dates of inspections and findings.
- Signed statements to confirm that protection measures were constructed as agreed. These statements shall also include confirmation that:
  - Membranes were free from tears and punctures and installed in accordance within manufacturer guidelines.
  - Underfloor voids were clear and free from debris.
- Clear photographic evidence of the construction of membranes and/or underfloor voids, which should include key details such as air vents, membrane penetrations etc.
- Details of non-conformances and how they were rectified.
- A declaration that remedial objectives set out in the conceptual site model have been achieved.
- The qualifications or relevant experience/training of the persons carrying out the installation.
- The independence of the person carrying out the verification, along with evidence of their qualifications or relevant experience/training.

10. Recommendations for Further Work

- This report should be forwarded to the relevant authorities as soon as practicable to ensure they have sufficient time to review and discuss any issues.
- Completion of the recommended additional asbestos testing.
- Production of a remediation statement.
- Discussions with ground work contractors in relation to the requirement for testing of materials to be disposed off-site (Waste Acceptance Criteria) and the suitability of imported materials.
- Produce a validation report to demonstrate that the environmental risks discussed in this report have been mitigated.

Clearly Rogers Geotechnical Services Ltd would be happy to offer advice with respect to the above and assist where necessary.

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11. References

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Appendix 1

Site Plan

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Project Id:	C700/20/E/1077	Title:	Site Plan
Project Title:	Immingham EFW Netherlands	Scale:	1:1500
Location:	Way, Immingham	Engineer:	RAP
Client:	TEGCO LTD	Contractor:	

Legend Key

- Locations By Type - Empty
- Locations By Type - TP
- Locations By Type - WLS
- Locations By Type - CP

Environmental Geotechnical Specialists

Appendix 2

Borehole Records

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Borehole Log

Borehole No. **CP01**

Sheet 1 of 2

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords:	520781.98E - 414396.86N	Hole Type CP
Location:	Netherlands Way, Immingham		Level:	3.08m aOD	Scale 1:50
Client:	TEGCO LTD		Dates:	12/05/2020 - 13/05/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D					MADE GROUND (Brown sandy GRAVEL of brick, concrete and rail ballast. Medium to high cobble content).
		0.40	D					
		0.60	D					
		0.60 - 1.20	B					
					1.10	1.98		
		1.20 - 1.65	D					MADE GROUND (Soft dark grey CLAY with occasional brick and stone).
		1.20 - 1.70	B					
		1.20	SPT	N=8 (3,5/2,2,2,2)				
					1.90	1.18		
		2.00	D					Very soft brown silty CLAY.
		2.00 - 2.45	UT	Ublow=33				
		2.50	D					
					2.80	0.28		
		3.00 - 3.45	D					Very soft dark brown mottled grey silty CLAY with occasional organic inclusions/horizons.
		3.00 - 3.50	B					
		3.00	SPT	2 (1,/1,,,1)				
		3.50	D					
		4.00 - 4.45	UT	Ublow=27				
					4.30	-1.22		
		4.50	D					Very soft dark grey silty CLAY. Locally slightly sandy - fine sand.
		5.00 - 5.45	D					
		5.00 - 5.50	B					
		5.00	SPT	2 (1,/1,,1,)				
		5.50	D					
		6.00 - 6.45	UT	Ublow=20				
		7.00	D					
		7.50 - 7.95	D					
		7.50 - 8.00	B					
		7.50	SPT	2 (1,/1,,,1)				
		8.50	D					
		9.00	D		9.00	-5.92		
		9.00 - 9.50	B					Loose light brown clayey silty slightly gravelly predominantly fine but also medium and coarse SAND. Gravel is sub-rounded fine of chalk.
		9.00	SPT	4 (1,1/1,,1,2)				
					9.80	-6.72		Soft brown slightly gravelly silty CLAY. Gravel
		10.00	D					

Continued on Next Sheet

Remarks

General; Spt @9.5m no recovery. General; Chalk gravel blowed up to 16.9m. General; 1m bento plug bottom of hole.

Borehole Log

Borehole No. **CP01** Sheet 2 of 2

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520781.98E - 414396.86N	Hole Type CP
Location:	Netherlands Way, Immingham		Level: 3.08m aOD	Scale 1:50
Client:	TEGCO LTD		Dates: 12/05/2020 - 13/05/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								is sub-angular and sub-rounded predominantly fine and medium of chalk and flint.
		10.50 - 10.95	UF	Ublow=100				
		10.50 - 11.00	B					
		11.00 - 11.45	D					
		11.00	SPT	N=8 (2,2/2,2,1,3)				
		11.50	D					
		12.00 - 12.45	U	Ublow=100				
					12.40	-9.32		
		12.50 - 13.00	B					Loose brown clayey silty very sandy sub-angular and angular fine to coarse GRAVEL of flint and quartz. Sand is fine to coarse.
		13.00	D					
		13.50 - 13.95	D		13.50	-10.42		
		13.50 - 14.00	B					Soft to firm becoming firm brown slightly gravelly silty CLAY. Gravel is sub-angular and sub-rounded predominantly fine and medium of chalk and flint.
		13.50	SPT	N=14 (2,2/2,2,4,6)				
		14.50	D					
		15.00 - 15.45	U	Ublow=100				
		16.00	D					
		16.50 - 16.95	D					
		16.50 - 17.00	B					
		16.50	SPT	N=22 (3,4/4,4,6,8)				
		17.50	D					
		18.00 - 18.45	U	Ublow=100				
		19.00	D					
					19.30	-16.22		
					19.30	-16.22		Weathered CHALK recovered as brown very gravelly fine to coarse SAND. Gravel is sub-angular and angular fine to coarse of chalk and flint.
								End of Borehole at 19.300m

Remarks

General; Spt @9.5m no recovery. General; Chalk gravel blowed up to 16.9m. General; 1m bento plug bottom of hole.

Borehole Log

Borehole No. **CP02**

Sheet 1 of 4

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520787.98E - 414438.57N	Hole Type CP
Location: Netherlands Way, Immingham		Level: 3.25m aOD	Scale 1:50
Client: TEGCO LTD		Dates: 13/05/2020 - 15/05/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D					MADE GROUND (Brown sandy GRAVEL of brick, concrete ash and rail ballast. Medium to high cobble content).
		0.40	D					
		0.60	D					
		0.60 - 1.20	B					
		1.20	D					
		1.20 - 1.70	B		1.40	1.85		
		1.20	SPT	N=12 (5,6/5,3,3,1)				Soft to firm dark brown mottled grey silty CLAY. Occasionally organic.
		1.80	D					
		2.00 - 2.45	UT	Ublow=25				
		2.50	D					
					2.80	0.45		
		3.00 - 3.45	D					Very soft dark grey silty CLAY. Occasionally organic.
		3.00 - 3.50	B					
		3.00	SPT	2 (1,/1,,,1)				
		3.50	D					
		4.00 - 4.45	UT	Ublow=22				
		4.50	D					
		5.00 - 5.45	D					
		5.00 - 5.50	B					
		5.00	SPT	1 (1,/1,,,)				
		5.50	D					
		6.00 - 6.45	UT	Ublow=18				
		6.50	D					
		7.00 - 7.45	D					
		7.00 - 7.50	B					
		7.00	SPT	2 (1,1/1,,,1)				
		7.50	D					
		7.80	D		7.80	-4.55		
		8.00 - 8.45	UT	Ublow=48				Soft brown slightly sandy silty CLAY.
		8.50	D					
					8.90	-5.65		
		9.00 - 9.45	D					Loose brown SAND.
		9.00 - 9.50	B		9.20	-5.95		
		9.00	SPT	N=11 (1,2/2,2,3,4)				Soft becoming firm brown slightly gravelly silty CLAY. Gravel is sub-angular and sub-rounded predominantly fine and medium of chalk and flint.
		10.00	D					

Continued on Next Sheet

Remarks

General; 30min getting 8inch lead through madeground. General; chalk gravel blew upto 16m. General; bento seal 16m to 15m 30min

Borehole Log

Borehole No. **CP02**

Sheet 2 of 4

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords:	520787.98E - 414438.57N	Hole Type CP
Location:	Netherlands Way, Immingham		Level:	3.25m aOD	Scale 1:50
Client:	TEGCO LTD		Dates:	13/05/2020 - 15/05/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		10.50 - 10.95	U	Ublow=100				
		11.50	D					
		12.00 - 12.45	D					
		12.00 - 12.50	B					
		12.00	SPT	N=15 (2,2/2,3,4,6)				
	▽	13.00	D					*13m : 100mm gravel lens.*
		13.50 - 13.95	D					
		13.50 - 14.00	B					
		13.50	SPT	N=16 (2,2/3,4,4,5)				
		14.50	D					
		15.00 - 15.45	U	Ublow=100				
		16.00	D					
		16.50 - 16.95	D					
		16.50 - 17.00	B					
		16.50	SPT	N=19 (2,2/3,4,6,6)				
	▼ ▽	17.50	D					
		18.00 - 18.45	UF	Ublow=100				
		18.00 - 18.50	B					
		18.50 - 18.95	D					
		18.50	SPT	N=16 (2,2/2,4,4,6)				
	▽	19.00	D					
		19.50	D		19.20	-15.95		Weathered CHALK recovered as brown very gravelly fine to coarse SAND. Gravel is sub-angular and angular fine to coarse of chalk and flint. (Driller noted blowing)
		19.50 - 20.00	B					
		19.50	SPT	N=14 (2,2/2,4,4,4)				

Continued on Next Sheet

Remarks

General; 30min getting 8inch lead through madeground. General; chalk gravel blew upto 16m. General; bento seal 16m to 15m 30min

Borehole Log

Borehole No. **CP02**

Sheet 3 of 4

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520787.98E - 414438.57N	Hole Type CP
Location: Netherlands Way, Immingham		Level: 3.25m aOD	Scale 1:50
Client: TEGCO LTD		Dates: 13/05/2020 - 15/05/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		20.50	D						
		21.00	D						21
		21.00 - 21.50	B						
		21.00	SPT	N=14 (2,3/3,3,3,5)					
		22.00	D						22
		22.50	D						
		22.50 - 23.00	B						
		22.50	SPT	N=17 (2,3/4,4,5,4)					23
		23.50	D		23.40	-20.15		Structureless CHALK composed of soft creamish brown, sandy slightly gravelly CLAY/ SILT. Gravel is very weak, sub-angular to sub-rounded, fine to medium of chalk. [FLAMBOROUGH CHALK FORMATION, Grade Dm].	
		24.00	D						
		24.00 - 24.50	B						24
		24.00	SPT	N=16 (3,3/3,4,4,5)					
		25.00	D						25
		25.50 - 25.95	D						
		25.50 - 26.00	B						
		25.50	SPT	N=21 (3,4/3,5,5,8)					26
		26.50	D						
		27.00 - 27.45	D						27
		27.00 - 27.50	B						
		27.00	SPT	N=25 (3,4/5,5,7,8)					
		28.00	D						28
		28.50 - 28.95	D						
		28.50 - 29.00	B						
		28.50	SPT	N=23 (3,3/4,6,5,8)					29
		29.50	D						
		30.00 - 30.45	D						30

Continued on Next Sheet

Remarks

General; 30min getting 8inch lead through madeground. General; chalk gravel blew upto 16m. General; bento seal 16m to 15m 30min

Borehole Log

Borehole No. **CP02**

Sheet 4 of 4

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords:	520787.98E - 414438.57N	Hole Type CP
Location:	Netherlands Way, Immingham		Level:	3.25m aOD	Scale 1:50
Client:	TEGCO LTD		Dates:	13/05/2020 - 15/05/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		30.00	SPT	N=23 (3,4/5,3,7,8)	30.45	-27.20		End of Borehole at 30.450m

31 32 33 34 35 36 37 38 39 40

Remarks

General; 30min getting 8inch lead through madeground. General; chalk gravel blew upto 16m. General; bento seal 16m to 15m 30min

Borehole Log

Borehole No. **CP03**

Sheet 1 of 2

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520783.83E - 414486.68N	Hole Type CP
Location: Netherlands Way, Immingham		Level: 3.12m aOD	Scale 1:50
Client: TEGCO LTD		Dates: 18/05/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D					MADE GROUND (Brown sandy GRAVEL of brick, concrete ash and rail ballast. Medium to high cobble content).
		0.40	D					
		0.60	D					
		0.60 - 1.20	B					
		1.20 - 1.65	D					
		1.20 - 1.70	B		1.40	1.72		
		1.20	SPT	N=10 (1,2/3,2,2,3)				MADE GROUND (Soft grey clay (Re-worked)).
		1.80	D		1.70	1.42		Soft brown silty CLAY.
		2.00 - 2.45	UT	Ublow=22				
		2.50	D					
		3.00 - 3.45	D		2.80	0.32		Very soft brown silty CLAY. Occasional organic horizons.
		3.00 - 3.50	B					
		3.00	SPT	1 (1,/1,,,)				
		3.50	D					
		4.00 - 4.45	UT	Ublow=18				
		4.50	D					
		5.00 - 5.45	D					
		5.00 - 5.50	B					
		5.00	SPT	2 (1,/1,,,1)				
		5.50	D					
		6.00 - 6.45	UT	Ublow=28				
		7.00	D					
		7.50 - 7.95	D					
		7.50 - 8.00	B		7.70	-4.58		
		7.50	SPT	N=8 (1,/1,2,2,3)				Soft brown slightly gravelly silty CLAY. Gravel is sub-angular and sub-rounded predominantly fine and medium of chalk and flint.
		8.50	D					
		9.00 - 9.45	UT	Ublow=100				
		9.50	D					
		10.00 - 10.45	D					

Continued on Next Sheet

Remarks

Borehole Log

Borehole No. **CP03**

Sheet 2 of 2

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords:	520783.83E - 414486.68N	Hole Type CP
Location:	Netherlands Way, Immingham		Level:	3.12m aOD	Scale 1:50
Client:	TEGCO LTD		Dates:	18/05/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		10.00	SPT	N=13 (1,2/2,3,3,5)	10.45	-7.33		End of Borehole at 10.450m

Remarks

Borehole Log

Borehole No. **CP04**

Sheet 1 of 4

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords:	520681.18E - 414427.80N	Hole Type CP
Location:	Netherlands Way, Immingham		Level:	8.29m aOD	Scale 1:50
Client:	TEGCO LTD		Dates:	29/05/2020 - 02/06/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D					MADE GROUND (Brown sandy GRAVEL of brick, concrete ash and rail ballast. Medium to high cobble content).
		0.40	D					
		0.60	D					
		0.60 - 1.20	B					
		1.20 - 1.65	D					
		1.20 - 1.70	B					
		1.20	SPT	4 (1,1/1,,2,1)	1.50	6.79		
		1.80	D					Soft dark brown mottled grey silty clay.
		2.00 - 2.45	UT	Ublow=30				
		2.50	D					
		3.00 - 3.45	D		2.90	5.39		
		3.00 - 3.50	B					Very soft brown mottled grey slightly organic silty CLAY.
		3.00	SPT	2 (1,/1,,,1)				
		3.50	D					
		4.00 - 4.45	UT	Ublow=19				
		4.50	D					
		5.00 - 5.45	D					
		5.00 - 5.50	B					
		5.00	SPT	1 (1,/,1,,)				
		5.50	D					
		6.00 - 6.45	UT	Ublow=35				
		6.50 - 7.00	B		6.50	1.79		
		7.00	D					Soft brown very organic silty CLAY with frequent pseudo-fibrous PEAT horizons and rare shell fragments.
		7.50 - 7.95	D		7.30	0.99		
		7.50 - 8.00	B					Soft to firm becoming firm brown slightly gravelly silty CLAY. Gravel is sub-angular and sub-rounded predominantly fine and medium of chalk and flint.
		7.50	SPT	N=6 (1,1/1,2,2,1)				
		8.50	D					
		9.00 - 9.45	U	Ublow=100				
		10.00	D					

Continued on Next Sheet

Remarks

General; 30min getting 8inch lead through compacted madeground. General; Chalk gravel blew up to 17.5m. General; 30min bento seal from 17.5m to 16.5m. General; 09.15 to 09.45 pulling casing. General; 10am to 10.25am pulling casing. Vibrating wire piezometer installed.

Borehole Log

Borehole No. **CP04**

Sheet 2 of 4

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords:	520681.18E - 414427.80N	Hole Type CP
Location:	Netherlands Way, Immingham		Level:	8.29m aOD	Scale 1:50
Client:	TEGCO LTD		Dates:	29/05/2020 - 02/06/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		10.50 - 10.95	D					
		10.50 - 11.00	B					
		10.50	SPT	N=15 (2,2/3,4,4,4)				
		11.50	D					
		12.00 - 12.45	U	Ublow=100				
		13.00	D					
		13.50 - 13.95	D					
		13.50 - 14.00	B					
		13.50	SPT	N=9 (1,1/2,1,3,3)				
		14.50	D					
		15.00 - 15.45	U	Ublow=100				
		16.00	D					
		16.50 - 16.95	D					
		16.50 - 17.00	B					
		16.50	SPT	N=15 (1,1/3,4,4,4)				
		17.50	D					
		18.00 - 18.45	UF	Ublow=100				
		18.00 - 18.50	B					
		18.50 - 18.95	D					
		18.50	SPT	N=17 (2,2/4,4,5,4)				
		19.00	D					
					19.30	-11.01		Weathered CHALK recovered as brown very gravelly fine to coarse SAND. Gravel is sub-angular and angular fine to coarse of chalk and flint.
		19.50	D					
		19.50 - 20.00	B					
		19.50	SPT	N=7 (1,/1,1,3,2)				

Continued on Next Sheet

Remarks

General; 30min getting 8inch lead through compacted madeground. General; Chalk gravel blew up to 17.5m. General; 30min bento seal from 17.5m to 16.5m. General; 09.15 to 09.45 pulling casing. General; 10am to 10.25am pulling casing. Vibrating wire piezometer installed.

Borehole Log

Borehole No. **CP04**

Sheet 3 of 4

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords:	520681.18E - 414427.80N	Hole Type CP
Location:	Netherlands Way, Immingham		Level:	8.29m aOD	Scale 1:50
Client:	TEGCO LTD		Dates:	29/05/2020 - 02/06/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		20.50	D					
		21.00	D					
		21.00 - 21.50	B					
		21.00	SPT	N=9 (1,2/2,2,1,4)				
		22.00	D					
		22.50	D					
		22.50 - 23.00	B					
		22.50	SPT	N=17 (2,2/4,4,3,6)	22.90	-14.61		Structureless CHALK composed of soft creamish brown, sandy gravelly CLAY/SILT. Gravel is very weak, sub-angular to sub-rounded, fine to medium of chalk. [FLAMBOROUGH CHALK FORMATION, Grade Dm].
		23.50	D					
		24.00 - 24.45	D					
		24.00 - 24.50	B					
		24.00	SPT	N=12 (1,1/2,3,3,4)	24.50	-16.21		Structureless CHALK composed of soft creamish white, sandy slightly gravelly CLAY/ SILT. Gravel is very weak, sub-angular to sub-rounded, fine to medium of chalk. Rare angular flint gravel [FLAMBOROUGH CHALK FORMATION, Grade Dm].
		25.00	D					
		25.50 - 25.95	D					
		25.50 - 26.00	B					
		25.50	SPT	N=13 (1,2/2,5,3,3)				
		26.50	D					
		27.00 - 27.45	D					
		27.00 - 27.50	B					
		27.00	SPT	N=32 (6,6/6,8,8,10)				
		28.00	D					
		28.50 - 28.95	D					
		28.50 - 29.00	B					
		28.50	SPT	N=37 (4,7/7,9,9,12)				
		29.50	D					
?		30.00 - 30.45	D					

Continued on Next Sheet

Remarks

General; 30min getting 8inch lead through compacted madeground. General; Chalk gravel blew up to 17.5m. General; 30min bento seal from 17.5m to 16.5m. General; 09.15 to 09.45 pulling casing. General; 10am to 10.25am pulling casing. Vibrating wire piezometer installed.

Borehole Log

Borehole No. **CP04**

Sheet 4 of 4

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords:	520681.18E - 414427.80N	Hole Type CP
Location:	Netherlands Way, Immingham		Level:	8.29m aOD	Scale 1:50
Client:	TEGCO LTD		Dates:	29/05/2020 - 02/06/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		30.00	SPT	N=43 (6,7/9,9,11,14)	30.45	-22.16		End of Borehole at 30.450m

Remarks

General; 30min getting 8inch lead through compacted madeground. General; Chalk gravel blew up to 17.5m. General; 30min bento seal from 17.5m to 16.5m. General; 09.15 to 09.45 pulling casing. General; 10am to 10.25am pulling casing. Vibrating wire piezometer installed.

Borehole Log

Borehole No. **CP05**

Sheet 1 of 2

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520624.15E - 414386.76N	Hole Type CP
Location: Netherlands Way, Immingham		Level: 4.03m aOD	Scale 1:50
Client: TEGCO LTD		Dates: 18/05/2020 - 19/05/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D					MADE GROUND (Brown sandy GRAVEL of brick, concrete ash and rail ballast. Medium to high cobble content).
		0.40	D					
		0.60	D					
		0.60 - 1.20	B					
		1.20 - 1.65	D					
		1.20 - 1.70	B		1.30	2.73		
		1.20	SPT	3 (1,/1,,1,1)				Soft brown mottled grey silty CLAY.
		1.80	D		1.60	2.43		
		2.00 - 2.45	UT	Ublow=22				Soft brown mottled grey slightly sandy silty CLAY. Sand is fine.
		2.50	D					
		3.00 - 3.45	D		2.80	1.23		
		3.00 - 3.50	B					Very soft brown mottled grey silty CLAY. Occasionally organic.
		3.00	SPT	1 (1,/,1,,)				
		3.50	D					
		4.00 - 4.45	UT	Ublow=20				
		4.50	D					
		5.00 - 5.45	D		4.70	-0.67		
		5.00 - 5.50	B					Very soft brown streaked dark brown slightly organic silty CLAY with occasional pseudo-fibrous PEAT horizons.
		5.00	SPT	4 (1,/1,,1,2)				
		5.50	D					
		6.00 - 6.45	UT	Ublow=26				
		6.50 - 7.00	B		6.10	-2.07		Soft greyish brown streaked dark brown slightly organic silty CLAY with rare chalk gravel.
		7.00	D		7.00	-2.97		
	▼	7.50 - 7.95	D					Soft to firm brown slightly sandy slightly gravelly silty CLAY. Gravel is sub-angular and sub-rounded predominantly fine and medium of chalk and flint.
		7.50 - 8.00	B					
	▽	7.50	SPT	N=10 (1,1/1,1,4,4)	7.80	-3.77		Loose brown SAND.
		8.50	D		8.10	-4.07		Loose to medium dense brown slightly sandy slightly gravelly silty CLAY. Occasional sand horizons. Gravel is sub-angular and sub-rounded predominantly fine and medium of chalk and flint.
		9.00 - 9.45	D					
		9.00 - 9.50	B					
		9.00	SPT	N=8 (1,2/2,2,1,3)				
		9.50	D					
		10.00 - 10.45	D					

Continued on Next Sheet

Remarks

General; 15min fetching install gear.

Borehole Log

Borehole No. **CP05**

Sheet 2 of 2

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords:	520624.15E - 414386.76N	Hole Type CP
Location:	Netherlands Way, Immingham		Level:	4.03m aOD	Scale 1:50
Client:	TEGCO LTD		Dates:	18/05/2020 - 19/05/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		10.00	SPT	N=11 (1,2/2,3,3,3)	10.45	-6.42		End of Borehole at 10.450m

Remarks

General; 15min fetching install gear.

Borehole Log

Borehole No. **CP06**

Sheet 1 of 1

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords:	520648.70E - 414305.62N	Hole Type CP
Location:	Netherlands Way, Immingham		Level:	3.20m aOD	Scale 1:50
Client:	TEGCO LTD		Dates:	26/05/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D					MADE GROUND.
		0.40	D					
		0.60	D					
		0.60 - 1.20	B					
					1.20	2.00		Obstruction. Borehole moved to 6A.
					1.20	2.00		End of Borehole at 1.200m

Remarks

General; ending hole dropping rig moving forward 2m CP6A

Borehole Log

Borehole No. **CP06A**

Sheet 1 of 4

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520647.34E - 414304.33N	Hole Type CP
Location: Netherlands Way, Immingham		Level: 3.21m aOD	Scale 1:50
Client: TEGCO LTD		Dates: 26/05/2020 - 28/05/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D					MADE GROUND (Brown sandy GRAVEL of brick, concrete ash and rail ballast. Rare slate and metal. Medium to high cobble content).
		0.40	D					
		0.60	D					
		0.60 - 1.20	B					
	▼	1.20	D					
	▽	1.20 - 1.70	B					
		1.20	SPT	N=22 (7,9/6,4,6,6)				
					1.90	1.31		
		2.00	D					Soft brown mottled grey silty CLAY. Occasional organic streaks.
		2.00 - 2.45	UTF	Ublow=40				
		2.00 - 2.50	B					
					2.40	0.81		
		2.50 - 2.95	D					Soft brown mottled grey silty CLAY. Rare organic streaks and sub-rounded gravels.
		2.50 - 3.00	B					
		2.50	SPT	3 (1,/1,1,,1)				
		3.00 - 3.45	D					
		3.00 - 3.50	B					
		3.00	SPT	2 (1,/1,1,,)	3.30	-0.09		
		3.50	D					Very soft brown mottled grey silty CLAY.
		4.00 - 4.45	UT	Ublow=22				
		4.50	D					
		5.00 - 5.45	D					
		5.00 - 5.50	B					
		5.00	SPT	1 (1,/,,1,)				
		5.50	D					
		6.00 - 6.45	UT	Ublow=42				
					6.30	-3.09		
		6.50 - 7.00	B					Soft brown streaked dark brown very organic silty CLAY with frequent pseudo-fibrous PEAT horizons.
		7.00	D					
					7.20	-3.99		
		7.50 - 7.95	D					Soft brown and grey slightly sandy silty CLAY. Sand is fine to coarse of broken chalk.
		7.50 - 8.00	B		7.70	-4.49		
		7.50	SPT	N=12 (1,2/2,3,3,4)				Firm greyish brown and brown sandy slightly gravelly silty CLAY. Gravel is sub-angular and sub-rounded predominantly fine and medium of chalk and flint.
		8.50	D					
		9.00 - 9.45	UF	Ublow=100				
		9.00 - 9.50	B					
		9.50 - 9.95	D					
		9.50	SPT	N=16 (2,2/3,4,4,5)				
		10.00	D					

Continued on Next Sheet

Remarks

General; 30min getting 8inch lead through compacted madeground. General; chalk gravel blew upto 18m. General; 30min bento seal from 18m to 17m. Vibrating wire piezometer installed.

Borehole Log

Borehole No. **CP06A**

Sheet 2 of 4

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords:	520647.34E - 414304.33N	Hole Type CP
Location:	Netherlands Way, Immingham		Level:	3.21m aOD	Scale 1:50
Client:	TEGCO LTD		Dates:	26/05/2020 - 28/05/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		10.50 - 10.95	D					
		10.50 - 11.00	B					
		10.50	SPT	N=13 (2,2/2,4,4,3)				
		11.50	D					
		12.00 - 12.45	U	Ublow=100				
		13.00	D					
		13.50 - 13.95	D					
		13.50 - 14.00	B					
		13.50	SPT	N=16 (1,2/3,3,5,5)				
		14.50	D					*14m: Becomes sandy.*
		15.00 - 15.45	U	Ublow=100				
		16.00	D					
		16.50 - 16.95	D					
		16.50 - 17.00	B					
		16.50	SPT	N=21 (2,3/4,4,6,7)				
		17.50	D					
	▼	18.00 - 18.45	UF	Ublow=100				
	▼	18.00 - 18.50	B					
		18.50 - 18.95	D					
		18.50	SPT	N=23 (3,3/4,6,6,7)				
		19.00	D					
	▽				19.30	-16.09		Weathered CHALK recovered as brown very gravelly fine to coarse SAND. Gravel is sub-angular and angular fine to coarse of chalk and flint.
		19.50	D					
		19.50 - 20.00	B					
		19.50	SPT	N=9 (1,/1,2,4,2)				

Continued on Next Sheet

Remarks

General; 30min getting 8inch lead through compacted madeground. General; chalk gravel blew upto 18m. General; 30min bento seal from 18m to 17m. Vibrating wire piezometer installed.

Borehole Log

Borehole No. **CP06A**

Sheet 3 of 4

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520647.34E - 414304.33N	Hole Type CP
Location: Netherlands Way, Immingham		Level: 3.21m aOD	Scale 1:50
Client: TEGCO LTD		Dates: 26/05/2020 - 28/05/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		20.50	D					
		21.00	D					
		21.00 - 21.50	B					
		21.00	SPT	N=15 (2,3/3,3,5,4)	21.30	-18.09		
								Structureless CHALK composed of soft creamish brown, sandy gravelly CLAY/SILT. Gravel is very weak, sub-angular to sub-rounded, fine to medium of chalk. [FLAMBOROUGH CHALK FORMATION, Grade Dm].
		22.00	D					
		22.50 - 22.95	D					
		22.50 - 23.00	B					
		22.50	SPT	N=15 (3,4/3,3,5,4)				
		23.50	D					
		24.00 - 24.45	D					
		24.00 - 24.50	B					
		24.00	SPT	N=19 (2,3/4,4,6,5)				
		25.00	D					
		25.50 - 25.95	D					
		25.50 - 26.00	B					
		25.50	SPT	N=47 (11,9/11,11,12,13)				
		26.50	D		26.50	-23.29		
								Structureless CHALK composed of soft creamish white, sandy slightly gravelly CLAY/ SILT. Gravel is very weak, sub-angular to sub-rounded, fine to medium of chalk. Rare angular flint gravel and cobbles [FLAMBOROUGH CHALK FORMATION, Grade Dm].
		27.00 - 27.45	D					
		27.00 - 27.50	B					
		27.00	SPT	N=43 (7,11/9,11,11,12)				
		28.00	D					
		28.50 - 28.95	D					
		28.50 - 29.00	B					
		28.50	SPT	N=46 (9,10/10,11,13,12)				
		29.50	D					
?		30.00 - 30.45	D					

Continued on Next Sheet

Remarks

General; 30min getting 8inch lead through compacted madeground. General; chalk gravel blew upto 18m. General; 30min bento seal from 18m to 17m. Vibrating wire piezometer installed.

Borehole Log

Borehole No. **CP06A**

Sheet 4 of 4

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords:	520647.34E - 414304.33N	Hole Type CP
Location:	Netherlands Way, Immingham		Level:	3.21m aOD	Scale 1:50
Client:	TEGCO LTD		Dates:	26/05/2020 - 28/05/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		30.00	SPT	N=44 (8,9/9,12,12,11)	30.45	-27.24		End of Borehole at 30.450m

31 32 33 34 35 36 37 38 39 40

Remarks

General; 30min getting 8inch lead through compacted madeground. General; chalk gravel blew upto 18m. General; 30min bento seal from 18m to 17m. Vibrating wire piezometer installed.

Borehole Log

Borehole No. **CP07**

Sheet 1 of 1

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords:
Location:	Netherlands Way, Immingham		Level:
Client:	TEGCO LTD		Dates: 19/05/2020

Hole Type: CP

Scale: 1:50

Logged By: RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.30			MADE GROUND.
					0.40			CONCRETE.
								MADE GROUND.
					0.80			CONCRETE.
					0.80			End of Borehole at 0.800m

Remarks

General; Hole called off due to concrete at 0.8m

Borehole Log

Borehole No. **CP07A**

Sheet 1 of 4

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520592.29E - 414322.35N	Hole Type CP
Location: Netherlands Way, Immingham		Level: 3.07m aOD	Scale 1:50
Client: TEGCO LTD		Dates: 19/05/2020 - 21/05/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D					MADE GROUND (Brown sandy GRAVEL of brick, concrete ash and rail ballast. Medium to high cobble content. Boulders and possible voids from 0.8m).
		0.40	D					
		0.60	D					
		0.80 - 2.00	B					
		2.00 - 2.50	B					
		2.00	SPT	N=4 (2,2/1,1,1,1)	2.10	0.97		
		2.50	D					Soft brown silty CLAY.
		3.00	D		2.80	0.27		
		3.00 - 3.45	UT	Ublow=17				Very soft dark grey slightly organic silty CLAY.
		3.50	D					
		4.00 - 4.45	D					
		4.00 - 4.50	B					
		4.00	SPT	1 (1,/,,1,)				
		4.50	D					
		5.00 - 5.45	UT	Ublow=10				
		5.50	D					
		6.00 - 6.45	D					
		6.00 - 6.50	B					
		6.00	SPT	1 (1,/,,,1)				
		7.00	D					
		7.50 - 7.95	UT	Ublow=80	7.40	-4.33		Firm brown slightly gravelly silty CLAY.
		8.50	D					
		9.00 - 9.45	D					
		9.00 - 9.50	B					
		9.00	SPT	N=12 (1,2/2,3,3,4)				
		10.00	D					

Continued on Next Sheet

Remarks

General; 20min breaking through possible drainage. General; Spt @2m no recovery. General; Chalk gravel blowed up to 17.9m. General; 30min bento seal from 17.9m to 16.9m. General; 15min moving rig and gear to CP9.

Borehole Log

Borehole No. **CP07A**

Sheet 2 of 4

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords:	520592.29E - 414322.35N	Hole Type CP
Location:	Netherlands Way, Immingham		Level:	3.07m aOD	Scale 1:50
Client:	TEGCO LTD		Dates:	19/05/2020 - 21/05/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		10.50 - 10.95	U	Ublow=100				
		11.50	D					
		12.00 - 12.45	D					
		12.00 - 12.50	B					
		12.00	SPT	N=15 (2,2/3,3,4,5)				
		13.00	D					
		13.50 - 13.95	U	Ublow=100				
		14.50	D					
		15.00 - 15.45	D					
		15.00 - 15.50	B					
		15.00	SPT	N=19 (2,3/3,4,6,6)				
		16.00	D					
		16.50 - 16.95	U	Ublow=100				
		17.50	D					
		18.00 - 18.45	D					
		18.00 - 18.50	B					
		18.00	SPT	N=27 (3,3/5,6,8,8)				
		19.00	D					
					19.20	-16.13		Weathered CHALK recovered as brown very gravelly fine to coarse SAND. Gravel is sub-angular and angular fine to coarse of chalk and flint.
		19.50	D					
		19.50 - 20.00	B					
		19.50	SPT	N=8 (1,2/3,1,1,3)				

Continued on Next Sheet

Remarks

General; 20min breaking through possible drainage. General; Spt @2m no recovery. General; Chalk gravel blowed up to 17.9m. General; 30min bento seal from 17.9m to 16.9m. General; 15min moving rig and gear to CP9.

Borehole Log

Borehole No. **CP07A**

Sheet 3 of 4

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520592.29E - 414322.35N	Hole Type CP
Location: Netherlands Way, Immingham		Level: 3.07m aOD	Scale 1:50
Client: TEGCO LTD		Dates: 19/05/2020 - 21/05/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		20.50	D					
		21.00	D					
		21.00 - 21.50	B					
		21.00	SPT	N=14 (2,3/3,5,3,3)				
					21.80	-18.73		White CHALK with flint gravel and putty chalk.
		22.00	D					
		22.50 - 22.95	D					
		22.50 - 23.00	B					
		22.50	SPT	N=26 (6,6/7,5,7,7)				
		23.50	D					
		24.00 - 24.45	D					
		24.00 - 24.50	B					
		24.00	SPT	N=21 (5,5/4,6,6,5)				
		25.00	D					
		25.50 - 25.95	D					
		25.50 - 26.00	B					
		25.50	SPT	N=20 (3,4/4,5,5,6)				
		26.50	D					
		27.00 - 27.45	D					
		27.00 - 27.50	B					
		27.00	SPT	N=23 (2,6/5,7,7,4)				
		28.00	D					
		28.50 - 28.95	D					
		28.50 - 29.00	B					
		28.50	SPT	N=41 (7,9/9,9,11,12)				
		29.50	D					
		30.00 - 30.45	D					

Continued on Next Sheet

21 22 23 24 25 26 27 28 29 30

Remarks

General; 20min breaking through possible drainage. General; Spt @2m no recovery. General; Chalk gravel blowed up to 17.9m. General; 30min bento seal from 17.9m to 16.9m. General; 15min moving rig and gear to CP9.

Borehole Log

Borehole No. **CP07A**

Sheet 4 of 4

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords:	520592.29E - 414322.35N	Hole Type CP
Location:	Netherlands Way, Immingham		Level:	3.07m aOD	Scale 1:50
Client:	TEGCO LTD		Dates:	19/05/2020 - 21/05/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		30.00	SPT	N=45 (8,9/9,11,11,14)	30.45	-27.38		End of Borehole at 30.450m

31
32
33
34
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36
37
38
39
40

Remarks

General; 20min breaking through possible drainage. General; Spt @2m no recovery. General; Chalk gravel blowed up to 17.9m. General; 30min bento seal from 17.9m to 16.9m. General; 15min moving rig and gear to CP9.

Borehole Log

Borehole No. **CP08**

Sheet 1 of 1

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords:	520704.46E - 414342.16N	Hole Type CP
Location:	Netherlands Way, Immingham		Level:	3.30m aOD	Scale 1:50
Client:	TEGCO LTD		Dates:	22/05/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D					MADE GROUND (Brown sandy GRAVEL of brick, concrete ash and rail ballast. Medium to high cobble content).
		0.40	D					
		0.60	D					
		0.60 - 1.20	B					
		1.20 - 1.65	D					
		1.20 - 1.70	B					
		1.20	SPT	N=6 (3,2/2,1,2,1)	1.50	1.80		
		1.80	D					Soft to firm brown mottled grey silty CLAY. Rare organic horizons.
		2.00 - 2.45	UT	Ublow=28				
		2.50	D					
		3.00 - 3.45	D					
		3.00 - 3.50	B					
		3.00	SPT	2 (1,/1,,1,)	3.30	0.00		
		3.50	D					Very soft brown mottled grey silty CLAY. Occasional organic streaks.
		4.00 - 4.45	UT	Ublow=22				
		4.50	D					
		5.00 - 5.45	D					
		5.00 - 5.50	B					
		5.00	SPT	1 (1,/,,1,)				
		5.50	D					
		6.00 - 6.45	UT	Ublow=30				
					6.80	-3.50		
		7.00	D					Soft greyish brown streaked dark brown very organic silty CLAY with frequent pseudo-fibrous PEAT horizons.
		7.00 - 7.50	B					
		7.50 - 7.95	D					
		7.50 - 8.00	B		7.60	-4.30		
		7.50	SPT	N=6 (1,/1,1,2,2)				Soft to firm brown slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is sub-angular and sub-rounded predominantly fine and medium of chalk and flint.
		8.50	D					
		9.00 - 9.45	UF	Ublow=100				
		9.00 - 9.50	B					
		9.50 - 9.95	D					
		9.50	SPT	N=11 (1,2/2,3,3,3)				
		10.00	D		10.00	-6.70		End of Borehole at 10.000m

Remarks

Borehole Log

Borehole No. **CP09**

Sheet 1 of 2

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords:	520677.04E - 414303.26N	Hole Type CP
Location:	Netherlands Way, Immingham		Level:	2.71m aOD	Scale 1:50
Client:	TEGCO LTD		Dates:	21/05/2020 - 22/05/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D					MADE GROUND (Brown sandy GRAVEL of brick, concrete ash and rail ballast. Medium to high cobble content).
		0.40	D					
		0.60	D					
		0.60 - 1.20	B					
					1.10	1.61		
		1.20 - 1.65	D					MADE GROUND (Soft brown silty CLAY (Re-worked)).
		1.20 - 1.70	B		1.40	1.31		
		1.20	SPT	N=5 (1,1/2,1,1,1)				Soft brown mottled grey silty CLAY. Locally sandy (fine).
		1.80	D					
		2.00 - 2.45	UT	Ublow=25				
		2.50	D					
					2.80	-0.09		
		3.00 - 3.45	D					Very soft dark grey mottled greyish brown slightly organic slightly sandy CLAY/SILT. Sand is fine and medium.
		3.00 - 3.50	B					
		3.00	SPT	1 (1,/,1,,)				
		3.50	D					
		4.00 - 4.45	UT	Ublow=17				
		4.50	D					
		5.00 - 5.45	D					
		5.00 - 5.50	B					
		5.00	SPT	1 (1,/,1,,)				
		6.00 - 6.45	UT	Ublow=33				
					6.30	-3.59		
		6.50 - 7.00	B					Soft greyish brown streaked dark brown very organic silty CLAY with frequent pseudo-fibrous PEAT horizons.
		7.00	D					
					7.20	-4.49		
		7.50 - 7.95	D					Soft brown slightly gravelly silty CLAY. Rare organic horizons in upper levels. Gravel is sub-rounded predominantly fine and medium chalk.
		7.50 - 8.00	B					
		7.50	SPT	N=6 (1,/1,1,2,2)				
		8.50	D					
		9.00 - 9.45	U	Ublow=100				
		9.50	D					
		10.00 - 10.45	D					

Continued on Next Sheet

Remarks

General; 15min fetching install gear

Borehole Log

Borehole No. **CP09**

Sheet 2 of 2

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords:	520677.04E - 414303.26N	Hole Type CP
Location:	Netherlands Way, Immingham		Level:	2.71m aOD	Scale 1:50
Client:	TEGCO LTD		Dates:	21/05/2020 - 22/05/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		10.00	SPT	N=16 (2,2/3,4,5,4)	10.45	-7.74		End of Borehole at 10.450m

Remarks

General; 15min fetching install gear

Borehole Log

Borehole No. **CP10**

Sheet 1 of 3

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520820.86E - 414399.84N	Hole Type CP
Location: Netherlands Way, Immingham		Level: 2.73m aOD	Scale 1:50
Client: TEGCO LTD		Dates: 02/06/2020 - 04/06/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D					MADE GROUND (Brown sandy GRAVEL of brick, concrete ash and rail ballast. Medium to high cobble content. Slight hydrocarbon odour at 0.5m).
		0.40	D					
		0.60	D					
		0.60 - 1.20	B					
					1.00	1.73		MADE GROUND (Soft brown silty CLAY (Possibly re-worked).
		1.20 - 1.65	D					
		1.20 - 1.70	B					
		1.20	SPT	3 (1,1/1,,1,1)	1.50	1.23		Soft brown mottled grey silty CLAY.
		1.80	D					
		2.00 - 2.45	UT	Ublow=19				
					2.30	0.43		Very soft dark grey slightly organic silty CLAY.
		2.50	D					
		3.00 - 3.45	D					
		3.00 - 3.50	B					
		3.00	SPT	1 (1,/1,,,)				
		3.50	D					
		4.00 - 4.45	UT	Ublow=21				
		4.50	D					
		5.00 - 5.45	D					
		5.00 - 5.50	B					
		5.00	SPT	3 (1,/1,,1,1)				
		5.50	D					
		6.00 - 6.45	UT	Ublow=33				
					6.20	-3.47		Soft dark brown very organic silty CLAY with abundant pseudo-fibrous PEAT horizons.
		6.50 - 7.00	B					
		7.00	D					
					7.20	-4.47		Soft greyish brown sandy silty CLAY.
	▼				7.40	-4.67		Soft brown slightly gravelly silty CLAY. Gravel is sub-rounded fine of chalk.
	▼	7.50 - 7.95	D					
		7.50 - 8.00	B					
	▽	7.50	SPT	N=6 (1,1/2,1,2,1)	7.80	-5.07		Loose greyish brown clayey silty fine SAND.
		8.50	D					
		8.50 - 9.00	B					
		9.00 - 9.45	D					
		9.00 - 9.50	B					
		9.00	SPT	N=10 (1,1/2,2,3,3)	9.20	-6.47		Firm brown slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is sub-rounded fine and medium of chalk.
		10.00	D					

Continued on Next Sheet

Remarks

General; 25min getting 8inch lead through compacted madeground. General; chalk gravel blew upto 16.9m. General; bento seal 16.9m to 15.9m. General; 10min fetching install gear. General; Chalk gravel kept blowing up to 14m inside 6inch casings

Borehole Log

Borehole No. **CP10**

Sheet 2 of 3

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords:	520820.86E - 414399.84N	Hole Type CP
Location:	Netherlands Way, Immingham		Level:	2.73m aOD	Scale 1:50
Client:	TEGCO LTD		Dates:	02/06/2020 - 04/06/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		10.50 - 10.95	U	Ublow=100				
		11.50	D					
		12.00 - 12.45	D					
		12.00 - 12.50	B					
		12.00	SPT	N=14 (2,2/2,4,4,4)				
		13.00	D					
		13.50 - 13.95	U	Ublow=100				
		14.50	D					
		15.00 - 15.45	D					
		15.00 - 15.50	B					
		15.00	SPT	N=15 (1,2/3,3,5,4)				
		16.00	D					
		16.50 - 16.95	U	Ublow=100				
		17.50	D					
		18.00 - 18.45	D					
		18.00 - 18.50	B					
		18.00	SPT	N=17 (2,3/3,4,4,6)				
	▽	19.00	D					
					19.20	-16.47		Weathered CHALK recovered as brown very gravelly fine to coarse SAND. Gravel is sub-angular and angular fine to coarse of chalk and flint. (Driller noted blowing)
		19.50	D					
		19.50 - 20.00	B					
		19.50	SPT	N=10 (1,/1,3,3,3)				

Continued on Next Sheet

Remarks

General; 25min getting 8inch lead through compacted madeground. General; chalk gravel blew upto 16.9m. General; bento seal 16.9m to 15.9m. General; 10min fetching install gear. General; Chalk gravel kept blowing up to 14m inside 6inch casings

Borehole Log

Borehole No. **CP10**

Sheet 3 of 3

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords:	520820.86E - 414399.84N	Hole Type CP
Location:	Netherlands Way, Immingham		Level:	2.73m aOD	Scale 1:50
Client:	TEGCO LTD		Dates:	02/06/2020 - 04/06/2020	Logged By RAP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		20.50	D					
		21.00	D					
		21.00 - 21.50	B					
		21.00	SPT	N=13 (2,2/2,5,3,3)				
		22.00	D					
		22.50	D					
		22.50 - 23.00	B					
		22.50	SPT	N=20 (3,3/5,5,6,4)				
		23.50	D					
		24.00	D					
		24.00 - 24.50	B		24.20	-21.47		
		24.00	SPT	N=23 (2,3/5,5,7,6)				Structureless CHALK composed of soft creamish brown, sandy gravelly CLAY/SILT. Gravel is very weak, sub-angular to sub-rounded, fine to medium of chalk. [FLAMBOROUGH CHALK FORMATION, Grade Dm].
		24.50	SPT	50 (25 for 30mm/50 for 10mm)	24.54	-21.81		
								End of Borehole at 24.540m

Remarks

General; 25min getting 8inch lead through compacted madeground. General; chalk gravel blew upto 16.9m. General; bento seal 16.9m to 15.9m. General; 10min fetching install gear. General; Chalk gravel kept blowing up to 14m inside 6inch casings

Borehole Log

Borehole No. **WS01**

Sheet 1 of 1

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520830.90E - 414394.27N	Hole Type WLS
Location: Netherlands Way, Immingham		Level: 2.85m aOD	Scale 1:50
Client: TEGCO LTD		Dates: 11/05/2020	Logged By DnG

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
				80	100		0.70	2.15		MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
		1.00	SPT			N=5 (1,1/1,1,1,2)				Initially firm becoming soft brown mottled grey slightly organic silty CLAY.
				80	100					
		2.00 - 2.40	U							
		2.00	SPT			0 (0 for 450mm/0 for 0mm)				
				70	80					
		3.00	SPT			0 (0 for 450mm/0 for 0mm)				
				70	100					
		4.00	SPT			0 (0 for 450mm/0 for 0mm)	4.00	-1.15		End of Borehole at 4.00m

Remarks

Borehole Log

Borehole No. **WS02**

Sheet 1 of 1

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520730.52E - 414333.05N	Hole Type WLS
Location: Netherlands Way, Immingham		Level: 2.75m aOD	Scale 1:50
Client: TEGCO LTD		Dates: 11/05/2020	Logged By DnG

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
				80	100		0.70	2.05		MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
		1.00	SPT			N=6 (1,1/1,1,2,2)				Initially firm becoming soft brown mottled grey slightly organic silty CLAY.
				80	90					
		2.00	SPT			0 (0 for 450mm/0 for 0mm)				
				70	80					
		3.00	SPT			0 (0 for 450mm/0 for 0mm)				
				70	100					
		4.00 - 4.40	U							
							4.40	-1.65		End of Borehole at 4.40m

1 2 3 4 5 6 7 8 9 10

Remarks

Borehole Log

Borehole No. **WS03**

Sheet 1 of 1

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520692.81E - 414307.06N	Hole Type WLS
Location: Netherlands Way, Immingham		Level: 2.65m aOD	Scale 1:50
Client: TEGCO LTD		Dates: 12/05/2020	Logged By DnG

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
				80	100		0.90	1.75		MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
		1.00	SPT			25 (1 for 75mm/25 for 40mm)	1.00	1.65		MADE GROUND (Brick Cobble).
										End of Borehole at 1.00m

Remarks

Borehole Log

Borehole No. **WS04**

Sheet 1 of 1

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520635.39E - 414276.94N	Hole Type WLS
Location: Netherlands Way, Immingham		Level: 2.71m aOD	Scale 1:50
Client: TEGCO LTD		Dates: 12/05/2020	Logged By DnG

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
				80	100		0.20	2.51		MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
							0.50	2.21		
		1.00	SPT			N=10 (1,2/2,2,3,3)	1.00	1.71		MADE GROUND (Dense white slightly sandy sub-angular fine to coarse Chalk GRAVEL).
				80	80					MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
		2.00	SPT			0 (0 for 450mm/0 for 0mm)				Initially stiff becoming soft brown mottled grey slightly organic silty CLAY.
				70	90					
		3.00	SPT			0 (0 for 450mm/0 for 0mm)				
				70	75					
		4.00 - 4.40	U							
							4.40	-1.69		End of Borehole at 4.40m

Remarks

Borehole Log

Borehole No. **WS05**

Sheet 1 of 1

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520604.73E - 414305.86N	Hole Type WLS
Location: Netherlands Way, Immingham		Level: 2.90m aOD	Scale 1:50
Client: TEGCO LTD		Dates: 13/05/2020	Logged By DnG

Well	Water Strikes	Samples and In Situ Testing					Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Dia. (mm)	TCR (%)	Results				
		0.80	SPT	80	100	10 (0 for 0mm/10 for 0mm)	0.80	2.10		MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
										End of Borehole at 0.80m

Remarks

Borehole Log

Borehole No. **WS06**

Sheet 1 of 1

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520588.41E - 414315.98N
Location:	Netherlands Way, Immingham		Level: 2.97m aOD
Client:	TEGCO LTD		Dates: 13/05/2020

Hole Type: WLS

Scale: 1:50

Logged By: DnG

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
				80	100					MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
		1.00	SPT			N=9 (1,1/2,2,2,3)	1.00	1.97		
				80	100					Initially firm becoming soft brown mottled grey slightly organic silty CLAY.
		2.00	SPT			0 (0 for 450mm/0 for 0mm)				
				70	75					
		3.00	SPT			0 (0 for 450mm/0 for 0mm)				
				70	60					
		4.00 - 4.40	U							
							4.40	-1.43		End of Borehole at 4.40m

Remarks

Borehole Log

Borehole No. **WS07**

Sheet 1 of 1

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520577.99E - 414350.58N	Hole Type WLS
Location: Netherlands Way, Immingham		Level: 2.93m aOD	Scale 1:50
Client: TEGCO LTD		Dates: 14/05/2020	Logged By DnG

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
				80	60					MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
		1.00	SPT			N=4 (1,1/1,1,1,1)	1.00	1.93		
				80	60					Soft brown mottled grey slightly organic silty CLAY.
		2.00	SPT			0 (0 for 450mm/0 for 0mm)	2.00	0.93		
				70	0					No recovery.
		3.00	SPT			0 (0 for 450mm/0 for 0mm)	3.00	-0.07		End of Borehole at 3.00m

Remarks

Borehole Log

Borehole No. **WS08**

Sheet 1 of 1

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520612.95E - 414379.35N	Hole Type WLS
Location: Netherlands Way, Immingham		Level: 3.03m aOD	Scale 1:50
Client: TEGCO LTD		Dates: 14/05/2020	Logged By DnG

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
				80	100					MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
		1.00	SPT			N=4 (1,0/1,1,1,1)	1.10	1.93		
				80	80					Soft brown mottled grey slightly organic silty CLAY.
		2.00	SPT			0 (0 for 450mm/0 for 0mm)				
				70	40					
		3.00	SPT			0 (0 for 450mm/0 for 0mm)				
				70	60					
		4.00 - 4.40	U							
							4.40	-1.37		End of Borehole at 4.40m

1 2 3 4 5 6 7 8 9 10

Remarks

Borehole Log

Borehole No. **WS09**

Sheet 1 of 1

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520650.66E - 414423.49N	Hole Type WLS
Location: Netherlands Way, Immingham		Level: 3.20m aOD	Scale 1:50
Client: TEGCO LTD		Dates: 15/05/2020	Logged By DnG

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
				80	90		0.60	2.60		MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
		1.00	SPT			N=6 (2,1/1,1,2,2)	0.90	2.30		MADE GROUND (Dense white slightly sandy sub-angular fine to coarse Chalk GRAVEL).
				80	20		1.20	2.00		MADE GROUND (Concrete pad). No recovery; cobble blocking sampling tube.
		2.00	SPT			0 (0 for 450mm/0 for 0mm)	2.00	1.20		Soft brown mottled grey slightly organic silty CLAY.
				70	90					
		3.00	SPT			0 (0 for 450mm/0 for 0mm)				
				70	65					
		4.00 - 4.40	U				4.40	-1.20		End of Borehole at 4.40m

Remarks

Borehole Log

Borehole No. **WS10**

Sheet 1 of 1

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520728.64E - 414456.70N	Hole Type WLS
Location: Netherlands Way, Immingham		Level: 3.36m aOD	Scale 1:50
Client: TEGCO LTD		Dates: 15/05/2020	Logged By DnG

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
				80	90					MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
		1.00	SPT			N=6 (2,1/1,1,2,2)	1.20	2.15		
				80	100					Initially soft to firm becoming soft brown mottled grey slightly organic silty CLAY.
		2.00	SPT			0 (0 for 450mm/0 for 0mm)				
				70	90					
		3.00	SPT			0 (0 for 450mm/0 for 0mm)				
				70	45					
		4.00 - 4.40	U							
							4.40	-1.04		End of Borehole at 4.40m

Remarks

Appendix 3

Trial Pit Records

Rogers Geotechnical Services Ltd Telephone 0843 50 666 87 Fax 0843 51 599 30
Email enquiries@rogersgeotech.co.uk www.rogersgeotech.co.uk

Trial Pit Log

Trialpit No **TP01**

Sheet 1 of 1

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520657.72 - 414283.68 Level: 2.62	Date 20/05/2020
Location: Netherlands Way, Immingham		Dimensions (m): Depth 3.85	Scale 1:50
Client: TEGCO LTD			Logged DnG

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.00 - 0.90	B					MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
				0.90	1.72		Soft to firm dark grey very organic silty CLAY.
				1.10	1.52		Initially stiff becoming soft to firm at 1.5m and very soft at 3.8m brown mottled grey slightly organic silty CLAY.
			HVR=33				
			HVR=33				
			HVR=13	3.85	-1.23		End of pit at 3.85 m

Remarks:

Stability: Initially poor within made ground

Trial Pit Log

Trialpit No **TP02**

Sheet 1 of 1

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520676.12 - 414325.40 Level: 3.26	Date 20/05/2020
Location: Netherlands Way, Immingham		Dimensions (m): Depth 3.65	Scale 1:50
Client: TEGCO LTD			Logged DnG

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.00 - 1.70	B					MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast and shaley mudstone with low cobble content).
				1.70	1.56		Initially stiff becoming soft to firm at 2.5m brown mottled grey slightly organic silty CLAY.
			HVR=29				
			HVR=28				
			HVR=23				
				3.65	-0.39		End of pit at 3.65 m

Remarks: Perched water infilling from above impermeable strata.

Stability: Initially poor within made ground

Trial Pit Log

Trialpit No **TP03**

Sheet 1 of 1

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520723.46 - 414354.62 Level: 3.33	Date 20/05/2020
Location: Netherlands Way, Immingham		Dimensions (m): Depth 3.20	Scale 1:50
Client: TEGCO LTD			Logged DnG

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 1.20	B					MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast and shaley mudstone with low cobble content).
				1.20	2.13		
				1.40	1.93		MADE GROUND (Dense white slightly sandy sub-angular fine to coarse Chalk GRAVEL. (Very high water content)). Initially stiff becoming soft to firm at 2.0m brown mottled grey slightly organic silty CLAY.
			HVR=36				
			HVR=30				
			HVR=28				
				3.20	0.13		End of pit at 3.20 m

Remarks:

Stability: Initially poor within made ground

Trial Pit Log

Trialpit No **TP04** Sheet 1 of 1

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520823.66 - 414419.03 Level: 2.86	Date 20/05/2020
Location: Netherlands Way, Immingham		Dimensions (m): Depth 3.20	Scale 1:50
Client: TEGCO LTD			Logged DnG

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 0.70	B		0.70	2.16		MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
				0.80	2.06		Reinforced Concrete Pad.
				1.20	1.66		MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
			HVR=37				Initially stiff becoming soft to firm at 1.5m brown mottled grey slightly organic silty CLAY.
			HVR=30				
			HVR=19				
				3.20	-0.34		End of pit at 3.20 m

Remarks:

Stability: Initially poor within made ground

Trial Pit Log

Trialpit No **TP05**

Sheet 1 of 1

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520809.75 - 414452.18 Level: 3.18	Date 20/05/2020
Location: Netherlands Way, Immingham		Dimensions (m): Depth 2.60	Scale 1:50
Client: TEGCO LTD			Logged DnG

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 1.40	B					MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
				1.40	1.78		Soft to firm dark grey very organic silty CLAY.
				1.60	1.58		Initially stiff becoming soft to firm at 1.8m brown mottled grey slightly organic silty CLAY.
			HVR=36				
			HVR=26				
				2.60	0.58		End of pit at 2.60 m

Remarks:

Stability: Initially poor within made ground

Trial Pit Log

Trialpit No **TP06**

Sheet 1 of 1

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520634.73 - 414335.52 Level: 4.67	Date 21/05/2020
Location: Netherlands Way, Immingham		Dimensions (m): Depth 3.10	Scale 1:50
Client: TEGCO LTD			Logged DnG

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.00 - 0.70	B					MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
				0.70	3.97		Bituminous Pavement.
				0.80	3.87		MADE GROUND (Dense compacted crushed limestone GRAVEL (Sub-base material)).
				1.00	3.67		MADE GROUND (Very dense dark greyish brown sandy slightly clayey sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
				1.30	3.37		MADE GROUND (Dense white slightly sandy sub-angular fine to coarse Chalk GRAVEL).
				1.50	3.17		MADE GROUND (Dense very dark grey/black sandy sub-angular to sub-rounded fine to coarse GRAVEL of various lithologies (Railway ballast)).
				2.00	2.67		Initially stiff becoming soft to firm at 2.5m brown mottled grey slightly organic silty CLAY.
			HVR=40				
			HVR=38				
				3.10	1.57		End of pit at 3.10 m

Remarks: Perched water infilling from above impermeable strata.

Stability: Initially poor within made ground

Trial Pit Log

Trialpit No **TP07** Sheet 1 of 1

Project Name:	Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520644.66 - 414367.18 Level: 2.99
Location:	Netherlands Way, Immingham	Dimensions (m): Depth 3.00	Date 21/05/2020 Scale 1:50
Client:	TEGCO LTD		Logged DnG

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 0.70	B		0.70	2.29		MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
				0.80	2.19		Reinforced Concrete Pad.
				1.50	1.49		MADE GROUND (Very dense dark greyish brown sandy slightly clayey sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
			HVR=40				Initially stiff becoming soft to firm at 1.7m brown mottled grey slightly organic silty CLAY.
			HVR=33				
			HVR=29	3.00	-0.01		End of pit at 3.00 m

Remarks: Perched water infilling from above impermeable strata.

Stability: Initially poor within made ground

Trial Pit Log

Trialpit No **TP08**

Sheet 1 of 1

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520715.53 - 414389.94 Level: 11.32	Date 21/05/2020
Location: Netherlands Way, Immingham		Dimensions (m): Depth 2.50	Scale 1:50
Client: TEGCO LTD			Logged DnG

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
							MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
				1.00	10.32		Bituminous Pavement.
				1.10	10.22		MADE GROUND (Dense compacted crushed limestone GRAVEL (Sub-base material)).
	1.30 - 1.50	B		1.30	10.02		MADE GROUND (Very dense dark greyish brown sandy slightly clayey sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
				1.50	9.82		MADE GROUND (Dense white slightly sandy sub-angular fine to coarse Chalk GRAVEL).
				1.60	9.72		MADE GROUND (Dense very dark grey/black sandy sub-angular to sub-rounded fine to coarse GRAVEL of various lithologies (Railway ballast)).
				1.80	9.52		Initially stiff becoming soft to firm at 2.0m brown mottled grey slightly organic silty CLAY.
			HVR=38				End of pit at 2.50 m
			HVR=33	2.50	8.82		

Remarks:

Stability: Initially poor within made ground

Trial Pit Log

Trialpit No **TP09**

Sheet 1 of 1

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520712.61 - 414400.91 Level: 10.30	Date 21/05/2020
Location: Netherlands Way, Immingham		Dimensions (m): Depth 2.70	Scale 1:50
Client: TEGCO LTD			Logged DnG

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
							MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
				0.90	9.40		Reinforced Concrete Pad.
	1.00 - 1.40	B		1.00	9.30		MADE GROUND (Very dense dark greyish brown sandy slightly clayey sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
				1.40	8.90		MADE GROUND (Dense white slightly sandy sub-angular fine to coarse Chalk GRAVEL).
				1.70	8.60		Initially stiff becoming soft to firm at 2.0m brown mottled grey slightly organic silty CLAY. (Very organic 1.9m - 2.1m).
			HVR=39				
			HVR=34				
				2.70	7.60		End of pit at 2.70 m

Remarks:

Stability: Initially poor within made ground

Trial Pit Log

Trialpit No **TP10** Sheet 1 of 1

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520672.25 - 414416.98 Level: 6.37	Date 22/05/2020
Location: Netherlands Way, Immingham		Dimensions (m): Depth 3.00	Scale 1:50
Client: TEGCO LTD			Logged DnG

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 0.80	B					MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with high cobble content).
				0.80	5.56		MADE GROUND (Dense white slightly sandy sub-angular fine to coarse Chalk GRAVEL).
				1.30	5.07		Soft to firm dark grey very organic silty CLAY.
				1.50	4.86		Initially stiff becoming soft to firm at 1.6m brown mottled grey slightly organic silty CLAY.
			HVR=40				
			HVR=38				
			HVR=19	3.00	3.36		End of pit at 3.00 m

Remarks:

Stability: Initially poor within made ground

AGS

Trial Pit Log

Trialpit No **TP11**

Sheet 1 of 1

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520599.13 - 414367.94 Level: 3.29	Date 22/05/2020
Location: Netherlands Way, Immingham		Dimensions (m): Depth 1.80	Scale 1:50
Client: TEGCO LTD			Logged DnG

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.00 - 1.60	B					MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with high cobble content).
				1.60	1.69		Initially stiff becoming soft to firm brown mottled grey slightly organic silty CLAY.
				1.80	1.49		End of pit at 1.80 m

Remarks: Perched water infilling from above impermeable strata. Position terminated at 1.8m due to discovery of drainage service.

Stability: Initially poor within made ground

Trial Pit Log

Trialpit No **TP12**

Sheet 1 of 1

Project Name: Immingham EFW	Project No. C700/20/E/1077	Co-ords: 520726.93 - 414450.43 Level: 2.25	Date 22/05/2020
Location: Netherlands Way, Immingham		Dimensions (m): Depth 1.90	Scale 1:50
Client: TEGCO LTD			Logged DnG

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 1.10	B		1.10	1.15		MADE GROUND (Very dense dark greyish brown sandy sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with high cobble content).
				1.70	0.55		MADE GROUND (Very dense dark greyish brown sandy slightly clayey sub-angular fine to coarse GRAVEL of various lithologies including brick, chalk, concrete, rail ballast, ash and clinker with low cobble content).
				1.90	0.35		Initially stiff becoming soft to firm brown mottled grey slightly organic silty CLAY.
							End of pit at 1.90 m

Remarks: Position terminated at 1.9m due to discovery of drainage service.

Stability: Initially poor within made ground

Appendix 4

Laboratory Testing

Rogers Geotechnical Services Ltd Telephone 0843 50 666 87 Fax 0843 51 599 30
Email enquiries@rogersgeotech.co.uk www.rogersgeotech.co.uk

Environmental
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LABORATORY REPORT

job number C700/20/E/1077	client ref
site address Netherlands Way Stallingborough, Immingham, DN41 8DF	client address TEGCO LTD
consultant	
date scheduled 17/06/2020	date issued 11/09/2020
issued by C J Norcliffe	job title Laboratory Manager

Rogers Geotechnical Services Ltd Telephone **01484 607 977**
Email **jude.norcliffe@rogersgeotech.co.uk** www.**rogersgeotech.co.uk**
Offices 1 & 2, Barncliffe Business Park, Near Bank, Shelley,
Huddersfield, West Yorkshire HD8 8LU.

GEOTECHNICAL ENVIRONMENTAL

Schedule of UKAS Accredited Laboratory Tests

		Accredited (A)	Unaccredited (U)
1. CLASSIFICATION OF SOIL	**BS 1377-2:1990**		
1.1 Moisture content determination			
i) Oven drying	Pt 2 : 3.2	**A**	
ii) Saturation m/c of chalk	Pt 2 : 3.3		U
1.2 Index Properties			
i) Liquid limit – cone penetrometer	Pt 2 : 4.3	**A**	
ii) Plastic limit	Pt 2 : 5.3	**A**	
iii) Shrinkage limit	Pt 2 : 6.3		U
iv) Linear shrinkage	Pt 2 : 6.5	**A**	
1.3 Particle Density			
i) Gas jar	Pt 2 : 8.2		U
ii) Large pyknometer	Pt 2 : 8.3		U
iii) Small pyknometer	Pt 2 : 8.4		U
1.4 Density Tests			
i) Linear measurement	Pt 2 : 7.2	**A**	
ii) Immersion in water	Pt 2 : 7.3		U
iii) Water displacement	Pt 2 : 7.4		U
iv) Sand replacement	Pt 9 : 2.1, 2.2		U
v) Core cutter	Pt 9 : 2.4		U
1.5 Particle Size Distribution			
i) Dry Sieve	Pt 2 : 9.2	**A**	
ii) Wet Sieve	Pt 2 : 9.3	**A**	
iii) Sedimentation by pipette	Pt 2 : 9.4	**A**	
iv) Sedimentation by hydrometer	Pt 2 : 9.5		U
2. CHEMICAL TESTS	**BS 1377-3:2018**		
ii) Mass loss on ignition	Pt 3 : 4		U
3. COMPACTION RELATED TESTS	**BS 1377-4:1990**		
3.1 Dry density/moisture relationship			
i) 2.5kg rammer – 1 litre mould	Pt 4 : 3		U
- CBR mould	Pt 4 : 3		U
ii) 4.5kg rammer – 1 litre mould	Pt 4 : 3		U
- CBR mould	Pt 4 : 3		U
3.2 Moisture Condition Value			
i) Single point test	Pt 4 : 5.4		U
ii) MCV/moisture content relationship	Pt 4 : 5.5		U
3.3 California Bearing Ratio			
i) Undisturbed sample	Pt 5 : 7		U
ii) Recompacted sample	Pt 5 : 7		U
iii) Soaked, inc measurement of swell	Pt 5 : 7		U
4. COMPRESSIBILITY OF SOIL	**BS 1377-5:1990**		
i) One dimensional consolidation	Pt 5 : 3		U
ii) Swelling pressure test	Pt 5 : 3		U
5. SHEAR STRENGTH OF SOIL	**BS 1377-7:1990**		
i) Hand shear vane	Makers instructions		U
ii) Shear box (100mm square sample)	BS 1377 : Pt 7 : 4		U
iii) Triaxial – quick undrained	BS 1377 : Pt 7 : 8, 9		U
6. PERMEABILITY			
i) Falling head	K. H. Head Vol 2		U
ii) Constant head	BS 1377 : Pt 6 : 6		U
iii) Triaxial cell	BS 1377 : Pt 6 : 6		U
7. ROCK TESTS			
7.1 Classification Tests			
i) Natural moisture content	-		U
ii) Saturated moisture content	-		U
iii) Natural density	-		U
iv) Porosity	-		U
7.2 Strength Tests			
i) Point load index	ISRM '85		U
ii) Uniaxial compression test	ISRM '81		U

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Company No: 5130864

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GEOTECHNICAL
ENVIRONMENTAL

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Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	20-15253-1
Initial Date of Issue:	23-Jun-2020
Client	Rogers Geotechnical Services Ltd
Client Address:	Unit 4, Barncliffe Business Park Near Bank Shelley Huddersfield West Yorkshire HD8 8LU
Contact(s):	Rob Palmer
Project	C700/20/E - Immingham
Quotation No.:	Q20-19998
Order No.:	PO-0750
No. of Samples:	12
Turnaround (Wkdays):	5
Date Approved:	23-Jun-2020
Approved By:	
Details:	Glynn Harvey, Technical Manager

Date Received:	17-Jun-2020
Date Instructed:	17-Jun-2020
Results Due:	23-Jun-2020

Chemtest
The right chemistry to deliver results

Results - Soil

Project: C700/20/E - Immingham

Client: Rogers Geotechnical Services Ltd		**Chemtest Job No.:**			20-15253	20-15253	20-15253	20-15253	20-15253	20-15253	20-15253	20-15253
Quotation No.: Q20-19998		**Chemtest Sample ID.:**			1018316	1018317	1018318	1018319	1018320	1018321	1018322	1018323
		Sample Location:			CP04	CP04	CP06A	CP06A	CP07A	CP07A	CP08	CP08
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.60	2.50	0.60	2.00	0.80	3.00	0.60	2.50
		Bottom Depth (m):			1.20		1.50	2.50	2.00			
		Date Sampled:			12-Jun-2020	12-Jun-2020	12-Jun-2020	12-Jun-2020	12-Jun-2020	12-Jun-2020	12-Jun-2020	12-Jun-2020
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
Moisture	N	2030	%	0.020	8.9	25	9.2	18	16	25	7.1	25
Soil Colour	N	2040		N/A	Brown	Brown	Brown	Brown	Brown	Brown	Grey	Brown
Other Material	N	2040		N/A	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones
Soil Texture	N	2040		N/A	Sand	Clay	Sand	Clay	Clay	Clay	Sand	Clay
pH	M	2010		4.0	9.7	8.4	9.6	8.1	10.1	8.3	8.3	8.3
Cyanide (Complex)	M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cyanide (Free)	M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cyanide (Total)	M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Sulphate (Total)	M	2430	mg/kg	100	6300	930	15000	1100	2900	13000	31000	750
Arsenic	M	2450	mg/kg	1.0	20	15	32	13	18	9.7	55	11
Beryllium	U	2450	mg/kg	1.0	2.6	1.1	3.4	1.9	1.3	< 1.0	1.5	< 1.0
Cadmium	M	2450	mg/kg	0.10	0.24	0.16	0.30	0.64	0.51	0.12	0.55	< 0.10
Antimony	N	2450	mg/kg	2.0	< 2.0	< 2.0	2.6	< 2.0	< 2.0	< 2.0	2.8	< 2.0
Copper	M	2450	mg/kg	0.50	77	40	72	16	36	12	47	15
Mercury	M	2450	mg/kg	0.10	0.28	< 0.10	0.19	< 0.10	0.18	< 0.10	0.21	< 0.10
Nickel	M	2450	mg/kg	0.50	19	45	30	35	23	29	38	37
Lead	M	2450	mg/kg	0.50	68	34	92	23	43	14	58	18
Selenium	M	2450	mg/kg	0.20	< 0.20	0.28	0.47	0.28	< 0.20	< 0.20	1.8	0.25
Vanadium	U	2450	mg/kg	5.0	37	45	72	43	39	34	32	41
Zinc	M	2450	mg/kg	0.50	330	110	280	78	150	57	110	71
Chromium (Trivalent)	N	2490	mg/kg	1.0	18	39	33	31	48	24	16	31
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	M	2625	%	0.40	1.9	1.3	7.1	1.1	7.1	1.4	17	1.3
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0	130	< 1.0	75	< 1.0	< 1.0	< 1.0	27	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	130	< 5.0	75	< 5.0	< 5.0	< 5.0	27	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0	< 1.0	6.9	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	M	2680	mg/kg	1.0	15	< 1.0	100	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	160	< 1.0	1200	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Chemtest
The right chemistry to deliver results

Results - Soil

Project: C700/20/E - Immingham

Client: Rogers Geotechnical Services Ltd					Chemtest Job No.:	20-15253	20-15253	20-15253	20-15253	20-15253	20-15253	20-15253	20-15253
Quotation No.: Q20-19998					Chemtest Sample ID.:	1018316	1018317	1018318	1018319	1018320	1018321	1018322	1018323
					Sample Location:	CP04	CP04	CP06A	CP06A	CP07A	CP07A	CP08	CP08
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	0.60	2.50	0.60	2.00	0.80	3.00	0.60	2.50
					Bottom Depth (m):	1.20		1.50	2.50	2.00			
					Date Sampled:	12-Jun-2020	12-Jun-2020	12-Jun-2020	12-Jun-2020	12-Jun-2020	12-Jun-2020	12-Jun-2020	12-Jun-2020
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0		710	< 1.0	2600	< 1.0	< 1.0	< 1.0	43	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0		< 1.0	< 1.0	89	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0		880	< 5.0	4000	< 5.0	< 5.0	< 5.0	43	< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0		1000	< 10	4100	< 10	< 10	< 10	70	< 10
Naphthalene	M	2700	mg/kg	0.10		1.4	< 0.10	7.6	0.16	0.17	< 0.10	6.0	< 0.10
Acenaphthylene	M	2700	mg/kg	0.10		0.88	< 0.10	1.1	0.12	< 0.10	< 0.10	0.75	< 0.10
Acenaphthene	M	2700	mg/kg	0.10		5.3	< 0.10	26	0.88	0.52	< 0.10	0.49	< 0.10
Fluorene	M	2700	mg/kg	0.10		7.6	< 0.10	32	1.0	0.59	< 0.10	1.3	< 0.10
Phenanthrene	M	2700	mg/kg	0.10		45	0.20	240	7.3	4.0	< 0.10	2.6	< 0.10
Anthracene	M	2700	mg/kg	0.10		14	< 0.10	65	1.8	1.3	< 0.10	0.31	< 0.10
Fluoranthene	M	2700	mg/kg	0.10		46	0.25	280	8.6	6.2	< 0.10	2.4	< 0.10
Pyrene	M	2700	mg/kg	0.10		43	0.26	250	7.8	5.9	< 0.10	2.5	< 0.10
Benzo[a]anthracene	M	2700	mg/kg	0.10		18	< 0.10	81	2.7	2.5	< 0.10	< 0.10	< 0.10
Chrysene	M	2700	mg/kg	0.10		16	< 0.10	77	2.2	2.3	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	M	2700	mg/kg	0.10		19	< 0.10	57	2.3	2.3	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	M	2700	mg/kg	0.10		7.9	< 0.10	29	1.3	0.92	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	M	2700	mg/kg	0.10		15	< 0.10	55	2.1	1.9	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10		9.2	< 0.10	29	1.2	1.3	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10		2.7	< 0.10	10	0.32	0.54	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10		8.1	< 0.10	24	1.0	1.2	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	M	2700	mg/kg	2.0		260	< 2.0	1300	41	32	< 2.0	16	< 2.0

Chemtest
The right chemistry to deliver results

Results - Soil

Project: C700/20/E - Immingham

Client: Rogers Geotechnical Services Ltd		**Chemtest Job No.:**			20-15253	20-15253	20-15253	20-15253
Quotation No.: Q20-19998		**Chemtest Sample ID.:**			1018324	1018325	1018326	1018327
		Sample Location:			CP10	TP07	TP11	TP12
		Sample Type:			SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.60	0.00	0.00	0.00
		Bottom Depth (m):			1.20	0.70	1.60	1.10
		Date Sampled:			12-Jun-2020	12-Jun-2020	12-Jun-2020	12-Jun-2020
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
Moisture	N	2030	%	0.020	14	11	9.0	7.7
Soil Colour	N	2040		N/A	Brown	Brown	Brown	Brown
Other Material	N	2040		N/A	Stones	Stones	Stones	Stones
Soil Texture	N	2040		N/A	Clay	Sand	Sand	Sand
pH	M	2010		4.0	9.5	9.3	11.4	10.2
Cyanide (Complex)	M	2300	mg/kg	0.50	< 0.50	0.70	< 0.50	< 0.50
Cyanide (Free)	M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cyanide (Total)	M	2300	mg/kg	0.50	< 0.50	0.70	< 0.50	< 0.50
Sulphate (Total)	M	2430	mg/kg	100	10000	14000	6100	11000
Arsenic	M	2450	mg/kg	1.0	14	53	10	18
Beryllium	U	2450	mg/kg	1.0	4.3	2.2	2.2	3.3
Cadmium	M	2450	mg/kg	0.10	0.35	3.7	0.30	0.54
Antimony	N	2450	mg/kg	2.0	< 2.0	2.5	< 2.0	< 2.0
Copper	M	2450	mg/kg	0.50	15	56	15	16
Mercury	M	2450	mg/kg	0.10	< 0.10	1.2	0.11	0.10
Nickel	M	2450	mg/kg	0.50	24	45	14	20
Lead	M	2450	mg/kg	0.50	25	320	51	54
Selenium	M	2450	mg/kg	0.20	0.22	< 0.20	< 0.20	< 0.20
Vanadium	U	2450	mg/kg	5.0	74	180	56	63
Zinc	M	2450	mg/kg	0.50	72	600	110	110
Chromium (Trivalent)	N	2490	mg/kg	1.0	30	150	22	26
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	M	2625	%	0.40	2.8	3.6	1.5	1.9
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0	12	< 1.0	< 1.0	88
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	12	< 5.0	< 5.0	88
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	43	< 1.0	< 1.0	< 1.0

Chemtest
The right chemistry to deliver results

Results - Soil

Project: C700/20/E - Immingham

Client: Rogers Geotechnical Services Ltd		**Chemtest Job No.:**			20-15253	20-15253	20-15253	20-15253
Quotation No.: Q20-19998		**Chemtest Sample ID.:**			1018324	1018325	1018326	1018327
		Sample Location:			CP10	TP07	TP11	TP12
		Sample Type:			SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.60	0.00	0.00	0.00
		Bottom Depth (m):			1.20	0.70	1.60	1.10
		Date Sampled:			12-Jun-2020	12-Jun-2020	12-Jun-2020	12-Jun-2020
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0	130	< 1.0	< 1.0	780
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	170	< 5.0	< 5.0	780
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	180	< 10	< 10	870
Naphthalene	M	2700	mg/kg	0.10	0.16	1.9	0.24	0.15
Acenaphthylene	M	2700	mg/kg	0.10	< 0.10	0.99	0.29	0.12
Acenaphthene	M	2700	mg/kg	0.10	0.94	2.5	0.71	0.13
Fluorene	M	2700	mg/kg	0.10	1.2	3.1	0.65	0.18
Phenanthrene	M	2700	mg/kg	0.10	9.0	19	7.3	1.3
Anthracene	M	2700	mg/kg	0.10	2.5	7.0	1.9	0.53
Fluoranthene	M	2700	mg/kg	0.10	11	23	11	2.8
Pyrene	M	2700	mg/kg	0.10	10	21	11	3.6
Benzo[a]anthracene	M	2700	mg/kg	0.10	3.2	9.3	5.1	1.7
Chrysene	M	2700	mg/kg	0.10	2.8	8.4	5.0	1.4
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	2.4	11	6.0	0.89
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	1.1	4.4	2.5	0.50
Benzo[a]pyrene	M	2700	mg/kg	0.10	1.9	7.8	4.4	1.2
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	0.96	5.3	2.9	1.1
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	0.47	1.7	0.94	0.23
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	1.0	5.1	2.9	2.3
Total Of 16 PAH's	M	2700	mg/kg	2.0	49	130	63	18

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

eurofins | Chemtest
Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	20-18860-1
Initial Date of Issue:	28-Jul-2020
Client	Rogers Geotechnical Services Ltd
Client Address:	Unit 4, Barncliffe Business Park Near Bank Shelley Huddersfield West Yorkshire HD8 8LU
Contact(s):	Jude Norcliffe
Project	C700/20/ E/1077 Immingham
Quotation No.:	Q20-19998
Order No.:	PO-0080
No. of Samples:	5
Turnaround (Wkdays):	5
Date Approved:	28-Jul-2020
Approved By:	
Details:	Glynn Harvey, Technical Manager

Date Received:	22-Jul-2020
Date Instructed:	22-Jul-2020
Results Due:	28-Jul-2020

Results - Soil

Project: C700/20/ E/1077 Immingham

Client: Rogers Geotechnical Services Ltd		**Chemtest Job No.:**			20-18860	20-18860	20-18860	20-18860	20-18860
Quotation No.: Q20-19998		**Chemtest Sample ID.:**			1035576	1035577	1035578	1035579	1035580
		Client Sample ID.:			D1	D1	D1	D1	D1
		Sample Location:			TP1	TP3	TP4	TP5	TP8
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.0	0.0	0.0	0.0	1.3
		Bottom Depth (m):			0.9	1.2	0.7	0.8	1.5
		Date Sampled:			16-Jul-2020	16-Jul-2020	16-Jul-2020	16-Jul-2020	16-Jul-2020
		Asbestos Lab:			DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
Cadmium	M	2450	mg/kg	0.10	5.1	1.6	1.4	0.76	0.32
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Copper	M	2450	mg/kg	0.50	130	130	110	160	41
Mercury	M	2450	mg/kg	0.10	0.67	0.93	0.72	0.20	0.32
Nickel	M	2450	mg/kg	0.50	250	45	38	47	25
Lead	M	2450	mg/kg	0.50	150	140	200	83	96
Zinc	M	2450	mg/kg	0.50	810	690	590	450	180
Vanadium	U	2450	mg/kg	5.0	97	120	410	61	73
Arsenic	M	2450	mg/kg	1.0	29	33	25	36	35
Selenium	M	2450	mg/kg	0.20	0.39	0.25	< 0.20	0.43	< 0.20
Cyanide (Free)	M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Naphthalene	M	2700	mg/kg	0.10	0.45	1.3	0.48	< 0.10	2.0
Acenaphthylene	M	2700	mg/kg	0.10	0.15	0.20	0.26	< 0.10	2.5
Acenaphthene	M	2700	mg/kg	0.10	1.6	0.85	0.75	< 0.10	3.0
Fluorene	M	2700	mg/kg	0.10	2.0	1.3	0.86	< 0.10	6.4
Phenanthrene	M	2700	mg/kg	0.10	24	11	8.1	0.83	21
Anthracene	M	2700	mg/kg	0.10	9.7	4.2	2.6	0.37	7.2
Fluoranthene	M	2700	mg/kg	0.10	64	26	18	1.8	30
Pyrene	M	2700	mg/kg	0.10	78	26	18	1.6	33
Benzo[a]anthracene	M	2700	mg/kg	0.10	26	11	6.7	0.80	14
Chrysene	M	2700	mg/kg	0.10	26	10	6.4	1.1	15
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	25	10	6.4	< 0.10	13
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	12	4.0	2.9	< 0.10	6.2
Benzo[a]pyrene	M	2700	mg/kg	0.10	23	8.5	6.3	< 0.10	12
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	12	4.8	3.7	< 0.10	7.6
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	3.5	1.3	1.0	< 0.10	2.5
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	11	6.0	4.8	< 0.10	8.5
Total Of 16 PAH's	M	2700	mg/kg	2.0	320	130	87	6.5	180
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	190
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	3400
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0	36	< 1.0	39	170	1900
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	43	< 1.0	< 1.0	< 1.0	< 1.0

Results - Soil

Project: C700/20/ E/1077 Immingham

Client: Rogers Geotechnical Services Ltd			**Chemtest Job No.:**		20-18860	20-18860	20-18860	20-18860	20-18860
Quotation No.: Q20-19998			**Chemtest Sample ID.:**		1035576	1035577	1035578	1035579	1035580
			Client Sample ID.:		D1	D1	D1	D1	D1
			Sample Location:		TP1	TP3	TP4	TP5	TP8
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.0	0.0	0.0	0.0	1.3
			Bottom Depth (m):		0.9	1.2	0.7	0.8	1.5
			Date Sampled:		16-Jul-2020	16-Jul-2020	16-Jul-2020	16-Jul-2020	16-Jul-2020
			Asbestos Lab:		DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	79	< 5.0	39	170	5500
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	M	2680	mg/kg	1.0	5.1	5.3	< 1.0	< 1.0	160
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	510	110	110	< 1.0	360
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0	890	290	480	240	790
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	25	< 1.0	< 1.0	< 1.0	21
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	1400	400	580	240	1300
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	1500	400	620	420	6800
pH	M	2010		4.0	10.4	10.2	10.0	10.6	9.2
ACM Type	U	2192		N/A	-	Fibres/Clumps	-	-	-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected	Amosite	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-	Stereo Microscopy	-	-	-
Asbestos by Gravimetry	U	2192	%	0.001		<0.001			
Total Asbestos	N	2192	%	0.001		<0.001			
Moisture	N	2030	%	0.020	5.1	9.9	6.5	3.1	14
Soil Colour	N	2040		N/A	Brown	Brown	Brown	Brown	Brown
Other Material	N	2040		N/A	Stones	Stones	Stones	Stones	Stones
Soil Texture	N	2040		N/A	Sand	Loam	Sand	Sand	Loam
Cyanide (Complex)	M	2300	mg/kg	0.50	< 0.50	0.60	< 0.50	< 0.50	< 0.50
Cyanide (Total)	M	2300	mg/kg	0.50	< 0.50	0.60	< 0.50	< 0.50	< 0.50
Ammonium (Extractable)	M	2425	mg/kg	0.50	3.9	3.9	1.6	1.0	1.0
Ammoniacal Nitrogen	M	2425	mg/kg	0.50	3.0	3.0	1.2	0.78	0.78
Ammonium (Water Soluble)	M	2120	g/l	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Sulphate (Total)	M	2430	mg/kg	100	18000	15000	9700	18000	9700
Beryllium	U	2450	mg/kg	1.0	4.7	3.7	2.7	3.2	1.5
Antimony	N	2450	mg/kg	2.0	2.7	3.6	3.2	2.4	< 2.0
Chromium (Trivalent)	N	2490	mg/kg	1.0	140	240	63	37	28
Organic Matter	M	2625	%	0.40	3.3	4.3	4.1	5.9	11

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2425	Extractable Ammonium in soils	Ammonium	Extraction with potassium chloride solution / analysis by 'Aquakem 600' Discrete Analyser using sodium salicylate and sodium dichloroisocyanurate.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)

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N/E	not evaluated
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>	"greater than"

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Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

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Final Report

Report No.:	20-20171-1		
Initial Date of Issue:	12-Aug-2020		
Client	Rogers Geotechnical Services Ltd		
Client Address:	Unit 4, Barncliffe Business Park Near Bank Shelley Huddersfield West Yorkshire HD8 8LU		
Contact(s):	Jude Norcliffe		
Project	C700/20/E Netherlands Way		
Quotation No.:	Q20-19998	**Date Received:**	03-Aug-2020
Order No.:	0832	**Date Instructed:**	04-Aug-2020
No. of Samples:	3		
Turnaround (Wkdays):	7	**Results Due:**	12-Aug-2020
Date Approved:	12-Aug-2020		
Approved By:			
Details:	Glynn Harvey, Technical Manager		

Results - Water

Project: C700/20/E Netherlands Way

Client: Rogers Geotechnical Services Ltd		**Chemtest Job No.:**			20-20171	20-20171	20-20171
Quotation No.: Q20-19998		**Chemtest Sample ID.:**			1042108	1042109	1042110
			Client Sample ID.:		D1	D1	D1
			Sample Location:		BH06	BH09	BH01
			Sample Type:		WATER	WATER	WATER
			Top Depth (m):		1.50	1.50	1.50
			Date Sampled:		30-Jul-2020	30-Jul-2020	30-Jul-2020
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Chromium (Hexavalent)	U	1490	µg/l	20	< 20	< 20	< 20
Cyanide (Free)	U	1300	mg/l	0.050	< 0.050	< 0.050	< 0.050
Total Phenols	U	1920	mg/l	0.030	< 0.030	< 0.030	< 0.030
Naphthalene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Fluorene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Anthracene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Pyrene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Chrysene	N	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	N	1700	µg/l	2.0	< 2.0	< 2.0	< 2.0
Aliphatic TPH >C5-C6	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C6-C8	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Total Aliphatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C7-C8	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Total Aromatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	< 5.0	< 5.0

Results - Water

Project: C700/20/E Netherlands Way

Client: Rogers Geotechnical Services Ltd		**Chemtest Job No.:**			20-20171	20-20171	20-20171
Quotation No.: Q20-19998		**Chemtest Sample ID.:**			1042108	1042109	1042110
				Client Sample ID.:	D1	D1	D1
				Sample Location:	BH06	BH09	BH01
				Sample Type:	WATER	WATER	WATER
				Top Depth (m):	1.50	1.50	1.50
				Date Sampled:	30-Jul-2020	30-Jul-2020	30-Jul-2020
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Total Petroleum Hydrocarbons	N	1675	µg/l	10	< 10	< 10	< 10
pH	U	1010		N/A	7.5	9.6	8.1
Cyanide (Total)	U	1300	mg/l	0.050	< 0.050	< 0.050	< 0.050
Thiocyanate	U	1300	mg/l	0.50	< 0.50	< 0.50	< 0.50
Cyanide (Complex)	U	1300	mg/l	0.050	< 0.050	< 0.050	< 0.050
Sulphide	U	1325	mg/l	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
Arsenic (Dissolved)	U	1450	µg/l	1.0	16	22	14
Boron (Dissolved)	U	1450	µg/l	20	740	210	990
Beryllium (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0	< 1.0
Cadmium (Dissolved)	U	1450	µg/l	0.080	0.084	< 0.080	3.4
Copper (Dissolved)	U	1450	µg/l	1.0	6.5	22	48
Mercury (Dissolved)	U	1450	µg/l	0.50	< 0.50	< 0.50	< 0.50
Nickel (Dissolved)	U	1450	µg/l	1.0	32	11	21
Lead (Dissolved)	U	1450	µg/l	1.0	2.6	< 1.0	2.2
Antimony (Dissolved)	U	1450	µg/l	1.0	< 1.0	2.1	2.1
Selenium (Dissolved)	U	1450	µg/l	1.0	56	9.7	23
Vanadium (Dissolved)	U	1450	µg/l	1.0	9.1	56	21
Zinc (Dissolved)	U	1450	µg/l	1.0	71	4.4	230
Chromium (Trivalent)	N	1490	µg/l	20	< 20	< 20	< 20

Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request.The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
1042108		D1	BH06	30-Jul-2020	B	Coloured Winchester 1000ml
1042108		D1	BH06	30-Jul-2020	B	EPA Vial 40ml
1042108		D1	BH06	30-Jul-2020	B	Plastic Bottle 1000ml
1042109		D1	BH09	30-Jul-2020	B	Coloured Winchester 1000ml
1042109		D1	BH09	30-Jul-2020	B	EPA Vial 40ml
1042109		D1	BH09	30-Jul-2020	B	Plastic Bottle 1000ml
1042110		D1	BH01	30-Jul-2020	B	Coloured Winchester 1000ml
1042110		D1	BH01	30-Jul-2020	B	EPA Vial 40ml
1042110		D1	BH01	30-Jul-2020	B	Plastic Bottle 1000ml

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1325	Sulphide in Waters	Sulphides	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using N,N–dimethyl-pphenylenediamine.
1450	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1490	Hexavalent Chromium in Waters	Chromium [VI]	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
1675	TPH Aliphatic/Aromatic split in Waters by GC-FID(cf. Texas Method 1006 / TPH CWG)	Aliphatics: >C5–C6, >C6–C8, >C8– C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Pentane extraction / GCxGC FID detection
1700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.

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The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

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All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

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Sample Deviation Codes

A - Date of sampling not supplied

B - Sample age exceeds stability time (sampling to extraction)

C - Sample not received in appropriate containers

D - Broken Container

E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com

Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	20-23607-1
Initial Date of Issue:	10-Sep-2020
Client	Rogers Geotechnical Services Ltd
Client Address:	Unit 4, Barncliffe Business Park Near Bank Shelley Huddersfield West Yorkshire HD8 8LU
Contact(s):	Harry Letch
Project	C700/20/E Immingham
Quotation No.:	
Order No.:	PO-0891
No. of Samples:	5
Turnaround (Wkdays):	7
Date Approved:	10-Sep-2020
Approved By:	
Details:	Glynn Harvey, Technical Manager

Date Received:	04-Sep-2020
Date Instructed:	04-Sep-2020
Results Due:	14-Sep-2020

Results - Soil

Project: C700/20/E Immingham

Client: Rogers Geotechnical Services Ltd				**Chemtest Job No.:**	20-23607	20-23607	20-23607	20-23607	20-23607
Quotation No.:				**Chemtest Sample ID.:**	1059161	1059162	1059163	1059164	1059165
				Client Sample ID.:	D1	D1	D1	D1	D1
				Sample Location:	CP04	CP04	CP07	CP7A	CP08
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	0.60	2.50	0.00	3.00	1.80
				Bottom Depth (m):	1.20		0.70		
				Date Sampled:	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
pH	M	2010		4.0	8.2	8.2	10.6	8.6	8.7
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	0.63	1.2	1.4	1.2	0.29
Moisture	N	2030	%	0.020	21	25	8.1	28	28
Soil Colour	N	2040		N/A	Grey	Brown	Brown	Brown	Brown
Other Material	N	2040		N/A	Stones	None	Stones	None	None
Soil Texture	N	2040		N/A	Clay	Clay	Sand	Clay	Clay

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES

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The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

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D - Broken Container

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Sample Retention and Disposal

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customerservices@chemtest.com

Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

2183

Final Report

Report No.:	20-25600-1		
Initial Date of Issue:	29-Sep-2020		
Client	Rogers Geotechnical Services Ltd		
Client Address:	Unit 4, Barncliffe Business Park Near Bank Shelley Huddersfield West Yorkshire HD8 8LU		
Contact(s):	Harry Letch		
Project	C700/20/E Immingham		
Quotation No.:		**Date Received:**	24-Sep-2020
Order No.:	PO-0924	**Date Instructed:**	24-Sep-2020
No. of Samples:	4		
Turnaround (Wkdays):	7	**Results Due:**	02-Oct-2020
Date Approved:	29-Sep-2020		
Approved By:			
Details:	Glynn Harvey, Technical Manager		

Results - Soil

Project: C700/20/E Immingham

Client: Rogers Geotechnical Services Ltd		**Chemtest Job No.:**			20-25600	20-25600	20-25600	20-25600
Quotation No.:		**Chemtest Sample ID.:**			1069314	1069315	1069316	1069317
		Client Sample ID.:			D1	D1	D1	D1
		Sample Location:			TP2	TP7	TP11	TP12
		Sample Type:			SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0	0	0	1
		Bottom Depth (m):			0.7	0.7	1.5	1.1
		Date Sampled:			22-Sep-2020	22-Sep-2020	22-Sep-2020	22-Sep-2020
		Asbestos Lab:			DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
ACM Type	U	2192		N/A	-	-	-	-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-	-	-	-

Test Methods

SOP	Title	Parameters included	Method summary
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry

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Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied

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End of Report

Rogers Geotechnical Services Ltd
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Appendix 5

Fill Screening Values

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Rogers Geotechnical Services Ltd.

Atkins ATRISK Soil Screening Values (SSVs) - Commercial Landuse

Tox Data Report No.	Compound	Commercial (mg/kg)				Reference
	Metals	1% SOM		6% SOM		
3	Cadmium	410		410		C
4	Chromium VI	19.7	49.1	19.7	49.1	B/C
	Copper	106000		106000		A+
7	Mercury	350.00		405.00		A/D
8	Nickel	1770		1770		A+
	Lead	2310		2310		C
	Zinc	1100000		1100000		A+
	Vanadium	7490		7490		A+
	Semi and Non Metals					
1	Arsenic	635		635		C
10	Selenium	13000		13000		A
	Free Cyanide	373		373		A
9	Phenols (total)	685		3170		A
	Poly Aromatic Hydrocarbons	Free product	No free produc	Free product	No free product	
20	Naphthalene	75	90.1	432	1050	A+
	Acenaphthene	156.8	83600	106000		A+
	Fluorene	66500		72000		A+
	Anthracene	535000		544000		A+
	Fluoranthene	72200		72600		A+
	Pyrene	54100		54400		A+
	Benzo(a)anthracene	1.71	131	10.3	142	A
2	Chrysene	0.44	14000	2.64	14300	A
2	Benzo(b)fluoranthene	1.22	142	7.29	144	A
2	Benzo(k)fluoranthene	0.686	1430	4.12	1440	A
2	Benzo(a)pyrene	26.1	76.3	26.2	76.3	B/C
2	Dibenz(a,h)anthracene	0.00393	14.3	0.0236	14.4	A*
2	Indeno(1,2,3-cd)pyrene	0.0614	142	0.368	144	A*
2	Benzo(g,h,i)perylene	0.0187	1440	0.112	1450	A*
	Petroleum Hydrocarbons					
	Aliphatic C5-C6	327	4490	1100	29400	A+
	Aliphatic C6-C8	157	10400	769	98200	A+
	Aliphatic C8-C10	82.4	1370	476	14800	A+
	Aliphatic C10-C12	49.9	7900	297	69500	A+
	Aliphatic C12-C16	20.9	34000	126	139000	A+
	Aliphatic C16-C21	3620000		3620000		A+
	Aliphatic C21-C35	3620000		3620000		A+
	Aromatic C5-C7 (Benzene)	12.5		98		A+
	Aromatic C7-C8 (Toluene)	834	27900	4360	183000	A+
	Aromatic C8-C10	613	2210	3600	20800	A+
	Aromatic C10-C12	369	12300	2190	53800	A+
	Aromatic C12-C16	155	41300	65400		A+
	Aromatic C16-C21	28400		28400		A+
	Aromatic C21-C35	28400		28400		A+
	Others					
	pH	-		-		-
	Organic Content (%)	-		-		-
	Soluble Sulphate (mg/l)	-		-		-
	Total Sulphate (%)	-		-		-
	Asbestos	-		-		-

A = WS ATKINS PLC, ATRISK SOIL SCREENING VALUES BASED ON 1% SOIL ORGANIC MATTER

A+ = Values updated June 2017.

A* Atrisk's SSV is lower than Chemtest's detectable limit for this compound.

B = health criterion values, which are available from toxicological reviews published in the C4SL project methodology report.

C = Category 4 Screening Levels (C4SLs) based on 1% soil organic matter.

D - Value provided is based on Methyl Mercury. Should elemental mercury be observed or a source be known then a limit of 7.95 should be used.

Alan Wood & Partners

APPENDIX B

YALPAG GUIDANCE VERIFICATION OF COVER SYSTEMS; V3.4 NOVEMBER 2017

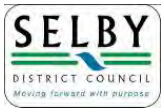
VERIFICATION REQUIREMENTS FOR COVER SYSTEMS

Technical Guidance for Developers, Landowners and Consultants

Yorkshire and Lincolnshire
Pollution Advisory Group

Version 3.4 – November 2017

The purpose of this guidance is to promote consistency and good practice for development on land affected by contamination. The local authorities in Yorkshire, Lincolnshire and the North East of England who have adopted this guidance are shown below:



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Acknowledgments

The author, Wakefield Council [David Jackson], would like to acknowledge the assistance provided by the following organisations: City of York Council, City of Lincoln Council, Leeds City Council and City of Sheffield Council. The author would also like to acknowledge Liverpool City Council's Contaminated Land Team, Coopers Consulting Engineers for allowing us to use their guidance document and photographs and WSP Environmental Ltd for also donating photographs.

Consultation

39 Local Authorities and 6 Environmental Consultants were consulted over a four week period in 2010 during the production of the initial guidance. At that time, consultation comments were considered by the review panel and a number of revisions were made to the guidance to reflect these comments. Given that no major changes have subsequently taken place, only Local Authorities were consulted during the production of this version [3.1] of the guidance.

Introduction

This guidance has been produced to help developers ensure that they can demonstrate that material brought onto a development site for gardens or areas of soft landscaping are suitable for use and do not present harm to people, the environment and/or property. It is intended to improve the quality of reports submitted to Local Authorities on this matter and to give contractors/consultants a point of reference to obtain approval for such work from their client. This guidance does not cover the geotechnical suitability of soils or material or chemical suitability that does not affect human health e.g. sulphates.

The verification of cover systems should be an integral part of the remediation project and agreed between developers and regulators at an early stage in the project.

There are some UK guidelines regarding verification, for example CLR 11[1] and the document on verification of remediation[2]. This guidance note should be considered as supplementary advice in conjunction with these documents.

This guidance relates to the remediation of land contamination by using cover systems; however, the verification of the quality of imported material is equally important in other situations, such as raising levels for flood prevention or general landscaping works. This guidance could also be used in such instances.

The Process of Verification

Implementation plans for remedial works should always be site specific. Where a cover system and potentially, excavation, is the main remedial method or a component of an overall site remediation, specific goals will need to be set that are linked directly to the risk management strategy for the site in question.

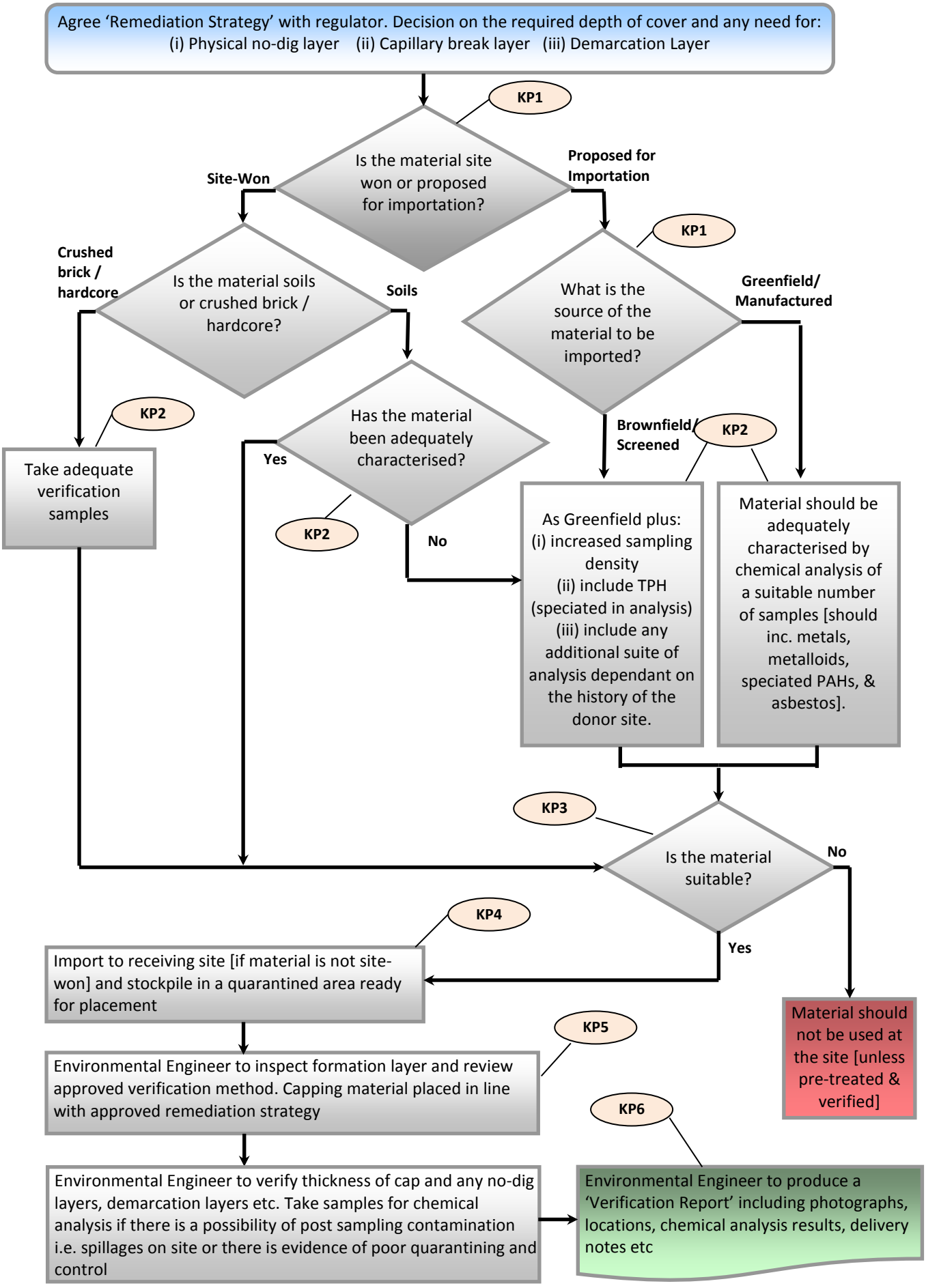
For cover and containment systems, verification will normally depend upon the provision of defensible measurements, observations and records. Critical factors to be considered are:

- What should be measured?
- When should they be measured?
- Where measurements need to be taken, what is the appropriate monitoring regime i.e. number and frequency of samples?
- Statistical constraints on sampling.

1 "Contaminated Land Report 11 - Model Procedures for the Management of Contaminated Land". Environment Agency, September 2004.

2 "Verification of Remediation of Contaminated Land. Environment Agency, 2010 [draft report].

Overview Flowchart



Key Points

KP1 Source of Material	Material can be sourced from site won material i.e. crushed brick /hardcore or site-won soils from existing open or landscaped areas. In the interest of sustainability, Local Authorities promote the use of such site-won material providing that they are suitable for the intended end use of the site. Alternatively, material can be sourced from other developments and commercial companies. Dependent on the source of the material it can be classified as either from a 'Greenfield/Manufactured' or 'Brownfield/Screened' source. Broadly speaking material can be classified as follows: Greenfield - if it can be demonstrated that it has not been developed and that no past contaminative uses have occurred at the site. Manufactured – from a commercial company who manufacture material by mixing or blending mineral soils (subsoil or sand) with an organic amendment (compost). Brownfield – material from a donor site that has previously been developed Screened – material from a company who deal with skip/demolition waste which is screened for unsuitable material i.e. bricks, wood, plastic etc.
KP2 Characterisation of Material	It is essential that material is inert and suitable for its intended use. Evidence of the source of the material should be provided to the Local Authority. What is required is a defensible method to ensure the verification proposals are site specific and that the level of sampling reflects the need to ensure that imported material are suitable for their intended use. When Should this be Done? Sampling of material should be undertaken as early as possible i.e. prior to placement [for site won material] and prior to importation [for imported material]. This is to avoid the costly exercise of re-excavating unsuitable material and the possibility of cross contamination. Where the assessor has confidence that the material is of sufficient quality (i.e. tested by supplier, used previously) it is acceptable to test the material on site but prior to placement. Although, if it is deemed unsuitable it would have to be either removed off site or pre-treated at the cost and time of the developer. What about Certificates from Commercial Suppliers? Where the material is provided by a commercial company, certificates or other industry Quality Protocol compliance i.e. WRAP, will normally be accepted. This is on the proviso that it (i) relates to

	the actual material being imported to the site and the type and amount of analysis is in line with what is prescribed in Appendix 1a and (ii) the certificates are less than two months old. Extreme caution should be given to importing material that has been recycled from demolition or skip waste as they could be easily be contaminated e.g. asbestos containing materials. [Please refer to questions you should be asking your supplier in Appendix 1b and include the responses in your report] British Standard Imported topsoils should be as specified in BS 3882:2007 as 'suitable for their intended purpose'. BS3882:2007 relates to nutrient content of topsoil and phytotoxic contamination and does not consider contaminants that pose a risk specifically to human health. Soils should be tested for contaminants that are considered to pose a risk to human health in addition to BS3882:2007 to ensure that they are suitable for their intended use. Initial Screening A visual / olfactory inspection of the material should be carried out by an Environmental Engineer to ensure that: • it is a suitable growing medium • it is free from obvious contamination i.e. staining / free product etc • it has not come from areas where Japanese Knotweed or other invasive or injurious plants, as specified by the Environment Agency, are suspected to have been growing. • it is not odorous (could be considered a statutory nuisance) • it is free from unsuitable material i.e. bricks, brick ties, timber and glass etc) • there are no visible signs of asbestos containing material (ACM's) Testing Schedule & Number of Samples Chemical testing will normally be required on any materials that are to be used as cover material, even where this includes first generation quarried material. This should be carried out by a suitably qualified Environmental Engineer. Please refer to the Characterisation of Material Matrix in Appendix 1a which details the number of samples to be taken; the testing schedule to be utilised dependant on the nature and source of the material and the acceptance criteria to be used.
KP3 Suitability of Material	Based on the characterisation of material above, the material should be either deemed suitable or unsuitable. Obviously unsuitable material should not be used [unless it is treated to reduce levels of contaminants below agreed target levels i.e. bioremediation – this would have to be agreed and included within the Remediation Strategy] and an alternative source of material should be sought by the developer. If the material is considered suitable it can be

	imported [if not site won] and stockpiled in a suitably quarantined area [refer to KP4].
KP4 Stockpiling & Quarantining of Material	It is essential that the 'suitable' material is either placed in its intended area straight away i.e. soft / landscaped areas or stockpiled in a suitable quarantine area to prevent on-site contamination. In the event that an assessor finds material has been stored in an unsuitable area, samples should be taken to confirm that no cross contamination has occurred [including a visual/olfactory check of the material]. The material should then be suitably quarantined or placed at its intended location immediately.
KP5 Verification of Required Depth	In line with the agreed 'Remediation Strategy', it is important to establish that the required depth has been achieved and is consistent across the site. There are two main ways to achieve this: <u>Depth testing in situ</u> – small trial pit excavated to allow measurement of its depth by tape measure or measuring staff. <u>Topographical surveys</u> – accurate survey of the base and final formation layer height to establish the depth of cover. Specific Local Authority Policy Please check with the local Contaminated Land Officer to establish: • which type of method for testing depth is accepted; and • the number of verification areas per property, plot, landscaped area or garden area [some Local Authorities recommend at least 2 per plot] Important Note: Where demarcation, physical no-dig and capillary break layers exist they should be verified for their thickness and presence during the time of their installation. Details of the demarcation layer should be agreed with the Contaminated Land Officer prior to placement. This will include the design, type and strength of the geotextile separator or visual warning membrane. The verification of depth and confirmation of such layers should be carried out by a suitably qualified environmental engineer.
KP6 Reporting	The purpose of verification documentation is to provide transparent reasoning why the remediation was required, a methodology about how it was to be undertaken and proof that the specified works have been undertaken and to provide confirmation that the site is 'suitable for its intended use'. The document is utilised not only to satisfy conditions of planning permissions but also is to be kept on record by the Local Authority should queries be raised during the lifetime of the development and to confirm to future purchasers that the site is suitable for use. Therefore, the presence of good quality photographs is essential to

prove beyond doubt that the remediation has been done as specified both by method and position.

It is also essential that other supporting documentation is included within a report e.g. laboratory analysis results, delivery tickets for material, certificates for imported material, trial pit logs etc. A checklist has been included in Appendix 2 to give an idea on what information should be recorded.

The reporting should be carried out by a suitably qualified Environmental Engineer.

To include details of any measures required to maintain the cover system integrity in the future e.g. successive construction phases (management plans) and longer term (restrictive covenants on title deeds).

Photographic Evidence for Validating the Depth of Cover

The Local Authority ideally would recommend the following programme of photographs to be taken of the placement of inert cover:

- Photographs of any stockpiles and quarantine areas
- Proof that the depth of inert cover has been installed
- Proof of the quality of the material to be used as inert cover
- Proof there is a geotextile separator and visual warning membranes if used between the made ground and suitable for use soils.
- Proof of the method of placement and different layers if appropriate
- Proof of the completed project
- Inclusion of geographic background features which will aid locating the photograph
- Inclusion of site identification boards within the photos which show the date, position taken i.e. corner of plot 3 and the site name.
- Inclusion of photographs of site stockpiles and quarantine areas.

The photographs have to prove beyond doubt that the images have been taken from the specific area stated.

Refer to Appendix 3 for examples of good photographic evidence.

Appendix 1a – Sampling & Testing Matrix

Type	Number of Samples	Testing Schedule	Assessment Criteria
Virgin Quarried Material	1 or 2 depending on the type of stone utilised, to confirm the inert nature of the material.	Standard metals/metalloids (should include as a minimum As, Cd, Cr, CrVI, Cu, Hg, Ni, Pb, Se, Zn)	This needs to be agreed with the Local Authority. The Assessment criteria needs to be UK based, e.g. LQM S4UL's, Defra C4SL's or other similarly derived GAC's.
Crushed Hardcore, Stone, Brick	Minimum 1 per 1000m^3	Standard metals/metalloids (As above) PAH (16 USEPA speciation) Asbestos	
Greenfield/ Manufactured Soils	Minimum 3 or 1 per 250m^3 (whichever is greater)	Standard metals/metalloids (As above) PAH (16 USEPA speciation) Asbestos	
Brownfield/ Screened Soils	Minimum 6 or 1 per 100m^3 (whichever is greater)	Standard metals/ metalloids (As above) PAH (16 USEPA speciation) TPH (CWG banded) Asbestos Any additional analysis dependant on the history of the donor site.	

Appendix 1b – Questions to Ask Your Soil Supplier Relating to Soil Quality

- What is the source of the material (refer to KP1)?
- Will all of the material be coming from the same source?
- Are you satisfied that the material is a suitable growing medium for the proposed end use?
- Has the supplier used an appropriate sampling protocol to ensure a representative sample is analysed? What volume of soil is represented by the analysis and does it comply with Appendix 1a?
- Does the testing include analysis of contaminants identified in Appendix 1a?
- Does the laboratory conducting the analysis have UKAS and MCERTS accreditation for the tests they are carrying out?
- Can I have a copy of the whole analysts report and does it include an interpretive section?
- Will the provided certificate be dated within the last 2 months?

Appendix 2 – Checklist for Verification Reports

Example only. Not to be considered as typical minimum requirements. Additional information should be included for non cover systems aspects of the remediation i.e. gas protection measures etc.

Site Details	
Site Name / location	
Developer name	
Development use	
Plot No / description of landscaped area (inc plan of inspection areas)	
National Grid Reference	
Inspection visit date	
Supporting Evidence	
Description of remediation (as per agreed Remediation Method Statement including depths / thickness checks, topographical readings)	
Material tracking information (including way tickets etc)	
Name of groundwork's remediation contractor	
Name of supervising environmental consultant	
Site Specific chemical analysis results	
Verification Photographs (inc. remarks)	
Recommendations	
Pass / fail	
If material fail, how will this be managed i.e. removed, treated	
Detail any further remedial works and / or inspection	
Signed off	

Failure to provide any of the above information may prevent planning conditions from being discharged.

Appendix 3 – Examples of Good Quality Photographs

Photograph 1: Depth check of inert cover within area of public open space. Physical break layer and topsoil visible.

Photograph 2: Depth check of inert cover with Site & Location Information Board.

Photographs 3 & 4: Depth check of inert cover within areas of front gardens.

Photographs 5 and 6: Depth check of inert cover within rear gardens. Taut string line spans across excavation.

Photograph 7 shows the spatial location of the verification pit.

Photograph 8: Excavation within public open space and verification pit showing the presence of a remediation break layer at the base, a crushed sandstone inert fill overlain by topsoil.

Photographs 9 and 10: Inert crushed sandstone being delivered with remediation break layer visible in Photograph 10. The spatial area of the remediation can be observed from these photographs (old terrace housing in Photograph 9 and traffic lights in photograph 10).

Photographs 11 and 12 show the remediation of the rear garden, with a significant depth (1.0m) of inert cover. Remediation break layer visible at the base of the excavation. Photograph 11 has been stitched to form a panoramic photograph and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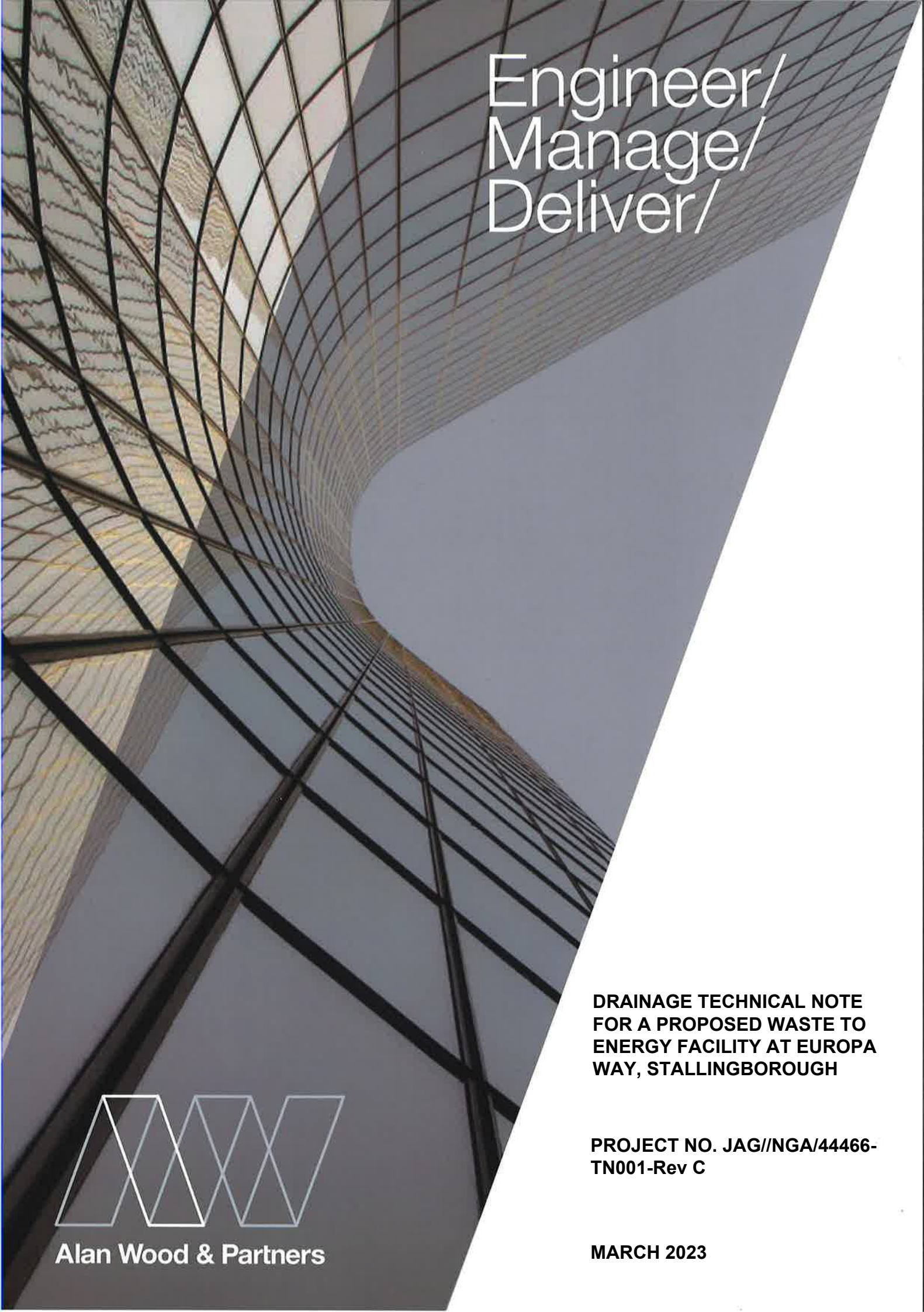
Appendix 4

Drainage Technical Note (Alan Wood and Partners)



DRAINAGE TECHNICAL NOTE FOR A PROPOSED WASTE TO ENERGY FACILITY AT EUROPA WAY, STALLINGBOROUGH

PROJECT NO. JAG//NGA/44466-TN001-Rev C

MARCH 2023

Alan Wood & Partners

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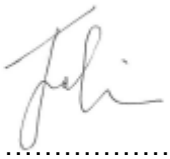
DRAINAGE TECHNICAL NOTE FOR A PROPOSED WASTE TO ENERGY FACILITY AT EUROPA WAY, STALLINGBOROUGH

Prepared by: N Ager BEng (Hons), IEng CWEM MCIWEM
Senior Engineer

Signed: ……
Date: 8th December 2020

Approved by: J Gibson, MEng (Hons), CEng, CWEM MCIWEM
Civil Engineering Director



Signed: ……
Date: 8th December 2020

Issue	Revision	Revised by	Approved by	Revised Date
A	Revised Report to reflect updated site layout	NGA	JAG	09.02.23
B	Updated Appendix E & G	NGA	JAG	14.03.23
C	Updated Appendix F	NGA	JAG	16.03.23

TABLE OF CONTENT

APENDICES

1.0 INTRODUCTION

1.1 Alan Wood & Partners (AWP) were commissioned by TEGCO UK Ltd to prepare a surface water drainage solution for the proposed waste to energy site at Europa Way, Stallingborough.

1.2 The works received planning approval from North East Lincolnshire Council (NELC) on 24/10/2020, the planning reference number is DM/0274/20/FUL and a copy of the notice of decision is included in Appendix A.

1.3 Twenty-four conditions were attached, including a condition relating to the provision of a sustainable provision of surface water drainage. This technical note outlines the historic, and proposed methods of draining the development and discusses how the planning condition is met.

1.4 Condition 6 states

> *"No development shall commence until a scheme for the sustainable provision of surface water drainage has been submitted to and approved in writing by the Local Planning Authority. The development shall then proceed and be completed in accordance with the approved details."*

and is addressed in this report.

1.5 Reference is made to the Flood Risk Assessment (FRA), which was prepared by KRS Environmental (Reference KRS.0637.001.R.001.A) which should be read in conjunction with this drainage assessment.

2.0 EXISTING SITE

2.1 Site Location

2.1.1 The development is within the Redwood Industrial Park, approximately 3.0Km North of Stallingborough, and 2.8Km East of Immingham, and is accessed via Europa Way. The OS Grid Reference of the site is TA 20676 14369.

2.1.2 A location plan identifying the location of the site is included in Figure 1 below.

Figure 1: Development Location (Google Maps)

2.2 Existing Site Details

2.2.1 The site has a total area of approximately 2.5Ha, of which 1.37Ha comprises an existing steel frame warehouse, with the remainder being compacted stone surfacing. North Beck Drain, a Main River, forms the northern boundary of the site.

2.2.2 The site is broadly flat and level with a flood defence embankment forming the north boundary. The crest level of the embankment is approximately 4.4mAOD. The existing site level at the toe of the embankment to the south face of the existing building is approximately 3.2mAOD, before falling to between 2.5mAOD and 2.8mAOD on the southern boundary. A copy of the Topographic Survey is included in Appendix B.

2.2.3 Anecdotal evidence from the current site owner indicates that the site is currently positively drained, and it discharges at an uncontrolled rate into North Beck Drain via a piped sewer system and existing watercourses adjacent to the site. This is reinforced by the presence of rainwater downpipes on the existing building, and manhole chambers and gullies shown on the topographic survey.

2.2.4 An aerial photograph of the site taken in 2020 showing the existing site is included in Figure 2 below.

Figure 2: Existing Site Plan (Google Maps)

2.2.5 The site is bounded by North Beck Drain to the north and west. This is a designated Main River with an embankment which acts as a flood defence structure. Works within 16m of the toe of the embankment will require an Environmental Permit to be obtained from the Environment Agency.

3.0 PROPOSED DEVELOPMENT

3.1. The proposed development comprises a waste to energy power plant, access roads, and other associated infrastructure. A plan showing the proposed layout and overall drainage strategy is included in Appendix C.

3.2. The development is a single level, with deliveries being received via HGV at the west end of the site via the north perimeter road prior to unloading into a receiving structure at the eastern end of the site. Vehicles will then exit via the southern perimeter road.

3.3. The external yard areas have been set at 3.7m AOD for the purposes of outline design with the building floor levels at approximately 4.000m.

3.4. The site will be drained via a Sustainable Drainage System to provide both surface water attenuation storage required to prevent on site flooding due to the reduction in allowable discharge rate and provide water quality enhancement prior to discharge into North Beck Drain.

3.5. In order to determine the level of SuDS treatment required the development has been divided into low, medium and high risk zones, relating to the potential for pollution due to suspended solids, hydrocarbons, and heavy metals. In the high-risk areas, a Class 1 Bypass Interceptor will provide primary treatment prior to the SuDS components providing secondary treatment.

3.6. The type, and location of the SuDS elements is constrained by the limited land availability within the site. Potential future development restricts the siting of systems to the east of the receiving yard. The North West/South West boundary is formed by North Beck Drain and its associated flood defence embankment. Works within the embankment would not be economically practical. Additionally, a strip of land adjacent to the north embankment is reserved for future services and pipes further limiting the positioning of SuDS elements.

3.7. The proposed substation and service trench to the south of the southern access road fall outside the scope of this technical note but restrict the positioning of SuDS features in this area.

3.8. The Peak water Level in North Beck Drain ranges from 2.48mAOD (50% AEP), to 3.82mAOD (1%+20% Climate Change AEP). The lowest invert level of the proposed drainage system is 0.191mAOD, therefore a pumped outfall will be necessary.

3.9. Surface, and treated foul & process water will be discharged via a pump station into North Beck Drain at a combined rate of 8.1 l/s, comprising a 5.6l/s surface water and 2.5l/s treated process & foul.

3.10. The outfall into North Beck Drain will be above modeled high-water level for the design life of the development, and a flap valve will be provided to prevent backflow in the event of an abnormally high water level.

3.11. An Environmental Permit will be required for any permanent or temporary engineering works within 16m of the toe of the embankment. A discharge consent defining the water quality and volume of process water and foul water permitted to discharge into North Beck Drain will also be required.

4.0 SURFACE WATER DRAINAGE PRINCIPLES

4.1 Existing Surface Water Drainage

4.1.1 As previously discussed, the current site owner has stated that the site is drained to North Beck Drain via an existing onsite piped drainage network and watercourses adjacent to the site.

4.1.2 The site is 2.5Ha, of which the existing warehouse is shown to be positively drained. The plan area of the warehouse is 1.32Ha and comprises 54% of the site. A IH124 assessment conducted in MicroDrainage Source Control for a 50Ha catchment with 54% hard standing to represent the positively drained areas. In accordance with guidance this was scaled down by 95% to replicate a 2.5Ha site. A copy of the Source Control calculations are included in Appendix D.

Catchment Area	1:1	QBAR	1:100
50Ha	369.9 l/s	425.1 l/s	1,017.0 l/s
2.5Ha	18.6 l/s	21.3 l/s	50.9 l/s

Table 1: Existing Surface Runoff

4.2 Surface Water Details

4.2.1 A high level assessment of the unrestricted runoff from the redeveloped site, based on a discharge rate of 140l/s/Ha, and a drained area of 1.57Ha is 220l/s.

4.2.2 In order to discharge as close to greenfield rate as possible, a peak discharge rate of 8.1l/s has been applied in accordance with planning permission DM/0628/18/FUL. This represents a 62% reduction from the existing partly urbanised QBAR runoff rate, an 84.3% reduction from the 1:100 runoff, and a 96% reduction from the unrestricted redeveloped runoff rate. Therefore, flood risk will be significantly reduced due to the proposed development.

4.2.3 The surface water discharges into North Beck Drain via a pumped outfall at a peak rate of 8.1l/s, which comprises 5.6l/s of surface water, and 2.5l/s of process water.

4.2.4 The tipping hall yard discharges into the eastern detention basin via a full retention interceptor area which will provide initial treatment prior to entering SuDS treatment path. The roof runoff discharges into the system between the interceptor and lagoon, as it will require less treatment than the tipping hall yard as it is a lower risk area. The remainder of the site carriageways will discharge via a filter drain into the carrier piped network and then into the detention basins. The roof drainage will discharge directly into the carrier drains. The gravel area will discharge into a herringbone perforated pipe network, and then into the main carrier drainage system.

4.2.5 Additionally there are two areas of high spillage risk, these will normally be drained via the normal surface water carrier system. However, in the event of a spill the area will be isolated from the drainage system while the spill is rectified.

4.2.6 Due to the restriction in available land for the detention basin at the east end of the site a secondary basin is provided at the west end, which are linked by a large diameter pipe that also acts as a carrier drain for the northern section of the development and allows the stored surface water runoff to be balanced between the two lagoons.

4.2.7 The western detention basin has a bed level of 1.4m, and top bank level of 2.7m, with 1:3 bank slopes, and can retain a maximum volume of approximately 470m^3.

4.2.8 The eastern detention is split over two levels, the deeper section to the north having a bed level of 0.5m AOD, and a shallower section, due to land constraints to the south with a bed level of 1.4m AOD. The total storage volume in this lagoon is approximately 970m^3.

4.2.9 The drainage systems & attenuation have been designed to prevent surface water flooding within the site for a 1:100+40% climate change rainfall event and take no account of the proposed substation located on the southern edge of the site as this is being served by a separate system.

4.2.10 A copy of the impermeable drained areas showing point of discharge and proposed drainage layout are shown in Appendix E. WinDES simulation calculations are included in Appendix F.

4.3 SuDS Treatment Processes

4.3.1 The planning condition requires a sustainable surface water drainage solution, to assess the water quality, the proposals were developed with reference to Chapter 26 CIRIA Report C753, the SuDS Manual.

4.3.2 Prior to discharge the surface water pass through a SuDS train incorporating filter drains and a detention basin that will provide treatment to remove suspended solids, heavy metals, and hydrocarbons. These elements also provide storage for the surface water attenuation required due to the restricted outfall.

4.3.3 Additionally, runoff from the access roads will pass through trapped gullies prior to entering the filter drains. The tipping hall area discharges via full retention interceptor prior to entering the eastern detention basin.

4.3.4 The quality of treatment within SuDS systems is linked to both velocity and retention time within the system, with a low velocity and high retention time allowing for sediment deposition and filtration processes within the site prior to discharge.

4.3.5 Water Quality Risk Management has been assessed via the simple index approach as outlined in Table 26.1 of C753. The site has been subdivided into roof and highway areas. The gravel plant area has been assessed as a low traffic road as there are no anticipated vehicle movements, but a potential contamination risk from adjacent access roads. The pollution hazard index for each area assessed in accordance with Table 26.2. A plan showing the level assigned to each area and the Suds Components is included in Appendix G.

Land Use	Pollution Hazard Level	Total Suspended Solids	Metals	Hydrocarbons
Tipping Hall Yard	High	0.8	0.8	0.9
Perimeter Roads	Medium	0.7	0.6	0.6
Gravel External Plant Area	Low	0.5	0.4	0.4
Roof Area	Low	0.3	0.2	0.05

Table 2: Extract of C573 Table 26.1

4.3.6 In order to deliver adequate treatment, the mitigation index provided by the SuDS elements must exceed the pollution hazard index shown in Table 1.

Suds Component	Total Suspended Solids	Metals	Hydrocarbons
Filter Drain	0.4	0.4	0.4
Detention Basin	0.5	0.5	0.6

Table 3: Extract of C573 Table 26.3

4.3.7 Where SuDS components are used in series, each element after the first shall have its mitigation index reduced by 50% to reflect the reduced performance of additional elements. The mitigation factors of the full retention interceptor.

4.4 Tipping Hall Yard: High Risk

4.4.1 The tipping hall yard is considered to high risk due the regular presence of heavy goods vehicles conducting unloading operations with waste material, in order to mitigate the pollution, risk the hard standing drains via a Class 1 Full Retention Interceptor before discharging into east attenuation lagoon, which in turn discharges to North Beck Drain via a pumped outfall. Mitigation indices have been estimated for the interceptor, and the mitigation index of the detention basin is retained at 100% of that in CIRIA C573 to recognise its position as the first SuDS treatment process.

	Total Suspended Solids	Metals	Hydrocarbons
Class 1 Interceptor	0.5	0.5	0.5
Detention Basin	0.5	0.5	0.6
Total Mitigation Index	1.0	1.0	1.1
Pollution Index	0.8	0.8	0.9

Table 4: HGV Yard

4.5 Perimeter Road: Medium Risk

4.5.1 The perimeter roads drain via trapped gullies into roadside filter drains, which in turn discharge into carrier drains that discharge into the detention basins prior to discharging via a pump station into North Beck Drain. Trapped gullies have an estimated mitigation index which assumes a medium level of suspended solids removal, but low hydrocarbon and heavy metal removal.

	Total Suspended Solids	Metals	Hydrocarbons
Trapped Gullies	0.25	0.1	0.1
Filter Drain	0.4	0.4	0.4
Detention Basin	0.25	0.25	0.3
Total Mitigation Index	0.9	0.75	0.8
Pollution Index	0.7	0.6	0.7

Table 5: Perimeter Road Treatment

4.5.2 The mitigation index of the SuDS components on the perimeter road exceeds the pollution index for metals and hydrocarbons and therefore the provisions of C753 are met. The trapped gullies will primarily reduce the volume of suspended solids in the surface runoff and thus reduce the pollution index, and therefore the SuDS elements will provide a sufficient level of treatment.

4.6 External Plant Area: Low Risk

4.6.1 The external plant area is drained via a herringbone perforated pipe drain network within a gravel trench and overlaid with a gravel surface. The filter drain and gravel surface are underlain by an impermeable membrane to prevent potential infiltration into the subsoil.

	Total Suspended Solids	Metals	Hydrocarbons
Filter Drain	0.4	0.4	0.4
Detention Basin	0.25	0.3	0.3
Total Mitigation Index	0.65	0.7	0.7
Pollution Index	0.5	0.4	0.4

Table 6: External Plant Area Treatment

4.6.2 The mitigation index of the SuDS components on the plant area exceeds the Pollution index and therefore the provisions of C753 are met.

4.7 Roof: Low Risk

4.7.1 Roof areas are drained into the carrier drains which discharge into the detention basins. Where the roof drainage in the vicinity of the tipping hall yard discharges into the east detention basin it will do so downstream of the full retention interceptor as the pollution risk from the roof is lower, and the treatment provided by the interceptor is not required.

	Total Suspended Solids	Metals	Hydrocarbons
Detention Basin	0.5	0.6	0.6
Total Mitigation Index	0.5	0.6	0.6
Pollution Index	0.3	0.2	0.05

Table 7: Roof Treatment

4.7.2 The mitigation index of the filter drain exceeds the roof pollution index area; therefore, the roof runoff can be sufficiently treated even if the detention basis is not utilized.

4.8 Foul & Process Treatment

4.8.1 In order to discharge to watercourse a discharge consent is required, that will impose limits of the allowable level of pollutants. Treatment processes that fall outside the scope of this technical note will be required to ensure that proposed effluent is treated to the required level.

4.8.2 The process water storage will be isolated from the main drainage subject to testing. If the water quality criteria are met the process water will discharge to the surface water system. If the water is not of sufficient quality, it will be disposed of off-site an at appropriate facility.

4.8.3 Wastewater from the toilet/washing facilities block will be treated by a suitably sized package waste water treatment plant that will discharge into the detention lagoon prior to discharging to North Beck Drain. The water supply to the accommodation facilities will be in part provided by the provision of rainwater harvesting system, and grey water reuse. It is anticipated that there will be a maximum of 30 employees on site, with mess facilities within the administration block.

4.9 Pump Station

4.9.1 The pump station will receive surface runoff via the site drainage/SuDS system, with a separate inlet for the treated process water. A non-return valve will be required on the process inlet to prevent cross-mixing of the separate systems.

4.9.2 The rising main will discharge into an access chamber sited on the top berm of the embankment, and discharge via a gravity connection into the watercourse. A flap valve should be installed on the outfall to prevent backflow in the event of the water level in the beck exceeding the invert of the outfall.

4.9.3 Reference should be made to the potential flood water level when siting the pump station control panels.

4.10 Site Isolation

4.10.1 In the event of a spill or leak the site can be isolated from North Beck Drain by shutting down the pump station and containing the pollutants within the site and site drainage system.

5.0 SUMMARY

5.1 The existing site comprises an area of approximately 2.5Ha and contains a 1.37Ha warehouse surrounded by a compacted stone service yard, the site drains to North Beck Drain. The greenfield runoff rate for the site is 8.1l/s, and QBAR, including the positively drained existing warehouse roof is 21.3l/s.

5.2 The site will discharge surface water into North Beck Drain at a peak rate of 5.6l/s with process water accounting for the remaining 2.5l/s. The total discharge of 8.1l/s is equivalent to the greenfield runoff from the site and equates to a 62% reduction from the existing QBAR rate.

5.3 Due to the relative levels of the onsite drainage system and predicted water level in North Beck Drain a pumped outfall will be required.

5.4 The surface water attenuation system is provided by two detention basins that have a total volume of approximately 1,440m^3, this will provide sufficient capacity to store the surface water runoff for the critical 1:100+40% storm event.

5.5 The tipping yard receiving area is categorised as high risk for pollutants. Drainage from this area will pass through a full retention interceptor order to provide an initial stage of water quality improvement prior to discharging into the east detention basin.

5.6 Water quality treatment is provided by multiple SuDS components assessed in accordance with the CIRIA SuDS guidance. The risk level of each section of the site has been assessed using the simple index approach against the likely pollutant loading derived from the end use. In addition to the SuDS treatment processes Class 1 Full Retention Interceptors are proposed to provide additional treatment to the highest risk level area, and the non-commercial vehicle parking area prior to discharge into the drainage network and SuDS components.

5.7 Consents will be required for temporary or permanent construction works adjacent to the North Beck Drain embankment, and for the discharge rate and quality of surface and treated foul/process water. The permit applications will be progressed by other parties and fall outside the scope of the discharge of planning conditions.

5.8 The proposed site drainage restricts discharge rate to the greenfield runoff rate of the existing site, therefore reducing the discharge rate into North Beck Drain and reducing flood risk.

5.9 SuDS components have been incorporated into the drainage system in order to increase the quality of surface water discharge into North Beck Drain.

5.10 Areas of high spillage risk will have the facility to be isolated from the surface water drainage network in event of a spill incident.

5.11 An onsite foul water package treatment plant will be provided to treat waste water prior to discharge to North Beck Drain via the eastern detention basin. Water for the facilities will be provided by the use of a rainwater harvesting system that will be fed by the runoff from low risk roof areas.

5.12 This report, supporting calculations and drawings show that the planning condition has been complied with and can be discharged.

APPENDIX A

NELC Planning Decision Notice

NORTH EAST LINCOLNSHIRE COUNCIL
www.nelincs.gov.uk

Town and Country Planning Acts

NOTICE OF DECISION

Application Number: DM/0274/20/FUL

Issuing Authority: North East Lincolnshire Council

Applicant's Name and Address:	**Agent's Name and Address:**
Immingham Industrial Estates Immingham Railfreight Terminal Stallingborough Grimsby DN41 8DU	Mr Max Jones Max Design Consultancy Max Design The White House 278 Bawtry Road Doncaster DN4 7PD

Proposal: Variation of condition 2 (Approved Plans) pursuant to DM/0628/18/FUL (Partially demolish existing building and erect 20MWE waste to energy power generation facility, 65m stack and associated plant, machinery, parking and external works) to increase bunker and boiler room height to 40m to the ridge, amend roof design to a mono-pitch, amend roof design of boiler room to pitch roof, erect raised platform of 3.8m high for fuel delivery, repositioning of attenuation basin and handing of the building by 180 degrees

Application Site: Immingham Railfreight Terminal Scandinavian Way Stallingborough Grimsby

The following decision has been made upon your application received on 2nd April 2020.

Granted subject to: -

1 Condition
The development hereby permitted shall begin by the 20th December 2021.

Reason
To comply with S.91 of the Town and Country Planning Act 1990.

2 Condition
The development shall be carried out in accordance with the following plans:

1816-08C Proposed Block Plan
1816-09C Site Location Plan
1816-006E Proposed Elevations 1

1816-007E Proposed Elevations 2
1816-30 Proposed Elevations 1 and 2
1816-31 Proposed Elevations 3 and 4

Floor plans as approved under DM/0628/18/FUL

1816-01 A Ground Floor Plan
1816-02 A First Floor Plan
1816-03 A Second Floor Plan
1816-04 A Third Floor Plan
1816-05 A Fourth Floor Plan

Reason
For the avoidance of doubt and in the interests of proper planning.

3 Condition
The hereby approved power facility shall use refuse derived fuel only (RDF). RDF comprises of pre-treated / residual waste from municipal, household, commercial and industrial sources. All as detailed in the Environmental Statement.

Reason
To ensure the proposal is consistent with the submitted details and supporting Environmental Statement to accord with Policies 5 and 41 of the North East Lincolnshire Local Plan 2013-2032 (adopted 2018).

4 Condition
At no time shall any fuel stock for the power generation facility be stored outside of the main building.

Reason
In the interest of environmental protection in accordance with Policy 5 of the North East Lincolnshire Local Plan 2013-2032 (adopted 2018).

5 Condition
Development shall not begin until details of all external materials to be used in construction of the buildings have been submitted to and approved in writing by the Local Planning Authority. The development shall then proceed in accordance with the approved details.

Reason
To ensure the development has an acceptable external appearance and is in keeping with the visual amenity and character of the area in accordance with Policy 5 and 22 of the North East Lincolnshire Local Plan 2013-2032 (adopted 2018).

6 Condition
No development shall commence until a scheme for the sustainable provision of surface water drainage has been submitted to and approved in writing by the Local Planning Authority. The development shall then proceed and be completed in accordance with the approved details.

Reason
To prevent an increased risk of flooding by ensuring the provision of a satisfactory means of surface water disposal in accordance with Policy 5 and 34 of the North East Lincolnshire Local Plan 2013-2032 (adopted 2018).

7 Condition
Prior to the development commencing, a Construction Management Plan shall be submitted to and approved in writing by the Local Planning Authority. A Construction Management Plan can be submitted separately for the defined ground works and for the balance of the development. All development shall then proceed in accordance with the approved details. The Construction Management Plan shall contain:

- Working hours during the construction process;
- Visitor and contractor parking areas;
- Materials storage area;
- Wheel cleaning facilities;
- Noise, vibration and dust mitigation measures;
- Deliveries and servicing plan;
- Pollution control;
- Construction traffic management plan:
-- The expected number, types and size of vehicles during the entire construction period;
-- Details of expected delivery schedules and how this will be managed to eliminate waiting on the public highway (i.e. call ahead or pre-booking scheduling system), if required;
-- Routing for all construction traffic.

Reason
In the interests of highway safety and to protect local amenity in accordance with Policy 5 of the North East Lincolnshire Local Plan 2013-2032 (adopted 2018).

8 Condition
Before development commences detailed specifications of the type of piling/foundations to be used to support the building/structures shall be submitted to the Local Planning Authority for written approval. Included shall be a scheme to mitigate the effects of the piling with particular regard to noise and vibration to surrounding properties and pollution of the underlying chalk aquifer. The piling/foundations shall be carried out/constructed in accordance with the approved details, unless variations are first approved in writing by the Local Planning Authority.

Reason
To protect local amenity and to ensure the integrity of the underlying aquifer is not compromised in accordance with Policy 5 and 34 of the North East Lincolnshire Local Plan 2013-2032 (adopted 2018).

9 Condition
The scheme of landscaping approved under DM/0167/19/CND shall be fully implemented in accordance with the approved details

Reason
To ensure a satisfactory appearance and setting for the development and protection of existing features in the interests of local amenity in accordance with Policy 5 and 42 of the North East Lincolnshire Local Plan 2013-2032 (adopted 2018).

10 Condition
The scheme of landscaping and tree planting required through condition 9 of this planning permission shall be completed within a period of 12 months, beginning with the date on which development first becomes operational or within such longer period as may be first agreed in writing by the Local Planning Authority. All planting shall be adequately maintained for a period of five years in accordance with the details agreed through condition 9 and during that period all losses shall be replaced during the next planting season.

Reason
To ensure a satisfactory appearance and setting for the development and continued maintenance of the approved landscaping in the interests of local amenity in accordance with Policy 5 and 42 of the North East Lincolnshire Local Plan 2013-2032 (adopted 2018).

11 Condition
The development permitted by this planning permission shall be carried out in accordance with the approved Flood Risk Assessment (FRA) reference SHF.1561.001.HY.R.001.B dated October 2018, compiled by Enzygo, and the following mitigation measures detailed within the FRA:

- Finished floor levels for the plant to be no lower than 300mm above ground level
- Critical equipment to be located no lower than 5.95m above Ordnance Datum
- Flood resilient construction measures to be incorporated
- Areas of safe refuge at first and second floor to be available to staff at all times
- Flood barriers to be fitted to the waste and slag bunkers

The mitigation measures shall be fully implemented prior to occupation and subsequently remain in place throughout the lifetime of the development.

Prior to the occupation and use of the development a flood evacuation and emergency plan shall be submitted to and approved in writing by the Local Planning Authority. The development shall then be occupied and used in accordance with that plan.

Reason
To reduce the risk of flooding to the proposed development and future employees in accordance with Policy 5 and 33 of the North East Lincolnshire Local Plan 2013-2032 (adopted 2018).

12 Condition
Prior to any operation or occupation of the development, a detailed operational travel plan for all operational HGVs entering and leaving the site shall be submitted to and approved in writing by the Local Planning Authority. This shall include a routing agreement. The development shall operate in accordance with the approved travel plan throughout its lifetime unless otherwise agreed in writing with the Local Planning Authority.

Reason
In the interest of highway safety and amenity in accordance with Policy 5 of the North East Lincolnshire Local Plan 2013-2032 (adopted 2018).

13 Condition
Prior to occupation and use of the development a Business Travel Plan (BTP) shall be produced and submitted in writing to the Local Planning Authority for approval. The BTP should be produced in accordance with NELC Guidance and in liaison with the Business Travel Plan Officer. The BTP should be fully costed for all measures/incentives and include, but not be limited to the following:

1. Contact details of the person with responsibility for the implementation for the BTP (i.e. The Travel Plan Coordinator);

2. Details of measures and initiatives to be in place to encourage travel by sustainable modes of travel, in particular walking, cycling, and public transport use;

3. 3 and 5 year targets associated with minimising lone car occupancy travel;

4. Details of how the BTP will be monitored (e.g. results of travel surveys within 3 months of first occupation and at key stages during occupancy;

5. The 'life' of the BTP should be from first occupation to 5 years after full occupation of the development to ensure that the BTP has adequate time to become effective;

6. For the lifetime of the Travel Plan, any new employee shall be provided with one public transport voucher to the value of a one week 'taster' Megarider Plus bus pass or equivalent.

7. Promotion of a car sharing scheme such as 'liftshare' and money set aside for guaranteed taxi home if required in emergency situations;

8. Provision of a Travel Information Pack (in hard and electronic copy) to be provided to all new employees for the life of the development;

9. Implement a 'cycle to work' salary sacrifice scheme.

10. Provision of electric vehicle charging points including timing of provision.

Once approved, the BTP shall be implemented in accordance with its terms.

Reason
In the interests of sustainable development in accordance with Policy 5 and 36 of the North East Lincolnshire Local Plan 2013-2032 (adopted 2018).

14 Condition
The development shall be implemented in accordance with the approved Barn Owl mitigation plan approved under DM/0167/19/CND and retained thereafter.

Reason
In the interests of environmental protection in accordance with Policy 41 of the North East Lincolnshire Local Plan 2013-2032 (adopted 2018).

15 Condition
Prior to construction commencing on the development a detailed Ecological and Bio-diversity Improvement and Management Plan for the site shall be submitted to and approved in writing by the Local Planning Authority. It shall include:

- Measures for bio-diversity and habitat improvement;
- An implementation plan;
- On going management plan;

The development shall then proceed in accordance with the approved detail and the area thereafter retained and managed in accordance with the approved details.

Reason
In the interests of bio-diversity enhancement and protection in accordance with Policy 41 of the North East Lincolnshire Local Plan 2013-2032 (adopted 2018).

16 Condition
Prior to the development first coming into use a minimum of 1 electric vehicle charging point (minimum 7kw) shall be provided within the parking area. Once provided it shall be maintained and retained through the lifetime of the development.

Reason
To encourage sustainable travel in accordance with Policy 5 and 36 of the North East Lincolnshire Local Plan 2013-2032 (adopted 2018).

17 Condition
Development shall not begin until management arrangements for any carriageways, footways or landscaped areas not to be adopted by the local authority have been submitted to and approved in writing by the Local Planning Authority. The carriageways, footways and landscaping areas shall be managed in accordance with the approved details thereafter.

Reason
In the interests of public safety in accordance with Policy 5 of the North East Lincolnshire Local Plan 2013-2032 (adopted 2018).

18 Condition
Unless otherwise agreed by the Local Planning Authority, development other than that required to be carried out as part of an approved scheme of remediation must not commence until conditions 19 to 21 have been complied with. If unexpected contamination is found after development has begun, development must be halted on that part of the site affected by the unexpected contamination to the extent specified by the Local Planning Authority in writing until condition 22 has been complied with in relation to that contamination.

Reason
In the interest of pollution control and health and safety in accordance with Policy 5 of the North East Lincolnshire Local Plan 2013-2032 (adopted 2018).

19 Condition
An investigation and risk assessment, in addition to any assessment provided with the planning application, must be completed in accordance with a scheme to assess the nature and extent of any contamination on the site, whether or not it originates on the site. The contents of the scheme are subject to the approval in writing of the Local Planning Authority. The investigation and risk assessment must be undertaken by competent persons and a written report of the findings must be produced. The written report is subject to the approval in writing of the Local Planning Authority. The report of the findings must include:

(i) a survey of the extent, scale and nature of contamination;

(ii) an assessment of the potential risks to:

human health, property (existing or proposed) including buildings, crops, livestock, pets, woodland and service lines and pipes, adjoining land, groundwaters and surface waters, ecological systems, archaeological sites and ancient monuments;

(iii) an appraisal of remedial options, and proposal of the preferred option(s).

This must be conducted in accordance with DEFRA and the Environment Agencys Model Procedures for the Management of Land Contamination, CLR 11.

Reason
In the interest of pollution control and health and safety in accordance with Policy 5 of the North East Lincolnshire Local Plan 2013-2032 (adopted 2018).

20 Condition

A detailed remediation scheme to bring the site to a condition suitable for the intended use by removing unacceptable risks to human health, buildings and other property and the natural and historical environment must be prepared, and is subject to the approval in writing of the Local Planning Authority. The scheme must include all works to be undertaken, proposed remediation objectives and remediation criteria, timetable of works and site management procedures. The scheme must ensure that the site will not qualify as contaminated land under Part 2A of the Environmental Protection Act 1990 in relation to the intended use of the land after remediation.

Reason

In the interest of pollution control and health and safety in accordance with Policy 5 of the North East Lincolnshire Local Plan 2013-2032 (adopted 2018).

21 Condition

The approved remediation scheme must be carried out in accordance with its terms prior to the commencement of development other than that required to carry out remediation, unless otherwise agreed in writing by the Local Planning Authority. The Local Planning Authority must be given two weeks written notification of commencement of the remediation scheme works. Following completion of measures identified in the approved remediation scheme, a verification report that demonstrates the effectiveness of the remediation carried out must be produced, and is subject to the approval in writing of the Local Planning Authority.

Reason

In the interest of pollution control and health and safety in accordance with Policy 5 of the North East Lincolnshire Local Plan 2013-2032 (adopted 2018).

22 Condition

In the event that contamination is found at any time when carrying out the approved development that was not previously identified it must be reported in writing immediately to the Local Planning Authority. An investigation and risk assessment must be undertaken in accordance with the requirements of condition 19, and where remediation is necessary a remediation scheme must be prepared in accordance with the requirements of condition 20, which is subject to the approval in writing of the Local Planning Authority. Following completion of measures identified in the approved remediation scheme a verification report must be prepared, which is subject to the approval in writing of the Local Planning Authority in accordance with condition 21.

Reason

In the interest of pollution control and health and safety in accordance with Policy 5 of the North East Lincolnshire Local Plan 2013-2032 (adopted 2018).

23 Condition
Prior to development commencing details and timing of the installation of a flashing red light to be positioned on the highest point of the stack shall be submitted to and approved in writing by the Local Planning Authority. The light shall be installed in accordance with the details approved and shall be so retained at all times thereafter.

Reason
In the interest of air safety in accordance with Policy 5 of the North East Lincolnshire Local Plan 2013-2032 (adopted 2018).

24 Condition
Prior to development commencing, other than the defined ground works, the following information shall be submitted to the Local Planning Authority, who shall notify UK DVOF and Powerlines at the Defence Geographic Centre:

a. Precise location of development.
b. Date of commencement of construction.
c. The proposed date of completion of construction.
d. The height above ground level of the tallest structure.
e. The maximum extension height of any construction equipment.
f. Details of aviation warning lighting fitted to the structure(s)

At the earliest opportunity prior to the known final date of completion of the construction, the actual date of construction completion shall be submitted to the Local Planning Authority. There shall be no deviation from, or exceedance of the details provided to the Local Planning Authority, without the Authority's prior approval.

Reason:
In the interests of air safety in accordance with Policy 5 of the North East Lincolnshire Local Plan 2013-2032 (adopted 2018).

Informatives:-

1 Reason for Approval
The Local Planning Authority has had regard to development plan policies and especially those in the North East Lincolnshire Local Plan. The proposal would not harm the area character or local amenity and is acceptable under all other planning considerations including highway safety and ecology. It will support the economic development of the area. This proposal is approved in accordance with the North East Lincolnshire Local Plan 2013-2032 (adopted 2018), in particular policies 1, 5, 6, 7, 9, 33, 36, 41 and 42.

2 Added Value Statement
Article 31(1)(cc) Statement - Positive and Proactive Approach
In accordance with paragraph 187 of the National Planning Policy Framework, the Local Authority has worked in a positive and proactive manner with the applicant to seek solutions to problems arising, by providing detailed pre-application advice on the proposed development and by addressing highway and ecological matters.

3 Informative
The applicants attention is drawn to the comments of the Environment Agency dated 9th February 2018 and their reference to the need for environmental permitting.

4 Informative
Please note that you may also require Building Regulations. You are advised to contact them in advance of work on site commencing (Tel: 01472 325959).

This Notice is issued on behalf of North East Lincolnshire Planning Authority.

Signed:
Clive Tritton
Official Capacity: Interim Director of Economy and Growth
Date: 24th September 2020

INFORMATION ON APPEALS TO THE SECRETARY OF STATE

If you are aggrieved by this decision to refuse permission for the proposed development or to grant it subject to conditions, then you can appeal to the Secretary of State under Section 78 of the Town and Country Planning Act 1990, or for Listed Building Consent, under Sections 20 and 21 for Listed Buildings & Conservation Areas Act 1990.

If you want to appeal this application, please carefully read the information below and choose which option applies to your application:

If this is a decision to refuse planning permission for a **householder** application and you want to appeal against the decision, then you must do so within 12 weeks of the date of this notice;

If this is a decision to refuse planning permission for a **minor commercial application (e.g. shop fronts)** and you want to appeal against the decision, you must do so within 12 weeks of the date of this notice;

If this is a decision to refuse express consent for the display of an **advertisement** and you want to appeal against the decision, you must do so within 8 weeks of the date of receipt of this notice;

For all other **Full** and **Listed Building Consent** applications - If you wish to appeal against the decision, you must do so within 6 months of the date of this notice.

Appeals on Planning Applications involving Enforcement Notices

If this is a decision on a planning application relating to the same or substantially the same land and development as is already the subject of an enforcement notice, if you want to appeal against the decision on your application, you must do so within 28 days of the date of this notice;

If an enforcement notice is served relating to the same or substantially the same land and development as in your application and you want to appeal against the decision on your application, you must do so within: 28 days of the date of service of the enforcement notice, or within 6 months [12 weeks in the case of a householder appeal] of the date of this notice, whichever period expires earlier.

All Appeals must be made using a form which you can obtain from:

Planning Inspectorate,
Temple Quay House,
2 The Square,
Temple Quay,
Bristol,
BS1 6PN

(Tel: 0303 444 5000) or to submit electronically at https://www.gov.uk/planning-inspectorate.

The Secretary of State can allow a longer period for giving notice of an appeal but will not normally use this power unless there are special circumstances which excuse the delay in giving notice of appeal.

The Secretary of State need not consider an appeal if it seems to the Secretary of State that the Local Planning Authority could not have granted planning permission for the proposed development or could not have granted it without the conditions they imposed, having regard to the statutory requirements, to the provisions of any development order and to any directions given under a development order. In practice, the Secretary of State does not refuse to consider appeals solely because the Local Planning Authority based their decision on a direction given by him/her.

If you intend to submit an appeal that you would like examined by inquiry then you must notify the Local Planning Authority (planning@nelincs.gov.uk) and Planning Inspectorate (inquiryappeals@planninginspectorate.gov.uk) at least 10 days before submitting the appeal. Further details are online on GOV.UK https://www.gov.uk/government/collections/casework-dealt-with-by-inquiries.

The Planning Inspectorate has introduced an online appeals service which you can use to make your appeal online at https://www.gov.uk/planning-inspectorate. The Inspectorate will publish details of your appeal on the internet. This may include a copy of the original planning application form and relevant supporting documents supplied to the local authority by you or your agent, together with the completed appeal form and information you submit to the Planning Inspectorate. Please ensure you only provide information, including personal information belonging to you that you are happy will be made available to others in this way. If you supply personal information belonging to a third party, please ensure you have their permission to do so. More detailed information about data protection and privacy is available on the Planning Inspectorate web site.

NB. Any approval in this notice of decision refers only to that required under the Town and Country Planning Acts and does not include any consent under any other enactment, bylaw, order, building or other regulation.

IF YOUR APPLICATIONS HAS BEEN REFUSED:

If you decide to resubmit, your application will not be subject to a fee under the Town and Country Planning (Fees for Applications and Deemed Applications) (Amendment) Regulations 2002 provided the new application:-

a) Is submitted as a valid application within one year of the date of the decision

b) Is development of the same character and description as submitted previously.

c) Relates to the same site area or part of the same site and does not include additional land

d) Is submitted by the same applicant

e) The applicant many only benefit from the fee exemption once for any site

Prior to any resubmission, it is strongly recommended that you discuss the revised scheme with the development management team so that any issues can be identified quickly and solutions to any barriers to achieving a planning permission discussed with you.

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APPENDIX B

Topographic Survey

520600m

520700m

NOTES:

1. THESE NOTES ARE INTENDED TO AUGMENT DRAWINGS AND SPECIFICATIONS. WHERE CONFLICT OF REQUIREMENTS EXIST THE ORDER OF PRECEDENCE SHALL BE AS SHOWN IN THE SPECIFICATION. OTHERWISE THE STRICTEST PROVISION SHALL GOVERN.

2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ENGINEERS AND ARCHITECTS DRAWINGS.

3. DRAWINGS NOT TO BE SCALED. ALL DIMENSIONS TO BE CHECKED ON SITE BY THE CONTRACTOR. ANY DISCREPANCIES TO BE NOTIFIED TO THE ENGINEER AND FURTHER INSTRUCTIONS OBTAINED BEFORE WORK IS COMMENCED.

4. THE STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER THE BUILDING IS FULLY COMPLETED. IT IS THE CONTRACTORS SOLE RESPONSIBILITY TO DETERMINE THE ERECTION PROCEDURE AND SEQUENCE AND ENSURE THAT THE BUILDING AND ITS COMPONENTS ARE SAFE DURING ERECTION. THIS INCLUDES THE ADDITION OF WHATEVER TEMPORARY BRACING, GUYS OR TIE-DOWNS WHICH MAY BE NECESSARY. SUCH MATERIAL REMAINING THE THE PROPERTY OF THE CONTRACTOR ON COMPLETION, AND FOR ENSURING THAT THE WORKS AND ANY ADJACENT PROPERTIES ARE SAFE IN THE TEMPORARY CONDITION.

Rev	Description	Date	By	Chk	App
P2	REVISED SITE LAYOUT	31.01.23	NA	JC	JAG
P1	FIRST ISSUE	08.12.20	NA	JC	JAG

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Scarborough T. 01723 865484
Sheffield T. 01142 440077
York T. 01904 611594

Project: IMMINGHAM WASTE TO ENERGY FACILITY
EUROPA WAY
STALLINGBOROUGH

Client: TEGCO UK Ltd

Drawing: TOPOGRAPHIC SURVEY

Role: CIVIL ENGINEER

Drawing Status: FOR APPROVAL

Suitability Code:

Job. no. 44466

Scale@ A1: 1:500

Rev. P2

Project	Originator	Volume	Level	Type	Role	Number
IWEF	AWP	ZZ	XX	DR	C	0001

100mm at A1

APPENDIX C

Proposed Site Layout

Notes

Figured dimensions only to be taken from this drawing.
Do not scale.If in doubt ask.

Rev	Date	Drawn	Description
-	-	-	-

PLANT COORDIN-
GLOBAL COORDINAT -
x=520720.69
y=414495.710

520500m
520600m
520700m
520800m
414500m
414400m
414300m

Y=150000
Y=100000
Y=50000
X=250000
X=200000
X=150000
X=100000
X=50000

+0.00
+0.00=+3.700
+3.00
17000
PARKING 29 cars

SITE PLAN 1:500

SCALE 1:500
0 5 10 15 20 25 30 40 50m

MaxDesign
Architecture | Planning | Consultancy
Armstrong House, First Avenue, Doncaster DN9 3GA
t: 01302 867509 m: 07734 939 044
e: design@maxdesignconsultancy.co.uk w: maxdesignconsultancy.co.uk

status: Section 73
client: TEGCO
project: Immingham
title: Site plan
scale: 1:500@A0
date: AUG 22

project no.:	drawn:	number:	rev:
1816	ZY	005	-

Alan Wood & Partners

APPENDIX D

WinDES IH124 Calculation

IH 124 Mean Annual Flood

Input

Return Period (years)	100	Soil	0.450
Area (ha)	50.000	Urban	0.540
SAAR (mm)	618	Region Number	Region 5

Results l/s

QBAR Rural	189.9
QBAR Urban	425.1
Q100 years	1017.0
Q1 year	369.9
Q2 years	420.1
Q5 years	569.6
Q10 years	670.8
Q20 years	765.9
Q25 years	796.8
Q30 years	819.5
Q50 years	882.7
Q100 years	1017.0
Q200 years	1117.0
Q250 years	1147.1
Q1000 years	1357.6

APPENDIX E

Proposed Drainage & Construction Details

520600m

520700m

MEDIUM RISK
S1.003
1,029m²

TIPPING HALL YARD
DELIVERY AREA
HIGH RISK
S3.000
3,618m²

MEDIUM RISK
S1.002
1,847m²

TIPPING HALL ROOF
LOW RISK
S3.000
1,223m²

MEDIUM RISK
S1.001
1,907m²

PACKAGE WWTW - CAPACITY
3.5m3/day

ROOF/NON TRAFFICKED
AREAS
LOW RISK
S1.002
2,160m²

LOW RISK
S1.001
163m²

ROOF/NON TRAFFICKED
AREAS
LOW RISK
S2.000
2,069m²

FOUL CONNECTION TO
PACKAGE WWTW FROM
ADMINISTRATION BLOCK

EXTERNAL GRAVEL YARD
LOW RISK
S1.001
980m²

MEDIUM RISK
S1.000
1,391m²

EXTERNAL GRAVEL YARD
LOW RISK
S2.000
1,544m²

MEDIUM RISK
S2.000
468m²

MEDIUM RISK
S2.000
1,166m²

100mm at A1

NOTES:

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FOR GENERAL NOTES PLEASE REFER TO AWP DRAWING No. IWEF-AWP-ZZ-XX-DR-C-3700

Rev	Description	Date	By	Chk	App
P3	REVISED TIPPING YARD DRAINAGE AREA	16.03.23	NA	JC	JAG
P2	REVISED SITE LAYOUT	31.01.23	NA	JC	JAG
P1	FIRST ISSUE	08.12.20	NA	--	--

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Sheffield T. 01142 440077
York T. 01904 611594

Project: IMMINGHAM WASTE TO ENERGY FACILITY
EUROPA WAY
STALLINGBOROUGH

Client: TEGCO UK Ltd

Drawing: DRAINAGE IMPERMEABLE AREAS

Role: CIVIL ENGINEER

Drawing Status: FOR APPROVAL

Suitability Code:

Job. no. 44466

Scale@ A1: 1:500

Rev. P3

Project Originator Volume Level Type Role Number
IWEF - AWP - ZZ - XX - DR - C - 3000

520600m

520700m

HEADWALL OUTFALL INTO NORTH BECK DRAIN

OUTLET TO HAVE FLAP VALVE AND BE ABOVE PREDICTED MAXIMUM WATER LEVEL

ENVIRONMENT AGENCY TO AGREE DISCHARGE RATE AND CONSENT PERMANENT AND TEMPORARY WORKS

PUMPED OUTFALL PEAK RIR 2.5l/s PROCESS & 5.5l/s SURFACE WATER

GRAVITY CONNECTION TO NORTH BECK DRAIN DOWNSTREAM OF PUMP STATION

PN 01.000 Dia. 150mm

S11 1500mm CL 3.700m IL (m)1.312

PN 01.001 Dia. 150mm

OUTLET HEADWALL IL 1.5m

GABION BASKET/RENO MATTRESS ON OUTFALL TO PROVIDE EROSION PROTECTION

EAST DETENTION BASIN 1:3 SLOPES BED LEVEL 1.5m BERM LEVEL 2.4m TOP BANK 3.7m

INLET HEADWALL WITH TRASH SCREEN & SAFETY RAILINGS. GABION BASKET/RENO MATTRESS ON OUTFALL TO PROVIDE EROSION PROTECTION IL 1.5m 750Ø

PN 01.000 Dia. 150mm

PN 01.000 Dia. 750mm

S10 1800mm CL 3.700m IL (m)1.631

CHANNEL DRAIN

TIPPING YARD TO FALL TO CHANNEL DRAIN

TIPPING YARD TO FALL TO CHANNEL DRAIN

LAGOON 1:3 SLOPES BED LEVEL 2.4M TOP BANK 3.7m

INLET HEADWALL WITH TRASH SCREEN & SAFETY RAILINGS GABION BASKET/RENO MATRESS FOR EROSION PROTECTION ON OUTFALL IL 2.4m 450Ø

SPILL RISK AREA TO BE ISOLATED FROM SURFACE WATER DRAINAGE NETWORK IN EVENT OF A SPILL

ISOLATED DRAINAGE AREA - SPILL RISK

GRAVELED AREA

PROCESS WATER WASTE PIT ISOLATED FROM SURFACE WATER NETWORK DISCHARGE AT 2.5l/s FOLLOWING TREATMENT & TESTING

PROCESS WATER WASTE PIT

PN 01.000 Dia. 150mm

PN 01.000 Dia. 750mm

S9 1800mm CL 3.700m IL (m)1.700

GRAVEL SURFACE WITH PERFORATED UNDERDRAIN

FILTER TRENCH

ROOF RUNOFF TO DISCHARGE DIRECTLY INTO SURFACE WATER NETWORK DISCHARDING DIRECTLY TO EAST LAGOON & BYPASSING FULL RETENTION INTERCEPTOR

ANY SURFACE WATER WITHIN TIPPING HALL TO DRAIN INTO TIPPING BUNKER

PN 02.000 Dia. 150mm

CONNECTION FROM DELIVERY YARD ROOF DRAINAGE

S8 1500mm CL 3.700m IL (m)2.494

SILT TRAP ON OUTFALL FROM CHANNEL DRAIN

HIGH RISK YARD AREA TO DRAIN TO LAGOON VIA FULL RETENTION INTERCEPTOR

PACKAGE WWTW - CAPACITY 3.5m3/day

S7 1500mm CL 3.700m IL (m)2.001

PN 02.001 Dia. 150mm

FOUL CONNECTION TO PACKAGE WWTW FROM ADMINISTRATION BLOCK

GULLIES TO DISCHARGE INTO FILTER DRAIN WHERE PRESENT

ROOF RUNOFF TO DISCHARGE DIRECTLY INTO SURFACE WATER NETWORK

INLET/OUTLET HEADWALL WITH TRASH SCREEN & GABION/RENO MATRESS ON OUTFALL IL 2.4m

WEST DETENTION BASIN BED LEVEL 2.4m TOP BANK 3.7m 1:3 SLOPES

INLET/OUTLET HEADWALL WITH TRASH SCREEN & GABION/RENO MATRESS ON OUTFALL 450Ø IL 2.4m

PN 01.000 Dia. 150mm

S6 1800mm CL 3.700m IL (m)1.939

S5 1500mm CL 3.700m IL (m)2.400

GRAVEL SURFACE WITH PERFORATED UNDERDRAIN

GULLIES ADJACENT TO DETENTION BASIN TO DISCHARGE DIRECTLY INTO BASIN

INLET/OUTLET HEADWALL WITH TRASH SCREEN & GABION/RENO MATRESS ON OUTFALL IL 2.4m

HERRINGBONE FILTER DRAIN UNDER GRAVEL AREA

GRAVELED AREA

GRAVEL SURFACE WITH PERFORATED UNDERDRAIN

PN 01.000 Dia. 150mm

PN 01.000 Dia. 525mm

S4 1500mm CL 3.700m IL (m)2.305

FILTER TRENCH

NOTES:

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FOR GENERAL NOTES PLEASE REFER TO AWP DRAWING No. IWEF-AWP-ZZ-XX-DR-C-3700

- SURFACE WATER SEWER
- CHANNEL DRAIN
- PERFORATED UNDERDRAIN
- ROADSIDE FILTER DRAIN
- SURFACE WATER ACCESS CHAMBER
- SURFACE WATER PUMP STATION
- ROAD GULLY
- HEADWALL
- FULL RETENTION INTERCEPTOR

Rev	Description	Date	By	Chk	App
P3	UPDATED TIPPING HALL DRAINAGE NOTES	13.03.23	NA	-	-
P2	REVISED SITE LAYOUT	31.01.23	NA	JC	JAG
P1	FIRST ISSUE	18.12.20	NA	--	--

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Sheffield T. 01142 440077
York T. 01904 611594

Project: IMMINGHAM WASTE TO ENERGY FACILITY
EUROPA WAY
STALLINGBOROUGH

Client: TEGGO UK Ltd

Drawing: PRELIMINARY SURFACE & FOUL WATER DRAINAGE LAYOUT

Role: CIVIL ENGINEER

Drawing Status: FOR APPROVAL

Suitability Code:

Job. no. 44466

Scale@ A1: 1:500

Rev. P3

Project Originator Volume Level Type Role Number
IWEF - AWP - ZZ - XX - DR - C - 3001

100mm at A1

DRAINAGE NOTES

1. ALL BUILDING DRAINAGE WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH THE CURRENT BRITISH/EUROPEAN STANDARDS BSEN752 (SUPERSEDING BS:8301 "BUILDING DRAINAGE"), THE CURRENT BUILDING REGULATIONS AND THE LOCAL AUTHORITY BUILDING CONTROL OR NHBC SPECIFICATIONS AND REQUIREMENTS.

2. THIS DRAWING TO BE READ IN ACCORDANCE WITH ALL OTHER RELEVANT DRAWINGS.

3. CONCRETE MANHOLES AND PLASTIC INSPECTION CHAMBERS TO BE PROVIDED AS REQUIRED BY THE RELEVANT STANDARDS.

4. INSITU AND PRECAST CONCRETE UNITS SHALL HAVE SULPHATE RESISTING PORTLAND CEMENT TO BS 4027, UNLESS A LABORATORY REPORT IS PROVIDED PROVING THAT SUCH PRECAUTIONS ARE NOT NECESSARY.

5. PRECAST CONCRETE MANHOLES TO BE IN ACCORDANCE WITH BS 5911:PART 200.

6. SEWERS 300MM DIAMETER OR GREATER SHALL BE CONCRETE PIPES. ANY SMALLER PIPES TO BE VITRIFIED CLAY.

7. ALL CONCRETE PIPES TO BE CLASS 120 TO BS EN 1916/BS5911-1:2002.

8. VITRIFIED CLAY PIPES AND FITTINGS SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS EN295 AND BS 65 RESPECTIVELY AND BE KITEMARKED. ALL PIPES SHALL BE EXTRA STRENGTH TO BS 65 OR EQUIVALENT BS EN295 PIPE CRUSHING STRENGTH. THE MINIMUM CRUSHING STRENGTH FOR CLAY PIPES SHOULD BE AS FOLLOWS: 100MMØ - 40KN/M, 150MMØ - 40KN/M, 225MMØ - 45KN/M BEDDING AND BACKFILL MATERIAL TO CONFORM TO THE REQUIREMENT OF WATER INDUSTRY SPECIFICATION 4-08-02 (TABLE A2).

9. SEWERS TO BE LAID IN CLASS "S" BEDDING (150MM GRANULAR BED AND SURROUND). WHERE DEPTH OF COVER TO TOP OF THE SEWER IS LESS THAN 1.2M IN HIGHWAYS AND VERGES (OR LESS THAN 900MM IN NON-VEHICULAR ACCESS AREAS) THEN A REINFORCED CONCRETE SLAB SHOULD BE PROVIDE ABOVE GRANULAR BED AND SURROUND.

10. WHERE TWO SEWERS CROSS, THE LOWER SEWER TO BE PROVIDED WITH A 150MM CONCRETE BED AND SURROUND.

11. MANHOLE COVERS AND FRAMES SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS EN124, 150MM DEEP FRAMES UNLESS OTHERWISE SPECIFIED. MANHOLE COVERS AND FRAMES TO BE OF A NON-ROCKING DESIGN WITH CUSHION INSERTS AND KITEMARKED. COVERS TO BE LOAD CLASS E600 IN ALL AREAS ACCESSIBLE FOR HGVS, OTHERWISE TO BE CLASS D400. MANHOLE COVER SLABS AND ACCESS TO BE IN ACCORDANCE WITH CONCRETE PIPE SYSTEMS ASSOCIATION (CPSA) TECHNICAL BULLETIN ISSUED AUTUMN 2004.

12. GULLY GRATES AND FRAMES SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS EN124 AND BE OF A NON-ROCKING DESIGN WITH LEFT HANDED CAPTIVE HINGE ACCESS AND BE KITEMARKED. LOAD CLASS E600 IN ALL AREAS ACCESSIBLE FOR HGVS, OTHERWISE TO BE CLASS D400. MINIMUM AREA OF WATERWAY TO BE 1010CM².

13. ALL GULLY CONNECTIONS TO BE MINIMUM 150Ø.

14. ANY ADOPTABLE SEWER WORKS AND CONNECTIONS TO ADOPTABLE SEWERS AND MATERIAL TO BE IN ACCORDANCE WITH "SEWERS FOR ADOPTION", THE RELEVANT BRITISH/EUROPEAN STANDARDS/REQUIREMENTS/ADDENDUM AND KITEMARKED.

15. THE CHAMBER SIZE OF MANHOLES WITH MORE THAN ONE CONNECTION IN THEM MAY NEED TO BE INCREASED AN INCREMENT TO ACCOMMODATE THE CONNECTIONS AND BENDS.

16. NO SUB-SURFACE OR GROUNDWATER TO BE PERMITTED TO ENTER THE FOUL OR SURFACE WATER DRAINAGE SYSTEMS.

17. SEWERS LAID BELOW BUILDINGS TO BE KEPT TO A MINIMUM. NO INTERNAL MANHOLES PERMITTED.

SUDS NOTES

1. SIDE SLOPES TO BE 1:3.

2. SLOPE REINFORCEMENT TO BE PROVIDED AS NECESSARY, BASED ON GROUND CONDITIONS, SURCHARGE LOADING, SLOPE ANGLE AND STORAGE VOLUME REQUIRED.

3. BASINS AND SWALES SHOULD BE LINED WITH WELDED WATERTIGHT MEMBRANE TO PREVENT GROUNDWATER/SUBSURFACE WATER INGRESS AND TERMINATED AT BANK TOP VIA AN ANCHOR TRENCH.

4. INLET AND OUTLET HEADWALLS TO BE PRECAST UNITS AND PROVIDED WITH PROTECTIVE BASKET GRILLES OVER PIPE CONNECTION WHERE PIPE IS LARGER THAN 350Ø. HEADWALLS TO BE PROVIDED WITH HANDRAILS AROUND TOP AND SIDES.

5. EDGE PROTECTION TO PREVENT ERRANT ACCESS TO BASINS REQUIRED (TO BE AGREED AS VEHICULAR OR PEDESTRIAN).

6. SUDS BASINS TO BE PLANTED TO SUIT ECOLOGIST AND LANDSCAPING REQUIREMENTS TO ENCOURAGE FLORA, FAUNA AND HABITAT CREATION.

7. SWALES AND OTHER SUDS TO BE PROTECTED FROM EROSION FROM INCOMING AND OUTGOING FLOWS.

8. CONTRACTOR TO PROVIDE OPERATION AND MAINTENANCE REQUIREMENTS FOR DRAINAGE AND SUDS FEATURES.

9. FOR BASINS AND SWALES, IMPERMEABLE LINERS/MEMBRANES TO BE BENTOMAT CLAY LINER OR SIMILAR APPROVED.

EXISTING SERVICES NOTES

1. CONTRACTOR TO PROTECT EXISTING SERVICES WITHIN THE SITE OR DIVERT AS REQUIRED.

2. EXISTING CULVERT TO BE PROVEN REDUNDANT AND REMOVED AS REQUIRED AND BACKFILLED WITH SUITABLE MATERIAL TO PROVIDE A STABLE FOUNDATION FOR THE PROPOSED ACCESS ROAD.

3. EXISTING GAS MAIN TO BE PROTECTED DURING THE WORKS.

4. EXISTING SEWERS AND OTHER SERVICES IN THE VICINITY OF THE PROPOSED WORKS TO BE SURVEYED AND DETAILS PROVEN AND PROTECTED AS NECESSARY FROM PROPOSED WORKS.

PRIVATE DRAINAGE NOTES:

1. DRAINAGE SYSTEMS TO COMPLY WITH THE FOLLOWING STANDARDS:
   - BS EN 752:2008
   - BUILDING REGULATIONS APPROVED DOCUMENT PART H, 2015 EDITION

2. ALL COMPONENTS USED IN DRAINAGE SYSTEMS TO COMPLY WITH THE FOLLOWING: BS EN 476:2011

3. ALL DRAINAGE SYSTEMS AND COMPONENTS TO BE CONSTRUCTED AND TESTED TO THE FULL SATISFACTION OF THE BUILDING REGULATIONS INSPECTOR

4. ALL DRAINAGE TO BE CONSTRUCTED AND TESTED IN ACCORDANCE WITH BS EN 1610:2015.

5. PIPES UPTO 225Ø TO BE VITRIFIED CLAY, VITRIFIED CLAY PIPES AND FITTINGS TO COMPLY WITH THE RELEVANT PROVISIONS OF BS EN295-1:2013,-2:2013,-3:2012 AND BS 65 RESPECTIVELY AND BE KITEMARKED. ALL PIPES SHALL BE EXTRA STRENGTH TO BS 65 OR EQUIVALENT BS EN295 PIPE CRUSHING STRENGTH.

6. PIPES > 225Ø TO BE CONCRETE. CONCRETE PIPES TO BE CLASS 120 TO BS EN1916:2002 & BS5911-1:2002.

7. PRECAST CONCRETE MANHOLES TO BE IN ACCORDANCE WITH BS EN 1917:2002 AND BS 5911-3:2010,-4:2002 AND TO BE KITEMARKED. PRECAST CONCRETE RINGS AND COVER SLABS TO CONCRETE PIPES TO BE JOINTED WITH CEMENT MORTAR UNLESS NOTED OTHERWISE.

8. INSITU AND PRECAST CONCRETE UNITS SHALL HAVE SULPHATE RESISTING PORTLAND CEMENT TO BS EN 197-1:2011.

9. POLYPROPYLENE INSPECTION CHAMBERS TO COMPLY WITH BS EN 13598-1:2010,-2:2016 AND BS 7158:2001 AND TO BE KITEMARKED.

10. MANHOLE COVERS AND FRAMES SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS EN 124-1 TO 6:2015. MANHOLE COVERS AND FRAMES TO BE OF A NON-ROCKING DESIGN WITH CUSHION INSERTS AND KITEMARKED. LOAD CLASS D400 COVERS TO BE USED IN ALL LOCATIONS. ALL COVERS TO BE BADGED "FW" OR "SW" AS APPROPRIATE. MANHOLE COVER SLABS AND ACCESS TO BE IN ACCORDANCE WITH CONCRETE PIPE ASSOCIATION TECHNICAL BULLETIN ISSUED SEPTEMBER 2001.

11. POLYPROPYLENE INSPECTION CHAMBER COVERS AND FRAMES SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS EN 124-1 TO 6:2015. COVERS AND FRAMES TO BE OF A NON-ROCKING DESIGN WITH CUSHION INSERTS AND KITEMARKED. LOAD CLASS A15 COVERS TO BE USED IN AREAS INACCESSIBLE TO VEHICLES; LOAD CLASS D400 COVERS TO BE USED ELSEWHERE.

12. ROAD GULLY GRATES AND FRAMES SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS EN 124-1 TO 6:2015 AND BE OF A NON-ROCKING DESIGN WITH LEFT HANDED CAPTIVE HINGE ACCESS AND BE KITEMARKED. LOAD CLASS D400 GRATES TO BE USED THROUGHOUT WITH 450mm SQ. GRATE AND FRAME. MINIMUM AREA OF WATERWAY TO BE 1010cm².

13. YARD GULLY GRATES AND FRAMES SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS EN 124-1 TO 6:2015 AND BE OF A NON-ROCKING DESIGN AND BE KITEMARKED. LOAD CLASS A15 GRATES TO BE USED IN AREAS INACCESSIBLE TO VEHICLES. GRATES TO BE 300mm SQ. MINIMUM AREA OF WATERWAY TO BE 900cm².

14. DRAINAGE CHANNELS TO BE ACO MULTIDRAIN MD100 0.0 OR EQUAL & APPROVED, UNLESS NOTED OTHERWISE ON DRAWING. CHANNELS TO BE FITTED WITH SLOTTED DUCTILE IRON GRATING. GRATES SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS EN 124-1 TO 6:2015 AND BE KITEMARKED. LOAD CLASS B125 GRATES TO BE USED IN AREAS INACCESSIBLE TO VEHICLES; LOAD CLASS D400 GRATES TO BE USED ELSEWHERE. SUMP UNIT AND SILT BUCKET UNITS TO BE USED ON ALL OUTLETS.

15. CLASS Z BEDDING DETAIL SHALL BE PROVIDED:
   - WHERE COVER TO PIPE BARREL IS;
     i) <1.2m IN VEHICULAR TRAFFICKED AREAS
     ii) <0.9m IN AREAS INACCESSIBLE TO VEHICLES.
   - AT ALL ROAD GULLY, YARD GULLY, RWP, SVP AND DRAINAGE CHANNEL BRANCHES.
   - AREAS OF DEEP ROOTING VEGETATION.
   - PIPE RUNS NEAR BUILDINGS IN ACCORDANCE WITH TYPICAL SECTIONS ON AWP DRAWINGS.
   - WHERE TWO PIPES CROSS WITH A CLEAR GAP OF <300mm. CLASS Z SURROUND TO EXTEND A MINIMUM OF 1.0m FROM THE CENTRE OF THE CROSSING POINT & EXTENDED TO WITHIN 150mm OF THE NEAREST FLEXIBLE JOINT, WHERE REQUIRED.

17. CLASS Y BEDDING DETAIL TO BE PROVIDED WHERE COVER TO PIPE CROWN FROM THE UNDERSIDE OF THE SUB STRUCTURE IS LESS THAN 300mm.

18. PIPE BEDDING MATERIALS TO COMPLY GENERALLY WITH SHW - SERIES 500 - CLAUSE 503. GRANULAR BEDDING MATERIALS TO ALSO COMPLY WITH BS EN 13242 & THE GRANULAR BEDDING MATERIAL TABLE ON THIS DRAWING.

19. SELECTED BACKFILL MATERIAL TO BE PROVIDED ABOVE THE PIPE SURROUND TO A HEIGHT OF 300mm MINIMUM ABOVE THE TOP OF THE PIPE. SELECTED BACKFILL MATERIAL TO BE CLASS 8 - LOWER TRENCH FILL MATERIAL IN ACCORDANCE WITH SHW - SERIES 600 TABLE 6/1 & TO COMPRISE OF UNIFORM SOIL, FREE FROM STONES LARGER THAN 40mm, LUMPS OF CLAY OVER 100mm, TIMBER, FROZEN MATERIAL & VEGETABLE MATTER. SELECTED BACKFILL MATERIAL TO BE PLACED & COMPACTED IN LAYERS NOT EXCEEDING 150mm IN THICKNESS. SHOULD THE MATERIAL BE UNSUITABLE OR WEATHER CONDITIONS AFFECT THE MATERIALS STABILITY, THEN A SUITABLE HARD GRANULAR MATERIAL SHALL BE USED.

20. GENERAL BACKFILL TO DRAINAGE TRENCHES [OTHER THAN FILTER DRAINS] IN VEHICULAR TRAFFICKED AREAS ABOVE THE PIPE BEDDING & SELECTED BACKFILL SHALL BE CLASS 1, 2 OR 3 GENERAL FILL MATERIAL IN ACCORDANCE WITH SHW - SERIES 600.

21. GENERAL BACKFILL UNDER NON-VEHICULAR TRAFFICED AREAS TO BE SUITABLE AS-DUG MATERIAL COMPACTED IN ACCORDANCE WITH SHW - SERIES 600 IN LAYERS NOT EXCEEDING 225mm, EACH LAYER COMPACTED TO FORM A STABLE TRENCH BACKFILL, SHOULD THE MATERIAL BE UNSUITABLE OR WEATHER CONDITIONS AFFECT THE MATERIALS STABILITY, THEN A HARD GRANULAR MATERIAL SHALL BE USED UP TO FORMATION LEVEL.

22. ALL CONCRETE TO BE DESIGNATED CONCRETE TO CONFORM TO BS 8500-2.

23. NO MECHANICAL COMPACTION OF FILL MATERIAL WITHIN 300mm OF THE CROWN OF ANY PIPE.

CONCRETE NOTES:

DESIGNATED CONCRETE:

1. ALL DESIGNATED CONCRETE TO CONFORM TO BS 8500-2

   DESIGNATION - GEN 1:
   - CEMENT TYPE - SRPC
   - MAXIMUM AGGREGATE SIZE - 20mm
   - CONSISTENCY CLASS - TO BE AGREED ON SITE

   DESIGNATION - GEN 3:
   - CEMENT TYPE - SRPC
   - MAXIMUM AGGREGATE SIZE - 20mm
   - CONSISTENCY CLASS - TO BE AGREED ON SITE

   DESIGNATION - RC 25/30:
   - CEMENT TYPE - SRPC
   - MAXIMUM AGGREGATE SIZE - 20mm
   - CONSISTENCY CLASS - TO BE AGREED ON SITE

2. NOMINAL COVER TO ALL REINFORCEMENT TO BE 50mm (UNLESS NOTED OTHERWISE).

3. ALL HIGH YIELD REINFORCEMENT (H BARS) TO BE GRADE 500.

4. BOTTOM STEEL REINFORCEMENT TO BR SUPPORTED ON 50x50x50mm DEEP CONCRETE BLOCKS OR SIMILAR, WIRED TO REINFORCEMENT.

5. TYING WIRE TO BE STAINLESS STEEL.

6. SPACING OF REINFORCEMENT TO BE ADJUSTED LOCALLY AS REQUIRED IN PARTICULAR TO AVOID HOLES, POCKETS, SOCKETS, RECESSES AND HOLDING DOWN BOLTS.

7. ALL EXPOSED EDGES TO HAVE 20x20mm CHAMFER.

8. IMMEDIATELY AFTER LAYING, CONCRETE SHALL BE PROTECTED FROM RAIN, RAPID TEMPERATURE CHANGE, FROST AND FROM DRYING OUT. ALSO MAINTAIN THE CONCRETE ABOVE 2° IN COLD WEATHER. THE METHODS USED SHALL BE IN ACCORDANCE WITH B.S. 5400, OR APPROVED BY THE ENGINEER.

STANDARDIZED PRESCRIBED CONCRETE:

1. ALL STANDARDIZED PRESCRIBED CONCRETE TO CONFORM TO BS 8500-2

2. STANDARDIZED PRESCRIBED CONCRETE MIX - ST5:
   - MAXIMUM AGGREGATE SIZE - 20mm
   - CONSISTENCY CLASS - S1

3. IMMEDIATELY AFTER LAYING, CONCRETE SHALL BE PROTECTED FROM RAIN, RAPID TEMPERATURE CHANGE, FROST AND FROM DRYING OUT. ALSO MAINTAIN THE CONCRETE ABOVE 2° IN COLD WEATHER. THE METHODS USED SHALL BE IN ACCORDANCE WITH B.S. 5400, OR APPROVED BY THE ENGINEER.

NOTES:

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Rev	Description	Date	By	Chk	App
P2	UPDATED CLIENT DETAILS	31.01.23	NA	JC	JAG
P1	FIRST ISSUE	04.12.20	LV	NA	JAG

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Project: IMMINGHAM WASTE TO ENERGY FACILITY
EUROPA WAY
STALLINGBOROUGH

Client: TEGCO UK Ltd

Drawing: GENERAL NOTES

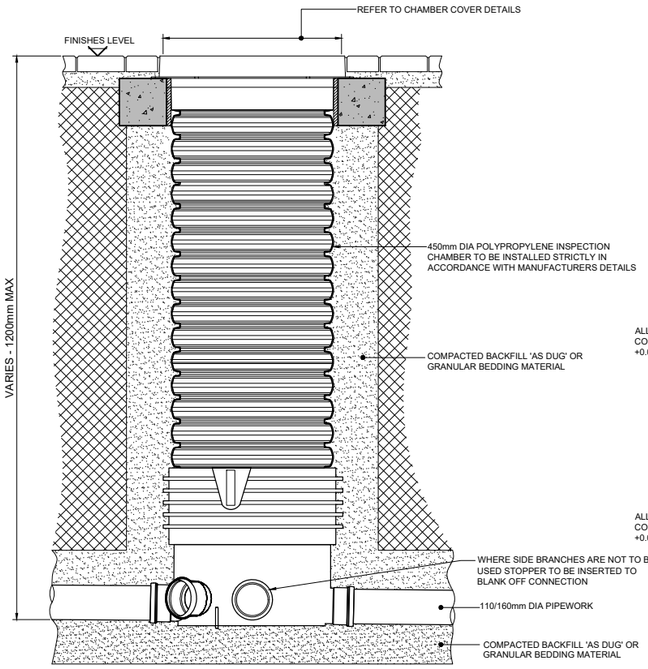
Role: CIVIL ENGINEER

Drawing Status: FOR APPROVAL

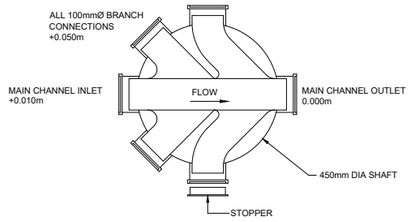
Job. no. 44466 | Scale@ A1: As Noted | Rev. P2

Project	Originator	Volume	Level	Type	Role	Number
IWEF	AWP	ZZ	XX	DR	C	3700

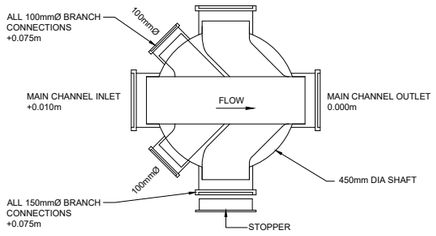
100mm at A1



SECTIONAL ELEVATION



PLAN - CHAMBER
(100mm PIPEWORK)

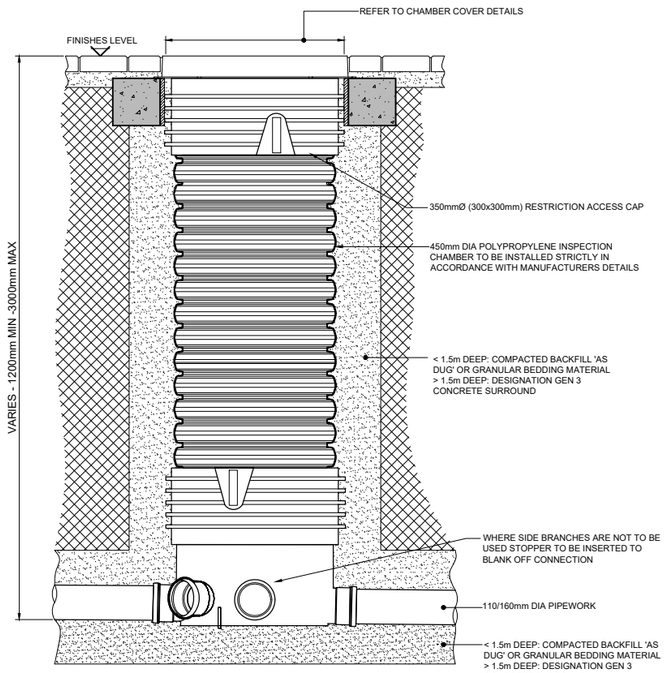


PLAN - CHAMBER
(150mm PIPEWORK U.N.O)

NOTES:
[1]. ALL COVER LEVELS ARE APPROXIMATE ONLY & SHOULD BE SET TO SUIT FINAL SURFACING LEVELS ON SITE.
[2]. MANUFACTURERS STOPPER PIECES TO BE USED ON ALL UNUSED INLETS ON ALL INSPECTION CHAMBERS.
[3].THE MAIN THROUGH CHANNEL MUST BE USED ON ALL INSPECTION CHAMBERS.
[4]. MAXIMUM 45 DEGREE BENDS MAY BE USED ON ANY INSPECTION CHAMBER INLET OR OUTLET TO SUIT PIPE ORIENTATION ON SITE.
[5]. AWP SHOULD BE INFORMED OF ANY DEVIATIONS FROM THE CHAMBER BASE AS SHOWN ON AWP 'PLAN CHAMBER' DETAILS, AS THIS WILL EFFECT GRADIENTS AND INVERT LEVELS OF CHAMBERS AND PIPE RUNS

POLYPROPYLENE INSPECTION CHAMBER (PPIC)
MAXIMUM CHAMBER DEPTH 1.2m

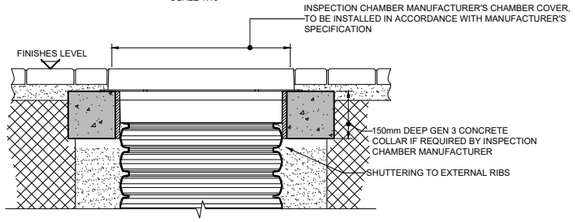
SCALE 1:10



SECTIONAL ELEVATION

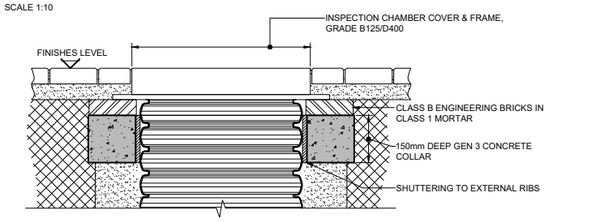
REDUCED ACCESS POLYPROPYLENE INSPECTION CHAMBER (PPIC)
CHAMBER DEPTH >1.2m < 3.0m

SCALE 1:10



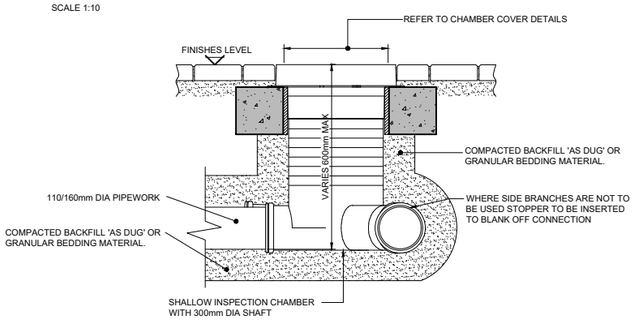
INSPECTION CHAMBER COVER DETAIL -
A15 GRADE: USE IN AREAS INACCESSIBLE TO VEHICLES ONLY

SCALE 1:10



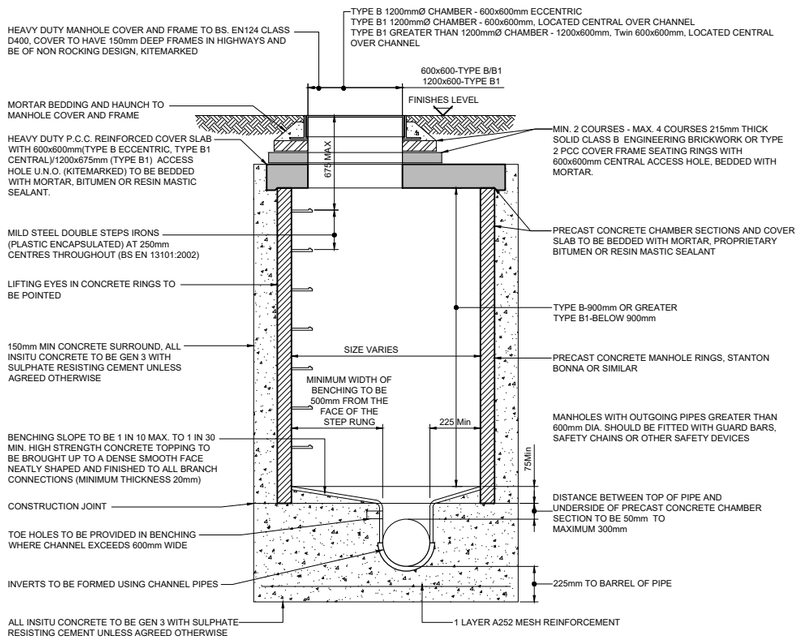
INSPECTION CHAMBER COVER DETAIL -
B125 GRADE: USE IN PRIVATE DRIVES
D400 GRADE: USE IN PRIVATE ROADS

SCALE 1:10



TYPICAL MINI ACCESS CHAMBER CONSTRUCTION DETAIL
MAXIMUM CHAMBER DEPTH 0.6m

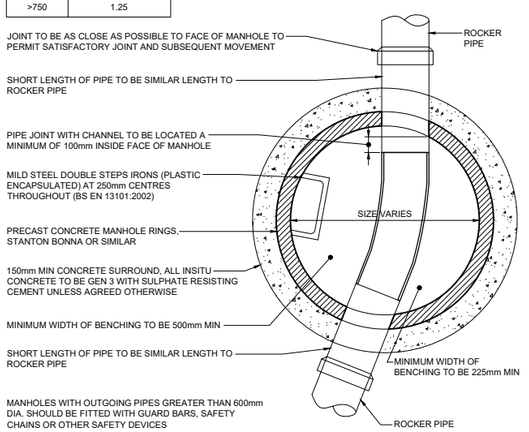
SCALE 1:10



SECTION
MANHOLE TYPE B - DEPTH 1.5-3.0m SOFFIT
MANHOLE TYPE B1 - DEPTH 1-1.5m SOFFIT

SCALE 1:20

ROCKER PIPE LENGTH	
NOM DIA (mm)	EFFECTIVE LENGTH (m)
150-600	0.60
601-750	1.00
>750	1.25



PLAN - TYPICAL

SCALE 1:20

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FOR GENERAL NOTES PLEASE REFER TO AWP DRAWING No. IWEF-AWP-ZZ-XX-DR-C-3700

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Project: IMMINGHAM WASTE TO ENERGY FACILITY
EUROPA WAY
STALLINGBOROUGH

Client: TEGCO UK Ltd

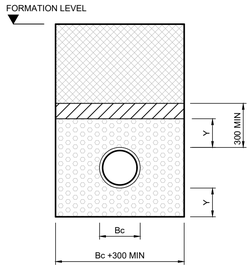
Drawing: DRAINAGE DETAILS (SHEET 1)

Role: CIVIL ENGINEER

Drawing Status: FOR APPROVAL

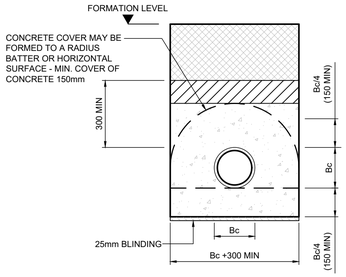
Job. no. 44466 | Scale@ A1: As Noted | Rev. P2

Project Originator Volume Level Type Role Number
IWEF - AWP - ZZ - XX - DR - C - 3701



CLASS S BEDDING DETAIL

SCALE 1:20



CLASS Z CONCRETE BEDDING DETAIL

(EXTERNALLY AS PER NOTE 15 OF DRAINAGE NOTES)

SCALE 1:20

4/20 COARSE GRADED AGGREGATE GRADING TABLE	
SIEVE SIZE (mm)	PERCENTAGE PASSING (%)
40	100
31.5	98 - 100
20	90 - 99
10	25 - 70
4	0 - 15
2	0 - 5

TABLE 2: 4/20 COARSE GRADED AGGREGATE GRADING TABLE

NOMINAL PIPE DIA (mm)	SINGLE SIZED (mm)	GRADED (mm)
100	10	N/A
OVER 100 TO 150	10 OR 14	14 TO 5
OVER 150 TO 300	10,14 OR 20	14 TO 5 OR 20 TO 5
OVER 300 TO 525	14 OR 20	14 TO 5 OR 20 TO 5
GREATER THAN 525	14,20 OR 40	14 TO 5,20 TO 5 OR 40 TO 5

GRANULAR BEDDING MATERIAL TABLE.

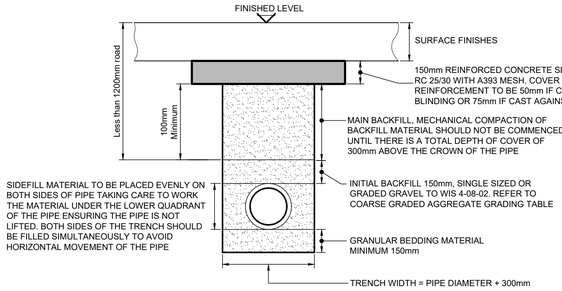
(ALL AGGREGATES TO BS EN 13242, PD 6682-6:2003 & BS EN 13055-2)

NOTES

A) Bc = OUTSIDE DIAMETER OF PIPE BARREL.

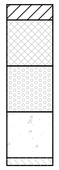
B) Y = FOR UNIFORM SOILS:
SLEEVE JOINTED PIPES, MIN. 50mm OR 1/6Bc, WHICHEVER IS THE GREATER. SOCKETED PIPE, MIN. 100mm OR 1/6Bc, WHICHEVER IS THE GREATER UNDER BARRELS, NOT LESS THAN 50mm UNDER SOCKETS. FOR ROCK OR MIXED SOILS CONTAINING ROCK BANDS, BOULDERS, STONES OR OTHER IRREGULAR HARD SPOTS: SLEEVE JOINTED PIPES, MIN. 150mm OR 1/4Bc, WHICHEVER IS THE GREATER. SOCKETED PIPE, MIN. 200mm OR 1/4Bc, WHICHEVER IS THE GREATER UNDER BARRELS, NOT LESS THAN 150mm UNDER SOCKETS.

CONCRETE BED AND SURROUND TO BE DISCONTINUED AT EVERY PIPE JOINT (NOT TO EXCEED 5m) USING COMPRESSIBLE FILLER. COMPRESSIBLE FILLER TO BE 18mm THICK FOR PIPEWORK UPTO 450mm DIAMETER, FOR PIPES OVER 450mm FLEXCELL JOINTS TO BE 36mm THICK



CONCRETE PROTECTION DETAIL - LATERAL DRAINS ONLY

PIPE BEDDING DETAIL KEY



SELECTED BACKFILL - SEE NOTE B2.

BACK FILL - TO STRUCTURAL ENGINEERS SPECIFICATION UNDER BUILDING & NOTES B3, B4 ELSEWHERE

GRANULAR MATERIAL - REFER TO GRANULAR BEDDING MATERIAL TABLE & NOTE B1

CONCRETE BEDDING - DESIGNATION GEN 3 - SEE NOTE B5.

CONCRETE BLINDING - DESIGNATION GEN 1 - SEE NOTE B5.

BEDDING NOTES:

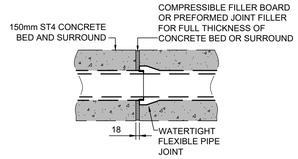
B1. PIPE BEDDING MATERIALS TO COMPLY GENERALLY WITH SHW - SERIES 500 - CLAUSE 503. GRANULAR BEDDING MATERIALS TO ALSO COMPLY WITH BS EN 13242 & THE GRANULAR BEDDING MATERIAL TABLE ON THIS DRAWING.

B2. SELECTED BACKFILL MATERIAL TO BE PROVIDED ABOVE THE PIPE SURROUND TO A HEIGHT OF 300mm MINIMUM ABOVE THE TOP OF THE PIPE. SELECTED BACKFILL MATERIAL TO BE CLASS 8 - LOWER TRENCH FILL MATERIAL IN ACCORDANCE WITH SHW - SERIES 600 TABLE 6/1 & TO COMPRISE OF UNIFORM SOIL, FREE FROM STONES LARGER THAN 40mm, LUMPS OF CLAY OVER 100mm, TIMBER, FROZEN MATERIAL & VEGETABLE MATTER. SELECTED BACKFILL MATERIAL TO BE PLACED & COMPACTED IN LAYERS NOT EXCEEDING 150mm IN THICKNESS. SHOULD THE MATERIAL BE UNSUITABLE OR WEATHER CONDITIONS AFFECT THE MATERIALS STABILITY, THEN A SUITABLE HARD GRANULAR MATERIAL SHALL BE USED.

B3. GENERAL BACKFILL TO DRAINAGE TRENCHES [OTHER THAN FILTER DRAINS] IN VEHICULAR TRAFFICKED AREAS ABOVE THE PIPE BEDDING & SELECTED BACKFILL SHALL BE CLASS 1, 2 OR 3 GENERAL FILL MATERIAL IN ACCORDANCE WITH SHW - SERIES 600.

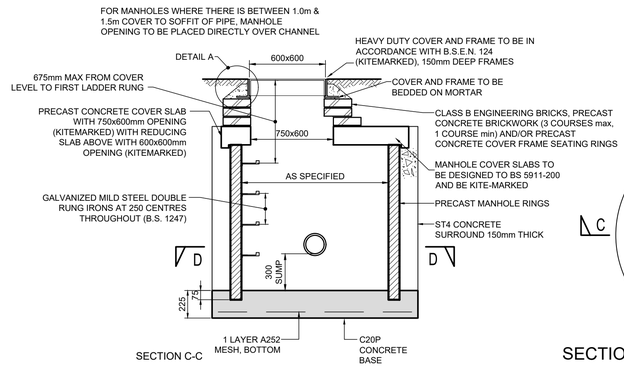
B4. GENERAL BACKFILL UNDER NON-VEHICULAR TRAFFICED AREAS TO BE SUITABLE AS-DUG MATERIAL COMPACTED IN ACCORDANCE WITH SHW - SERIES 600 IN LAYERS NOT EXCEEDING 225mm, EACH LAYER COMPACTED TO FORM A STABLE TRENCH BACKFILL, SHOULD THE MATERIAL BE UNSUITABLE OR WEATHER CONDITIONS AFFECT THE MATERIALS STABILITY, THEN A HARD GRANULAR MATERIAL SHALL BE USED UP TO FORMATION LEVEL.

B5. ALL CONCRETE TO BE DESIGNATED CONCRETE TO CONFORM TO BS 8500-2.

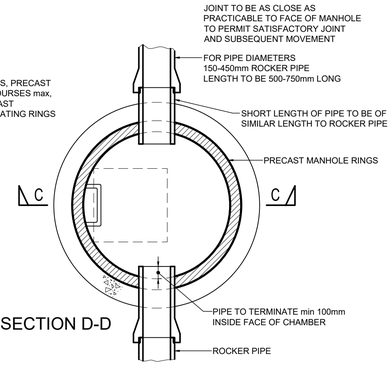


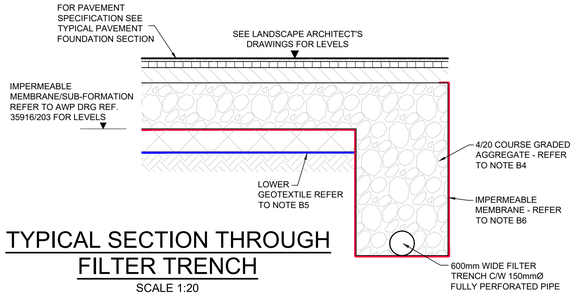
DETAIL OF EXPANSION JOINT FOR CONCRETE BED AND SURROUND

JOINTS TO BE AT 3m MAX CENTERS OR PIPE JOINTS WHICHEVER IS THE SMALLER.



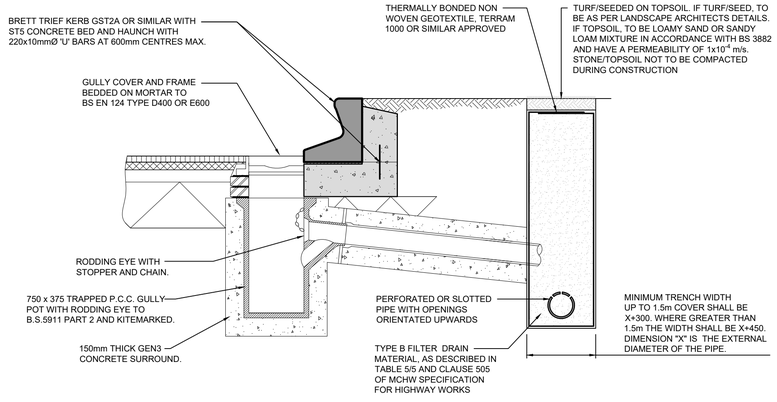
TYPICAL CATCHPIT MANHOLE



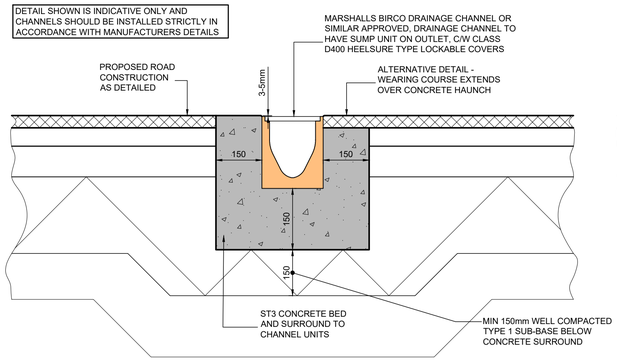


TYPICAL SECTION THROUGH FILTER TRENCH

SCALE 1:20



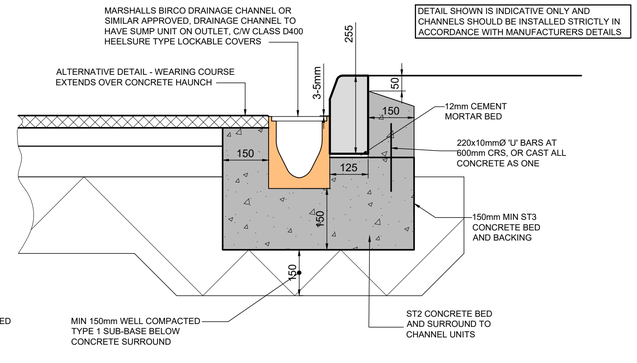
DETAIL SHOWN IS INDICATIVE ONLY AND CHANNELS SHOULD BE INSTALLED STRICTLY IN ACCORDANCE WITH MANUFACTURERS DETAILS



TYPICAL CHANNEL CONSTRUCTION DETAIL

SCALE 1:10

DETAIL SHOWN IS INDICATIVE ONLY AND CHANNELS SHOULD BE INSTALLED STRICTLY IN ACCORDANCE WITH MANUFACTURERS DETAILS



TYPICAL KERBSIDE CHANNEL CONSTRUCTION DETAIL

SCALE 1:10

100mm at A1

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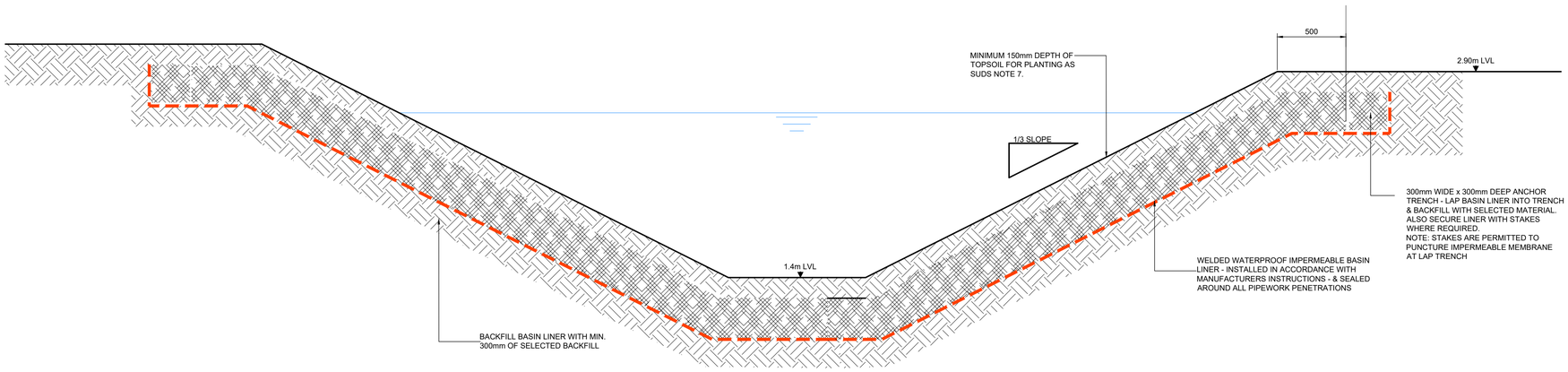
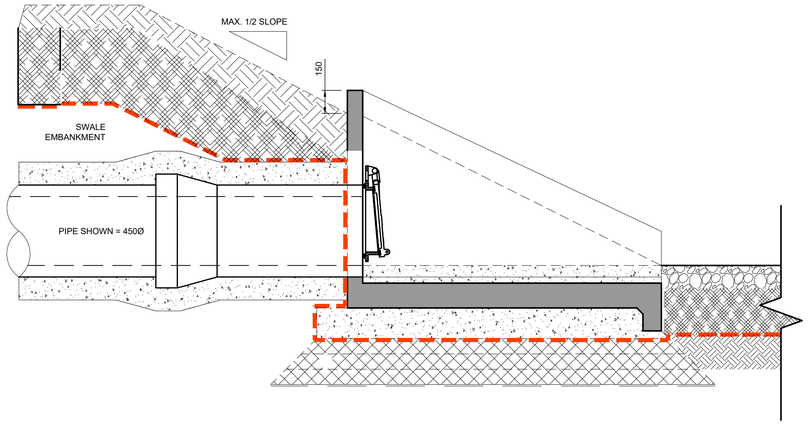
Project:	IMMINGHAM WASTE TO ENERGY FACILITY EUROPA WAY STALLINGBOROUGH
Client:	TEGCO UK Ltd
Drawing:	DRAINAGE DETAILS (SHEET 2)
Role:	CIVIL ENGINEER
Drawing Status:	FOR APPROVAL
Job. no.	44466
Scale@ A1:	As Noted
Rev.	P2

Project Originator Volume Level Type Role Number

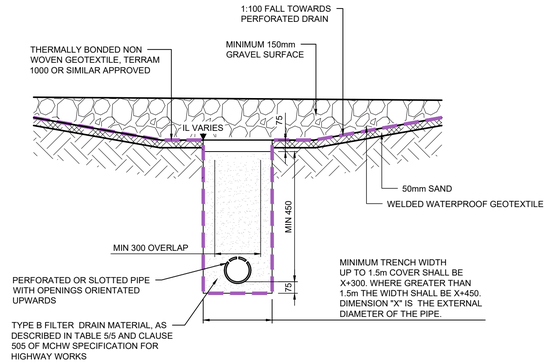
IWEF - AWP - ZZ - XX - DR - C - 3702



TYPICAL SECTION THROUGH PROPOSED DETENTION BASIN
(SCALE 1:20)



TYPICAL SECTION THROUGH HEADWALL
SCALE 1:20)



TYPICAL SECTION THROUGH PROPOSED GRAVEL YARD UNDERDRAIN
(SCALE 1:20)

100mm at A1

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FOR GENERAL NOTES PLEASE REFER TO AWP DRAWING No. IWEF-AWP-ZZ-XX-DR-C-3700

Rev	Description	Date	By	Chk	App
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Project: IMMINGHAM WASTE TO ENERGY FACILITY
EUROPA WAY
STALLINGBOROUGH

Client: TEGCO UK Ltd

Drawing: DRAINAGE DETAILS (SHEET 3)

Role: CIVIL ENGINEER

Drawing Status: FOR APPROVAL

Job. no. 44466 | Scale@ A1: As Noted | Rev. P2

Project Originator Volume Level Type Role Number
IWEF - AWP - ZZ - XX - DR - C - 3703

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APPENDIX F

WinDES Simulation Outputs

Existing Network Details for Storm

* - Indicates pipe has been modified outside of System 1

	PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	k (mm)	HYD SECT	DIA (mm)	Section Type
*	S1.000	7.188	0.161	44.6	0.139	5.00	0.600	o	450	Pipe/Conduit
*	S1.001	66.481	0.132	503.6	0.305	0.00	0.600	o	750	Pipe/Conduit
*	S1.002	53.297	0.107	498.1	0.401	0.00	0.600	o	750	Pipe/Conduit
*	S1.003	34.970	0.069	506.8	0.103	0.00	0.600	o	750	Pipe/Conduit
*	S2.000	119.829	0.238	503.5	0.525	5.00	0.600	o	525	Pipe/Conduit
*	S2.001	29.778	0.066	451.2	0.122	0.00	0.600	o	525	Pipe/Conduit
*	S2.002	76.051	0.145	524.5	0.000	0.00	0.600	o	525	Pipe/Conduit

	PN	US/MH Name	US/CL (m)	US/IL (m)	US C.Depth (m)	DS/CL (m)	DS/IL (m)	DS C.Depth (m)	Ctrl	US/MH (mm)
*	S1.000	1	3.700	2.400	0.850	3.700	2.239	1.011		1500
*	S1.001	2	3.700	1.939	1.011	3.700	1.807	1.143		1800
*	S1.002	3	3.700	1.807	1.143	3.700	1.700	1.250		1800
*	S1.003	4	3.700	1.700	1.250	3.700	1.631	1.319		1800
*	S2.000	5	3.700	2.305	0.870	3.700	2.067	1.108		1500
*	S2.001	6	3.700	2.067	1.108	3.700	2.001	1.174		1500
*	S2.002	7	3.700	2.001	1.174	3.700	1.856	1.319		1500

Existing Network Details for Storm

	PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	k (mm)	HYD SECT	DIA (mm)	Section Type
	S1.004	27.119	0.131	207.0	0.000	0.00	0.600	o	750	Pipe/Conduit
	S3.000	7.246	0.014	517.6	0.362	5.00	0.600	o	525	Pipe/Conduit
*	S1.005	28.133	0.188	149.6	0.000	0.00	0.600	o	150	Pipe/Conduit
*	S1.006	18.205	0.121	150.5	0.000	0.00	0.600	o	150	Pipe/Conduit

	PN	US/MH Name	US/CL (m)	US/IL (m)	US C.Depth (m)	DS/CL (m)	DS/IL (m)	DS C.Depth (m)	Ctrl	US/MH (mm)
	S1.004	8	3.700	1.631	1.319	3.700	1.500	1.450		1800
	S3.000	9	3.700	2.400	0.775	3.700	2.386	0.789		1500
*	S1.005	10	3.700	1.500	2.050	3.700	1.312	2.238		1500
*	S1.006	11	3.700	1.312	2.238	3.700	1.191	2.359	Pump	1500

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S1	3.700	1.300	Open Manhole	1500	S1.000	2.400	450				
S2	3.700	1.761	Open Manhole	1800	S1.001	1.939	750	S1.000	2.239	450	
S3	3.700	1.893	Open Manhole	1800	S1.002	1.807	750	S1.001	1.807	750	
S4	3.700	2.000	Open Manhole	1800	S1.003	1.700	750	S1.002	1.700	750	
S5	3.700	1.395	Open Manhole	1500	S2.000	2.305	525				
S6	3.700	1.633	Open Manhole	1500	S2.001	2.067	525	S2.000	2.067	525	
S7	3.700	1.699	Open Manhole	1500	S2.002	2.001	525	S2.001	2.001	525	
S8	3.700	2.069	Open Manhole	1800	S1.004	1.631	750	S1.003	1.631	750	
								S2.002	1.856	525	
S9	3.700	1.300	Open Manhole	1500	S3.000	2.400	525				
S10	3.700	2.200	Open Manhole	1500	S1.005	1.500	150	S1.004	1.500	750	
								S3.000	2.386	525	1261
S11	3.700	2.388	Open Manhole	1500	S1.006	1.312	150	S1.005	1.312	150	
SOF1	3.700	2.509	Open Manhole	0		OUTFALL		S1.006	1.191	150	

Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S1	520570.549	414355.742	520570.549	414355.742	Required	
S2	520576.647	414359.548	520576.647	414359.548	Required	
S3	520633.046	414394.745	520633.046	414394.745	Required	
S4	520678.261	414422.962	520678.261	414422.962	Required	
S5	520621.264	414297.748	520621.264	414297.748	Required	
S6	520722.921	414361.188	520722.921	414361.188	Required	
S7	520748.184	414376.953	520748.184	414376.953	Required	
S8	520707.928	414441.476	520707.928	414441.476	Required	

Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S9	520734.769	414449.687	520734.769	414449.687	Required	
S10	520730.934	414455.834	520730.934	414455.834	Required	
S11	520716.043	414479.703	520716.043	414479.703	Required	
SOF1	520706.406	414495.148			No Entry	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	450	S1	3.700	2.400	0.850	Open Manhole	1500
S1.001	o	750	S2	3.700	1.939	1.011	Open Manhole	1800
S1.002	o	750	S3	3.700	1.807	1.143	Open Manhole	1800
S1.003	o	750	S4	3.700	1.700	1.250	Open Manhole	1800
S2.000	o	525	S5	3.700	2.305	0.870	Open Manhole	1500
S2.001	o	525	S6	3.700	2.067	1.108	Open Manhole	1500
S2.002	o	525	S7	3.700	2.001	1.174	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	7.188	44.6	S2	3.700	2.239	1.011	Open Manhole	1800
S1.001	66.481	503.6	S3	3.700	1.807	1.143	Open Manhole	1800
S1.002	53.297	498.1	S4	3.700	1.700	1.250	Open Manhole	1800
S1.003	34.970	506.8	S8	3.700	1.631	1.319	Open Manhole	1800
S2.000	119.829	503.5	S6	3.700	2.067	1.108	Open Manhole	1500
S2.001	29.778	451.2	S7	3.700	2.001	1.174	Open Manhole	1500
S2.002	76.051	524.5	S8	3.700	1.856	1.319	Open Manhole	1800

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.004	o	750	S8	3.700	1.631	1.319	Open Manhole	1800
S3.000	o	525	S9	3.700	2.400	0.775	Open Manhole	1500
S1.005	o	150	S10	3.700	1.500	2.050	Open Manhole	1500
S1.006	o	150	S11	3.700	1.312	2.238	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.004	27.119	207.0	S10	3.700	1.500	1.450	Open Manhole	1500
S3.000	7.246	517.6	S10	3.700	2.386	0.789	Open Manhole	1500
S1.005	28.133	149.6	S11	3.700	1.312	2.238	Open Manhole	1500
S1.006	18.205	150.5	SOF1	3.700	1.191	2.359	Open Manhole	0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.006	SOF1	3.700	1.191	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Manhole Headloss Coeff (Global)	0.500	Inlet Coeffiecient	0.800
Areal Reduction Factor	1.000	Foul Sewage per hectare (l/s)	0.000	Flow per Person per Day (l/per/day)	0.000
Hot Start (mins)	0	Additional Flow - % of Total Flow	0.000	Run Time (mins)	60
Hot Start Level (mm)	0	MADD Factor * 10m³/ha Storage	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Offline Controls	0	Number of Time/Area Diagrams	0
Number of Online Controls	1	Number of Storage Structures	2	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	18.600	Cv (Summer)	0.750
Return Period (years)	2	Ratio R	0.400	Cv (Winter)	0.840
Region	England and Wales	Profile Type	Summer	Storm Duration (mins)	30

Online Controls for Storm

Pump Manhole: S11, DS/PN: S1.006, Volume (m³): 4.7

Invert Level (m) 1.312

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.5000	0.600	5.5000	1.100	5.5000	1.600	5.5000	2.100	5.5000	2.600	5.5000
0.200	5.5000	0.700	5.5000	1.200	5.5000	1.700	5.5000	2.200	5.5000	2.700	5.5000
0.300	5.5000	0.800	5.5000	1.300	5.5000	1.800	5.5000	2.300	5.5000	2.800	5.5000
0.400	5.5000	0.900	5.5000	1.400	5.5000	1.900	5.5000	2.400	5.5000	2.900	5.5000
0.500	5.5000	1.000	5.5000	1.500	5.5000	2.000	5.5000	2.500	5.5000	3.000	5.5000

Storage Structures for Storm

Tank or Pond Manhole: S1, DS/PN: S1.000

Invert Level (m) 2.400

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	118.0	1.300	678.0

Tank or Pond Manhole: S10, DS/PN: S1.005

Invert Level (m) 1.500

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	70.0	0.900	229.0	0.910	282.0	2.200	1105.0

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Manhole Headloss Coeff (Global) 0.500 MADD Factor * 10m³/ha Storage 0.000
Hot Start (mins) 0 Foul Sewage per hectare (l/s) 0.000 Inlet Coeffiecient 0.800
Hot Start Level (mm) 0 Additional Flow - % of Total Flow 0.000 Flow per Person per Day (l/per/day) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 2 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.600 Cv (Summer) 0.750
Region England and Wales Ratio R 0.400 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0 DTS Status OFF Inertia Status ON
Analysis Timestep Fine DVD Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)
S1.000	S1	30 Winter	1	+0%	30/180 Winter				2.450	-0.400	0.000	0.03		
S1.001	S2	360 Winter	1	+0%	30/60 Winter				2.383	-0.306	0.000	0.02		

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	6.4	OK	
S1.001	S2	8.1	OK	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)
S1.002	S3	360 Winter	1	+0%	30/30 Winter				2.383	-0.174	0.000	0.02		
S1.003	S4	360 Winter	1	+0%	30/15 Winter				2.383	-0.067	0.000	0.02		
S2.000	S5	15 Winter	1	+0%	30/120 Winter				2.514	-0.316	0.000	0.29		
S2.001	S6	360 Winter	1	+0%	30/30 Winter				2.381	-0.211	0.000	0.07		
S2.002	S7	360 Winter	1	+0%	30/30 Summer				2.381	-0.145	0.000	0.06		
S1.004	S8	360 Winter	1	+0%	30/15 Summer				2.381	0.000	0.000	0.03		
S3.000	S9	15 Winter	1	+0%	30/240 Winter				2.611	-0.314	0.000	0.34		
S1.005	S10	360 Winter	1	+0%	1/15 Summer				2.367	0.717	0.000	0.45		
S1.006	S11	240 Winter	1	+0%	1/15 Summer				2.334	0.872	0.000	0.41		

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
S1.002	S3	11.5	OK	
S1.003	S4	9.7	OK	
S2.000	S5	58.2	OK	
S2.001	S6	12.5	OK	
S2.002	S7	11.9	OK	
S1.004	S8	16.0	OK	
S3.000	S9	46.6	OK	
S1.005	S10	6.2	SURCHARGED	
S1.006	S11	5.5	SURCHARGED	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Manhole Headloss Coeff (Global) 0.500 MADD Factor * 10m³/ha Storage 0.000
Hot Start (mins) 0 Foul Sewage per hectare (l/s) 0.000 Inlet Coeffiecient 0.800
Hot Start Level (mm) 0 Additional Flow - % of Total Flow 0.000 Flow per Person per Day (l/per/day) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 2 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.600 Cv (Summer) 0.750
Region England and Wales Ratio R 0.400 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0 DTS Status OFF Inertia Status ON
Analysis Timestep Fine DVD Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)
S1.000	S1	600 Winter	30	+0%	30/180 Winter				2.977	0.127	0.000	0.01		
S1.001	S2	600 Winter	30	+0%	30/60 Winter				2.977	0.288	0.000	0.02		

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	2.9	SURCHARGED	
S1.001	S2	9.8	SURCHARGED	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)
S1.002	S3	600 Winter	30	+0%	30/30 Winter				2.977	0.420	0.000	0.03		
S1.003	S4	600 Winter	30	+0%	30/15 Winter				2.977	0.527	0.000	0.04		
S2.000	S5	600 Winter	30	+0%	30/120 Winter				2.978	0.148	0.000	0.08		
S2.001	S6	600 Winter	30	+0%	30/30 Winter				2.978	0.386	0.000	0.10		
S2.002	S7	600 Winter	30	+0%	30/30 Summer				2.977	0.451	0.000	0.09		
S1.004	S8	600 Winter	30	+0%	30/15 Summer				2.977	0.596	0.000	0.05		
S3.000	S9	600 Winter	30	+0%	30/240 Winter				2.977	0.052	0.000	0.08		
S1.005	S10	600 Winter	30	+0%	1/15 Summer				2.977	1.327	0.000	0.46		
S1.006	S11	600 Winter	30	+0%	1/15 Summer				2.953	1.491	0.000	0.41		

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
S1.002	S3	15.6	SURCHARGED	
S1.003	S4	17.5	SURCHARGED	
S2.000	S5	15.5	SURCHARGED	
S2.001	S6	18.1	SURCHARGED	
S2.002	S7	17.2	SURCHARGED	
S1.004	S8	32.6	SURCHARGED	
S3.000	S9	10.5	SURCHARGED	
S1.005	S10	6.4	SURCHARGED	
S1.006	S11	5.5	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Manhole Headloss Coeff (Global) 0.500 MADD Factor * 10m³/ha Storage 0.000
Hot Start (mins) 0 Foul Sewage per hectare (l/s) 0.000 Inlet Coeffiecient 0.800
Hot Start Level (mm) 0 Additional Flow - % of Total Flow 0.000 Flow per Person per Day (l/per/day) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 2 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.600 Cv (Summer) 0.750
Region England and Wales Ratio R 0.400 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0 DTS Status OFF Inertia Status ON
Analysis Timestep Fine DVD Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)
S1.000	S1	960 Winter	100	+40%	30/180 Winter				3.549	0.699	0.000	0.01		
S1.001	S2	960 Winter	100	+40%	30/60 Winter				3.549	0.860	0.000	0.02		

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	2.2	FLOOD RISK	
S1.001	S2	7.4	FLOOD RISK	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)
S1.002	S3	960 Winter	100	+40%	30/30 Winter				3.549	0.992	0.000	0.03		
S1.003	S4	960 Winter	100	+40%	30/15 Winter				3.549	1.099	0.000	0.03		
S2.000	S5	960 Winter	100	+40%	30/120 Winter				3.549	0.719	0.000	0.09		
S2.001	S6	960 Winter	100	+40%	30/30 Winter				3.550	0.958	0.000	0.12		
S2.002	S7	960 Winter	100	+40%	30/30 Summer				3.549	1.023	0.000	0.12		
S1.004	S8	960 Winter	100	+40%	30/15 Summer				3.549	1.168	0.000	0.06		
S3.000	S9	960 Winter	100	+40%	30/240 Winter				3.549	0.624	0.000	0.10		
S1.005	S10	960 Winter	100	+40%	1/15 Summer				3.548	1.898	0.000	0.42		
S1.006	S11	1440 Winter	100	+40%	1/15 Summer				3.552	2.090	0.000	0.41		

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
S1.002	S3	12.2	FLOOD RISK	
S1.003	S4	13.6	FLOOD RISK	
S2.000	S5	19.2	FLOOD RISK	
S2.001	S6	23.6	FLOOD RISK	
S2.002	S7	23.4	FLOOD RISK	
S1.004	S8	34.9	FLOOD RISK	
S3.000	S9	13.2	FLOOD RISK	
S1.005	S10	5.8	FLOOD RISK	
S1.006	S11	5.5	FLOOD RISK	

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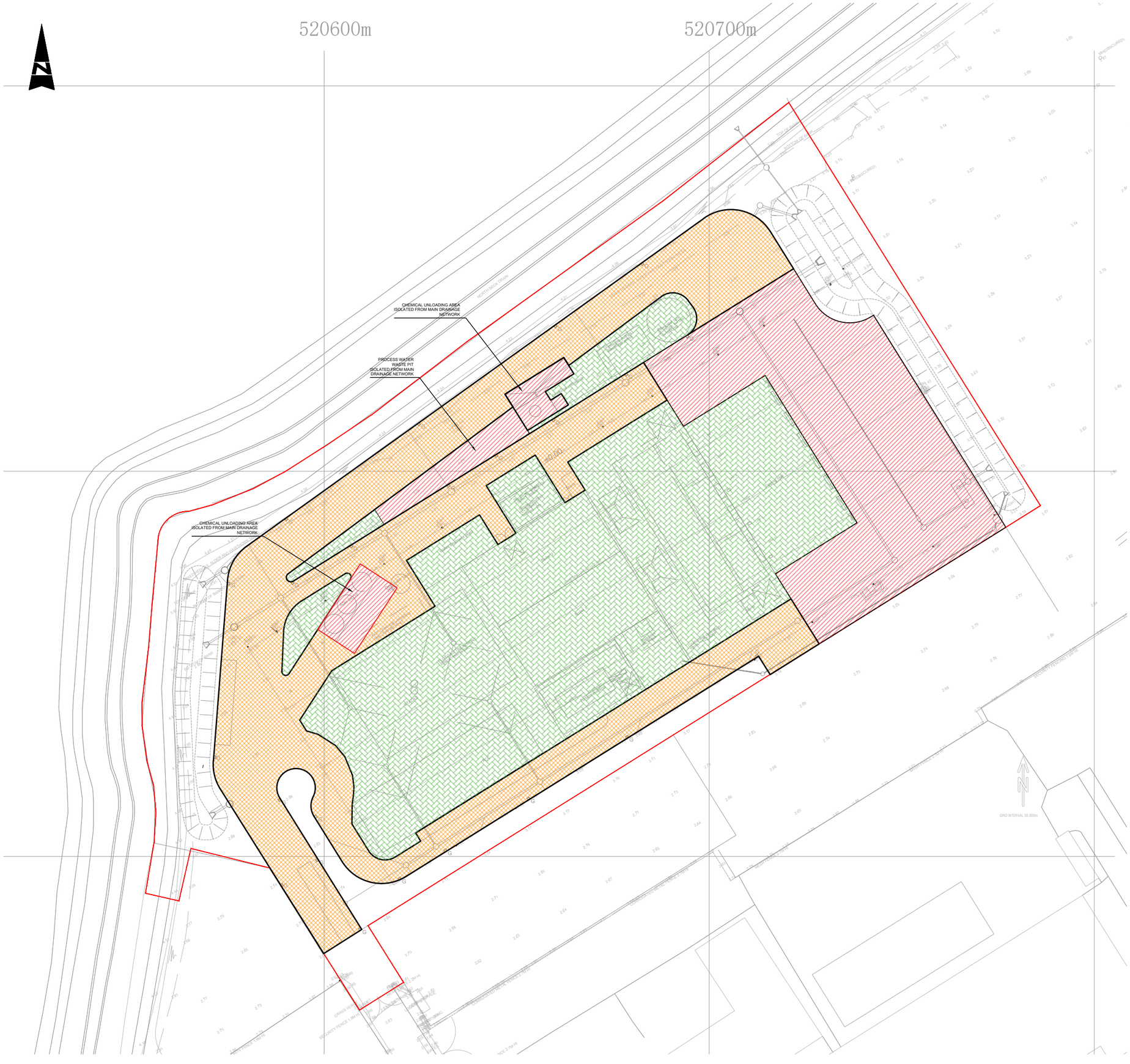
APPENDIX G

Land Use Pollution Index & SuDS Components Plan



NOTES:

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FOR GENERAL NOTES PLEASE REFER TO AWP DRAWING No. IWEF-AWP-ZZ-XX-DR-C-3700

TIPPING HALL - HIGH RISK

PERIMETER ROAD - MEDIUM RISK

ROOF/GRAVEL YARDS - LOW RISK

Rev	Description	Date	By	Chk	App
P3	AMENDED TIPPING HALL RISK AREA	13.03.23	NA	-	-
P2	UPDATED SITE LAYOUT	31.01.23	NA	JC	JAG
P1	FIRST ISSUE	08.12.20	NA	--	--

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Project: IMMINGHAM WASTE TO ENERGY FACILITY
EUROPA WAY
STALLINGBOROUGH

Client: TEGCO UK Ltd

Drawing: POLLUTION RISK AREAS

Role: CIVIL ENGINEER

Drawing Status: FOR APPROVAL

Suitability Code:

Job. no. 44466

Scale@ A1: 1:500

Rev. P3

Project Originator Volume Level Type Role Number
IWEF - AWP - ZZ - XX - DR - C - 3100

100mm at A1

520600m

520700m

HEADWALL OUTFALL INTO NORTH BECK DRAIN

OUTLET TO HAVE FLAP VALVE AND BE ABOVE PREDICTED MAXIMUM WATER LEVEL

ENVIRONMENT AGENCY TO AGREE DISCHARGE RATE AND CONSENT PERMANENT AND TEMPORARY WORKS

PUMPED OUTFALL PEAK BIS 2.5l/s PROCESS & 5.5l/s SURFACE WATER

GRAVITY CONNECTION TO NORTH BECK DRAIN DOWNSTREAM OF PUMP STATION

OUTLET HEADWALL IL 1.5m

GABION BASKET/RENO MATTRESS ON OUTFALL TO PROVIDE EROSION PROTECTION

EAST DETENTION BASIN
1:3 SLOPES
BED LEVEL 1.5m
BERM LEVEL 2.4m
TOP BANK 3.7m

INLET HEADWALL WITH TRASH SCREEN & SAFETY RAILINGS. GABION BASKET/RENO MATTRESS ON OUTFALL TO PROVIDE EROSION PROTECTION IL 1.5m 750Ø

CHANNEL DRAIN

TIPPING YARD TO FALL TO CHANNEL DRAIN

TIPPING YARD TO FALL TO CHANNEL DRAIN

LAGOON
1:3 SLOPES
BED LEVEL 2.4M
TOP BANK 3.7m

INLET HEADWALL WITH TRASH SCREEN & SAFETY RAILINGS GABION BASKET/RENO MATRESS FOR EROSION PROTECTION ON OUTFALL IL 2.4m 450Ø

CONNECTION FROM DELIVERY YARD ROOF DRAINAGE

SILT TRAP ON OUTFALL FROM CHANNEL DRAIN

HIGH RISK YARD AREA TO DRAIN TO LAGOON VIA FULL RETENTION INTERCEPTOR

ROOF RUNOFF TO DISCHARGE DIRECTLY INTO SURFACE WATER NETWORK

SPILL RISK AREA TO BE ISOLATED FROM SURFACE WATER DRAINAGE NETWORK IN EVENT OF A SPILL

PROCESS WATER WASTE PIT ISOLATED FROM SURFACE WATER NETWORK DISCHARGE AT 7.5l/s FOLLOWING TREATMENT & TESTING

GRAVEL SURFACE WITH PERFORATED UNDERDRAIN

SPILL RISK AREA TO BE ISOLATED FROM SURFACE WATER DRAINAGE NETWORK IN EVENT OF A SPILL

INLET/OUTLET HEADWALL WITH TRASH SCREEN & GABION/RENO MATRESS ON OUTFALL IL 2.4m

WEST DETENTION BASIN
BED LEVEL 2.4m
TOP BANK 3.7m
1:3 SLOPES

INLET/OUTLET HEADWALL WITH TRASH SCREEN & GABION/RENO MATRESS ON OUTFALL 450Ø IL 2.4m

GRAVEL SURFACE WITH PERFORATED UNDERDRAIN

GULLIES ADJACENT TO DETENTION BASIN TO DISCHARGE DIRECTLY INTO BASIN

INLET/OUTLET HEADWALL WITH TRASH SCREEN & GABION/RENO MATRESS ON OUTFALL IL 2.4m

GULLIES TO DISCHARGE INTO FILTER DRAIN WHERE PRESENT

GRAVEL SURFACE WITH PERFORATED UNDERDRAIN

ROOF RUNOFF TO DISCHARGE DIRECTLY INTO SURFACE WATER NETWORK

100mm at A1

NOTES:

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FOR GENERAL NOTES PLEASE REFER TO AWP DRAWING No. IWEF-AWP-ZZ-XX-DR-C-3700

Rev	Description	Date	By	Chk	App
P2	UPDATED SITE LAYOUT	31.01.23	NA	JC	JAG
P1	FIRST ISSUE	08.12.20	NA	-	-

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Project: IMMINGHAM WASTE TO ENERGY FACILITY
EUROPA WAY
STALLINGBOROUGH

Client: TEGCO UK Ltd

Drawing: SUDS COMPONENTS

Role: CIVIL ENGINEER

Drawing Status: FOR APPROVAL

Suitability Code:

Job. no. 44466

Scale@ A1: 1:500

Rev. P2

Project	Originator	Volume	Level	Type	Role	Number
IWEF	AWP	ZZ	XX	DR	C	3101

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APPENDIX H

Residual Risk Plan

520600m

520700m

DR 03

DR 01

NOTES:

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FOR GENERAL NOTES PLEASE REFER TO AWP DRAWING No. IWEF-AWP-ZZ-XX-DR-C-3700

HEALTH & SAFETY RISKS

IN ADDITION TO THE STANDARD HAZARDS AND RISKS NORMALLY ASSOCIATED WITH THE TYPE OF WORK DETAILED ON THIS DRAWING, PLEASE NOTE THE FOLLOWING RESIDUAL HEALTH AND SAFETY RISKS

DESIGN RISKS

DR 01	FINISHED LEVELS TO BE DESIGNED BY OTHERS
DR 02	REFER TO DRAWING IWEF-AWP-ZZ-XX-DR-C-3000 FOR INDICATIVE DRAINAGE AREAS. AWP TO BE INFORMED OF ANY CHANGE DESIGN TO BE CHECKED AND SUBJECT TO REDESIGN IF REQUIRED

CONSTRUCTION RISKS

CR 01	BURIED SERVICES - DAMAGE MAY RESULT IN ELECTROCUTION, GAS LEAK, EXPLOSION, WATER LEAK. OBTAIN ACCURATE LOCATIONS OF UNDERGROUND SERVICES PRIOR TO EXCAVATION.
CR 03	UNTREATED/POLLUTED WATER CAN CAUSE ILL HEALTH THROUGH WATERBORNE DISEASES. STAFF WORKING ON OR NEAR SEWERS/WATERCOURSES MUST BE AWARE OF THESE DISEASES.
CR 04	CONTAMINATED GROUND - SITE ASSESSMENT MUST BE CARRIED OUT TO DETERMINE RISK IF CONTAMINATED GROUND IS UNCOVERED.
CR 05	UNFORESEEN GROUND CONDITIONS - CONTRACTOR SHOULD CARRY OUT APPROPRIATE SURVEYS TO MINIMISE RISK OF ENCOUNTERING UNKNOWN STRUCTURES
CR 07	SERVICES ARE UNKNOWN WHETHER LIVE OR ABANDONED - ENSURE APPROPRIATE SURVEY DATA RECEIVED BEFORE WORKS COMMENCE
CR 08	CONSTRUCTION ADJACENT LIVE TRAFFIC - CONTACTOR TO PROVIDE APPROPRIATE PROTECTION AND BARRIERS TO SEPARATE THE CONSTRUCTION SITE FROM TRAFFIC.
CR 11	EXISTING RELICT FOUNDATIONS TO BE BROKEN, REMOVED AND DISPOSED OF AS REQUIRED

IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING IN ACCORDANCE WITH THE REQUIREMENTS DEFINED IN THE CDM REGULATIONS.

Rev	Description	Date	By	Chk	App
P2	UPDATED SITE LAYOUT	31.01.23	NA	JC	JAG
P1	FIRST ISSUE	08.12.20	NA	-	-

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Project: IMMINGHAM WASTE TO ENERGY FACILITY
EUROPA WAY
STALLINGBOROUGH

Client: TEGCO UK Ltd

Drawing: RESIDUAL RISKS

Role: CIVIL ENGINEER

Drawing Status: FOR APPROVAL

Suitability Code:

Job. no. 44466

Scale@ A1: 1:500

Rev. P2

Project Originator Volume Level Type Role Number
IWEF - AWP - ZZ - XX - DR - C - 3102

100mm at A1

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DRAWINGS

Notes

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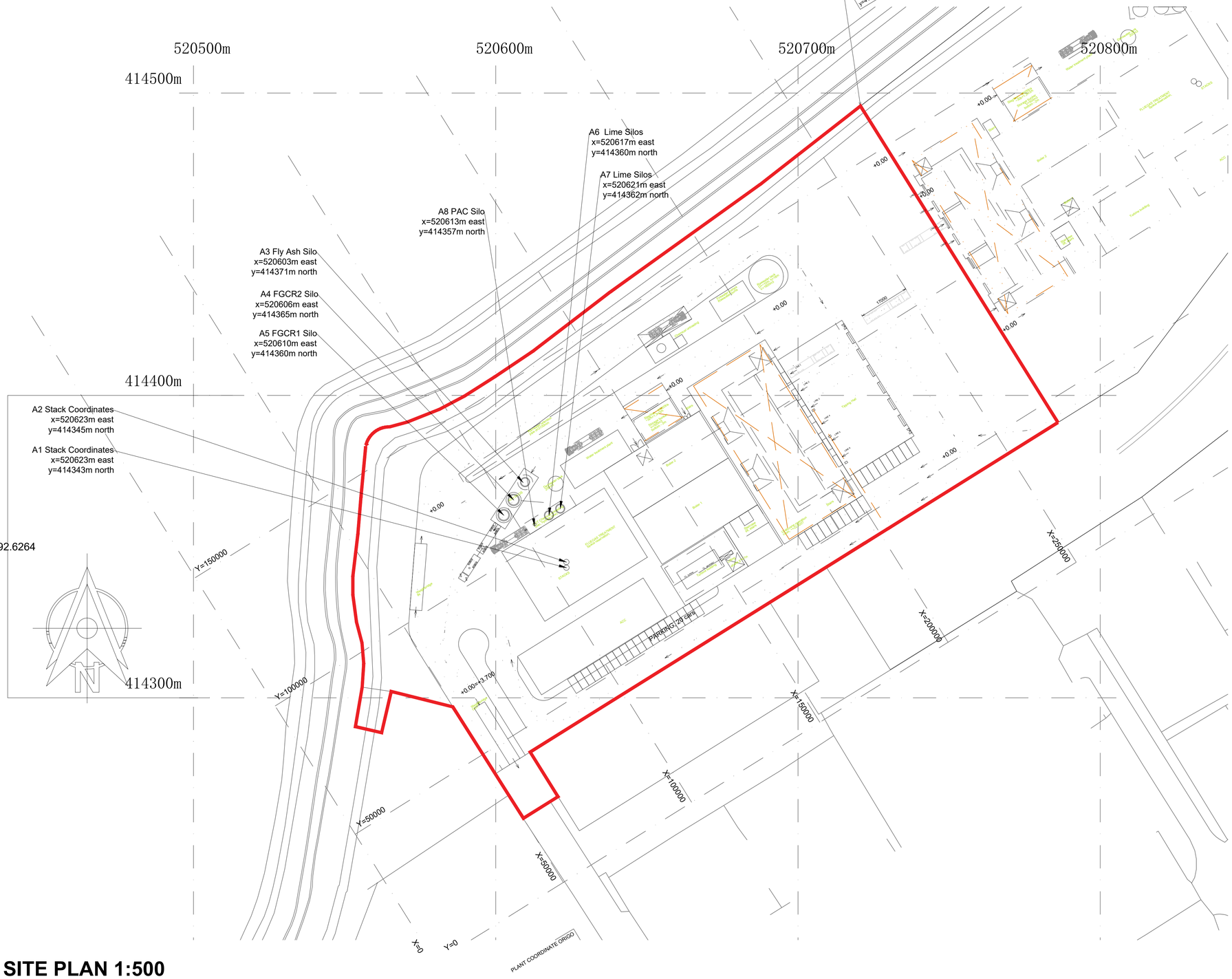
Rev	Date	Drawn	Description
-	-	-	-



SITE PLAN 1:500

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client:	TEGCO
project:	Immingham
title:	Site plan
scale:	1:500@A0
date:	AUG 22
project no.:	1816
drawn:	ZY 005
number:	
rev:	-

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