Net Zero Teesside

Deposit For Recovery Permit Application
Waste Recovery Plan

Net Zero Teesside Power Limited

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1. Report Context

1.1 Introduction

AECOM Limited (AECOM) has been instructed by Net Zero Teesside Power Limited ('NZTPL'), referred to as 'the Operator', to prepare the application for an environmental permit for a Deposit for Recovery (DfR) operation during the construction phase of the Net Zero Teesside Project.

This document is the Waste Recovery Plan (WRP) which is being prepared to support the environmental permit application for a DfR activity and should be read in conjunction with other supporting application information.

1.2 Background

Net Zero Teesside (NZT) is a low carbon electricity generating station, which forms part a proposed Carbon Capture, Utilisation and Storage (CCUS) project located in Redcar, Teesside. It will be the UK's first commercial scale, full chain CCUS project and has recently (Feb 2024) received a Development Consent Order (DCO). It is a Nationally Significant Infrastructure Project (NISP) which includes the construction and operation of a new gas-fired electricity generating station with post-combustion carbon capture (PCC) and CO_2 compression plant. It has a gross electrical output of up to 860 MWe and associated connections for natural gas, water, electricity and to a CO_2 pipeline network for the capture and storage of CO_2.

Prior to the construction of the facility, the land on which the PCC installation will be developed (Main Site) is subject to remediation by the landowner, South Tees Development Corporation (STDC). This involves the excavation, treatment and redeposit of excavated waste at the site under a Local Enforcement Position (LEP) issued by the Environment Agency (EA). The STDC remediation involves the following works:

- demolition of existing structures within the boundary of the PCC Site and laydown areas within the Teesworks site: principally the former raw materials handling facility, sinter plant and conveyor systems;
- turnover of an agreed thickness of the made ground to remove unsuitable/contaminated/hazardous materials including removal and crushing of derelict underground structures and obstructions within that depth;
- targeted removal of deeper underground structures;
- crushing and grading of suitable material to form a geotechnical material complaint with requirements in the Highways Spec series 600; and
- placement and compaction of suitable material to form appropriate platform levels for development.

The LEP permitted the redeposit of up to 1,252,000 m^3 of excavated waste at Main Site in order to provide for the reclamation or improvement to land as detailed in the submitted Waste Recovery Plan (WRP) (ref: LWWX-ATK-EEI-NZTXX-RP-EN-000001). The STDC works associated with this LEP and WRP are currently being progressed and will create the development platform on which NZT will be built. As a result, the waste material being considered for recovery under this application at Main Site has already been lifted, processed and redeposited as part of the remediation works.

Following completion and validation /verification of the remediation works, NZTPL will lease the site and the construction of the facility is anticipated to commence with a construction schedule lasting approximately 4 years. The construction of the facility is expected to involve a number of works which will generate a volume of excavated material comprising both previously remediated and redeposited materials. There are opportunities to recover excavated materials to deliver aspects of the construction scheme which in turn will reduce the volume of excavated material sent for off-site disposal and reduce the need for the import of virgin material. It is understood that such material reuse must be completed under a Deposit for Recovery (DfR) permit and as such this WRP sets out the intended reuse of such material along with the justifications to demonstrate that such activities are recovery.

1.3 Structure of the Waste Recovery Plan

This WRP was prepared using the EA Guidance "Waste Recovery Plans and Deposit for Recovery Permits" which was published on 29 June 2023 and the WRP is structured to follow the guidance as detailed in Table 1 below.

Table 1 Structure of the WRP

Section	Description
2. Purpose of the Work	The section sets out the reason why the recovery activities are taking place, the benefits brought by the work and reviews compliance with environmental permit requirements to confirm the type of permit being sought.
3. Quantity and Nature of Waste	This section sets out the nature of the waste materials which will be accepted for recovery and the quantity of materials being used.
4. Meeting Quality Standards	This section provides details of how quality standards will be achieved including material testing, recording of 'as-built' information and construction quality assurance (CQA) requirements.
5. Waste Recovery Activities – Evidence	This section sets out the evidence of why the proposed activities are considered to be recovery and demonstrates that the same outcome would be achieved using non-waste materials. The evidence presented demonstrates the obligations to undertake the works.
6. Monitoring	This section details the monitoring being considered while the recovery permit is active and to support ultimate surrender.
7. Conclusion	This section provides a summary conclusion of the proposed recovery activities, the evidence and the management/controls to be employed.
Appendices	Appendices include any additional information to support the WRP as deemed necessary by the Operator and/or the EA.

2. Project Description

2.1 Introduction

The Operator intends to reuse excavated material from construction earthworks to refill, level and raise the Site and reduce the volume of excavated material being taken off site for disposal. There is also the potential to reuse excavated material from pipeline and cable construction within the installation boundary to refill pipeline and cable excavations.

2.2 Site Description

2.2.1 Site Location

The installation boundary covers two discrete areas where reuse of material will take place:

- Main Site is the primary area of the DfR activity and encompasses the areas associated with the construction and installation of the main NZT production facility; and
- Tod Point a smaller area located to the southeast which will be used for construction and installation of the substation.

The entirety of the Main Site is reclaimed land from mudflats and marshland of the Tees Estuary in the 19th and 20th centuries and is relatively flat, roughly rectangular in shape and covers an area of around 64.82 Ha. The Main Site is located within the former Redcar steelworks site in Redcar, Teesside. The land was specifically used for iron and steel manufacture, together with associated ancillary development. The former steelworks shut in October 2015 and the Main Site comprised generally large-scale redundant plant and buildings (such as the raw materials handling facility, the sinter plant and extensive conveyor systems), with large open land areas that were previously utilised for raw materials storage and processing.

The current land surface prior to remediation is predominantly slag with some relic structures from the former steel works. Slag rich made ground which is a by-product of the Teesworks site former use for production of iron and steel, was placed to re-develop and raise the site and wider area (including on the dunes to the north) from the mudflats and marshland. Prior to construction of the proposed installation, STDC will remediate the site including reuse of excavated and treated material under a LEP issued by the EA.

The approximate centre of the Main Site is at national grid reference NZ 57000 25400. The address and postcode is Net Zero Teesside CCUS Project, Redcar, Cleveland, TS10 5QW.

In addition to the Main Site, a smaller discrete area known as Tod Point lies approximately 700m to the southeast of the Main Site. New substation infrastructure will be constructed in the Tod Point area, which is centred at NZ 57068, 23840 and covers approximately 3 ha.

Figure 1 and Figure 2 (Appendix A) shows the proposed installation boundary for the DfR permit and within the immediate setting is:

- To the northwest of the Main Site, there is an area of the decommissioned former iron-making plant within the Redcar steelworks. The operational Redcar Bulk Terminal is beyond, on the south bank of the River Tees.
- To the south lies an area of the decommissioned Redcar steelworks part of which will be temporarily leased as a construction laydown area for the NZTPL Construction. Beyond is the Northumbrian Water Ltd (NWL) Bran Sands sewage treatment plant, operational land of PD Ports Teesport and the Wilton International industrial complex.
- West of the Main Site, on the north bank of the River Tees, similar industrial complexes are present (at Seal Sands).
- The town of Dormanstown is located approximately 1.4 km southeast of the Main Site and 0.625 km east of Tod Point, whilst Redcar is situated approximately 1.8 km to the east of the Main Site and 2.2 km northeast of Tod Point.
- The Main Site is located approximately 400 m to the south of the North Sea shoreline and Tod Point approximately 2km south at its closest point.

2.2.2 Site Geology

Based on multiple ground investigations conducted at the Main Site between 2004 and 2022, substantial thickness of Made Ground has been observed at the site overlying the natural deposits, consisting of slag rich Made Ground >50 % slag and granular Made Ground with <50 % slag. There is also the potential for cohesive Made Ground to also be encountered. Made Ground was encountered at all exploratory locations and ranged in thickness from 0.9 m to 8.9 m with the deepest Made Ground identified in the south of the site.

Natural deposits comprising Tidal Flat Deposits were identified immediately underlying the Made Ground, these natural deposits were hard to distinguish from Blown Sand deposits which are also indicated as being present on geological mapping. Glacial Till or occasionally Glaciolacustrine Deposits of varying thicknesses were identified below the Tidal Flat Deposits, where present the Glaciolacustrine Deposits were underlain by Glacial Till.

Depth to bedrock is varies between 15 and 21.8 m below the current ground level and consists of the Redcar, Penarth and Mercia Mudstone Group, with the depth generally increasing towards the north.

The STDC remediation project is excavating and placing recovered made ground and imported material to variable depths across the site. In most areas of the site recovered made ground is present from 4.8mAOD to the platform level of 7.3mAOD. Recovered made ground has been placed to deeper depths in the centre of the main site and in areas of former structures, and recovered made ground has been placed to shallower depths in some defined areas. The recovered made ground predominantly comprises slag rich made ground >50 % slag and granular made ground with <50 % slag with some cohesive made ground. Imported materials comprise mudstone and crushed concrete material produced under Factory Production Control. Full details of the recovered material present will be detailed in the Validation and Verification Report for this remediation works and will be summarised in the Environmental Setting and Site Design Report (ESSD) that will be prepared to support this DfR permit application.

2.2.3 Site Hydrogeology

In accordance with the EA Groundwater Protection Policy aquifer designations for the site:

- Redcar Mudstone Formation is classified as a Secondary (undifferentiated) aquifer.
- The Mercia Mudstone Group and Penarth Group are mudstones and classified as Secondary aquifers.
- The Sherwood Sandstone Group is classified as Principal aquifer.
- The Superficial Aquifer Designation comprises classification of the Blown Sand and Tidal Flat Deposits (sand and silt) strata are classed as Secondary Aquifer – A, and the Glacio-lacustrine deposits and Till (Diamicton) as Unproductive.

The site is also identified to be located on a Secondary (undifferentiated) Aquifer with the groundwater vulnerability classified as High.

The Environment Agency (EA) Groundwater Maps show that the site falls outside any Groundwater Source Protection Zones and the site is indicated to be outside the Groundwater and Surface water Safeguard Zones for Drinking Water.

2.2.4 Sensitive Receptors

There are no residential receptors within 500 m of the Main Site or 630m of Tod Point. The closest residential properties (individual receptors) to the Main Site are those at Marsh House Farm, in Warrenby 750 m to the east and on Broadway West in Dormanstown, approximately 1.5 km to the south-east. The closest to Tod Point are 630m to the west at Limerick Road, Dormanstown.

A number of nationally designated ecological sites are situated in close proximity, including:

- Teesmouth and Cleveland Coast Site of Special Scientific Interest (SSSI)/ Special Protection Area (SPA)/ Ramsar site located approximately 240 m north of the Main Site and 1.22km northeast of Tod Point (at its nearest point).
- South Gare and Coatham Sands SSSI (small areas extend to the boundary of the Main Site to the north/ east of the indicative proposed installation boundary).
- Seal Sands SSSI (approximately 2.9 km west of the Main Site and 3.8 km northeast of Tod Point).

- Seaton Dunes and Common SSSI (2.9 km north west of the Main Site).
- Redcar Rocks SSSI (3 km east of the Main Site).
- Tees and Hartlepool Foreshore and Wetlands SSSI (4.1 km south west of the Main Site).

The River Tees flows approximately 1.6 km to the west of the Main Site and 2km west of Tod Point and is tidal at that point, with the normal tidal limit approximately 14 km upstream (at the Tees Barrage). There are also a number of surface water features in the vicinity of the Site, including the Dabholm Gut which flows to the River Tees approximately 0.8 km south of the Main Site and 0.4 km west of Tod Point. The Dabholm Gut is tidal and accepts water from smaller streams, namely the Fleet (that runs from Coatham Marsh, to the west of Redcar), the Mill Race (from east of the Wilton International complex); and Dabholm Beck (from the west of the Wilton International complex).

2.2.5 Site Layout

The proposed NZT installation will consist of an integrated power generation and carbon capture train constructed on top of a flat hardstanding base. The construction works will incorporate an area of approximately 64.82Ha and involve the following activities:

- establishment of construction laydown areas (e.g. site offices, storage areas, security fencing and gates);
- earthworks to prepare the Site;
- construction of foundations, which is likely to require the piling of key structures;
- erection of buildings and structures and installation of plant and equipment;
- installation of utilities and utility connections (electricity, natural gas and water);
- construction of the CO2 Gathering Network and CO2 Export Pipeline; and
- commissioning (testing) of the plant prior to operation.

2.3 Description of Proposed Recovery Operations

2.3.1 Proposed Recovery Operations

As part of site construction, the intention is to undertake earthworks to prepare the site for the installation of the foundations and construction of the development platform prior to the erection of buildings and plant and installation of the site utilities. The majority of the earthwork's activities will generally take place to depths of 2.5 to 3.5m although there will be designated areas where excavation and/or foundations may go beyond the 3.5m depth. The majority of the excavated material will therefore be made ground with a smaller amount of the naturally occurring material being encountered at depth. The excavated materials are anticipated to be classed as non-hazardous waste following classification in accordance with WM3 and will be subject to chemical and geotechnical testing to ensure the required material specification can be met.

The material is proposed to be used in a recovery operation to facilitate the following.:

- Structural backfill of the HV switchyard platform at Tod Point;
- Construction of an earth dyke/bund associated with fire water pond and filling and embankment for tank foundations;
- Other structural backfill;
- Use of sand materials for underground pipes;
- Filling and embankment of tank(s);
- Soil substitution as a structural fill; and
- Provision of base and sub-base courses during road construction.

2.3.2 Design Basis

Design assumptions are as follows:

- Earthworks excavations at Main Site will take place to depths of 2.5 to 3.5m apart from specified areas where deeper excavation may be required for construction of specific site infrastructure (e.g. lagoon) or where unexpected ground conditions are encountered.
- Development platform height post-STDC remediation is around 7.3 mAOD.
- Materials generated from piling (e.g. drill cuttings) are unlikely to be suitable for reuse.
- Layout of the proposed PCC site includes an allowance for undeveloped stand-offs and buffers for the purposes of safe operation which provides a cohesive network of land that can be used to deliver the landscaping and biodiversity strategy. This strategy allows for using the existing ground conditions (i.e nutrient poor, free draining and summer drought tested) to create flower-rich native grassland.
- Material may be subject to screening and crushing prior to reuse.

Proposed layout and contours to be achieved are shown on the drawings attached in Appendix A.

2.3.3 Works Implementation

Works will take place in accordance with the Construction Environmental Management Plans (CEMPs) that is required to discharge condition 16 in Schedule 2 of the Development Consent Order (DCO 2024 No 0000) which came into force on the 11th March 2024. The CEMP will include controls and mitigations to be employed during construction that include but are not limited to:

- Soil management plan
- Sediment control plan
- Surface and foul drainage measures
- Materials management plan
- Hazardous materials management plan;
- Emission control; and
- Scheme for environmental monitoring.

Material excavated will be initially stockpiled in designated areas which are located within the secure DFR installation boundary and are sited on ground which is firm and provides a stable foundation. Arrangements for stockpile management will include:

- Ensuring the ground is relatively level, properly drained and unaffected by water courses that may flood;
- There is sufficient space to allow safe access for material sampling and allow safe movement of mobile plant during placement and removal of materials;
- Sampling and testing of the stockpile for chemical and geotechnical properties to ensure it is non-hazardous and suitable for its intended use; and
- A routine visual inspection will be completed to ensure the stockpile remains stable and that any accumulation of runoff material is removed from site following testing prior to disposal via an appropriate route.

2.3.4 General Compliance with Permit Selection Criteria

The site does not meet the requirements of the Standard Rules SR 2015 No 39 ‘Use of waste in a deposit for recovery operation (construction, reclamation, restoration or improvement of land other than by mobile plant)’ given its:

- Location in close proximity to designated sites European Site, namely the Teesmouth and Cleveland Coast SSSI/ SPA/ Ramsar and South Gare and Coatham Sands SSSI;
- Proximity to a site that has species or habitats protected under the Biodiversity Action Plan, namely the estuary, salt marsh and sub-tidal habitats which occur along the banks of the River Tees to the west and the coast to the north of the site; and
- Need to reuse in excess of 60,000 m^3.

Therefore a bespoke permit is required.

3. Quantity and Nature of Waste

3.1 Material Suitability

Excavated materials from the remediated and un-remediated ground are expected to be subject to the DfR permit and will be classified in accordance with WM3 Guidance.

Any waste to be used will have a confirmed use on the site, will be subject to the proposed testing as outlined in Section 4.4 to demonstrate it is suitable for such use, and will be used in quantities which are a direct replacement for non-waste materials only.

It is anticipated that the majority of the waste to be used will be generated on site and imported material would only be considered to address any deficit due to:

- Contamination being detected during testing of site generated material which makes it unsuitable for reuse;
- Risk assessment based on the site conceptual model shows that site generated material is unsuitable for the intended use; or
- Volumes generated on site are less than that estimated.

The wastes to be used are detailed in Table 2 below and are noted by the EA as being acceptable for:

- structural fill for building, stabilising slopes, drainage and road construction; and/or
- landscaping associated with construction work; and/or
- construction of dykes/bunds.

Table 2. List of Waste (LoW) Codes to be accepted

Waste Code	Description	Materials Generated Onsite	Materials From External Sources	Purpose of Reuse	Comment
01	**WASTES RESULTING FROM EXPLORATION, MINING, QUARRYING AND PHYSICAL AND CHEMICAL TREATMENT OF MINERALS**				
01 01	**Wastes from Mineral Excavation**				
01 01 02	Wastes from non-metalliferous excavation	X	✓	Structural fill, landscaping, and bunds	Imported only if needed and - restricted to waste overburden and inter-burden only
01 04	**Wastes from Physical And Chemical Processing of Non-Metalliferous Minerals**				
01 04 08	Waste gravel and crushed rocks other than those containing dangerous substances	X	✓	Structural fill	Imported only if needed
01 04 09	Waste sand and clays	X	✓	Structural fill	Imported only if needed
10	**WASTES FROM THERMAL PROCESSES**				
10 02	**wastes from the iron and steel industry**				
10 02 02	unprocessed slag	✓	X	Structural fill, landscaping, and bunds	Un-remediated slag material from areas of deeper excavation.
17	**CONSTRUCTION AND DEMOLITION WASYES (INCLUDING EXCAVATED SOIL FROM CONTAMINATED SITES)**				
17 01	**Concrete, Bricks, Tiles and Ceramics**				
17 01 01	Concrete	✓	✓	Structural fill	Site won material associated with relic structures from deeper excavations. Imported only if needed
17 01 02	Bricks	✓	✓	Structural fill	Site won material associated with relic structures from deeper excavations. Imported only if needed
17 01 03	Tiles and Ceramics	✓	✓	Structural fill	Site won material associated with relic structures from deeper excavations. Imported only if needed
17 01 07	Mixtures of Concrete, Bricks, Tiles and Ceramics	✓	✓	Structural fill	Site won material associated with relic structures from deeper excavations. Imported only if needed Metal from reinforced concrete must be removed
17 05	**Soil Stones and Dredging Spoil**				
17 05 04	Soil and stones (topsoil, peat, subsoil and stones)	✓	✓	Structural fill, landscaping, and bunds	Material deposited in place of non-waste topsoil must meet the British Standard for Topsoil - BS3882:2015. Imported only if needed.
19	**WASTES FROM WASTE MANAGEMENT FACILITIES, OFFSITE WASTEWATER TREATMENT PLANTS AND THE PREPARATION OF WATER INTENDED FOR HUMAN CONSUMPTION AND WATER FOR INDUSTRIAL USE**				
19 12	**Wastes from the Mechanical Treatment of Waste Not Otherwise Specified**				
19 12 09	Minerals (such as sand and stones) from the treatment of waste aggregates that are otherwise naturally occurring minerals (see specific guidance for further limitations)	X	✓	Structural fill, landscaping, and bunds	Imported only if needed "It does not include residual 'fines' from mechanical treatment of mixed waste at transfer stations. Source materials must be: (a) properly classified as hazardous or non-hazardous (b) accurately described (characterised)"
19 12 12	Other wastes (including mixtures of materials) from the mechanical treatment of wastes other than those mentioned in 19 12 11	✓	X	Structural fill, landscaping, and bunds	Site-won materials processed by screening and/or crushing comprising bricks, tiles, concrete, ceramics, slag based materials or mixtures of materials.

Waste Code	Description	Materials Generated Onsite	Materials From External Sources	Purpose of Reuse	Comment
19 13	***Wastes from soil and groundwater remediation***				
19 13 02	Solid wastes from soil remediation other than those containing dangerous substances	✓	✓	Structural fill, landscaping, and bunds	Site won material comprising recovered made ground materials placed during STDC remediation. Imported only if needed
20	**MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS**				
20 02	**Garden and Park Wastes (Including Cemetery Waste)**				
20 02 02	Soil and stones (topsoil, peat, subsoil and stones)	X	✓	Structural fill, landscaping, and bunds	Imported only if needed. Material deposited in place of non-waste topsoil must meet the British Standard for Topsoil - BS3882:2015.

3.2 Quantity of Waste Being Used

It is anticipated the waste material will come from on site during the construction of the following activities/items:

- Piling drilling
- Excavation for the pump sumps and buried vessels secondary containment pits
- Excavation for the cooling water supply/return pipelines
- Excavation for the outfall retention and overflow ponds
- Excavation of foundations
- Temporary Construction Facilities (TCF)
- Pipeline and cable construction.

The materials from these activities are considered to originate from both remediated and un-remediated made ground.

The volume of waste being used will be a direct replacement of non-waste materials only – any surplus material generated on site will be removed via an appropriate waste management route.

In relation to the quantity of waste that would be required as a direct replacement for virgin fill materials, an initial survey of the site was completed to determine:

- The volume of materials anticipated to be generated from site construction activities;
- The volume of site-won materials that can potentially be reused;
- The volume of external waste materials that may need to be imported; and
- The volume of surplus site-won materials that will need to be managed via an appropriate offsite waste management route.

The initial calculations identify the volume of materials being generated by the construction activities is around 334,606 m^3 as shown in table 3 below.

Table 3. Maximum Anticipated Volume of Materials Generated During Construction

Excavation Into Remediated Made Ground (m^3)	Excavation Into Non-Remediated Made Ground (m^3)	Excavation Into Natural Strata (m^3)	Drill Cuttings from Piling (m^3)
260,543	47,199	9,889	16,975

It is proposed that a portion of this material will be used as follows:

Table 4. Proposed Material Reuse

Proposed Used	Material Source	Volume (m^3)	Tonnage[(b)]
Structural Backfill - HV Switchyard and construction of earth bund/landscaping	Remediated Made Ground Materials	84,619	143,852
Other structural backfill, sand for underground pipes, filling, earth dike and embankment of tank(s)	Suitable Site Won Materials[(a)]	11,849	20,143
Soil substitution/structural fill	Suitable Site Won Materials[(a)]	81,696	138,883
Road construction	Suitable Site Won Materials[(a)]	13,951	23,717
Total reuse of remediated made ground materials		**84,619**	**143,852**
Total reuse of other suitable site won materials[(a)]		**107,496**	**182,743**
Maximum amount of material reused		**192,115**	**326,596**

(a) site aims to use as much site won materials as possible with the deficit of waste material imported to site as needed from suitable external sources.

(b) Tonnage has been determined from the volume based on a density of 1.7 tonnes/m^3.

The calculations which are attached in Appendix C show that:

- the overall material to be reused is around 192,115 m^3 or around 326,596 tonnes for all construction activities as shown in Table 4 above.
- There is an anticipated surplus of site-won material which will need to be sent offsite through an appropriate waste management route. However, as site-won material has to be evaluated and is subject to risk assessment against the site conceptual model to ensure it is suitable for reuse the volume of surplus may increase or decrease. The current anticipated volume of surplus is around 142,500 m^3.

3.3 Waste Acceptance

The requirements for the waste acceptance will be defined in the written site procedure which will meet EA regulatory requirements as detailed in EA appropriate measures and WM3 guidance. Waste acceptance procedures will be subject to ongoing review and revision as appropriate. The proposed procedure is presented in Appendix E and the current version will be kept at the site and will be made available for inspection.

4. Meeting Quality Standards

4.1 General

The proposed scheme has been designed to achieve the objectives of site construction using the minimum quantity of waste materials to achieve the installation platform.

The work will be undertaken to the following general requirements:

- Management and operation in accordance with a written Construction Environmental Management Plan (CEMP) that is sufficient to ensure compliance with the conditions of its permit;
- Using sufficient competent persons and resources which includes NZTPL and/or any appointed contractor;
- The works will be undertaken in accordance with the latest Environment Agency Guidance “Control and Monitor Emissions for Your Environmental Permit”
- The placement and compaction of all engineered fill materials will be carried out in general accordance with best practice and a recognised standard; and
- NZTPL and/or its appointed contractor will maintain relevant records as appropriate to demonstrate compliance with its permit, this WRP and any associated CQA requirements specified in the permit.

4.2 Definitions

The following definitions will apply to the specifications wherever reference is made to the defined materials.

- “Suitable fill material” will comprise all that is acceptable in accordance with the specifications for use in the works and as defined in Section 3.3;
- “Unsuitable material” will mean material other than suitable materials and will include:
  - Logs stumps and perishable material;
  - Material susceptible to spontaneous combustion; and
  - any hazardous waste Materials

The proposed scheme will not result in soil erosion or increased risk of flooding and pollution will be prevented by use of waste materials accepted under the Waste Acceptance Procedure.

NZTPL will ensure that there are staff (either internally or via its appointed contractor) that are appropriately qualified to act as Site Manager or Technically Competent Person prior to the commencement of the recovery operation.

4.3 Material Testing

Prior to the Technical Team approving the materials as suitable for the recovery work, the materials will be subjected to the following testing:

- Chemical Testing – to confirm the material is acceptable in accordance with waste acceptance controls; and
- Geotechnical Testing – to confirm the material meets the minimum requirements set out in the Construction Quality Assurance (CQA) for the individual works.

Materials being stockpiled before use, will be tested to ensure that it will be suitable and there is certainty in its use.

Any material found not to be suitable for use will be removed from site via an appropriate licensed waste management route.

4.4 General Fill and Placement

NZTPL or its appointed Contractor will employ only that plant and those working methods which are suited to the materials to be handled and traversed. NZTPL or its appointed Contractor will be responsible for maintaining the nature of the suitable material so that when it is placed and compacted it remains in accordance with the specifications. Suitability will be determined in accordance with the definitions above and any specifications detailed in CQA Plans.

- Placement works will be overseen by a suitably qualified person.
- Engineered fill material will comprise only suitable material as defined in this section and Section 3.3 above.
- Suitable materials will be classified and then placed in accordance with this WRP for the recovery works. Materials will be placed and compacted in accordance with the method specification contained within MCDHW, Clause 612, Compaction of Fills.

4.5 As Built Information

As-built surveys will be carried out to confirm that the required profiles have been achieved.

4.6 Construction Quality Assurance Requirements

The Site Supervisor will:

- assess the method statement submitted by the Contractor for the reuse, placement and compaction of the materials;
- ensure that any material deemed unsuitable in accordance with the specification is removed to an area agreed with NZTPL and hence for appropriate disposal;
- monitor the works, ensuring that it is carried out in accordance with the specifications;
- ensure that all areas of non-compliance are remediated in accordance with the specifications; and
- take photographs and maintain records during the construction.

4.7 Records

Records to be collected will include the following:

- Excavation extents and depths supported by topographic survey data.
- Volumetric measures of materials excavated and removed from site.
- Volumetric measures of materials recovered on site.
- Field screening / on-site analysis of soil samples.
- Records of required backfilling and any compaction processes.
- In situ geotechnical testing of reinstated material to ensure compliance with Earthworks Specification.
- Site diary containing works observations.
- Photographic records (delegated to validating consultant).
- Waste acceptance records of material approved for reuse on site and for imported waste if used.
- Waste transfer notes for waste removed from site or for imported material accepted at site.
- Soil and groundwater sampling and accredited laboratory analysis data.

5. Waste Recovery Activities – Evidence

5.1 Introduction

The Waste Framework Directive (WFD) 2008 (2088/98/EC) (the Framework) defines waste recovery as 'any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function'. Effectively, waste recovery preserves resources through the use of waste in place of other raw materials to achieve a beneficial outcome in an environmentally sound manner.

WFD 2008 was further amended in 2018 (2018/851) to include a definition of backfilling as "any recovery operation where suitable non-hazardous waste is used for reclamation in excavated areas or for engineering in landscaping". This definition applies to the proposed recovery operation and the intended reuse of the waste in lieu of non-waste materials.

Further guidance on what the Environment Agency considers to be recovery is provided in "Waste Recovery Plans and Deposit for Recovery Activities" June 2023 whereby the Agency will consider the activity constitutes recovery when the main aim is to replace a non-waste material that the Operator would have used in the operation with a waste material that performs the same function. However, the Operator must demonstrate that use of waste in this manner meets the "substitution test" by providing relevant evidence to demonstrate the work would be progressed using non-waste such as:

- Evidence that the waste is serving a useful purpose;
- Evidence of financial gain or other worthwhile benefit by using non-waste materials;
- Evidence that funding has been secured to cover the expected cost of the work using non-waste materials;
- Evidence there is an obligation to do the work.

5.2 Evidence the Waste Is Serving a Useful Purpose

5.2.1 What Scheme of Work is Needed

The primary reason for undertaking the deposit for recovery operations is to deliver the site construction works in a manner which:

- Ensures worker and public safety;
- Minimises environmental impacts, including maximising the reuse and recycling of site-generated materials wherever practicable; and
- Uses resources effectively, efficiently and economically.

In developing the construction strategy, NZTPL has approached waste management in an integrated manner, applying the waste hierarchy where possible, including:

- Minimising the amount of waste generated; and
- Recovering and reusing suitable waste materials generated on site to achieve final levels. The importation of materials from off-site sources will only be undertaken where site-generated materials are not sufficient or not appropriate for its intended use.

5.2.2 How Will the Scheme/Waste Meet the Need

During the construction works, it is anticipated that material will be generated from:

- Excavation into remediated and non-remediated manmade soils;
- Excavation into natural soils; and
- Excavation from piling (i.e. drill cuttings)

The material types anticipated to be generated and available for reuse have been selected due to their physical similarities to the imported non-waste primary and secondary recycled aggregates they replace. These materials have already been successfully reused as part of the remediation and earthworks to create the development

platform in accordance with earthworks specifications based on Series 600 of the specification for Highways Works. Material will be tested against the Specification for Highways Works as presented in Appendix F with results assessed by a suitably qualified and experienced geotechnical engineer. Materials generated from piling are unlikely to be suitable for reuse on site although this will be confirmed through testing.

The excavated material would also need to meet to meet the chemical/environmental criteria specified as being acceptable for the proposed work. Therefore once the excavated material is analysed in accordance with waste acceptance criteria and confirmed to be within the prescribed limits, the materials will be considered to be suitable for re-use.

The combined works will assist in achieving a final development platform which facilitates installation construction.

5.2.3 Benefit

The proposed approach of using recovered waste soils to substitute for natural resources/virgin materials in delivering work which NZTPL is obligated to undertake will achieve a beneficial outcome in an environmentally sound manner, and provides benefits through:

- Protecting natural resources by minimising the demand for virgin materials;
- Moving waste up the waste hierarchy and minimising the use of finite landfill capacity through DfR which puts suitable waste to use; and
- Providing for low carbon material selection by using waste as opposed to virgin materials and avoiding the need to dispose of waste materials. This aligns with the low carbon aim of the project.

The proposed scheme therefore provides a long term, environmentally sustainable solution with improved management techniques to ensure site compliance during the aftercare period.

5.3 Evidence of Financial Gain or Other Worthwhile Benefit

5.3.1 Financial Gain

The ultimate purpose of undertaking the proposed recovery operations (see Section 2.3) is to facilitate the construction of the new NZT CCUS Project. The project is being funded by the project partners and Financial Statements projected to 2040 have been prepared which detail:

- the CAPEX requirements for the 2024 – 2029 period including the construction, preparation and supervision costs along with land acquisition costs; and
- the OPEX costs from the year 2029 when the plant becomes operational to 2040.

The financial summary information for the project from the Financial Statements is presented in Appendix J.

Proceeding using only non-waste materials, the CAPEX would need to include:

- disposal costs for removing all excavated materials from site including excavation, stockpiling, haulage, landfill gate fees and landfill tax; and
- cost for the purchase, haulage and use of the required imported non-waste materials .

The cost of proceeding using non-waste materials is also presented in Appendix J and this shows:

- The use of non-waste materials would be off set against the contingency the project development is carrying..
- The cost of using non-waste is covered by the base CAPEX
- The project would remain financially viable and make a profit.

5.3.2 Other Worthwhile Benefit

In addition, to the financial benefits set out above, delivery of the proposed recovery activity provides other worthwhile benefits in respect of:

- Reducing the amount of non-waste materials required by NZTPL to deliver its obligations under the project, thus conserving valuable reserves of virgin materials which is in line with the Goal 5 of the DEFRA 25-year Environment Plan (25-YEP) of “using resources sustainably and efficiently”;

- Reducing transportation for removal of excavated material from site and import of virgin materials and minimising the impact on the surrounding road network and associated carbon impact. If the maximum amount (see Table 4) of site won material is reused, then this would avoid around 17,290 movements of this material to a disposal facility and an equivalent number of movements of imported non-waste material. This is in accord with Goal 1 and Goal 7 of the DEFRA 25-YEP which respectively involve "achieving a reduction of 5 damaging air pollutants" and "mitigating and adapting to climate change
- Reducing off-site disposal of excavated material from a historical industrial site and reducing impact on local waste infrastructure and landfill
- Moving waste up the waste hierarchy in line with the Waste Regulations 2011, as amended, and the Waste and Resource Strategy 2018 objective of "*managing waste in the most appropriate way to ensure that environmental impacts are minimised, and that the resource value extracted is maximised*."; and,
- Providing for a low-carbon material selection, as opposed to using virgin materials which will not.

5.4 Evidence of Secured Funding

The development programme will be funded primarily through external financing. The Project Partners and Applicants are working with a variety of financial institutions and advisors to secure funding and have extensive experience of financing major capital projects.

Appendix J gives details of the CAPEX spend associated with the project and the financial model presented to demonstrate Financial Gain integrates these financing costs (including interest).

The DCO funding statement provided in Appendix H provides further evidence to demonstrate that the Applicants have the ability to procure the financial resources necessary to fund the works. It should be noted that since the DCO was first submitted in 2021 the estimated costs of the development have increased and therefore an updated estimate of the total CAPEX has been provided in Appendix J.

5.5 Evidence of an Obligation To Do the Work

5.5.1 Need for the Facility

The need for new energy infrastructure is defined in several UK Government Strategy and Policy documents (see Appendix H for the detailed review presented in the DCO Application) including in the National Infrastructure Plan which was published by the Conservative/ Liberal Democrat Coalition Government in December 2014 (the 'NIP 14'). The NIP 14 sets out an ambitious vision for the UK's infrastructure, reinforcing the government commitment to investing in infrastructure and improving its quality and performance.

Chapters 3 to 13 of the NIP 14 deal with different infrastructure sectors. Chapter 8 covers 'Energy'. It reports on the progress made since 2010, with 20 GW of new electricity capacity created (enough for 23 million homes), much of it being low carbon or renewable. However, a key objective of the NIP 14 in terms of energy investment (paragraph 8.1) is to "…*reduce carbon emissions in order to mitigate climate change and meet legally binding targets."*

Paragraph 8.3 states that large-scale investment in gas and low-carbon electricity generation is vital in order to replace ageing energy infrastructure, maintain secure energy supplies and meet legally binding environmental targets. Around £100 billion of investment is estimated to be required in electricity generation and networks by 2020. Paragraph 8.5 continues: "As legacy coal, gas and nuclear power stations come offline, they will increasingly be replaced with a combination of renewable energy, new nuclear power and fossil fuel power stations fitted with Carbon Capture and Storage (CCS) technology. New gas plant is also needed as a vital backup for less flexible renewable generation and to ensure that the system can meet peak electricity demand. Demand for gas to supply heat to homes and businesses will also remain significant for some time to come." [underlining added]

At paragraph 8.28 the NIP 14 sets out the Government's Top 40 'Priority Investments' to support its objectives for the energy sector. Alongside increased generation from renewables and new nuclear these include more electricity generation from gas and the deployment of carbon capture and storage.

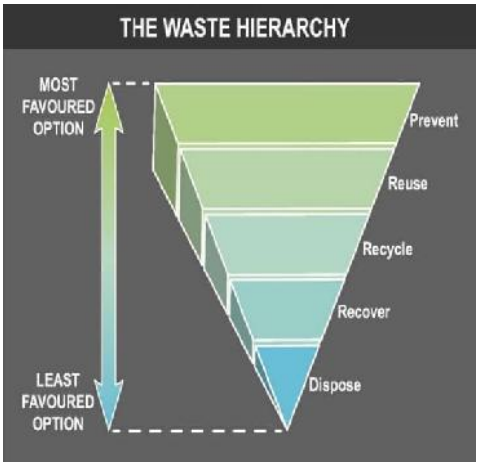
The NIP 14 therefore recognises the continuing need for new low carbon gas fired power stations to provide back-up to less flexible renewable generation. The provision of such infrastructure is critical to ensuring that the National Grid can meet peak electricity demand as the amount of renewable generation increases.

NZT will be the UK's first commercial scale, full chain Carbon Capture, Usage and Storage (CCUS) project, and will initially capture up to 4 million tonnes of carbon dioxide (CO2) emissions per annum, the equivalent to the annual energy use of over 1 million homes in the UK. The NZT project will therefore contribute to the delivery of the NIP 14 and in particular the objectives for the energy sector, including the deployment of new low carbon gas-fired power stations fitted with CCS technology which in turn will make a significant contribution toward the UK reaching its net zero greenhouse gas emissions target by 2050.

5.5.2 Obligations Under Waste Regulations 2011

Revisions to the Waste Framework Directive have been implemented in England and Wales through the Waste (England and Wales) Regulations 2011 and ancillary legislation in Wales, which were both introduced in April 2011. These regulations place an obligation on businesses such as NZTPL to:

- Confirm that they have applied the waste management hierarchy when transferring waste and to include a declaration on their waste transfer note (WTN) or consignment note;
- Take all reasonable measures to apply the following waste hierarchy:



- To seek to recover at least 70% by weight of non-hazardous construction and demolition (C&D) waste.

Reuse of site won materials to effectively 'backfill' excavated areas or use for engineering or landscaping purposes effectively discharge's NZTPL's legal requirements under the Waste Regulations.

5.5.3 Obligations Under Development Consent Order

In relation to the DfR activity, the construction works relates to Work Package No 1 covering the construction of the main NZT power plant, carbon capture plant (CCP) and associated electrical substation as defined in the DCO. The Net Zero Teesside Order 2024 (Appendix D) came into force on 11th March 2024 and is legally binding once development of the facility commences, It sets out the:

- Principal Powers of the consent order in Part 2, Condition 4 (1) which states that "*Subject to the provisions of this Order and to the Requirements, NZT Power is granted development consent for Project A to be carried out within the Order Limits*". Where Part 1, Condition 2, states that 'Project A' means the development described in Schedule 1 except Work Nos. 6, 7 and 8.
- Authorised Development defined at Schedule 1 which states that "*In the Borough of Redcar and Cleveland and the Borough of Stockton on Tees a nationally significant infrastructure project as defined in sections 14(1)(a) and 15 of the 2008 Act, and development which is to be treated as development for which development consent is required under sections 35(1) and 35ZA of that Act, and associated development under section 115(1)(b) of that Act, comprising:*

  Work No 1 – *an electricity generating station fuelled by natural gas and with a gross output capacity of up to 860 megawatts (MWe) comprising:*

  a. Work No. 1A – a combined cycle gas turbine plant comprising-

  I. A gas turbine;
  II. A steam turbine;
  III. A heat recovery steam generator (HRSG);

IV. *Gas and steam turbine buildings;*
V. *Gas turbine air intake filters;*
VI. *Selective catalytic reduction equipment;*
VII. *HRSG stack;*
VIII. *A transformer;*
IX. *Deaerator and feed water pump buildings;*
X. *Chemical sampling/dosing plant;*
XI. *Demineralised water treatment plant, including storage tanks;*
XII. *Electrical substation, including electrical equipment, buildings and enclosures;*
XIII. *Gas reception facility including gas supply pipeline connection works, gas receiving area, gas pipeline internal gauge receiver for pipe inspection, emergency shutdown valves, gas vents and gas metering and pressure reduction equipment;*
XIV. *Auxiliary boiler and emissions stack; and*
XV. *Continuous emissions monitoring system.*

b. *Work No. 1B – CCGT and CCP cooling and utilities infrastructure comprising –*

I. *Mechanical draft cooling towers;*
II. *Cooling water pumps, plant and buildings;*
III. *Cooling water dosing and sampling plant and buildings;*
IV. *Standby diesel generator and emissions stack;*
V. *Diesel fuel storage tanks and unloading area;*
VI. *Fire and raw water storage tanks;*
VII. *Chemical storage facilities;*
VIII. *Wastewater treatment plant and building; and*
IX. *Effluent. Stormwater and firewater retention ponds.*

c. *Work No 1C – CCP comprising –*

I. *Flue gas pre-treatment plant and blower;*
II. *Carbon dioxide adsorption column and associated stack;*
III. *Carbon dioxide stripper and solvent regenerator;*
IV. *Carbon dioxide conditioning and compression equipment; and*
V. *Ancillary equipment, including pumps, chemical storage, eater washing equipment, acid washing equipment and pipework.*

d. *Work No 1D – administration, control room and stores, comprising -*

I. *Administration and control buildings; and*
II. *Workshop and stores buildings.*

e. *Work No 1E – ancillary works in connection with Work Nos. 1A, 1B, 1C and 1D –*

I. *ancillary plant, buildings, enclosures and structures;*
II. *pipework, pipe runs and pipe racks;*
III. *firefighting equipment, buildings and distribution pipework;*
IV. *lubrication oils storage facilities;*
V. *permanent plant laydown area for operation and maintenance activities; and*
VI. *mechanical, electrical, gas, telecommunications and water networks, pipework, cables, racks, infrastructure, instrumentation and utilities, including connections between Work Nos. 1A, 1B, 1C and 1D and parts of Works Nos. 2A, 3, 4, 5, 6, 7 and 8.*

- the requirements to be met in Schedule 2 to be met once development commences. sets out specific measures that must be addressed and of particular relevance to the DfR activity is:

  a. Condition 16 requires that a CEMP for the approved works must be submitted and approved in accordance with the Framework CEMP that was approved as part of the DCO application. The Framework CEMP requires the inclusion of details relating to the management of soil, sediment, hazardous and non-hazardous materials during construction and this Waste Recovery Plan will be included to help discharge these requirements.

     The Framework CEMP also requires that all reasonable measures are taken to apply the waste hierarchy in respect of managing such excavated materials and sets out:

     - All spoil will be processed and managed in accordance with The Waste (England and Wales) Regulations 2011 (as amended) and spoil will be beneficially used onsite where possible to minimise the amount of spoil that requires treatment or disposing of offsite

- Excavation materials will be sampled and will be managed in accordance with the Site Waste Management Plan (SWMP) and a Material Management Plan (MMP). Construction will utilise excavation arisings where these are geotechnically or chemically suitable.

b. In addition Condition 24 of the DCO requires that a SWMP for the approved works must be submitted and approved in accordance with the Framework SWMP that was approved as part of the DCO application. The Framework SWMP requires that:

- waste materials are handled in a manner that complies with the Waste Regulations 2011, as amended including the application of the waste hierarchy; and
- where possible, excavated earthworks materials and soils arising from the Project will be stockpiled on-site and reused within the Project.

Therefore the proposed reuse of site won materials to effectively 'backfill' excavated areas or use for engineering or landscaping purposes effectively discharge's NZTPL's obligation to manage such material in accordance with its Framework CEMP and SWMP requirement and their legal requirements under the Waste Regulations.

5.6 Conclusion

While there is no specific obligation to build the facility, it's construction and operation will contribute to the delivery of the NIP 14 and in particular the objectives for the energy sector, including the deployment of new low carbon gas-fired power stations fitted with CCS technology which in turn will make a significant contribution toward the UK reaching its net zero greenhouse gas emissions target by 2050.

Once development has commenced, NZTPL will have a broad obligation to ensure that the NZT facility is constructed in accordance with the principal powers and authorised development as detailed in Part 2 and Schedule 1 of the Net Zero Teesside Order 2024 (Appendix D). As well as general obligations to ensure that the NZT facility is constructed in accordance with the Framework CEMP and SWMP as detailed Schedule 2 of the DCO which in turn will define the standards to be delivered during construction and thus delivery of the DfR activities.

In developing the approach to construction management to meet the requirements of the DCO, NZTPL will approach waste management in an integrated manner, applying the waste hierarchy where possible, including:

- Minimising the amount of waste generated; and
- Recovering and reusing suitable excavated waste materials generated on site during the preparation of the development platforms for infrastructure (which must be constructed to facilitate the wider facility construction). The importation of materials from off-site sources will only be undertaken where site-generated materials are not sufficient in amount or suitable for the intended purpose.

This approach aligns with Government policies and with regulatory requirements to deliver the general obligations of the application of the waste hierarchy, to meet the legal obligations on waste producers of the Waste Regulations 2011, as amended and relevant Government environmental strategy.

The proposed approach of using site-generated waste (or where necessary appropriate imported wastes) to substitute for natural resources/virgin materials in delivering work which NZTPL will also achieve a beneficial outcome in an environmentally sound manner, and provides other worthwhile benefits through:

- Reducing emissions associated with transport movements from exporting waste and importing virgin materials to achieve the development platform. As outlined in Section 5.3.2 above, if all identified suitable site-won materials were realised this would avoid in excess of 17,000 transport movements associated with waste export and an equivalent number of virgin material imports;
- Protecting natural resources by minimising the demand for virgin materials; and
- Providing for low carbon material selection by using waste as opposed to virgin materials.

On the above basis, the proposed disposal for recovery activity is considered to meet the definition of recovery operations.

6. Monitoring

6.1 Gas Monitoring

Based on our current knowledge we do not believe that there will be a gas risk. We will supply a gas risk assessment with the permit application.

6.2 Other Monitoring

In relation to other monitoring at the site, it is anticipated that this will include:

- Monitoring in accordance with the approved CEMP during placement of materials;
- Site checks and visual inspections at a frequency appropriate to the phase of activity; and
- Surface water and groundwater monitoring as determined through the development of the site conceptual model and hydrogeological risk assessment which will support the permit application. The proposed monitoring regime will be detailed in the permit application and will where appropriate link with the monitoring regime proposed under the new NZT Installation environmental permit.

7. Overall Conclusion

Based on the evidence presented in section 5 above, the proposed recovery activities using selected non-hazardous waste materials to support the construction of the NZT site is considered to be a waste recovery rather than a waste disposal activity as the work would still be required to be undertaken with non-waste materials if waste was not available/permitted.

Only waste covered by EWC Codes approved by the regulator will be accepted in accordance with NZTPL Waste Acceptance Procedures and records will be retained of the volume and nature of the materials used.

The proposed recovery activities will be undertaken to an appropriate standard using an engineering specification by NZNSLL or its appointed reputable contractor and will be designed to achieve the stated benefit, be built to last, not cause soil erosion or pollution. Appropriate monitoring will be in place to demonstrate the relevant standards have been met.

The waste recovery operations would be carried out under a Tier 3 bespoke permit.

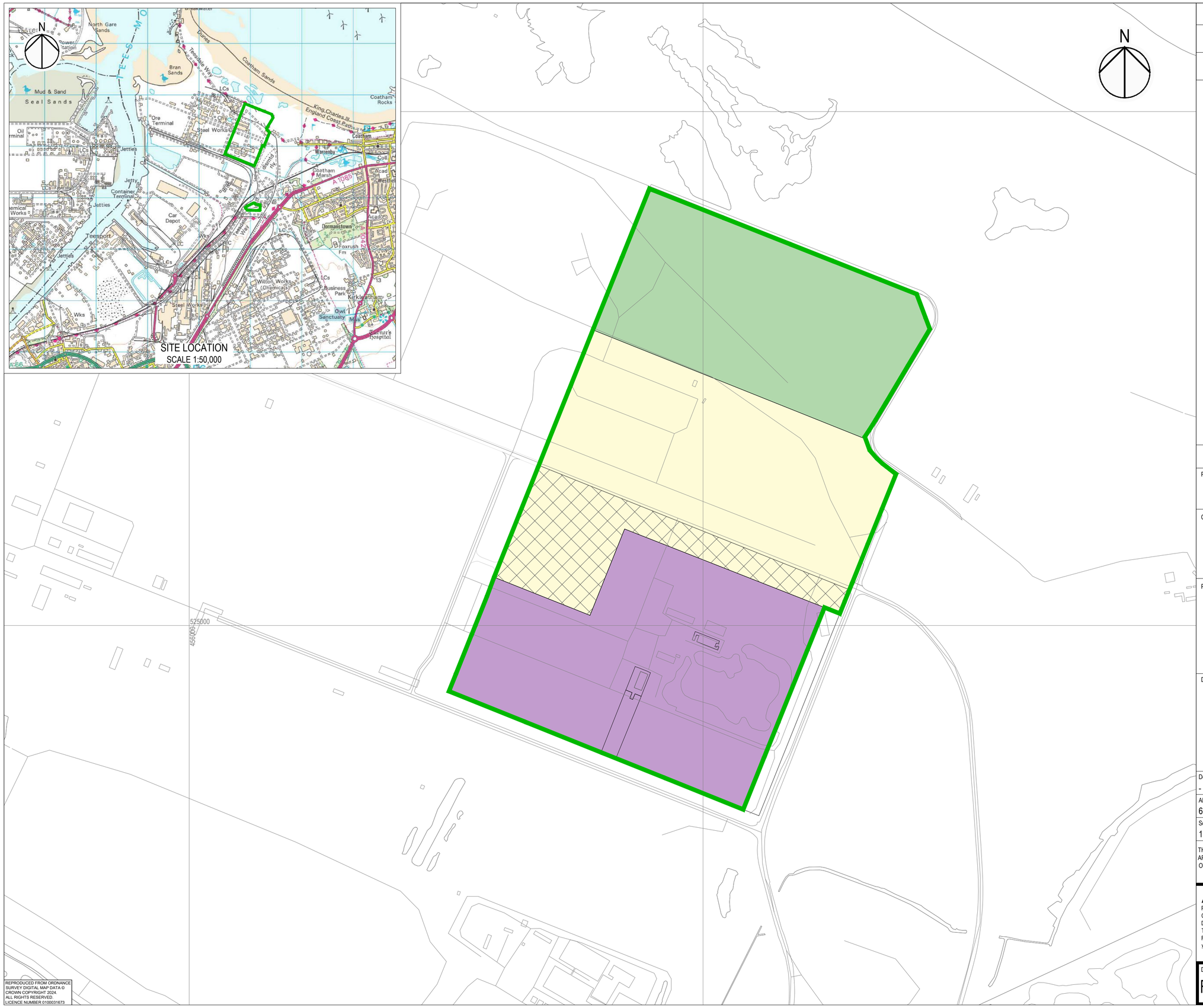
Appendix A Drawings and Plans

A.1 Site Location and Installation Boundary Plan

A.2 Final PCC layout from DCO

A.3 Cross Sections

SITE LOCATION
SCALE 1:50,000



SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION BOX

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THIS DRAWING IS TO BE USED ONLY FOR THE PURPOSE OF ISSUE THAT IT WAS ISSUED FOR AND IS SUBJECT TO AMENDMENT.

KEY

- INSTALLATION BOUNDARY
- MAIN SITE BOUNDARY - PERMANENT LAND (G&C)
- MAIN SITE BOUNDARY - PERMANENT LAND (T&S AND G&C)
- TEMPORARY/EXPANSION LAND (T&S AND G&C)
- T&S RECONFIGURATION LAND

Revision Details	By / Check	Date	Suffix

Purpose of issue

PERMIT APPLICATION

Client

Net Zero Teesside

Project Title

NET ZERO TEESSIDE

Drawing Title

INSTALLATION BOUNDARY AND SITE LOCATION PLAN

Designed	Drawn	Checked	Approved	Date
-	AO	AG	AG	05/24

AECOM Internal Project No.	Suitability
60689030	-
Scale @ A3	Zone
1:5,000	-

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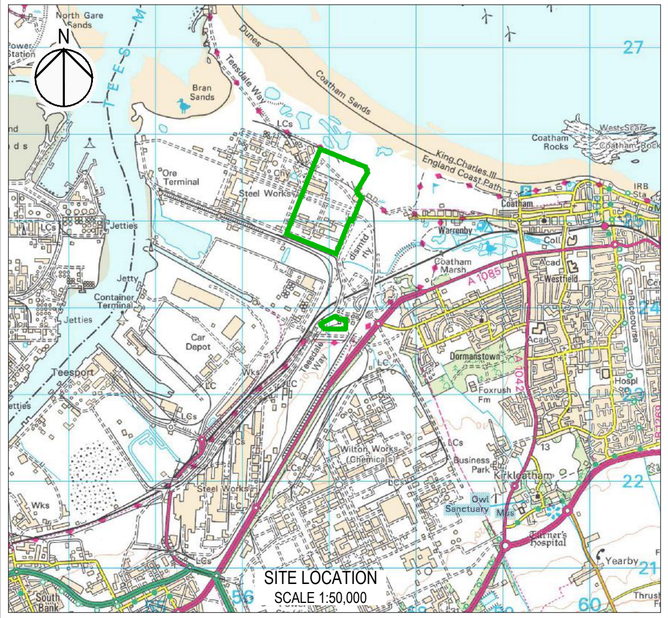
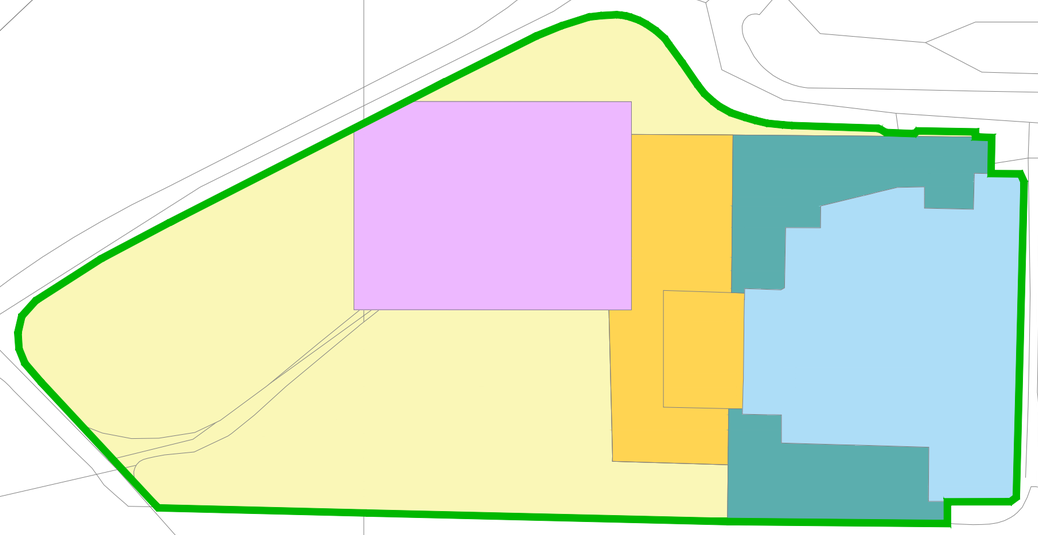
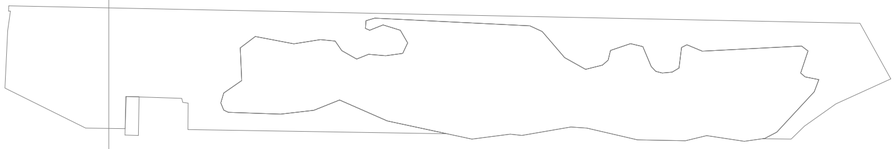
Drawing Number	Rev
FIGURE 1	-



SITE LOCATION
SCALE 1:50,000





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KEY

- INSTALLATION BOUNDARY
- TEMPORARY CONSTRUCTION LAND
- EXISTING NATIONAL GRID TOD POINT SUBSTATION
- NATIONAL GRID TOD POINT SUBSTATION EXTENSION
- TOD POINT NZT SUBSTATION CABLE LAND
- NEW NZT TOD POINT SUBSTATION

Revision Details	By / Check	Date	Suffix

Purpose of issue

PERMIT APPLICATION

Client

Net Zero Teesside

Project Title

NET ZERO TEESSIDE

Drawing Title

INSTALLATION BOUNDARY AND SITE LOCATION PLAN

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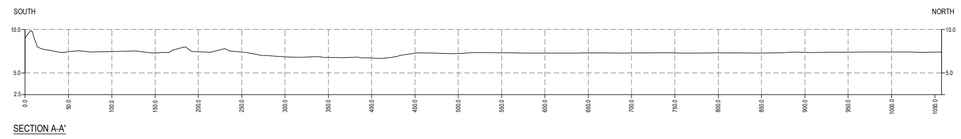
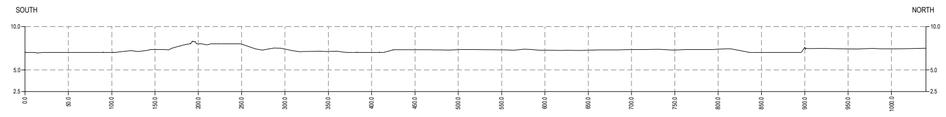
FIGURE 2	-

PLAN
SCALE 1:5,000



SECTION A-A'



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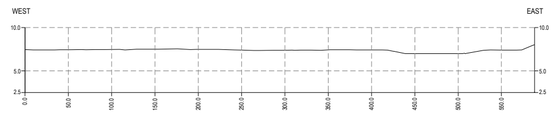
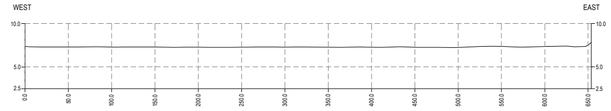


SECTION C-C



SECTION D-D'

SECTION E-E'

SECTIONS
SCALE H1:5,000 V1:500

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THIS DRAWING WAS COMMISSIONED FOR WASTE RECOVERY PLAN. THIS DRAWING IS ONLY TO BE USED FOR THE PURPOSE IT WAS ISSUED FOR, AND IS SUBJECT TO AMENDMENT.
NOT TO BE USED FOR ANY OTHER PURPOSE

KEY

- SITE BOUNDARY
- DEVELOPMENT SITE
- CONSTRUCTION LAYDOWN AREA

NOTES

1. DATA SOURCE: OCTOBER 2024 DRONE SURVEY. ADDITIONAL EARTHWORKS HAVE SINCE OCCURRED AND ANY AREAS OF DEVELOPMENT SITE WHICH WERE LOWER HAVE SINCE BEEN RAISED TO 7.3mAOD +- 0.1m. CONSTRUCTION LAYDOWN AREA HAS BEEN LEVELLED.
2. CONTOURS AT 1m.

Revision Details	By / Check	Date	Suffix

Purpose of issue

FOR INFORMATION

Client

NZT NZT Power Limited

Project Title

NET ZERO TEESSIDE

Drawing Title

MAIN SITE
EXISTING LEVELS

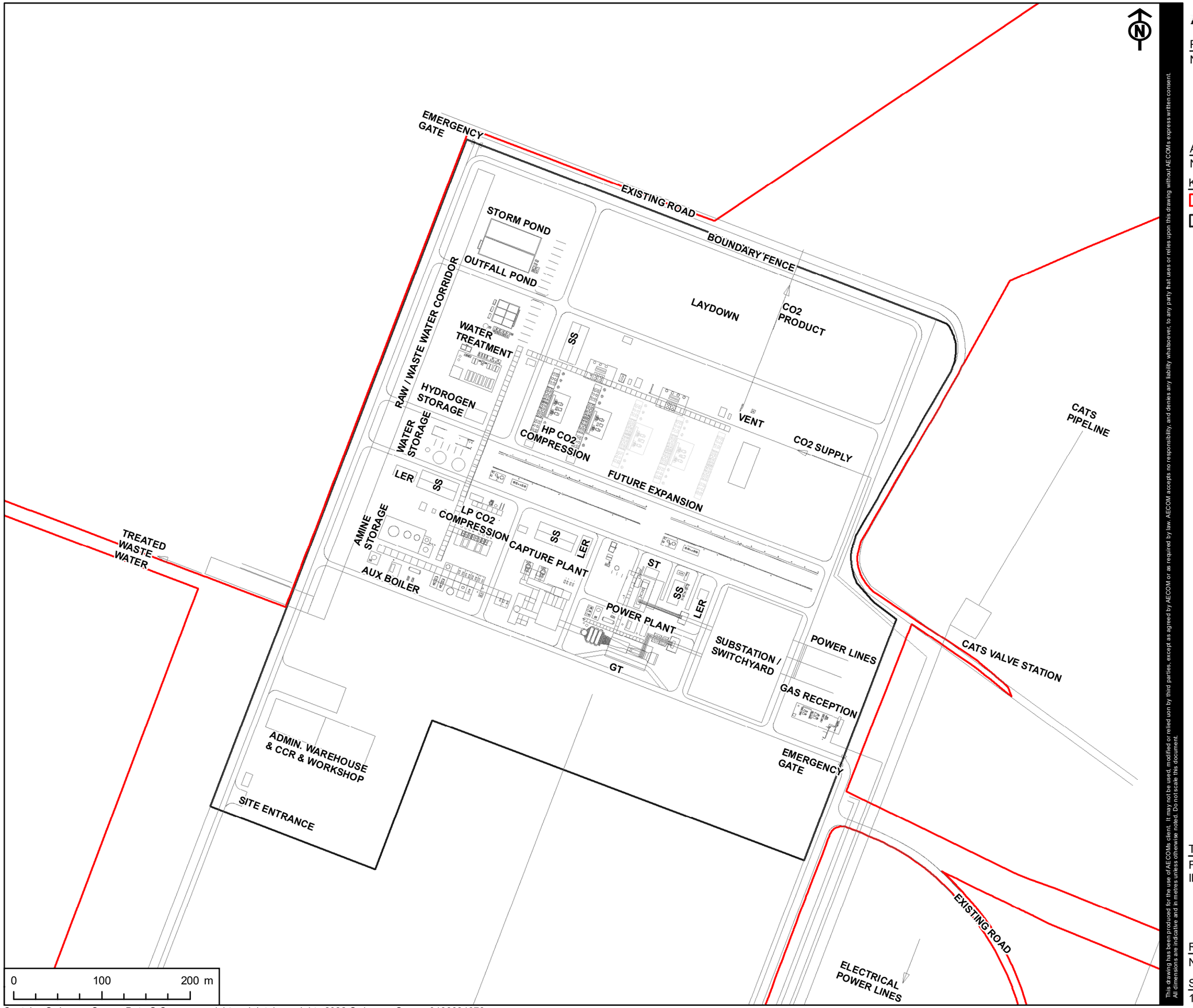
Designed	Drawn	Checked	Approved	Date
-	AO	AG	AG	12/24

AECOM Internal Project No.	Suitability
60675797	-
Scale @ A3	Zone
1:5,000	-

AECOM
Royal Court, Basil Close
Chesterfield
Derbyshire. S41 7SL
Telephone. (01246) 209221
Fax. (01246) 209229
www.aecom.com

Drawing Number	Rev
FIGURE 03	-

Project Management Initials: RL Designer: LC Checked: AR Approved: IC



Scale @ A3 1:4,000

AECOM

PROJECT
NET ZERO TEESSIDE PROJECT

Net Zero Teesside

APPLICANTS
NZT POWER LTD. AND NZNS STORAGE LTD.

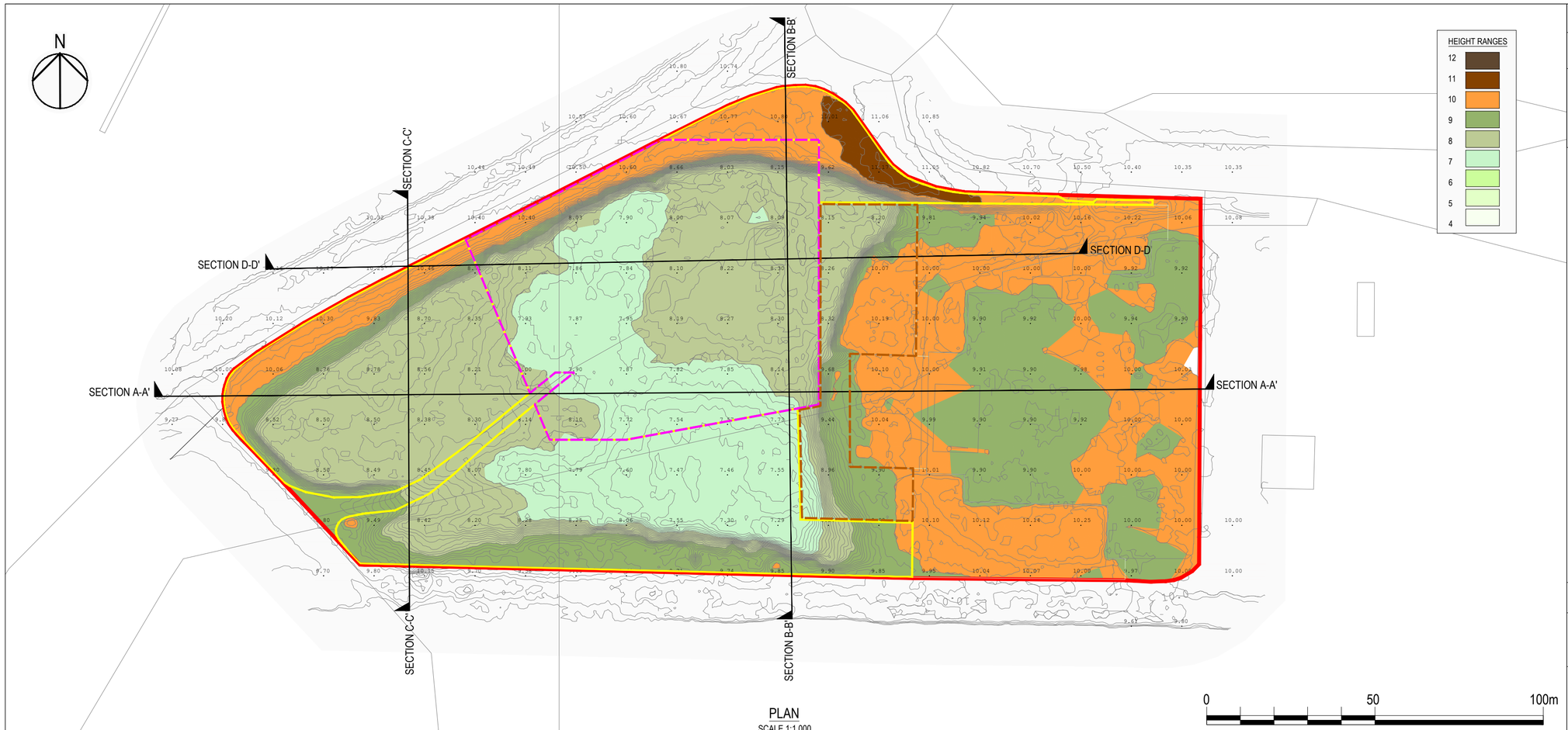
KEY
- Site Boundary
- Power, Capture and Compressor Site

TITLE
FIGURE 4-1
INDICATIVE PCC SITE LAYOUT

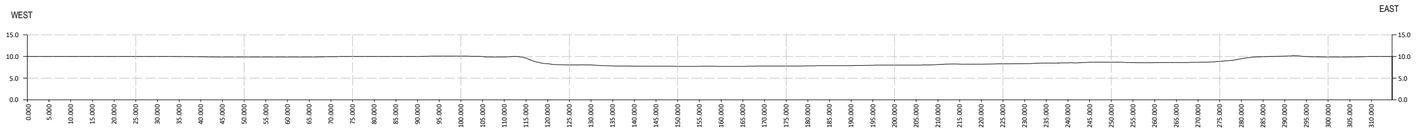
REFERENCE
NZT_221025_ES_4-1_v5

SHEET NUMBER
1 of 1

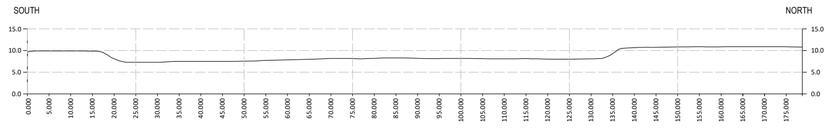
DATE
25/10/2022



PLAN
SCALE 1:1,000



SECTION A-A'



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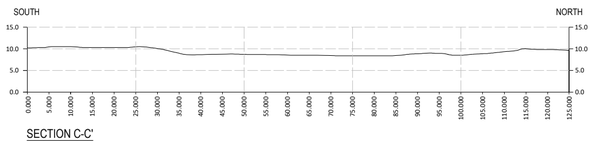
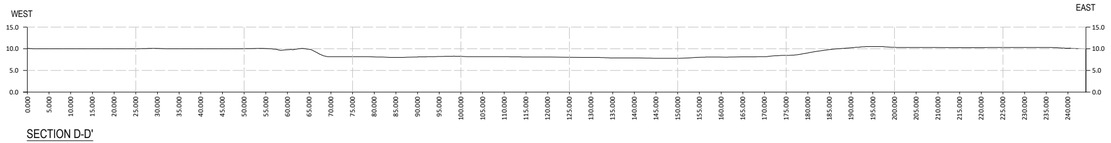


SECTION C-C'



SECTION D-D'

SCALE 1:1,000

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION BOX

IT IS ASSUMED THAT ALL WORKS ON THIS DRAWING WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROPRIATE METHOD STATEMENT.

THIS DRAWING WAS COMMISSIONED FOR WASTE RECOVERY PLAN. THIS DRAWING IS ONLY TO BE USED FOR THE PURPOSE IT WAS ISSUED FOR, AND IS SUBJECT TO AMENDMENT.
NOT TO BE USED FOR ANY OTHER PURPOSE

KEY

- SITE BOUNDARY
- NEW NZT TOD POINT SUBSTATION BOUNDARY
- TEMPORARY CONSTRUCTION LAND BOUNDARY
- TOD POINT NZT SUBSTATION CABLE LAND BOUNDARY

NOTES
1. DATA SOURCE: LIDAR DATA.
2. SURVEY LEVELS AS OF AUGUST 2024.
3. CONTOURS AT 1m.

Revision Details	By / Check	Date	Suffix

Purpose of issue

FOR INFORMATION

Client

NZT Power Limited

Project Title

NET ZERO TEESSIDE

Drawing Title

TOD POINT SITE
EXISTING LEVELS

Designed	Drawn	Checked	Approved	Date
-	AO	AG	AG	12/24

AECOM Internal Project No.	Suitability
60675797	-
Scale @ A3	Zone
1:1,000	-

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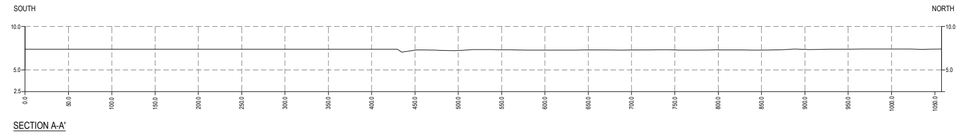
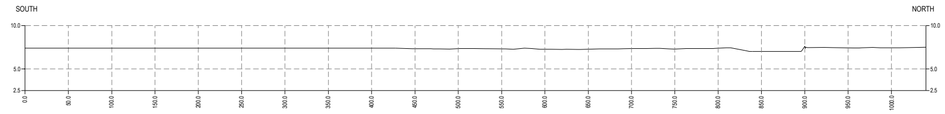
Drawing Number	Rev
FIGURE 04	-

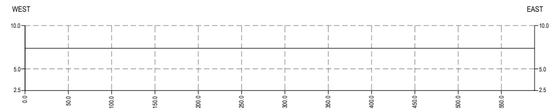
PLAN
SCALE 1:5,000



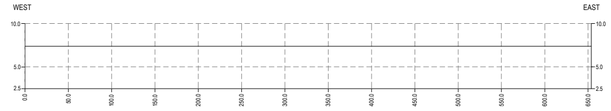
SECTION A-A'



SECTION B-B'



SECTION C-C



SECTION D-D'

SECTION E-E'

SECTIONS
SCALE H1:5,000 V1:500

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION BOX

IT IS ASSUMED THAT ALL WORKS ON THIS DRAWING WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROPRIATE METHOD STATEMENT.

THIS DRAWING WAS COMMISSIONED FOR WASTE RECOVERY PLAN. THIS DRAWING IS ONLY TO BE USED FOR THE PURPOSE IT WAS ISSUED FOR, AND IS SUBJECT TO AMENDMENT.
NOT TO BE USED FOR ANY OTHER PURPOSE

KEY

- SITE BOUNDARY
- DEVELOPMENT SITE
- CONSTRUCTION LAYDOWN AREA

NOTES

1. DATA SOURCE: OCTOBER 2024 DRONE SURVEY. ADDITIONAL EARTHWORKS HAVE SINCE OCCURRED AND ANY AREAS OF DEVELOPMENT SITE WHICH WERE LOWER HAVE SINCE BEEN RAISED TO 7.3mAOD +- 0.1m. CONSTRUCTION LAYDOWN AREA HAS BEEN LEVELLED.
2. CONTOURS AT 1m.
3. FOLLOWING RECOVERY DEVELOPMEMT SITE WILL BE AT 7.3m AOD +-0.1m. RECOVERY OPERATIONS MAY LOCALLY RAISE LAND TO ABOVE 7.3m AOD UNDER SPECIFIC ROAD / HARDSTANDING.

Revision Details	By / Check	Date	Suffix

Purpose of issue

FOR INFORMATION

Client

NZT Power Limited

Project Title

NET ZERO TEESSIDE

Drawing Title

MAIN SITE
POST RECOVERY LEVELS

Designed	Drawn	Checked	Approved	Date
-	AO	AG	AG	01/25

AECOM Internal Project No.	Suitability
60675797	-
Scale @ A3	Zone
1:5,000	-

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Derbyshire. S41 7SL
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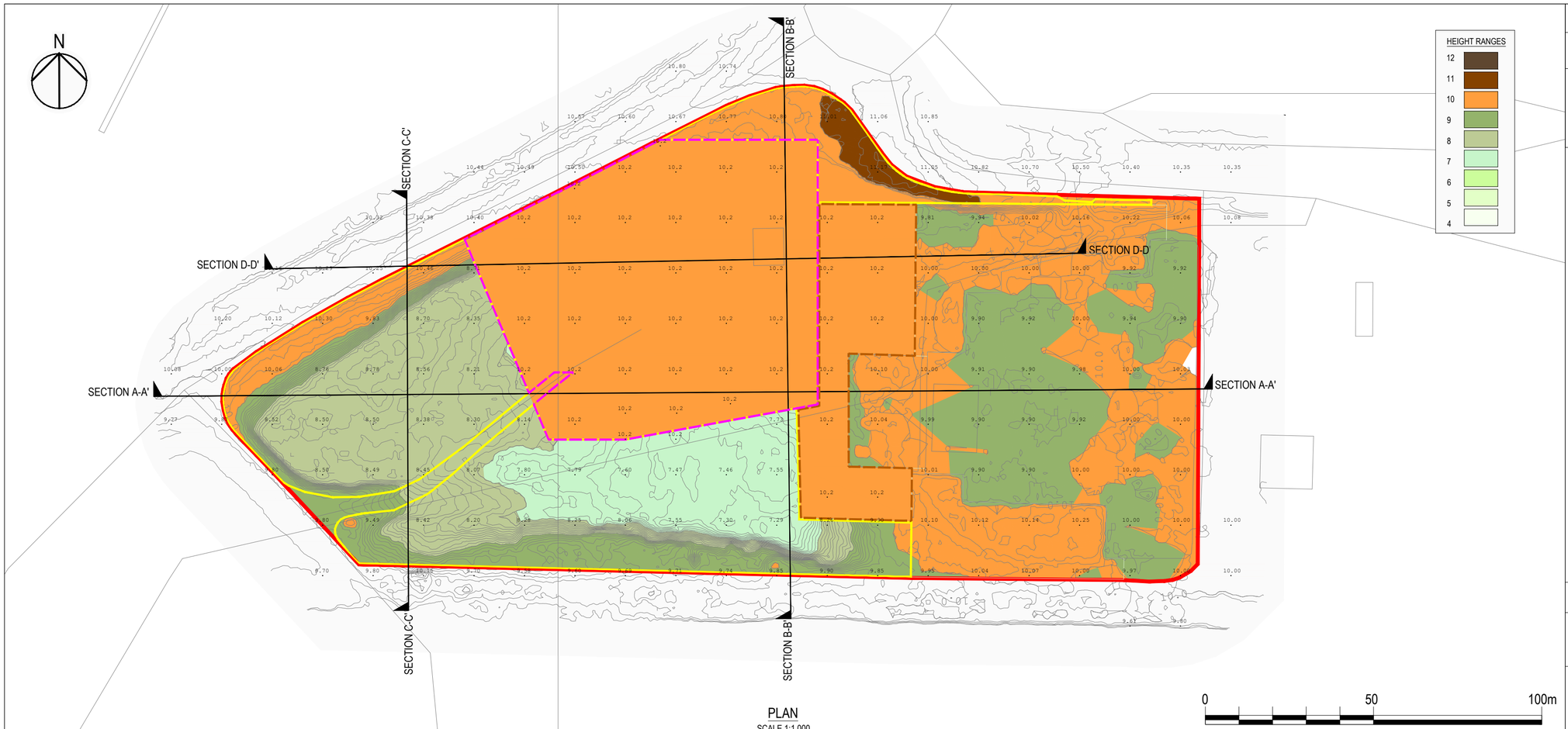
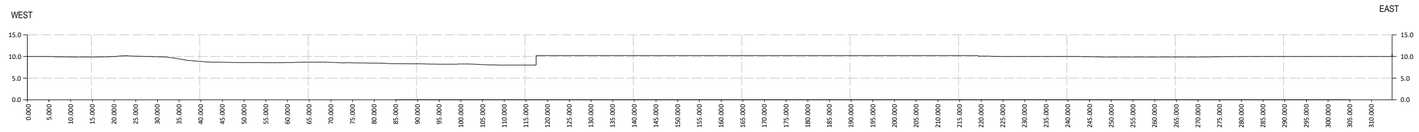
www.aecom.com

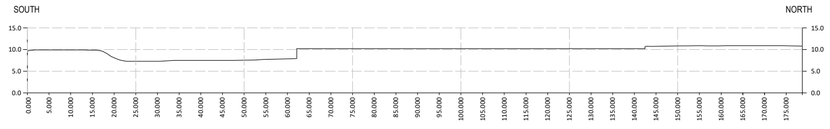
Drawing Number	Rev
FIGURE 05	-



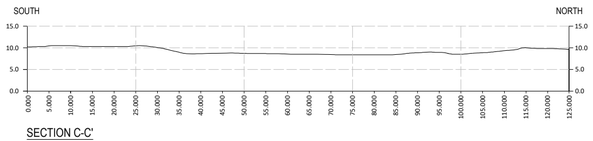
PLAN
SCALE 1:1,000



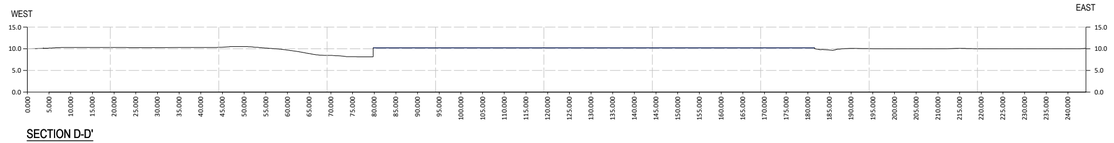
SECTION A-A'



SECTION B-B'



SECTION C-C'



SECTION D-D'

SCALE 1:1,000

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION BOX

IT IS ASSUMED THAT ALL WORKS ON THIS DRAWING WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROPRIATE METHOD STATEMENT.

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NOT TO BE USED FOR ANY OTHER PURPOSE

KEY

- SITE BOUNDARY
- NEW NZT TOD POINT SUBSTATION BOUNDARY
- TEMPORARY CONSTRUCTION LAND BOUNDARY
- TOD POINT NZT SUBSTATION CABLE LAND BOUNDARY

NOTES

1. DATA SOURCE: LIDAR DATA.
2. SURVEY LEVELS AS OF AUGUST 2024.
3. CONTOURS AT 1m.
4. DETAILED DESIGN OF SLOPES BETWEEN RAISED AND EXISTING LAND IS ONGOING. CURRENTLY SHOWN AS A VERTICAL FEATURE, BUT DESIGN COULD INCLUDE A 1 IN 3 OR STEEPER SLOPE OR A VERTICAL FEATURE.

Revision Details	By / Check	Date	Suffix

Purpose of issue

FOR INFORMATION

Client

NZT Power Limited

Project Title

NET ZERO TEESSIDE

Drawing Title

TOD POINT SITE
POST RECOVERY LEVELS

Designed	Drawn	Checked	Approved	Date
-	AO	AG	AG	01/25

AECOM Internal Project No.	Suitability
60675797	-
Scale @ A3	Zone
1:1,000	-

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Drawing Number	Rev
FIGURE 06	-

AECOM

PROJECT

NET ZERO TEESSIDE
FEED ONSHORE
GROUND INVESTIGATION

CLIENT

bp

CONSULTANT

AECOM Limited
Aldgate Tower
2 Leman Street
London E1 8FA, United Kingdom
www.aecom.com

LEGEND

FEED GI Locations
- Sample Location
- Sonic + Rotary Coring
- Trial Pit

Pre-FEED GI Locations
- CPTu
- Trial Pit
- Borehole

Historic GI Locations
- Borehole
- Trial Pit
- Section Lines

Site Boundaries
- Extension
- Main Site

NOTES

1. DO NOT SCALE FROM THIS DRAWING.
2. THIS FIGURE SHOULD BE READ IN CONJUNCTION WITH THE FOLLOWING GEOTECHNICAL REPORT: FEED ONSHORE GROUND INVESTIGATION FOR NET ZERO TEESSIDE, GROUND INVESTIGATION REPORT, AECOM, 2022.
3. ALL DIMENSIONS IN METRES (m) AND ALL ELEVATIONS/LEVELS IN METRES RELATIVE TO ORDNANCE DATUM (mOD) UNLESS NOTED OTHERWISE.
4. GROUND SURFACE SHOWN DERIVED FROM ENVIRONMENT AGENCY LIDAR DATA 2020. MODIFICATIONS TO THE GROUND ELEVATION SINCE THE LIDAR WAS ACQUIRED WILL NOT BE REPRESENTED.
5. THE GROUND INVESTIGATION (GI) DATA IS DISPLAYED FROM THE FOLLOWING FACTUAL REPORTS AND CORRESPONDING DIGITAL DATA PROVIDED IN AGS FILES:
- HISTORICAL GI DATA: ALLIED EXPLORATION & GEOTECHNICS LTD. THE FORMER SSI STEELWORKS, REDCAR – GROUND INVESTIGATION CONTRACT, FINAL FACTUAL REPORT, CONTRACT NO. 4153 & 4154 (AREA A), JUNE 2018.
- PRE-FEED GI DATA: ALLIED EXPLORATION & GEOTECHNICS LTD. PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NET ZERO TEESSIDE (NZT), FINAL FACTUAL REPORT, CONTRACT NO. 4339, DECEMBER 2021.
- FEED GI DATA: AECOM, NET ZERO TEESSIDE ONSHORE GROUND INVESTIGATION – FRONT END ENGINEERING DESIGN (FEED), GROUND INVESTIGATION FACTUAL REPORT, PROJECT NO. 60678042, NOVEMBER 2022.

6. EXPLORATORY HOLE AND SECTION LINE LOCATIONS SHOWN ON FIGURE NUMBER F001.
7. GEOLOGICAL CROSS SECTIONS A-A', B-B', C-C' AND D-D' REFER TO FIGURE NUMBERS F002 TO F005 INCLUSIVE.
8. FOR GEOLOGICAL BOUNDARY ELEVATION CONTOUR MAPS REFER TO FIGURE NUMBERS F006 TO F011 INCLUSIVE.
9. INTERPRETED GEOLOGY SHOWN ON HOLE STICKS IS BASED ON AGS DATA AND IS SUBJECT TO CHANGE ON REVIEW. THE ILLUSTRATED 3D GEOLOGICAL STRATIGRAPHY HAS BEEN CUT FROM AN INTERPRETATIVE 3D MODEL AND SHOULD BE CONSIDERED AS AN INDICATIVE DISTRIBUTION BETWEEN EXPLORATORY HOLES ONLY. ACTUAL GROUND CONDITIONS AWAY FROM EXPLORATORY HOLES MAY VARY FROM THAT SHOWN.
10. GROUNDWATER SURFACES ARE SHOWN FOR THE MAXIMUM AND MINIMUM LEVELS RECORDED; THEY SHOULD BE CONSIDERED INDICATIVE ONLY. THE SURFACES HAVE BEEN PRODUCED USING GROUNDWATER MONITORING DATA FROM THE PRE-FEED GI (BETWEEN 14TH JUNE AND 15TH NOVEMBER 2021) AND THE FEED GI (BETWEEN 15TH AND 30TH SEPTEMBER 2022). ACTUAL GROUNDWATER LEVELS ON SITE MAY VARY, BOTH SPATIALLY AND SEASONALLY, FROM THOSE SHOWN.

ISSUE PURPOSE

FINAL

PROJECT NUMBER

60657467

FIGURE TITLE

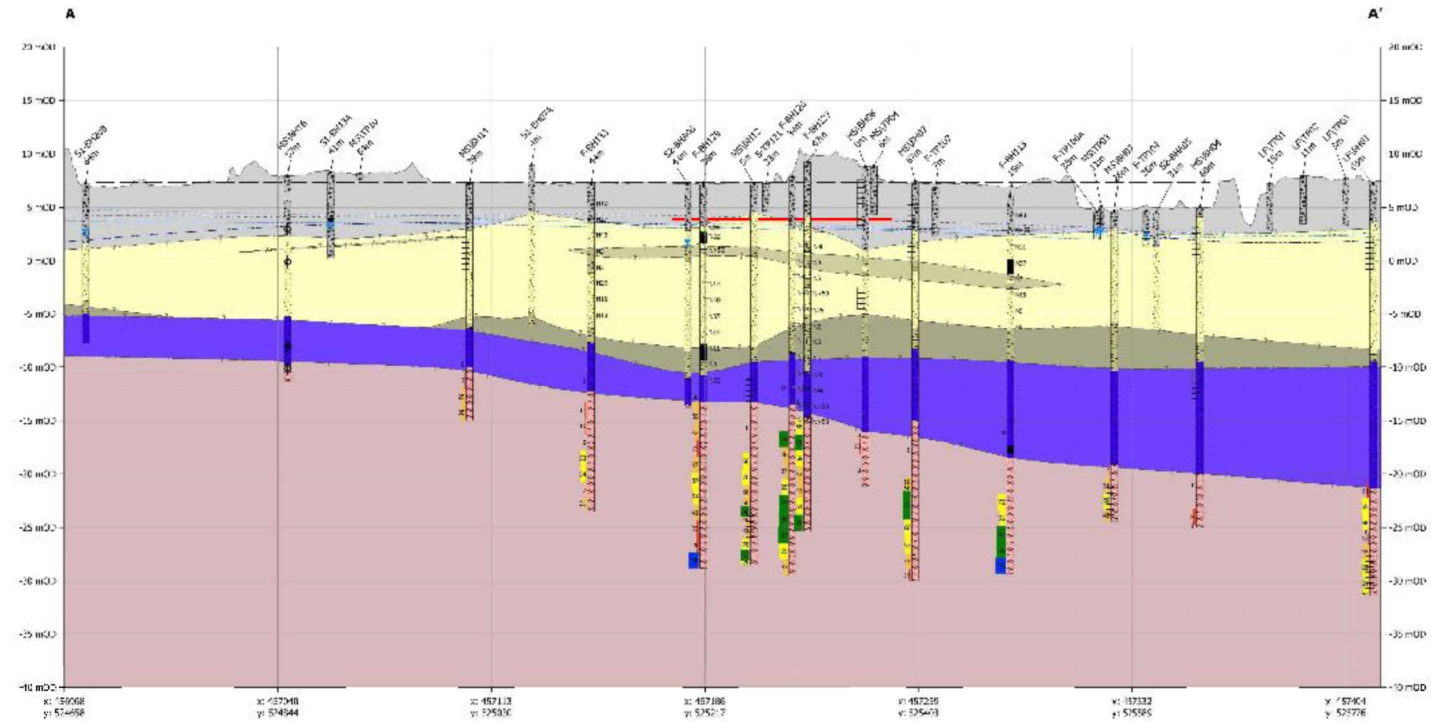
Site Location Plan

FIGURE NUMBER

F001

Revision: P04 Drawn: MB Checked: MS Approved: DW Date: 2023-01-10

Filename: C:\GIS_local\NZT_FEED_GIR\NZT_FEED_GIR.aprx



Legend

FEED Ground Model Geology
- d & e - Made Ground & Topsoil
- c2 - Tidal Flat Deposits Sand
- c1a - Tidal Flat Deposits Clay Upper
- c1b - Tidal Flat Deposits Clay Lower
- b - Glacial Deposits
- a - Mudstone Bedrock

Note - Geology Codes / Strata Names: e - Topsoil, d - Made Ground, c2 - Tidal Flat Deposits Sand, c1 - Tidal Flat Deposits Clay, b1 - Glacial Till, a3 - Redcar Mudstone Formation, a2 - Penarth Group, a1 - Mercia Mudstone Group, NR - No Recovery

Hole Geology Code
- e
- d
- c2
- c1
- b1
- a3
- a2
- a1
- NR

Rock Quality Designation (%)
Value and bar on LHS of hole stick:
- ≤ 25
- ≤ 50
- ≤ 75
- ≤ 90
- > 90

Standard Penetration Test Results
Value on RHS of hole stick:
N[SPT N Value]

Surfaces
- Finished Site Level
- Groundwater Superficials - Max. recorded
- Groundwater Mudstone - Max. recorded
- Groundwater Superficials - Min. recorded
- Groundwater Mudstone - Min. recorded
- Remediation Levels

Installations (VWP)
- Installations VWP

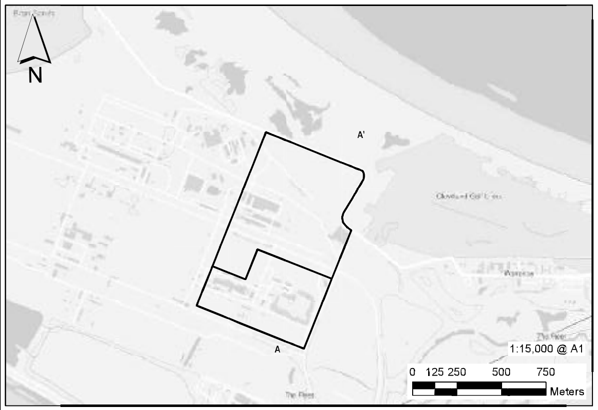
Installations (Standpipe response zone)
- SLOTTED

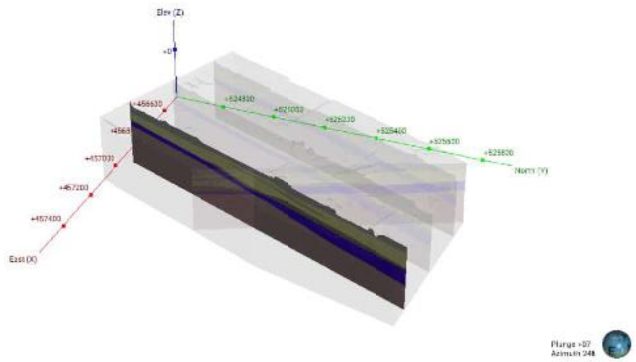
Groundwater Strike
- Strike_Level

Monitored Strike
- Rise_Level

Scale: 1:2,500
Vertical exaggeration: 10x
0m 200m

HOLES WITHIN 75M OF THE SECTION PLANE ARE GENERALLY SHOWN, BUT SOME HAVE BEEN OMITTED FOR CLARITY. THE OFFSET OF THE HOLE FROM THE SECTION PLANE IN METRES IS GIVEN BELOW THE HOLE ID (LOCATED ABOVE EACH HOLE STICK). REFER TO THE SITE LOCATION PLAN FOR THE LOCATION RELATIVE TO THE SECTION. HOLES OMITTED FOR SECTION A-A': S1-BH07, S1-BH13, F-TP106





AECOM

PROJECT
NET ZERO TEESSIDE
FEED ONSHORE
GROUND INVESTIGATION

CLIENT
bp

CONSULTANT
AECOM Limited
Aldgate Tower
2 Leman Street
London E1 8FA, United Kingdom
www.aecom.com

LEGEND

NOTES

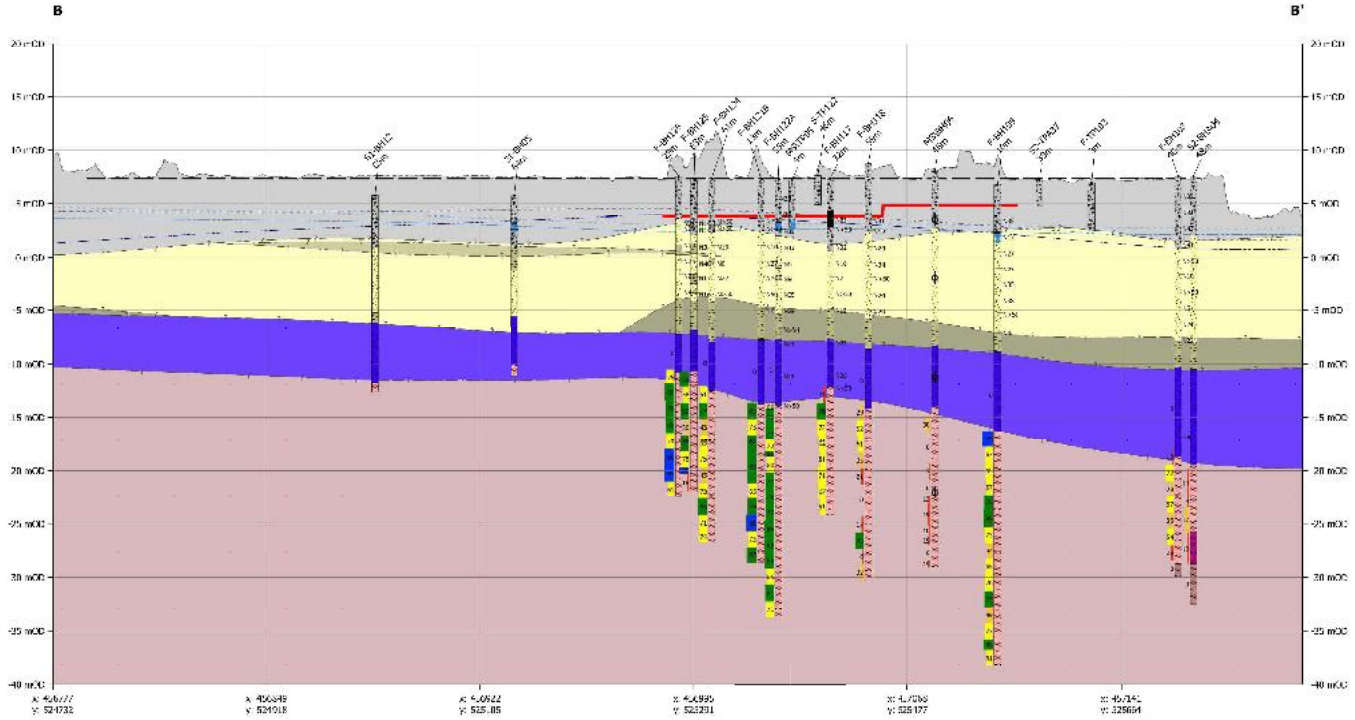
1. DO NOT SCALE FROM THIS DRAWING.
2. THIS FIGURE SHOULD BE READ IN CONJUNCTION WITH THE FOLLOWING GEOTECHNICAL REPORT: FEED ONSHORE GROUND INVESTIGATION FOR NET ZERO TEESSIDE. GROUND INVESTIGATION REPORT. AECOM 2022.
3. ALL DIMENSIONS IN METRES (m) AND ALL ELEVATIONS/LEVELS IN METRES RELATIVE TO ORDNANCE DATUM (mOD) UNLESS NOTED OTHERWISE.
4. GROUND SURFACE SHOWN DERIVED FROM ENVIRONMENT AGENCY LiDAR DATA 2020. MODIFICATIONS TO THE GROUND ELEVATION SINCE THE LiDAR WAS ACQUIRED WILL NOT BE REPRESENTED.
5. THE GROUND INVESTIGATION (GI) DATA IS DISPLAYED FROM THE FOLLOWING FACTUAL REPORTS AND CORRESPONDING DIGITAL DATA PROVIDED IN AGS FILES:
• HISTORICAL GI DATA: ALLIED EXPLORATION & GEOTECHNICS LTD. THE FORMER SSI STEELWORKS, REDCAR – GROUND INVESTIGATION CONTRACT. FINAL FACTUAL REPORT. CONTRACT NO. 4153 & 4154 (AREA A), JUNE 2018.
• PRE-FEED GI DATA: ALLIED EXPLORATION & GEOTECHNICS LTD. PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NET ZERO TEESSIDE (NZT). FINAL FACTUAL REPORT. CONTRACT NO. 4339, DECEMBER 2021.
• FEED GI DATA: AECOM. NET ZERO TEESIDE ONSHORE GROUND INVESTIGATION - FRONT END ENGINEERING DESIGN (FEED). GROUND INVESTIGATION FACTUAL REPORT. PROJECT NO. 60678042, NOVEMBER 2022.
6. EXPLORATORY HOLE AND SECTION LINE LOCATIONS SHOWN ON FIGURE NUMBER F001.
7. GEOLOGICAL CROSS SECTIONS A-A', B-B', C-C' AND D-D' REFER TO FIGURE NUMBERS F002 TO F005 INCLUSIVE.
8. FOR GEOLOGICAL BOUNDARY ELEVATION CONTOUR MAPS REFER TO FIGURE NUMBERS F006 TO F011 INCLUSIVE.
9. INTERPRETED GEOLOGY SHOWN ON HOLE STICKS IS BASED ON AGS DATA AND IS SUBJECT TO CHANGE ON REVIEW. THE ILLUSTRATED 3D GEOLOGICAL STRATIGRAPHY HAS BEEN CUT FROM AN INTERPRETATIVE 3D MODEL AND SHOULD BE CONSIDERED AS AN INDICATIVE DISTRIBUTION BETWEEN EXPLORATORY HOLES ONLY. ACTUAL GROUND CONDITIONS AWAY FROM EXPLORATORY HOLES MAY VARY FROM THAT SHOWN.
10. GROUNDWATER SURFACES ARE SHOWN FOR THE MAXIMUM AND MINIMUM LEVELS RECORDED; THEY SHOULD BE CONSIDERED INDICATIVE ONLY. THE SURFACES HAVE BEEN PRODUCED USING GROUNDWATER MONITORING DATA FROM THE PRE-FEED GI (BETWEEN 14TH JUNE AND 15TH NOVEMBER 2021) AND THE FEED GI (BETWEEN 15TH AND 30TH SEPTEMBER 2022). ACTUAL GROUNDWATER LEVELS ON SITE MAY VARY, BOTH SPATIALLY AND SEASONALLY, FROM THOSE SHOWN.

ISSUE PURPOSE
FINAL

PROJECT NUMBER
60657467

FIGURE TITLE
Geological Cross Section
Section Line A

FIGURE NUMBER
F002



Legend

FEED Ground Model Geology
- d & c - Made Ground & Topsoil
- c2 - Tidal Flat Deposits Sand
- c1a - Tidal Flat Deposits Clay Upper
- c1b - Tidal Flat Deposits Clay Lower
- b - Glacial Deposits
- a - Mudstone Bedrock

Note - Geology Codes / Strata Names: c - Topsoil, d - Made Ground, c2 - Tidal Flat Deposits Sand, c1 - Tidal Flat Deposits Clay, b1 - Glacial Till, a3 - Redcar Mudstone Formation, a2 - Penarth Group, a1 - Mercia Mudstone Group, NR - No Recovery

Hole Geology Code
- c
- d
- c2
- c1
- b1
- a3
- a2
- a1
- NR

Rock Quality Designation (%)
Value and bar on LHS of hole stick:
- ≤ 25
- ≤ 50
- ≤ 75
- ≤ 90
- > 90

Standard Penetration Test Results
Value on RHS of hole stick: N [SPT N Value]

Surfaces
- Finished Site Level
- Groundwater Superficials - Max. recorded
- Groundwater Mudstone - Max. recorded
- Groundwater Superficials - Min. recorded
- Groundwater Mudstone - Min. recorded
- Remediation Levels

Installations (VWP)
- Installations VWP

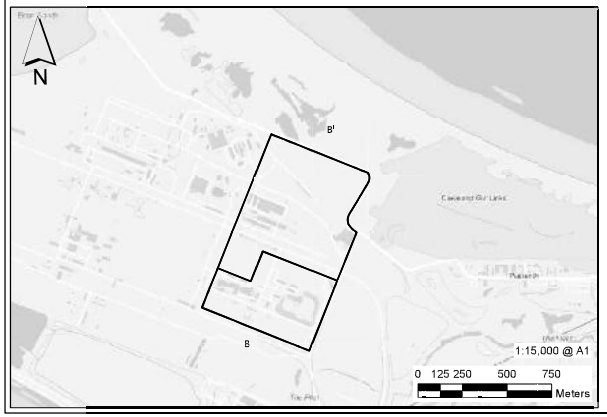
Installations (Standpipe response zone)
- SLOTTED

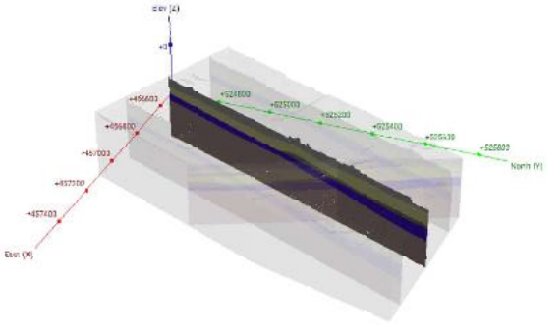
Groundwater Strike
- Strike_Level

Monitored Strike
- Rise_Level

Scale: 1:2,500
Vertical exaggeration: 10x
0m 200m

HOLES WITHIN 75M OF THE SECTION PLANE ARE GENERALLY SHOWN, BUT SOME HAVE BEEN OMITTED FOR CLARITY. THE OFFSET OF THE HOLE FROM THE SECTION PLANE IN METRES IS GIVEN BELOW THE HOLE ID (LOCATED ABOVE EACH HOLE STICK). REFER TO THE SITE LOCATION PLAN FOR THE LOCATION RELATIVE TO THE SECTION. HOLES OMITTED FOR SECTION B-B': MS/BH10, F-TP114, F-TP113, F-BH121, F-BH121A, S2-TPA39, F-TP105, SS07, SS08, SS04.





AECOM

PROJECT
NET ZERO TEESSIDE
FEED ONSHORE
GROUND INVESTIGATION

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Aldgate Tower
2 Leman Street
London E1 8FA, United Kingdom
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LEGEND

NOTES

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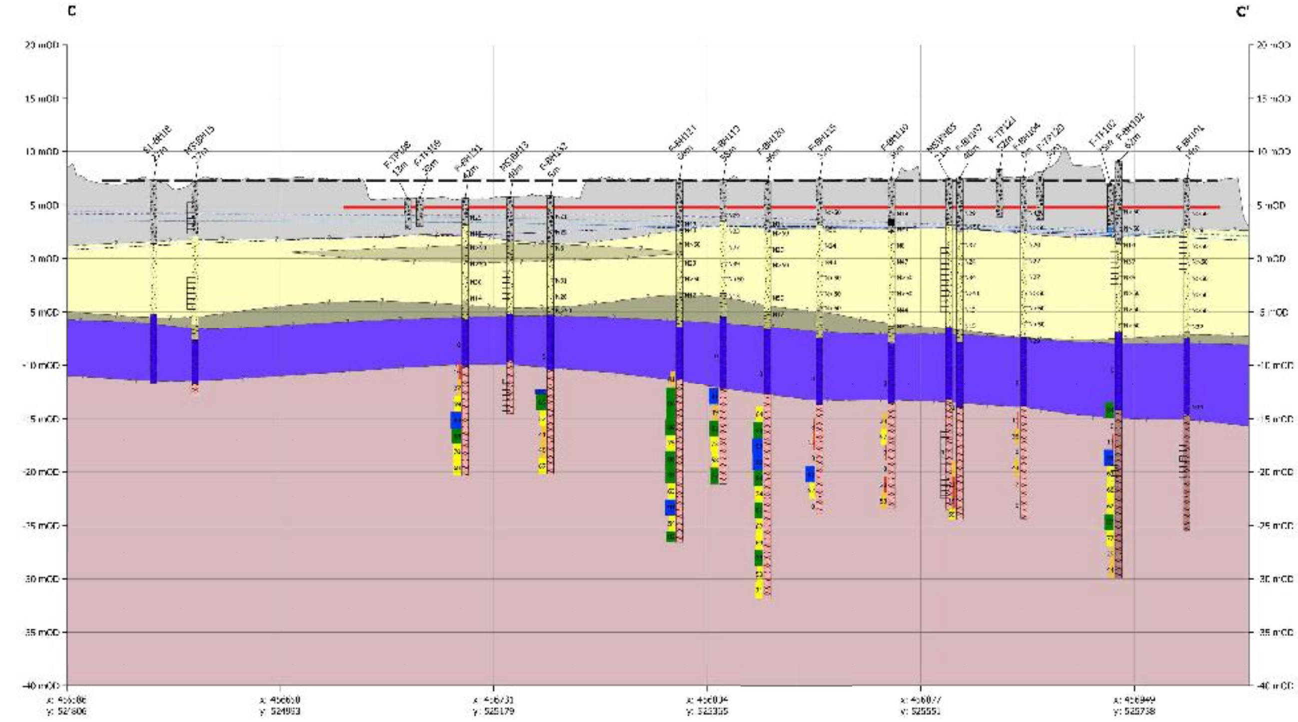
ISSUE PURPOSE
FINAL

PROJECT NUMBER
60657467

FIGURE TITLE
Geological Cross Section
Section Line B

FIGURE NUMBER
F003



Legend

FEED Ground Model Geology

- d & e - Made Ground & Topsoil
- c2 - Tidal Flat Deposits Sand
- c1a - Tidal Flat Deposits Clay Upper
- c1b - Tidal Flat Deposits Clay Lower
- b - Glacial Deposits
- a - Mudstone Bedrock

Note - Geology Codes / Strata Names: e - Topsoil, d - Made Ground, c2 - Tidal Flat Deposits Sand, c1 - Tidal Flat Deposits Clay, b1 - Glacial Till, a3 - Redcar Mudstone Formation, a2 - Penarth Group, a1 - Mercia Mudstone Group, NR - No Recovery

Hole Geology Code

e, d, c2, c1, b1, a3, a2, a1, NR

Rock Quality Designation (%)

Value and bar on LHS of hole stick:

- ≤ 25
- ≤ 50
- ≤ 75
- ≤ 90
- > 90

Standard Penetration Test Results

Value on RHS of hole stick:
N[SPT N Value]

Surfaces

- Finished Site Level
- Groundwater Superficials - Max. recorded
- Groundwater Mudstone - Max. recorded
- Groundwater Superficials - Min. recorded
- Groundwater Mudstone - Min. recorded
- Remediation Levels

Installations (VWP)

- Installations VWP

Installations (Standpipe response zone)

- SLOTTED

Groundwater Strike

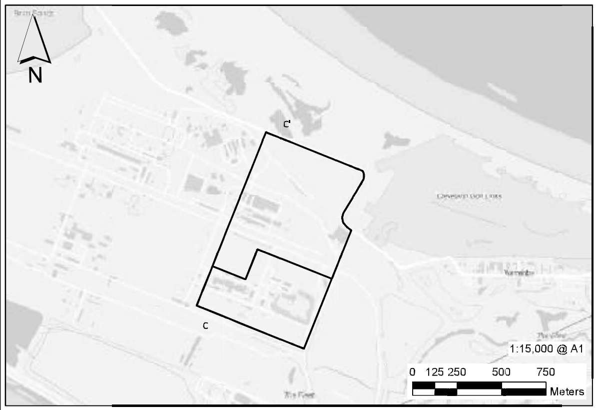
- Strike_Level

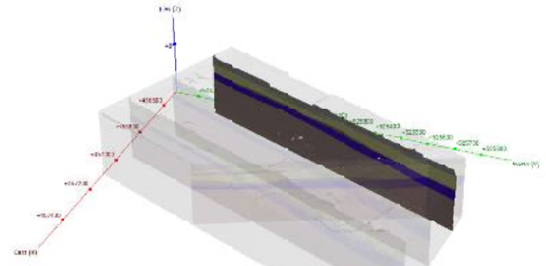
Monitored Strike

- Rise_Level

Scale: 1:2,500
Vertical exaggeration: 10x
0m 200m

HOLES WITHIN 75M OF THE SECTION PLANE ARE GENERALLY SHOWN, BUT SOME HAVE BEEN OMITTED FOR CLARITY. THE OFFSET OF THE HOLE FROM THE SECTION PLANE IN METRES IS GIVEN BELOW THE HOLE ID (LOCATED ABOVE EACH HOLE STICK). REFER TO THE SITE LOCATION PLAN FOR THE LOCATION RELATIVE TO THE SECTION. HOLES OMITTED FOR SECTION C-C': F-TP119, F-TP115, F-TP116, F-BH114, MS/BH09, F-BH106A, SS05, SS03, SS02, SS01.





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ISSUE PURPOSE

FINAL

PROJECT NUMBER

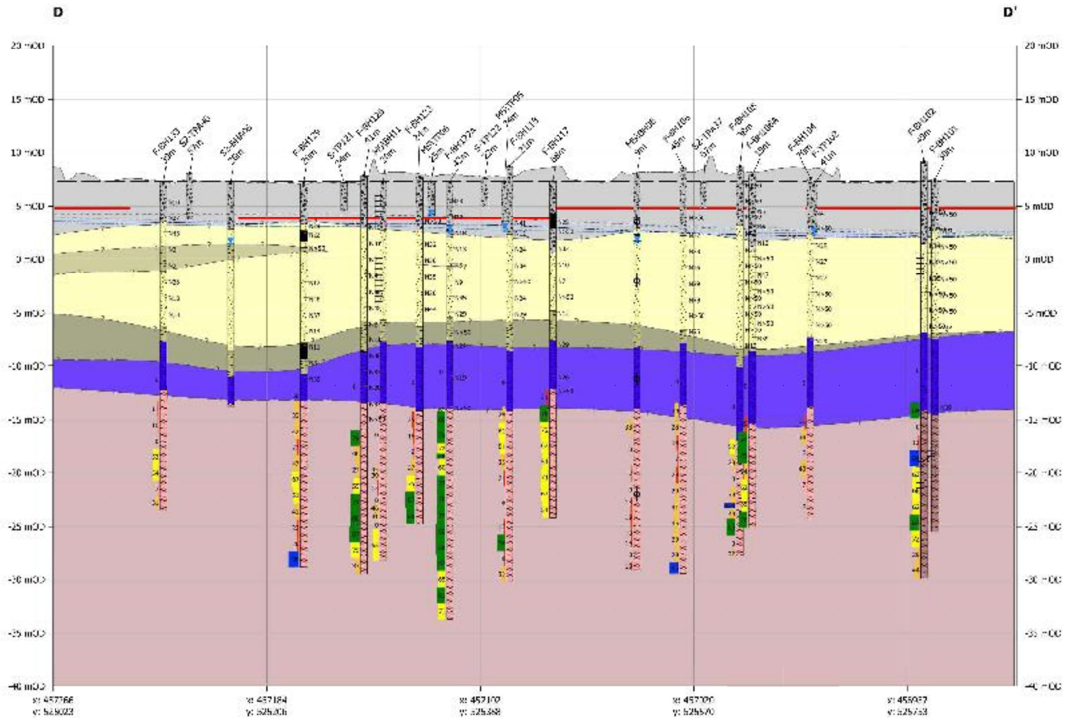
60657467

FIGURE TITLE

Geological Cross Section
Section Line C

FIGURE NUMBER

F004



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Hole Geology Code
- e
- d
- c2
- c1
- b1
- a3
- a2
- a1
- NR

Rock Quality Designation (%)
Value and bar on LHS of hole stick:
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- > 90

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Value on RHS of hole stick:
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- Installations VWP

Installations (Standpipe response zone)
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Groundwater Strike
- Strike_Level

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- Rise_Level

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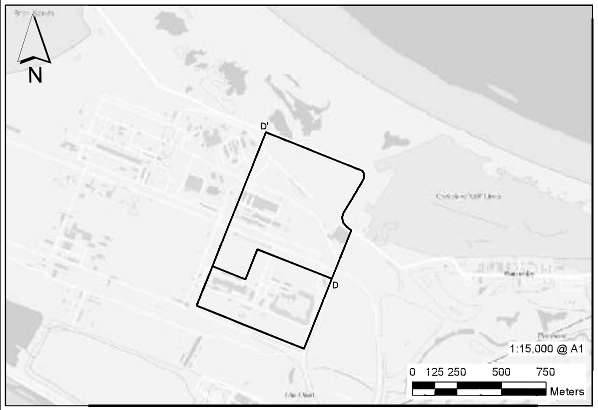

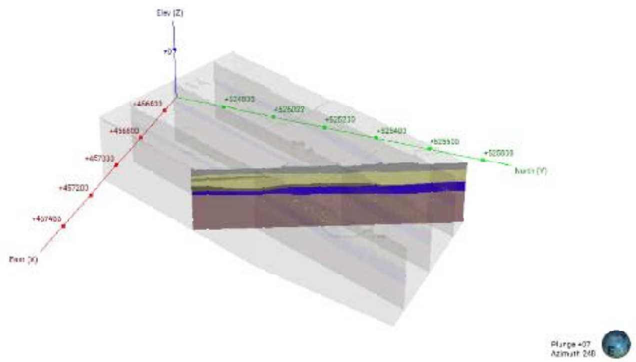

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ISSUE PURPOSE
FINAL

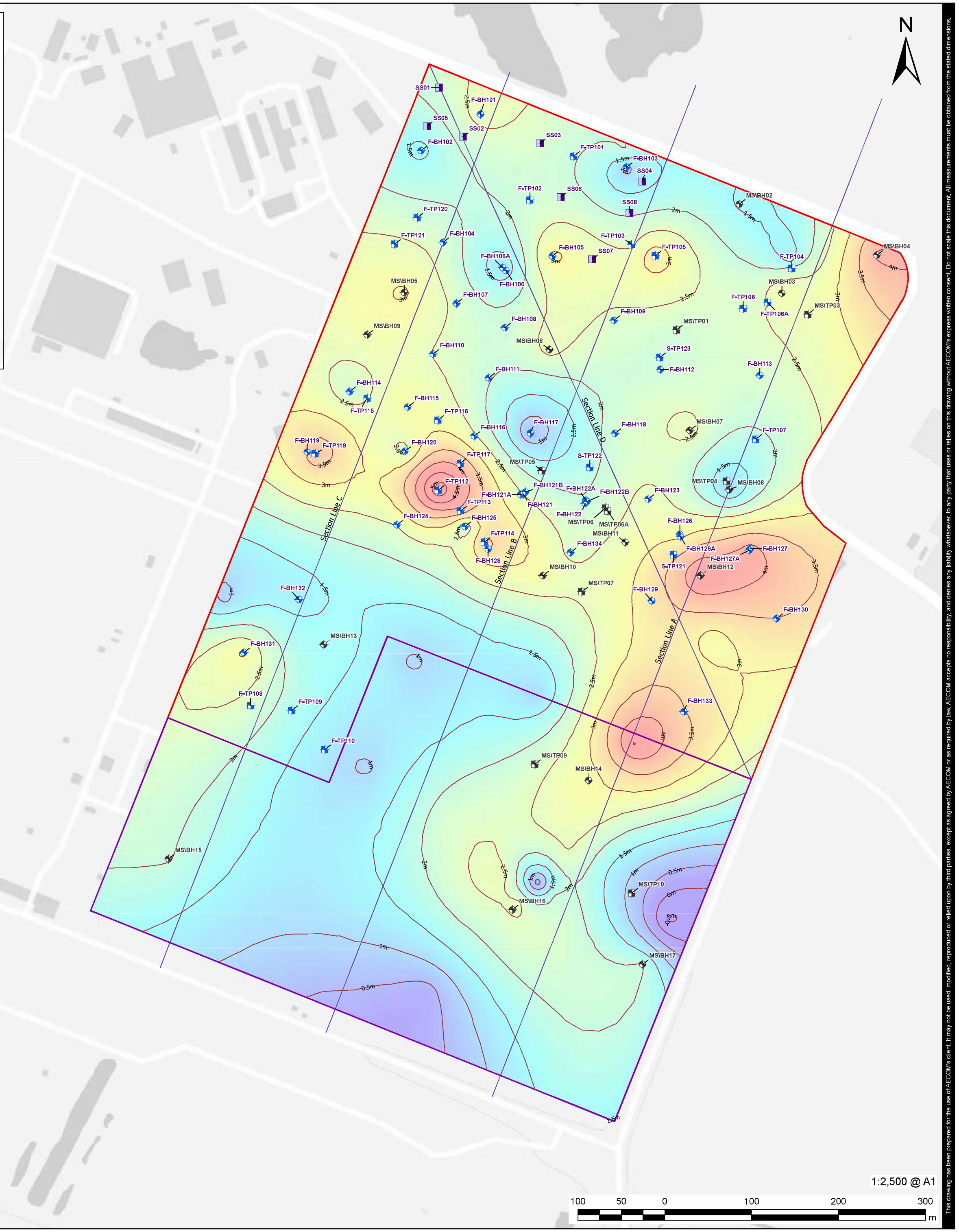
PROJECT NUMBER
60657467

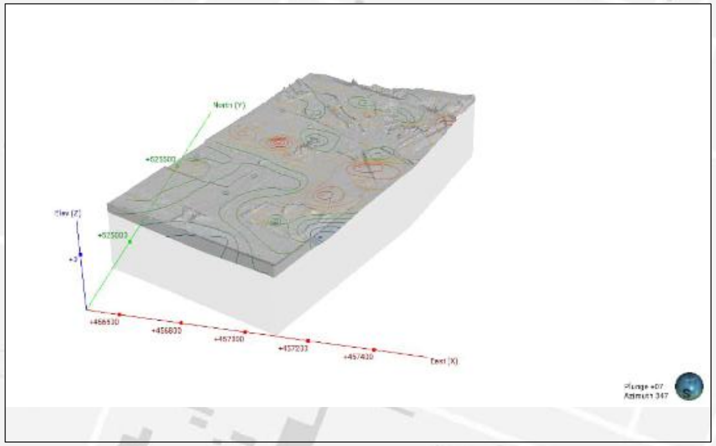
FIGURE TITLE
Geological Cross Section
Section Line D

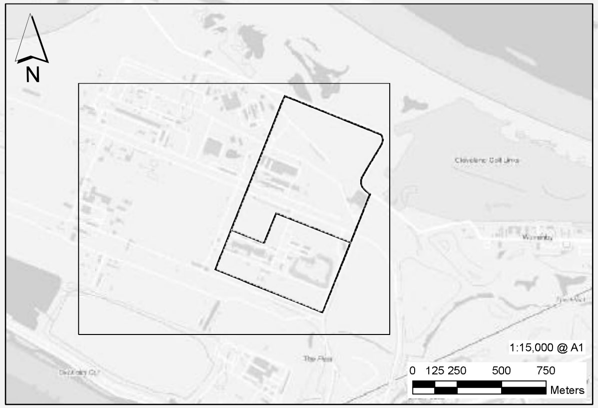
FIGURE NUMBER
F005

Revision: P04 Drawn: MB Checked: MS Approved: DW Date: 2023-01-10

Filename: C:\GIS_local\NZT_FEED_GIR\NZT_FEED_GIR.aprx







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LEGEND

Site Boundaries
- Main Site
- Extension
- Section Lines

FEED GI Locations
- Sample Location
- Sonic + Rotary Coring
- Trial Pit

Pre-FEED GI Locations
- Trial Pit
- Borehole
- Base of Made Ground elevation contours (m OD)

Base of Made Ground elevation
- 5.4 mOD
- -0.56 mOD

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ISSUE PURPOSE

FINAL

PROJECT NUMBER

60657467

FIGURE TITLE

Geological Boundary Elevation Contours
Base of Made Ground & Topsoil

FIGURE NUMBER

F006

Revision: P04 Drawn: MB Checked: MS Approved: DW Date: 2023-01-11
Filename: C:\GIS_local\NZT_FEED_GIR\NZT_FEED_GIR.aprx

Appendix B Response from EA

Angela Graham – AECOM Limited
By E-mail only

Our ref: EPR/KP3427ST/P001
Your ref: 60675797

Date: 22/11/2024

Dear Angela,

Environmental Permitting – Recovery vs Disposal assessment of a waste recovery plan

Pre-application reference: EPR/KP3427ST/P001
Prospective applicant name: Net Zero Teesside Power Limited
Site name and address: Net Zero Teesside CCUS Project, Redcar, Cleveland, TS10 5QW

You have submitted information to us that includes your assessment that the activity you wish to undertake at your site amounts to a recovery operation.

We have now considered your submission and we would like to advise you that:

We agree with your assessment that your activity is a recovery operation. This advice is based on the information you have provided to support that the waste is being used as a substitute for non-waste material plus details in relation to waste types and quantity and the purpose and nature of the proposal. If you change any of this information between now and when you submit an application, this advice may no longer apply.

Please note that the advice contained in this letter is <u>not</u> in itself a permitting decision or an indication that a permit will be granted or permit variation issued following submission of an application. Further assessment will take place during the permit determination stage and pre-application advice should be sought as required before preparing an application. See appendix for more information.

The following documents are considered to form the approved waste recovery plan:

Title	Reference (where applicable)	Date
Waste Recovery Plan	EPR/ZP3827SK/WRP R06	21/11/2024

Additional comments:

Existing and final levels and contour plans for the proposed deposit for recovery activity have not been included within the Waste Recovery Plan referenced above. It is understood that these plans are still being produced and will be provided with forthcoming bespoke deposit for recovery permit application.

If you have any questions regarding our advice above please contact me using the details below.

Yours sincerely

Chris Cumming
Permitting Officer, National Permitting Service
Environment Agency | Quadrant 2, 99 Parkway Avenue, Sheffield, S9 4WF

Christopher.Cumming@environment-agency.gov.uk
External: 020 302 58177

Appendix

Recovery vs Disposal advice

The Recovery vs Disposal (RvD) assessment of a waste recovery plan enables us to advise an applicant regarding whether or not we agree in principle that a proposed waste activity is a recovery operation to inform what type of permit would be required (recovery or disposal).

This assessment is discrete from the pre-application advice that would be provided to support the preparation of a permit application (see below) attracting a separate charge.

Our decision to grant a recovery permit or to issue a variation is subject to further assessment carried out during the permit determination stage. In the case of bespoke permit applications, this includes site-specific risk assessment based on the location of the site and technical requirements of the scheme.

For example:

- RvD assessment considers what waste types *may* be suitable, not what waste types *will* be deemed suitable following technical assessment of a permit application which would take into account the sensitivity of the site location and the proposed appropriate measures to be carried out. This is particularly relevant where non-inert wastes are to be deposited.

- RvD assessment considers whether it has been demonstrated that the scheme will be designed and constructed to be fit for purpose. Further technical assessment of the design and the construction methods and/or quality standards to be met may be carried out during permit determination.

If the permit that you are intending to apply for includes the application of waste to improve / enhance or maintain soil quality (landspreading), you must make this clear in your permit application and provide a benefit statement with your application that shows that the specific use of the waste is suitable and will provide no more soils and/or nutrients than the plants need. This is separate to the RvD assessment of the waste recovery plan.

If you plan to mix or blend waste or manufacture a soil substitute under the permit this should be made clear in the permit application as it is a separate activity that will need to be assessed during permit determination.

Pre-application advice on a recovery permit application

Prior to preparing and submitting an application for a recovery permit, you should review our deposit for recovery guidance (https://www.gov.uk/government/publications/deposit-for-recovery-operators-environmental-permits) and consider seeking pre-application advice (https://www.gov.uk/government/publications/environmental-permit-pre-application-advice-form).

You should use the paid for enhanced pre-application advice service to discuss your proposal if any of the following apply:

- your site is in a sensitive location (https://www.gov.uk/guidance/landfill-operators-environmental-permits/plan-the-environmental-setting-of-your-site#sensitive-locations)
- you are depositing waste on top of a landfill
- you are depositing waste into water
- hazardous waste is to be deposited as part of the scheme
- additional activities (such as landspreading or soil treatment) are intended to be included in the permit

Changes to your waste recovery plan

Before making changes to your proposal you should review our waste recovery plan guidance (https://www.gov.uk/government/publications/deposit-for-recovery-operators-environmental-permits/waste-recovery-plans-and-deposit-for-recovery-permits).

Appendix C Volume Calculations

Appendix D Net Zero Teesside Order 2024

Appendix E Waste Acceptance Protocol

1) Scope

Applies to all loads of waste:

- Generated onsite during construction works and available for reuse during the construction of the NZT facility; and
- Imported and accepted for use during the construction of the NZT facility when suitable site-won materials are not sufficient or not suitable for the intended use.

This document is applicable to all personnel who accept and handle waste at the NZT Construction Site. It should be noted that the procedure is subject to review and updating and the current version will always be available on site.

2) Purpose

The purpose of the Waste Acceptance Protocol is to ensure that the Site only accepts waste for recovery that is:

- suitable for the activity;
- is allowed by the permit; and
- is appropriately considered by the environmental risk assessment.

The Waste Acceptance Procedure will also assist with:

- ensuring the activities do not cause pollution;
- assist in the waste sourcing decision making process; and
- prevent the receipt of non-permitted wastes.

This Waste Acceptance Procedure has been prepared with reference to the Environment Agency guidance 'Waste Acceptance Procedures for Deposit for Recovery' dated 29th June 2023.

3) Responsibilities

The Site Manager or designated Competent Person will ensure the wastes are handled in accordance with this procedure and the Environment Agency guidance document:

The Site Manager will ensure that all personnel involved in the waste acceptance process are fully trained on the waste acceptance procedures and understand what information is required for site-won material (internal testing) and for imported materials on the documentation that will accompany each load.

The Site Operatives are responsible for verifying the information matches each waste stockpile or load. Any non – conformance or irregularities will be notified to the Site Manager without delay. Suspicious materials identified in site-won stockpiles or identified on deposit of an incoming load will be isolated pending further investigation and the driver will be instructed to wait.

4) Permitted Wastes

The wastes permitted to be reused for the purposes of construction at the NZT Construction are listed in Table 1 below.

Table 1 Acceptable Waste Types for Remedial Works[1]

Waste Code	Description	Comment	Entry Type
01	**WASTES RESULTING FROM EXPLORATION, MINING, QUARRYING AND PHYSICAL AND CHEMICAL TREATMENT OF MINERALS**		
01 01	**Wastes from Mineral Excavation**		
01 01 02	Wastes from non-metalliferous excavation	Import only if needed. Restricted to waste overburden and inter-burden only	AN
01 04	**Wastes from Physical And Chemical Processing of Non-Metalliferous Minerals**		

[1] Extract from Environment Agency Guidance "Check If Your Waste Is Suitable For Deposit For Recovery", June 2023

Waste Code	Description	Comment	Entry Type
01 04 08	Waste gravel and crushed rocks other than those containing dangerous substances	Import only if needed.	MN
01 04 09	Waste sand and clays	Import only if needed.	AN
10	**WASTES FROM THERMAL PROCESSES**		
10 02	**wastes from the iron and steel industry**		
10 02 02	unprocessed slag	Unremediated slag from areas of deep excavation.	AN
17	**CONSTRUCTION AND DEMOLITION WASTES (INCLUDING EXCAVATED SOIL FROM CONTAMINATED SITES)**		
17 01	**Concrete, Bricks, Tiles and Ceramics**		
17 01 01	Concrete	Site won material associated with relic structures from deeper excavations. Imported only if needed	MN
17 01 02	Bricks	Site won material associated with relic structures from deeper excavations. Imported only if needed	MN
17 01 03	Tiles and Ceramics	Site won material associated with relic structures from deeper excavations. Imported only if needed	MN
17 01 07	Mixtures of Concrete, Bricks, Tiles and Ceramics	Site won material associated with relic structures from deeper excavations. Imported only if needed Metal from reinforced concrete must be removed	MN
17 05	**Soil Stones and Dredging Spoil**		
17 05 04	Soil and stones (topsoil, peat, subsoil and stones)	Import only if needed. Material deposited in place of non-waste topsoil must meet the British Standard for Topsoil - BS3882:2015.	MN
19	**WASTES FROM WASTE MANAGEMENT FACILITIES, OFFSITE WASTEWATER TREATMENT PLANTS AND THE PREPARATION OF WATER INTENDED FOR HUMAN CONSUMPTION AND WATER FOR INDUSTRIAL USE**		
19 12	**Wastes from the Mechanical Treatment of Waste Not Otherwise Specified**		
19 12 09	Minerals (such as sand and stones) from the treatment of waste aggregates that are otherwise naturally occurring minerals (see specific guidance for further limitations)	Import only if needed. "It does not include residual 'fines' from mechanical treatment of mixed waste at transfer stations. Source materials must be: (a) properly classified as hazardous or non-hazardous (b) accurately described (characterised)"	AN
19 12 12	Other wastes (including mixtures of materials) from the mechanical treatment of wastes other than those mentioned in 19 12 11	Site won material comprising recovered made ground materials placed during STDC remediation. Imported only if needed	MN
19 13	***Wastes from soil and groundwater remediation***		
19 13 02	Solid wastes from soil remediation other than those containing dangerous substances		MN
20	**MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS**		
20 02	**Garden and Park Wastes (Including Cemetery Waste)**		
20 02 02	Soil and stones (topsoil, peat, subsoil and stones)	Import only if needed. Material deposited in place of non-waste topsoil must meet the British Standard for Topsoil - BS3882:2015.	AN

Waste shall only be accepted if it is of a type listed in Table 1 and meets the additional restrictions in that table; and

I. It has been confirmed as non-hazardous in accordance with WM3;
II. it has been identified as a suitable waste in the approved waste recovery plan; and
III. its chemical, physical and biological characteristics make it suitable for its intended use on the site.

5) Sampling Requirements

The frequency of testing required to determine materials acceptability is provided in Table 2.

Table 2 Waste Acceptance Testing Frequencies

Waste Types	Frequency	
	Soil/Solid	Leachate
Site Won Materials		
Slag Dominant Made Ground	One sample per 2,000 m^3	One sample per 10,000 m^3
All Other ground Types	One sample per 1,000 m^3	One sample per 10,000 m^3
Imported Materials		
All Waste Types	One sample per 2,000 m^3	One sample per 10,000 m^3

To ensure the materials placed meet the required engineering properties, the materials are to be tested in accordance and at the frequency set out with the Earthworks Specification (Appendix F).

Chemical suitability comprises confirming the material is non-hazardous in accordance with WM3 and it meets the Screening Criteria (Appendix G) defined in the Hydrogeological Risk Assessment (HRA).

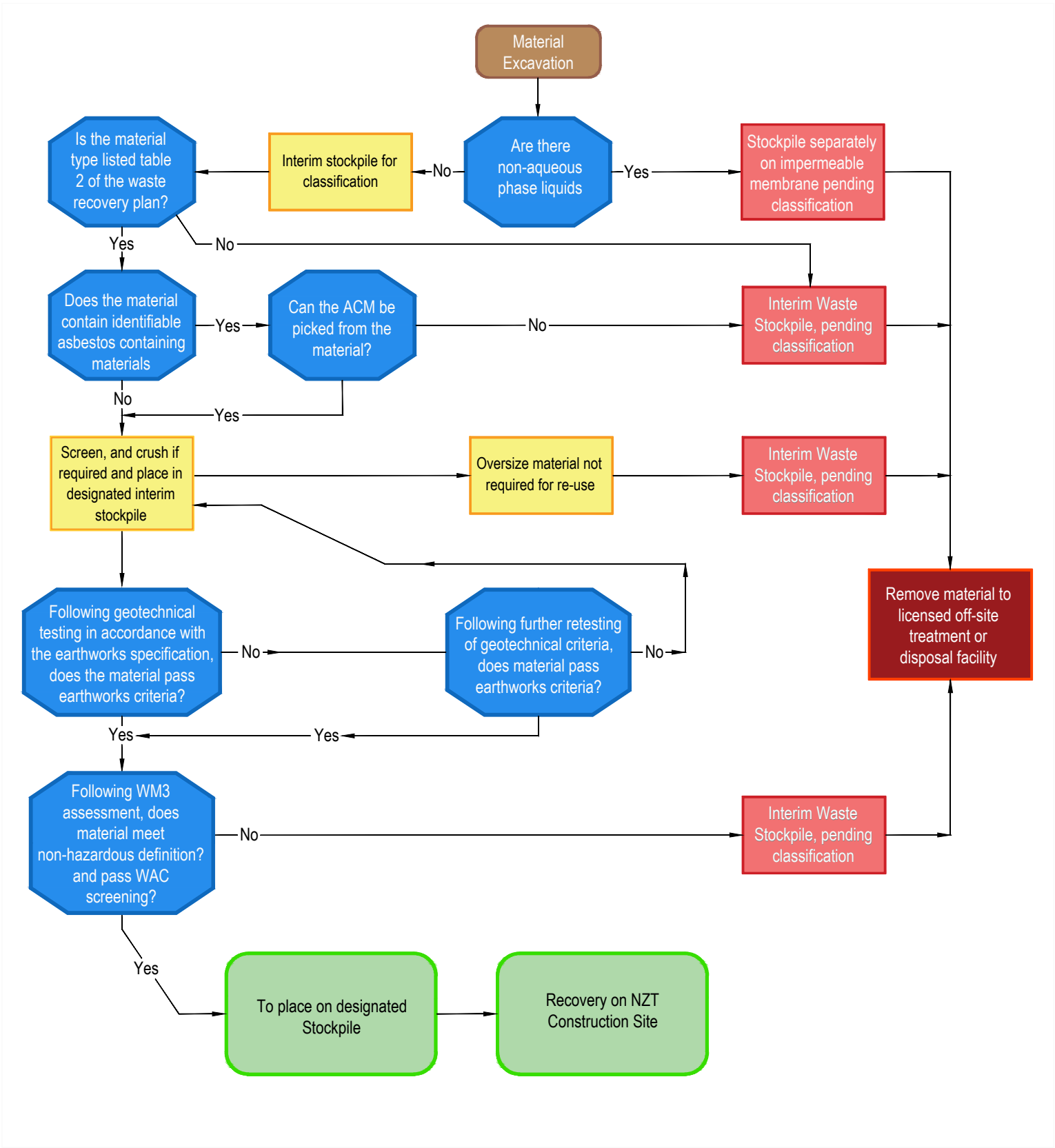
6) Procedure for Approving Site Won Materials for Reuse

Only the waste types shown in Table 1 that will be generated during construction at the site and which meet the specified chemical and geotechnical criteria for reuse will be approved for reuse in accordance with Figure 1 on the following page.

Materials that are not deemed suitable for recovery by virtue of either their chemical or physical characteristics will either be:

- Disposed of at a suitably permitted facility with treatment as necessary.
- Treated offsite, reclassified, and recovered for use as an engineered fill either within site or at another suitably permitted recovery site.

Figure 1 - Waste Acceptance Flow Chart



7) Acceptance Procedures for Imported Material

7.1 Pre-Acceptance Requirements

Imported waste will be subject to a 48 hour pre-acceptance approval by the Site Manager as outlined below. The site proposes to accept only the waste types in Table 1 The Site Manager shall obtain, as a minimum, the following information about the characteristics of each waste stream prior to receiving the waste at the site:

i. the full address where the waste was produced;
ii. the identity of the producer;
iii. all the reasonably identifiable previous uses of the producer site (where the waste is excavation waste;
iv. the process giving rise to the waste;
v. the physical appearance of the waste including colour and texture
vi. where a weighbridge isn't used, a metric conversion factor for volume (cubic metres) to weight (tonnes) for each waste stream;
vii. the quantity of waste to be imported; and
viii. evidence of compliance with the additional restriction requirements as identified in Table 1.

Prior to accepting waste from a source for the first time and in the event that there is suspicion of contamination, the waste producer will be required to test the waste against the site waste acceptance criteria.

The pre-acceptance procedural requirements will result in either the waste:

- Being approved for delivery to the site and therefore suitable for disposal at the site; or
- Failing the site's waste pre-acceptance criteria and therefore not acceptable for delvery to the site and the customer will be advised that delivery is not approved.

Sampling and testing will follow the procedures in Appendix 4 of WM3. The waste producer will be responsible for ensuring the sampling procedure employed characterises the waste both chemically and physically, and accounts for the variability of the waste stream.

7.2 Acceptance Requirements

7.2.1 Site Entrance Procedures

The site entrance procedures will be to undertake:

- Check and ensure completion of paperwork associated with each load;
- Visual inspection of pre-approved loads;
- Verification sampling and testing;
- Rejection of unacceptable loads; and
- Ensuring that only pre-approved wastes are accepted at the site.

7.2.2 Paperwork Checks

All incoming vehicles will enter the site via the site entrance. Only authorised waste carriers (and exempt authorities) will be permitted on site and any new waste carriers must provide evidence of registration before being allowed to deposit waste on site.

The waste carrier must complete a Waste Transfer Note (WTN). Each WTN must have a unique reference number. In the event of multiple consignments from a registered carrier a copy of the WTN must be produced on arrival

Checks will be made at the site entrance that the relevant paperwork is provided for each load and the driver will be issued with a receipt.

Once the waste is accepted the driver will be directed to the reception area. The driver will not leave any portion of the WTN at the site entrance at this time. In the event that a driver enters the site for the first time, the Site Manager will issue a copy of the site instructions to the driver. The relevant section of the document must be signed and returned for the site records. Drivers who have not received a copy of the site instructions nor signed the appropriate section will be refused entry to the site.

7.2.3 Visual Inspection of Pre-approved Loads

On entering the site, a suitably trained and experienced member of staff will examine the waste description detailed on the WTN to ensure that, as far as possible, the waste load is consistent with the details provided on the WTN.

The European Waste Classification (EWC) codes listed on the WTN will be checked as acceptable under the conditions of the site permit. Should any non- acceptable EWC be identified, the WTN will be checked to ensure that the EWC have been listed correctly. Where errors have been made, the correct EWC will be identified, and the WTN amended. Where the waste type is still identified as being unacceptable, the Waste Rejection Procedure (Section 6) will be followed.

The load will only be directed to the active waste deposit area when it is confirmed that everything relating to that load has been found to be acceptable. It is acknowledged that there may be occasions when inspection is not possible at the site entrance and as such inspection will take place at the operational area. No deposit will take place unless a visual inspection has taken place.

7.3 Procedures at The Operational Area

The aim of the procedures at the operational area are to:

- carry out further visual inspection of the loads during and following discharge from the delivery vehicle;
- communicate with the staff at the site entrance as necessary regarding issues relating to individual loads of waste; and
- implement quarantine and rejection procedures as necessary for any non-conforming waste identified.

7.3.1 Secondary Inspection of Waste Loads at the Disposal Area

On site verification of the accepted inert waste will be undertaken at the reception point, by the machine operator. Prior to tipping, the WTN will be passed to the machine operator who will examine the waste description detailed on the WTN to ensure that, as far as possible, the waste load is consistent with the details provided on the WTN.

Each waste load will be observed by a Site Operator as it is discharged from the vehicle and the load visually inspected at that stage to ensure there is no unauthorised materials present in the load. The visual inspection will generally take place from the cab of the mobile plant, however in the event of suspicious material being present the Site Operator will exit the mobile plant to complete a closer visual examination.

Wastes that do not conform to the description on the WTN will be isolated to a quarantine area for supplementary verification checks. Materials found to be unacceptable will be removed from site and disposed of to a suitable facility. The waste rejection procedure (Section 6) will be followed as noted previously.

When the Site Operator is satisfied that the waste is acceptable it will be deposited over the working face.

7.3.2 Completion of Documentation

After successfully tipping, the machine operator will complete the relevant section of the WTN and retain the top copy, the remaining copies will leave site with the driver.

7.4 Quarantine and Rejection Procedures

The objectives of quarantine and rejection procedures is to ensure that all non-conforming waste is removed from site and that the waste producer and carrier are informed so that appropriate action can be taken to prevent a recurrence.

Non-conforming waste will be identified by visual or olfactory means either at the site entrance or by the site operator at the operational area. Visual criteria used to assess waste loads will be the presence of material not specified by the permit or the presence of discoloration and staining. Any odorous materials will be rejected as potentially contaminated.

7.4.1 Rejection of Loads At Site Entrance

Waste will be rejected if:

- The waste has not been pre-approved;
- The waste does not comply with the description on the accompanying paperwork, the WTN or with the description on what was pre-approved;
- The waste is delivered by an unauthorised carrier; or
- If visual and olfactory inspection indicates the presence of unauthorised waste or that it may not be suitable for acceptance at the site. If it is uncertain whether the waste can be accepted the Site Manager or another Technically Competent Person will be contacted and asked to verify whether the waste can be accepted.

In the above circumstances the load will be rejected and the Site Manager or another Technically Competent Person will be informed. The driver will be informed the load has been rejected and the site operator at the entrance will issue the relevant paperwork to the driver.

7.4.2 Rejection of Loads At Operational Area

If the Site Operator observes unauthorised waste either during or after discharge of the load from the delivery vehicle, the driver will be alerted and the waste will be reloaded back onto the vehicle where possible. The driver will then be directed to return to the site entrance where the driver will be issued with the relevant paperwork and asked to leave the site.

If the delivery vehicle has left the operational area when the unacceptable material is discovered, the Site Operator will contact the Site Entrance Operator and efforts made to intercept the vehicle leaving the site to that the waste can be reloaded and the relevant paperwork issued.

In the event that the delivery vehicle has already left the site, the Site Operator will segregate the load in a temporary quarantine area away from the working face. The waste carrier will be contacted and asked to return and collect the load from site.

If the waste carrier is unable to remove the unacceptable waste, then it will be consigned to an alternative suitably authorised facility by a registered waste carrier. A new WTN will be completed for all such transactions. In the event that it is necessary to sample such waste to identify a suitable treatment facility, the necessary sampling will be carried out. The waste will be retained in the quarantine area until such times as a suitable alternative facility has been identified and the waste can be removed.

A skip will be maintained close to the operational area which will be used for the storage of isolated contaminants identified within waste loads which would not warrant rejection of the load. Such minor inclusions may include small amounts of plastic or wood which are removed from the load and placed in the skip prior to removal to a suitably authorised off-site facility.

7.4.3 Communication With Producer and Carrier

The producer and carrier of any rejected waste loads will be advised by the completion of the relevant paperwork. In the event that repeated deliveries of non-conforming waste is received from the same producer or carrier, formal letters will be sent to the offending producers and carriers and the ultimate sanction will be to prohibit them from delivering waste to the site. A record of such prohibited producers and carriers will be maintained on site and will be available for inspection by the Environment Agency (EA).

7.4.4 Notification of Rejected Loads

Details of the waste load will be documented on the Waste Rejection Form and will be logged as an incident in the site diary. The Environment Agency will be informed of the rejected load. If load rejection has taken place after the paperwork has been completed then a new transfer note will be generated.

8) Record Management

Records will be maintained of all waste transactions relating to NZT Deposit for Recovery Operations and will comprise the following.

8.1 Site Placement Records

Site will maintain records of all site-generated material which was approved and used for the recovery operations. The records will include:

- Stockpile Reference Number and Date of Sampling
- Chemical Testing Results
- Waste description and EWC code; and
- Quantity of material placed, location of placement and date of placement.

8.2 Waste Transfer Notes

All waste accepted for recovery at the site will be accompanied by a waste transfer note (unless it is a multiple consignment) in accordance with the Duty of Care requirements and will provide the following details:

- Waste description including the appropriate European Waste Classification (EWC) code;
- Waste origin;
- Transferor and transferee details;
- Transferor and transferee signatures.

8.3 Records of Waste Quantity Received

The site will maintain a register of the characteristics and quantities of waste loads accepted at the site which will include:

- Date of receipt;
- Waste quantity accepted;
- Waste description and EWC code; and
- Waste producer and/or waste carrier details.

A record will also be maintained of all waste that is removed from the site.

8.4 Waste Information Forms, Waste Rejection Forms and Correspondence

Copies of all relevant paperwork and correspondence will be maintained at the site office.

8.5 Waste Characterisation and Analysis Records

Copies of all information pertaining to the characterisation and analysis of waste accepted at the site will be maintained at the site office.

8.6 Site Log/Diary

A site log/diary will also be maintained which will be used to record further details relating to waste acceptance and rejection including logging any communications with the Environment Agency.

9) Training

All personnel involved in the acceptance of inert waste at NZT Construction Site will be fully trained on the waste acceptance procedures and must be capable of:

- Understanding the inert waste acceptance criteria for the site and site management policies;
- Understanding the information which should be provided on the documentation accompanying loads;
- Identifying inert wastes that should not be accepted at the site; and
- Following specific procedures in the event that the documentation is incorrect or the waste load does not comply with the waste types accepted at the site.

Appendix F Engineering Specification

NZT

Net Zero Teesside

EARTHWORKS ROADS AND PAVING SUB-BASE SPECIFICATION

EARTHWORKS ROADS AND PAVING SUB-BASE SPECIFICATION

B01A	30/07/24	IFR - Issued for Review	N Pressard	P Ezquera	P Ezquera
B01	24/08/22	IFF – Issued for FEED	Syed F Ali	M. Nagannavar	Syed F Ali
A02	27/07/22	IFCR – Issued for Company Review	Syed F Ali	M. Nagannavar	Syed F Ali
A01	20/04/22	IFCR – Issued for Company Review	Syed F Ali	M. Nagannavar	J Starr
Rev	Date DD/MM/YY	STATUS	WRITTEN BY (name & visa)	CHECKED BY (name & visa)	APPROVED BY (name & visa)
DOCUMENT REVISIONS					

Sections changed in last revision are identified by a vertical line in the left margin

	Project n° - Unit	Doc Type	Eng/Mat. Code	Serial n°	Page
	217994C-A00	**JSS**	**1400**	**0003**	2 / 27
Client document reference	**NS051-CV-SPE-012-A00-00001**				Rev **B01A**

NZT

Net Zero Teesside

EARTHWORKS ROADS AND PAVING SUB-BASE SPECIFICATION

Revision Description

Revision	Para.	Description
General.		Reorganization of the document
Section 3.		Update of applicable references

Holds

Hold number	Rev.	Applicable paragraph	Description

TECHNIP ENERGIES / GE VERNOVA / bp	Project n° - Unit	Doc Type	Eng/Mat. Code	Serial n°	Page
	217994C-A00	**JSS**	**1400**	**0003**	3 / 27
Client document reference	**NS051-CV-SPE-012-A00-00001**				Rev **B01A**

NZT
Net Zero Teesside
EARTHWORKS ROADS AND PAVING SUB-BASE SPECIFICATION

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Net Zero Teesside
EARTHWORKS ROADS AND PAVING SUB-BASE SPECIFICATION

1. INTRODUCTION

The Power, Capture and Compression (PCC) Project is planned to be built in Teesside in the North-East of England. Net Zero Teesside (NZT) in association with the Northern Endurance Partnership (NEP) intends to kick-start decarbonisation of the Teesside and Humber industrial clusters and deliver the UK's first zero-carbon industrial cluster, by capturing up to 10 million tons of CO2 emissions per annum from the mid-2020s. This program supports addressing national priorities such as securing green recovery and driving new jobs and economic growth in some of the regions hit most by the recent pandemic.

The project consists of a large-scale CCGT power generation plant, with a post combustion carbon capture system for abatement. The abated power is dispatched into the UK grid, with the captured and conditioned CO2 entering high pressure compression which then feeds directly into the offshore pipeline for sequestration. The HP compression is sized at 4 MTPA to also accommodate the CO2 from additional emitters within the local gathering network.

2. SCOPE OF DOCUMENT

This specification covers the materials and workmanship requirements relating to site clearance, excavation and earthworks, including Pavement base and roads, for the NZT PCC project. The earthwork shall be executed and tested in accordance with engineering code and rules, standards and governmental applicable regulations that are listed herein.

Note for T. EN and bp understanding:

- Scope covered by this document:
  - This document is based on the scope covered by the LNTP Activities as defined in Amendment 003 of the "Front End Engineering Design Services" contract # CW203177, specifically clause 19.31. EPC CONTRACT Enabling WORK.
  - While it is understood that T. EN will coordinate with Post FEED WORK to tentatively maintain provisions for accommodating the Post FEED Work results, only the post FEED Work items specified in clause 19.31.2 will be considered.
  - As an illustrative example (though not limited to), the following Post FEED WORK items are excluded:
    - Findings from performance standard review (workshops held between bp and T. EN on June 2024, 18th to 20th and on July 2024, 9th to 11th)
    - Piping Vibration Management strategy, doc ref NM051-PM-STR-012-A00-00001 rev A01
  - At the start of FNTP phase, and once post FEED WORKs are completed and finalised, this document will be reviewed, and any relevant Post FEED WORK subjects will be incorporated.
- Purpose and range of applicability of JSD & JSS:
  - Job Specification for Design (JSD), Job Specification for Supply (JSS) are to organize codes, standards, and project contractual information in a T. EN formatted manner. The purpose is to secure the works of our multiple technical disciplines, operating centers, as

well as our material suppliers, by providing the information needed in a familiar format. These documents are, therefore, intrinsically part of T. EN quality system and processes.

- These documents do not alter the contractual terms, and any deviations shall be submitted through the agreed process if such changes are necessary.
- These documents shall be applied only to the T. EN Scope of Work and T.EN suppliers, and not to GE's Scope of Work. GE have their dedicated processes, embedded within their quality management system, to ensure compliance with codes, standards and contract requirements, and to inform their teams and supplier accordingly.

3. REFERENCE DOCUMENTS

The following specifications, codes and standards shall be read in conjunction with and shall be part of this Basis of Design. Metric equivalent shall be used as applicable. Applicable parts of the industry codes, standards and references shall be considered an integral part of this Design Criteria. The edition in effect on the date of offer award shall be used, except as otherwise noted.

The order of precedence for specifications and standards is as follows:

- Statutory law and regulations.
- Project Specifications and Standards
- COMPANY Specifications and Standards
- Industry Codes and Standards

3.1. PROJECT DOCUMENTS

[A1]	NS051-CV-SPE-012-A00-00002	Foundation and Piling Work specification
[A2]	NS051-CV-BOD-012-A00-00001	Civil and Structural Basis of Design
[A3]	NS051-CV-SPE-012-A00-00004	General Civil Specification
[A4]	NS051-CV-PHI-012-A00-00001	Drainage Philosophy and Design Specification
[A5]	NS051-CV-SDD-012-A00-00002	Underground Drainage and General Civil Standard drawings
[A6]	NS051-CV-SPE-012-A00-00003	Concrete Works Specification

3.2. CODES AND STANDARDS

3.2.1. Tests and controls

[B1] EN 13108-20, Bituminous mixtures — Material specifications — Part 20: Type Testing

[B2] EN 13108-21, Bituminous mixtures — Material specifications — Part 21: Factory Production Control

[B3] BS EN 16907-5 Earthworks: Quality control

[B4] BS 1377-1, Methods of test for soils for civil engineering purposes - Part 1; General requirements and sample preparation

[B5] BS 1377-2, Methods of test for soils for civil engineering purposes - Part 2: Classification tests

[B6] BS 1377-3, Methods of test for soils for civil engineering purposes - Part 3: Chemical and electro chemical tests

[B7] BS 1377-4, Methods of test for soils for civil engineering purposes - Part 4: Compaction related tests

[B8] BS 1377-5, Methods of test for soils for civil engineering purposes - Part 5: Compressibility, permeability and durability tests

[B9] BS 1377-6, Methods of test for soils for civil engineering purposes - Part 6: Consolidation and permeability tests in hydraulic cells and with pore pressure measurement

[B10] BS 1377-7, Methods of test for soils for civil engineering purposes - Part 7; Shear strength tests (total stress)')

[B11] BS 1377-8, Methods of test for soils for civil engineering purposes - Part 8: Shear strength tests (effective stress)')

[B12] BS 1377-9, Methods of test for soils for civil engineering purposes - Part 9: In-situ tests

[B13] BS 812-124: Testing aggregates - Method for determination of frost heave

[B14] BS ISO 17313:2004: Soil quality. Determination of hydraulic conductivity of saturated porous materials using a flexible wall permeameter

3.2.2. Design and Material standards

[B15] BS EN 1997 Eurocode 7: Geotechnical design

[B16] BS EN 16907-1 Earthworks: Principles and general rules

[B17] BS EN 16907-2 Earthworks: Classification of materials

[B18] BS EN 16907-3 Earthworks: Construction procedures

[B19] BS EN 16907-4 Earthworks: Soil treatment with lime and/or hydraulic binders

[B20] CD 225 Design for new pavement foundations

[B21] CD 226 Design for new pavement construction

[B22] CD 236 Surface course materials for construction

[B23] Standard for Highway: Series 3000 (05/01) Landscape and Ecology

[B24] CIRIA Report C750 Groundwater control – design and practice

[B25] CIRIA publications C681 : UXO A guide for the construction industry

[B26] CIRIA publications C532 Control of water pollution from construction sites. Guidance for consultants and contractors

[B27] CIRIA publications C785 : UXO risk management guide for land-based projects

[B28] BS EN 13108-1 Bituminous mixtures - Material specifications - Part 1: Asphalt Concrete

[B29] BS EN 13108-2 Bituminous mixtures - Material specifications - Part 2: Asphalt Concrete for Very Thin Layers (BBTM)

[B30] BS EN 13108-3 Bituminous mixtures - Material specifications - Part 3: Soft Asphalt

[B31] BS EN 13108-4 Bituminous mixtures - Material specifications - Part 4: Hot Rolled Asphalt

[B32] BS EN 13108-5 Bituminous mixtures - Material specifications - Part 5: Stone Mastic Asphalt

[B33] EN 13108-6, Bituminous mixtures — Material specifications — Part 6: Mastic Asphalt

[B34] EN 13108-7, Bituminous mixtures — Material specifications — Part 7: Porous Asphalt

[B35] EN 13108-8, Bituminous mixtures — Material specifications — Part 8: Reclaimed Asphalt

[B36] EN 13108-9, Bituminous mixtures — Material specifications — Part 9: Asphalt for Ultra-Thin Layers (AUTL)

[B37] Standard for Highway: Series 600 ‘Earthworks’

[B38] Standard for Highway: Series 800 ‘Road Pavements – Unbound, Cement and Other Hydraulically Bound Mixtures’

[B39] Standard for Highway: Series 900 ‘Road Pavements - Bituminous Bound Materials’

[B40] Energy networks association Technical Specification 97-1 - Special backfill material for cable installations

[B41] PD 6691:2022: Guidance on the use of BS EN 13108, Bituminous mixtures

[B42] BS 8000-2-2:1990 Workmanship on building sites. Code of practice for concrete work. Sitework with in situ and precast concrete.

3.3. COMPANY DOCUMENTS & REPORTS

[C1] Net Zero Teesside – Environmental Statement Volume III – Appendices, Appendix 25A: Commitments Register: The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017(as amended)

[C2] NS051-CV-REP-0A1-00003 Geophysical Investigation

[C3] NS051-CV-REP-0A1-00006 Preliminary Onshore Ground Investigation for Net Zero Teesside (NZT) - South Tees Development Corporation (STDC) 'Main Site' and Onshore CO2 Export Pipeline Corridor Draft Factual Report

[C4] NS051-CV-REP-0A1-00009 Onshore Unexploded Ordnance Threat and Risk Assessment with Risk Mitigation Strategy: Net Zero Teesside

[C5] NS051-CV-REP-0A1-00012 Phase 2 Preliminary Onshore Ground Investigation Net Zero Teesside Factual Report

[C6] Deposit For Recovery Permit Application

[C7] Topographic Survey & Benchmarks

[C8] EN0I0103-002311-NZTDCO 6.4.49 - ES Vol III Appendix 25A Commitments Register Clean Oct 2022 (D9). (AVAILABLE ONLINE)

[C9] EN010103-002537-NZT DCO 4.4 - Works Plan Key Plan Nov 2022. (AVAILABLE ONLINE)

[C10] (D12J.pdf EN010103-002538-NZT DCO 4.4 - Works Plan Nov 2022 (D12). (AVAILABLE ONLINE)

[C11] EN010103-002555-NZT DCO 6.3.2 - ES Vol II Figure 3-1 Site Boundary Plan Nov 2022 (D12). (AVAILABLE ONLINE)

[C12] Site remediation Record Hand Over Package final documentation. (DETAILLED REFERENCE TO BE AKNOWLEDGED)

3.4. CONFLICTING REQUIREMENTS

Any conflict between the referenced codes and standards, contract documents and this Basis of Design, the most stringent requirement shall govern until written clarification is provided by COMPANY.

4. DEFINITIONS AND ABBREVIATIONS

CLSM	Controlled Low-Strength Material
COMPANY	BP Exploration Operating Company Limited (bp)
CONTRACTOR	Consortium of GE Gas Power and Technip Energies
COSHH	Control of Substances Hazardous to Health
CEMP	Construction Environmental Management Plan
DCO	Development Consent Order
DPT	Dynamic Penetration Test
EPC	Engineering, Procurement & Construction
FEED	Front-End Engineering Design
IFC	Issued for Construction

NZT
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ISBL	Inside Battery Limits
OSBL	Outside Battery Limits
PCC	Power, Capture & Compression
PLT	Plate Loading Test,
Project	NZT / NEP Power, Capture and Compression Project
SUB-CONTRACTOR	Contractor responsible for the execution of the works as described in present document.
STDC	South Tees Development Corporation
T. EN	Technip Energies
TRL	Transport Research Laboratory
UXO	Unexploded Ordnance

5. GENERAL REQUIREMENTS

Modern plant adequately sized for the scale of work involved and the time limits required by the contract shall be used. The selection of plant shall also consider the types of material, proximity of existing structures and equipment and environmental considerations.

Prior to the start of work, the number, and types of plant to be used and the method of working shall be submitted to the CONTRACTOR for approval. Prior to commencement of the site work, SUB-CONTRACTOR shall develop and submit Materials Management plan and Quality Control Plan including Inspection Test Plan (ITP) in accordance with the project Construction Environmental Management Plan. ITP shall include details of field and laboratory testing, and calibration requirements which shall be carried out by an independent inspection and testing agency to control the quality of earthworks. SUB-CONTRACTOR shall appoint a qualified independent inspection and testing agency.

SUB-CONTRACTOR shall obtain a 'Work Permit' from COMPANY before commencing any underground works located within an existing third-party facility. Excavations in the vicinity of existing underground services shall be carried out by hand digging until the existing live underground services are exposed.

5.1 Benchmarks and setting Out

SUB-CONTRACTOR shall satisfy himself of any grid points or benchmarks provided by CONTRACTOR (refer to [C7]).

Before the earthworks are begun, SUB-CONTRACTOR shall submit for the approval, his proposals for setting out and controlling the works to the dimensions and levels shown on the IFC drawings. SUB-CONTRACTOR shall give CONTRACTOR not less than 24 hours' notice in writing of his intention to set out the works to enable CONTRACTOR to make arrangements for checking as considered necessary. Any check by CONTRACTOR shall in no way absolve SUB-CONTRACTOR from his responsibility for setting out the works correctly.

5.2 Development Consent Order (DCO)

The design and implementation of the earthworks shall reference the guidance within [B16] . Principles and general rules detailed within the DCO [C8] [C9] [C10] [C11] shall be implemented in the execution of earthworks.

5.3 Unexploded Ordnances (UXO) and residual contamination

The earthworks shall take account of the residual conditions following the site remediation works undertaken by STDC [C12] , including UXO risk [C4] and residual contamination. The management of UXO risk shall refer to [B25] and [B27] .

5.4 Construction Phase Earthworks

Subject to the residual conditions following remediation of the site by STDC [C12] , prior to the commencement of any construction Works, SUB-CONTRACTOR shall clear the Site of all rubbish, debris, building and unwanted materials of any description and remove / dispose them

in line with CEMP and [C6] requirements, via licensed contractor to area permitted by the local approving authorities.

SUB-CONTRACTOR shall prepare and re-dress the Site platform level as necessary with free-draining granular material to facilitate the efficient movement of Plant and personnel during the construction of the Works and shall maintain the surfacing as required such that construction is not interrupted and water collection on the surface is minimised.

SUB-CONTRACTOR shall properly establish temporary site drainage system including settlement/attenuation ponds, oil interceptors and run off from the wheel washes. Disposal of water from the Site from whatever source during construction stage of the Works shall be controlled as directed by CONTRACTOR and in line with CEMP and [C6] Any contaminants whose presence would render water unsuitable for discharge into water courses or drains external to the Site shall be effectively removed prior to discharge and, where appropriate, such extracted contaminants shall be transported to a licensed disposal facility by SUB-CONTRACTOR.

5.5 Permanent Earthworks

The earthworks shall be designed to minimise the amount of cut and fill complying with the Environmental and Planning requirements. In addition, the final platform level shall be in line with the requirements of the DCO documents [C8] [C9] [C10] [C11] which will be reflected in the drawings issued by CONTRACTOR.

Adequate hard standings suitable for the plant, equipment and/or vehicles using them shall be provided for the proper operation and maintenance of the Plant.

Temporary hard standings shall be provided to permit storage of equipment as per the relevant construction drawings shall be provided by SUB-CONTRACTOR.

Earthworks activities shall be carried out fully in accordance with the requirements of [B15] , and the Specification for the Highway Works,[B37] .

Commencement of any field work shall be subject to a ‘Permit to Work’ system as per the project Construction Execution Plan and HSSE Plan.

SUB-CONTRACTOR shall be responsible for setting up the site coordinate system and datums provided in the CONTRACTOR drawings. All physical survey monuments shall be protected and maintained by SUB-CONTRACTOR for the entire duration of Works.

Should any form of ordnance be discovered during construction it shall be immediately reported to CONTRACTOR for further instruction. All construction activities shall be suspended immediately, and the area shall be vacated. An agreed UXO risk assessment and on-site procedure shall be followed by the SUB-CONTRACTOR.

This specification does not cover requirements related to any ground improvement work considered specialised work, if needed would be designed and executed by a specialised contractor as per CONTRACTOR design and performance criteria.

5.6 Construction Environmental Management Plan

The issuance of the “Construction Environmental Management Plan” CEMP is under the duty of SUB-CONTRACTOR

5.7 Environmental Requirements

Measures shall be taken to control dust, using water spray or other effective method, throughout the duration of excavation and filling operations.

Any surface water and ponding water disposal from the site reference shall be made as per [B26] requirements.

6. SITE CLEARANCE

6.1 Removal of Surface Material and Existing Construction.

SUB-CONTRACTOR shall demolish and clear from the Site any redundant roads, hedges, shrubs, buildings, foundations and the like, which are not covered in the existing remediation work and are specified on the drawings to be demolished.

Existing underground services which are directed as redundant shall be removed, sealed or redirected, as shown on IFC drawings or as directed by CONTRACTOR. The extent and nature of site clearance will be identified on site preparation / earthworks IFC drawings.

Areas where trees/vegetation are to remain shall be clearly marked at site prior to commencement of the works. SUB-CONTRACTOR shall be responsible for protecting trees, shrubs and other vegetation outside the earthworks area. Trees or bushes designated to be replanted shall be uprooted in a manner to avoid damage to the root system and replanted in soils that promote their growth.

All other trees, shrubs, hedges and vegetation shall be cleared from the site and roots shall be grubbed out. Any depressions caused by clearing, grubbing and soft spots removal shall be filled and compacted with approved material.

Existing buildings, walls and fences, identified for demolition on the site preparation IFC drawings, shall be clearly marked at site, prior to commencement of the works.

Existing underground services including any temporary or permanent monitoring wells and standpipes at site shall be protected from disturbance or damage. Exclusion zones and protection shall be provided as necessary.

Material to be cleared from site shall not be burned, disposed of or buried without prior CONTRACTOR approval.

6.2 Existing Structures and Foundations

Before earthworks operations commence, the existing ground surface elevation and boundaries shall be surveyed for validation/record purposes and as the basis for calculation of earthworks quantities. The location of residual services (further to remediation works [C12] shall be

confirmed by field investigation, using ground penetrating radar (GPR), electromagnetic location (EML) and trial digs by hand or vacuum excavation subject to no impact on the live services and necessary safety measures, as appropriate. CONTRACTOR will review the results of the survey and advise COMPANY accordingly. Where needed, SUB-CONTRACTOR to conduct volumetric survey for the stockpiles to accurately quantify the earthwork volumes.

All necessary steps shall be taken to prevent damage to identified services by appropriate methods of working, including hand digging and physical protection measures.

The stability of existing structures and foundations constructed as part of the PCC project shall be maintained during the excavation in surroundings, by the use of temporary supports and appropriate clearance distances, having regard for load distribution beneath foundations. Excavation under foundations shall be prohibited. Excavation areas around foundation and structures shall be inspected before commencement and subject to approval prior to being backfilled. CONTRACTOR shall be notified within 24 hours if any unforeseen services, features or structures are encountered during the Works. Continuation of work shall be subject to CONTRACTOR approval.

7. EXCAVATION

All excavations shall be carried out to the lines, levels and depths required by CONTRACTOR IFC drawings and shall comply with the tolerances specified and in accordance with [B16] . All excavations shall be suitably shored, supported and strutted, to enable the works within to be carried out efficiently and safely. Prior to start of the excavation works, SUB-CONTRACTOR shall submit for CONTRACTOR / COMPANY review and approval the necessary calculations for shoring or other proposed temporary work measures for safe execution of the works. The related temporary works shall include safe access and egress of the personnel and equipment from the excavation areas. Any surcharge loading due to equipment movement or material storage around the excavation shall be adequately accounted for in the slope stability checks and shoring design, preferably material storage around the excavation area shall be avoided.

Subject to the approval of CONTRACTOR, SUB-CONTRACTOR may, if wishes, provide battered sides to excavations with supporting slope stability calculation, to dispense with strutting and supports. In no case the battered slope shall be steeper than 1V:1.5H. Such additional excavation shall be deemed to be included in the SUB-CONTRACTOR's rates, including the cost of back-filling, consolidating around the work with approved material, and reinstatement to original (i.e. Concrete or tarmac hardstanding, gravel etc.).

Where design conditions limit the width of trench for a drain or pipeline, the maximum trench width will be shown on the drawings. Such trenches must be excavated with vertical sides (as specified in the drawings) and battering of the excavation shall not be permitted.

Any over-excavation of the formation shall be filled and compacted with approved material of similar characteristics to the in-situ material. Alternatively, in the case of structural foundations, it may require the level to be made up in lean concrete over the full width of the foundation.

SUB-CONTRACTOR shall locate all existing services known to be within or close to the earthworks and shall protect them against movement or damage during works. If, in the course of excavation SUB-CONTRACTOR comes upon any pipes, cables, concrete work or other obstruction not indicated on the drawings he shall immediately inform CONTRACTOR and shall resubmit his construction operation method statement and risk assessment for approval in accordance with the approved site management change procedure. Care shall be taken not to damage any live or new pipes or cables or other obstruction which may run through the PCC plot. The work shall only commence after the necessary approvals from CONTRACTOR.

SUB-CONTRACTOR shall prepare and re-dress the Site platform level as necessary with free-draining granular material to facilitate the efficient movement of Plant and personnel during the construction of the Works and shall maintain the surfacing as required such that construction is not interrupted and water collection on the surface is minimised.

SUB-CONTRACTOR shall keep the works free from surface water using temporary pumping, bailing or other means. The formation beneath concrete structures shall be covered with blinding concrete on the same day as it is excavated. Particular attention shall be paid to maintaining a dry formation during the pouring and setting of concrete.

Specialised dewatering techniques shall not be used without the prior approval of the CONTRACTOR.

If high groundwater inflow is expected, sheet piling will be required to ensure stability and control groundwater inflow at this depth. Method Statement for installation and depth of such sheet piling shall be provided by SUB-CONTRACTOR for approval by CONTRACTOR.

SUB-CONTRACTOR shall carry out the excavations so that suitable materials for filling shall be excavated separately and be kept apart from all other excavated material in stockpiles as approved by CONTRACTOR. No excavated material suitable for filling shall be removed from the site unless it is deemed by CONTRACTOR to be surplus to requirements.

All material that is deemed unsuitable or surplus to requirements shall be removed to a location approved by the CONTRACTOR.

Working methods and equipment shall be used which are appropriate to the type and condition of the soil encountered.

Care shall be taken in selecting the work methods and equipment to ensure that the physical properties of the soil are not affected during excavation, transportation, storage, compaction or any other related activities.

SUB-CONTRACTOR shall immediately advise CONTRACTOR of any previously unforeseen conditions or obstruction to be discussed and agreed with CONTRACTOR.

SUB-CONTRACTOR shall be wholly responsible for the safety of the works during all stages of construction. He shall be responsible for regularly checking that excavations are safely supported and maintaining a register of such checks, which shall be available to CONTRACTOR for inspection.

Topsoil stripped off the surface of excavations and the storage of topsoil in stockpiles or its removal off site, shall be to the extent specified on the CONTRACTOR drawings. Topsoil stockpiles shall be formed in approved locations, to slopes and dimensions as shown on the CONTRACTOR IFC drawings.

Care shall be taken to avoid consolidation of topsoil by vehicles. Precautions shall be taken to prevent stored topsoil being contaminated by sub-soil, cement, diesel, lubrication oil or other substances likely to impair its growing qualities. Topsoil containing organic material shall not be used for any fill or backfill.

Excavation supports shall be removed as the filling proceeds except where they are specified as per drawings to be left in position.

Construction plant shall not be permitted to use the surface of an excavation unless the bottom of the excavation is maintained 300 mm above formation level. Any damage to the formation shall be made good as described earlier in this section.

Rock blasting is not permitted without prior approval from CONTRACTOR, only to be used in exceptional circumstances after exhausting other available options and satisfying the DCO noise limits requirements at the receptors. Preferably, rock shall be excavated with mechanical rippers, mechanical breakers or mechanical drills with non-explosive demolition agent.

SUB-CONTRACTOR shall excavate to remove soft spots or other unsuitable materials below formation level and replace it with compacted STRUCTURAL FILL.

7.1 Water in Excavations

Excavations shall be kept free of water by methods submitted by SUB-CONTRACTOR and approved by CONTRACTOR a minimum of fourteen (14) days prior to commencement of excavation.

Labour and equipment to remove water from excavations shall be provided by SUB-CONTRACTOR. Water shall be pumped to a location within environmental limits [C8] [C6] and as directed by CONTRACTOR.

SUB-CONTRACTOR shall ensure that ground water table levels are not less than 500 mm below the lowest level of excavations, during periods of construction activities. Methods of maintaining groundwater table levels shall be submitted by SUB-CONTRACTOR for review and approval by CONTRACTOR a minimum of fourteen (14) days prior to commencement of maintaining groundwater levels.

Where pumping is necessary the material in and around the excavations shall not be disturbed by pumping and all sumps shall be formed in the excavations clear of permanent works. All ditches, field drains, and other waterways wherever encountered during progress of work shall be diverted by SUB-CONTRACTOR, as required, including obtainment of all necessary permissions from relevant local authorities and CONTRACTOR. Where such diversions are temporary, they shall subsequently be reinstated. Prior to installing dewatering system, SUB-CONTRACTOR to submit the suitable design for dewatering to include, a pumping design plan, pump sizing, hose diameter and length, and discharge location, for approval and disposal of water for CONTRACTOR approval.

7.2 Preparation of Area for Filling

The bottom of the excavation material shall be screened as necessary to reach the applicable specification as per section 8.1 and prepared in accordance with section 8.6.

Placement of the blinding concrete were indicated on the drawing shall not take place until approved by CONTRACTOR.

8. BACKFILL

Backfill shall not be placed until the subsurface construction (foundations, underground piping etc) and preparation of the subgrade have been inspected and approved by CONTRACTOR.

When backfilling above foundations, the concrete must have hardened sufficiently to avoid impregnation by backfill material, spalling, cracking or any other damage caused by backfilling. The criteria for “hardened sufficiently” shall follow the requirements for the removal of formwork as given in [B42] .

When during the progress of the work but subsequent to the acceptance of an excavation the material forming the bottom of an excavation becomes puddled, soft or loose SUB-CONTRACTOR shall remove such damaged, softened or loosened material and make good in accordance with the requirements of 8.6.

8.1 Backfill Material Selection and Acceptability

Unless otherwise shown in the CONTRACTOR IFC drawings, the following areas shall be backfilled using STRUCTURAL FILL:

a) Beneath or immediately surrounding foundations

b) Beneath slabs, roadways, area pavement, and parking areas

c) Where otherwise indicated on design drawings

Other areas not designated above may be backfilled using GENERAL FILL.

The backfill material are classified as below:

GENERAL FILL: Backfill to be used as GENERAL FILL shall be gravel, sand, clay, or silt, or a mixture of these constituents as per section 8.1.3 and is capable of being compacted to requirements of Section 8.6.

Fill material shall be free of frozen lumps, organic matter, trash, chunks of highly plastic clay or other unsatisfactory material and is capable of being compacted to the requirements of section 8.6.

STRUCTURAL FILL: Backfill to be used as STRUCTURAL FILL shall be gravel, sand, clay, or silt, or a mixture of these constituents as per section 8.1.4 and is capable of being compacted to requirements of Section 8.6.

Controlled Low-Strength Material (CLSM): CLSM may be substituted for either STRUCTURAL FILL material or GENERAL FILL material where needed subject to CONTRACTOR approval.

Mix design shall be proportioned to produce a 28-day compressive strength between 0.3 and 0.7 MPa for GENERAL FILL and 0.7 and 1.4 MPa for STRUCTURAL FILL, pre-tested using actual raw materials and approved by CONTRACTOR before use.

Impermeable Fill: Is compacted clay fill which has a hydraulic conductivity of less than $1x10^{-6}$ cm/second using the fluids to be retained.

This fill shall be used for the Earthen dikes or levees using fill material with hydraulic conductivity, liquid limit and plasticity index as specified in IFC drawings. Channel or pond linings shall have a minimum of 300 mm thick layer of compacted clay unless noted otherwise in IFC drawings.

The hydraulic conductivity shall be measured in accordance with [B14] .

Landscape Fill: Landscape fill shall be provided for the area allocated for landscaping in the architectural drawings. Landscape areas shall be topsoiled with suitable topsoil material when shown on the IFC drawing to receive the subsequent turfing on top. The material for the landscape fill shall be as per section 8.2.3 and the compaction shall be as per 8.6.

Topsoil Fill: Topsoil shall be provided in areas receiving turfing for the landscaping. The material for the topsoil shall be as per section 8.2.4 and the compaction shall be as per 8.6.

Working platforms: A working platform is required for compaction on soft soil, shall be 500mm thick layer of GENERAL FILL material placed directly on the soft soil and compacted as necessary to achieve a stable base. A geotextile layer between the soft soil and the working platform shall be provided for the capillary break to improve both short-term (construction) and long-term performance of the GENERAL FILL. Compaction testing of working platforms is not required.

8.1.1 Fill around underground Pipes

Backfill around underground pipes shall be as specified on the IFC drawings. This may involve backfilling in purpose excavated trenches, or in areas of general excavation adjacent to foundation. The material used for backfilling around underground pipes shall be as shown on the IFC drawings and maybe be different from that required for general site filling as specified in [A5] . Different materials must be compacted monolithically during laying.

The material used shall contain no particle size greater than 50 mm in any dimension within 150 mm of the piping or ducts. Backfill material within 150mm of coated pipes shall be non-angular 10mm single size.

8.1.2 Fill to cable trenches of buried cables

The fill around underground cables will be in accordance with applicable electrical specification. The material used for backfilling around underground cables shall be as shown on the IFC drawings and may be different from that required for general site filling as specified in [A5] . The cable trench above cable tiles or markers can be backfilled with selected excavated material.

Example of material for filling cables trenches according to [B40] is provided for SUBCONTRACTOR guidance.

ENA TS 97-1 Pass specifications (laboratory)	SELECTED SAND	GRAVEL/SAND	CEMENT BOUND SAND
Resistivity fully dry (Km/W)	≤2.7	≤1.2	≤1.2
Dry Density (Mg/m³)	≥1.6	≥1.8	NA
Cohesion *	2 of 3	2 of 3**	NA
Voids ratio	NA	NA	≤0.54
Composition (% passing 5 mm)	≥95%	≥95%**	≥95%

* Tests to support the 4 kg weight **Sand Only NA: Not applicable

8.1.3 GENERAL FILL

Class 1A/1B (Well graded granular material) as per [B37]

8.1.4 STRUCTURAL FILL

Class 6N (Selected well-graded granular material) as per [B37]

The material shall be mechanically screened to the grading as specified in Table 6/2 from [B37]
.

BS Sieve Size	Percentage By Mass Passing
75 mm	100
63 μ mm	< 15

Water soluble sulphate (WS) and total sulphate content as per requirement for concrete classes as per [A6] for the structures in contact with STRUCTURAL FILL, i.e. Piles, Foundations, Ground Slabs, Paving, Ditches, Manholes and reinforced concrete slabs shall be considered.

At the time of delivery, the material shall be visually checked for contamination by unsuitable material.

Unsuitable material is as listed below:

i. Organic clay or silt, wood, debris, trash and any other foreign material.

ii. Chemically contaminated material.

iii. Organic material, topsoil, peat or other materials subject to decomposition.

iv. Frozen material (but may be used when thawed).

All excavated material classified as unsuitable shall be removed from the site. Any material delivered without written certification or contaminated with unsuitable material shall be rejected.

8.1.5 Granular Sub-Base Materials

Granular sub-base materials shall be in accordance with [B38] – Clause 801.

Subclause 9 of Clause 801 shall be disregarded and Water soluble sulphate (WS) and total sulphate content as per requirement for concrete classes as per [A6] for the Sub-Base material at the vicinity (less than 500mm) of structures, i.e. Piles, Foundations, Ground Slabs, Paving, Ditches, Man Holes and reinforced concrete slabs shall be considered.

It shall be classified as:

- Type 1 in accordance with clause 803 or
- Type 2, in accordance with Clause 804.

SUB-CONTRACTOR shall supply a certificate confirming that the material has a heave not greater than 15 mm when subjected to [B13] frost heave test.

8.1.6 Landscape Fill Material

The landscaping areas shall be constructed with Class 4 material complying with Table 6/1 of series 600, Specification for Highway Works.

8.1.7 Topsoil

Topsoiling shall be carried out using Class 5 [B37] .

8.1.8 Compaction Water

Water used for compaction of fill material shall be reasonably free of salts, oil, acid, alkalis, organic matter, or other deleterious substances. Use of water with Total Dissolved Solids of 10,000 ppm or more (i.e., brackish water, seawater or water obtained from ground pits) is not allowed.

8.1.9 Geotextile Membrane

Geotextile membranes shall be manufactured from synthetic or other fibres and shall be in the form of a thermally bonded permeable membrane. They shall be handled, stored and installed in accordance with the Manufacturer's instructions.

Non-woven Geotextiles shall meet the following criteria:

- Sustain a tensile load of not less than 2.5 kN/m at 5 per cent axial strain determined on a wide 'strip' tensile test to Manual of Contract Documents for Highway Works - Volume 1 Specification for Highway Works Series 600 Earthworks – Clause 609.
- Allow water to flow through at right angles to the principal plane in both directions at a minimum rate of 10 litres/m^2/s under a constant head to 100 mm determined to Manual of Contract Documents for Highway Works - Volume 1 Specification for Highway Works Series 600 Earthworks requirements.

- Have a size distribution of pore openings such that the D90 size is between 100 and 300 microns.

CONTRACTOR may be instructed to conduct tests to demonstrate the compliance of proposed geotextile with the relevant Specification for Highway Works prior to authorisation being given for its use in the works. The results of the required tests shall be submitted to CONTRACTOR for review a minimum of fourteen (14) days prior to commencement of testing.

The materials on which the geotextile is to be laid shall not have any protrusions or sharp projections which are likely to damage the geotextile during installation or in service. The method of installation must ensure that the geotextile is in continuous contact with the surface on which it is being placed.

Minimum overlaps between sheets shall be 300 mm but this shall not be less than the manufacturer requirements.

Immediately after laying, a fill material shall be placed on the membrane to act as protective cover against direct operation of construction plant.

8.2 Material Certification

SUB-CONTRACTOR shall submit the material testing regime for acceptance and production (if from external sources) and classification / suitability and production if site-excavated, before the start of earthworks. SUB-CONTRACTOR shall provide written certification, along with all test results at delivery, that all imported material conforms to the requirements of this specification.

8.3 Material Storage

All excavated materials are to be transported to the nominated ‘on site’ spoil storage area, from where they are to be spread and compacted in accordance with CONTRACTOR’s instruction, to form backfill, landscaping / screen bunds or embankments. Where material is required to be stored prior to use it shall be stockpiled in a manner to avoid contamination by unsuitable materials. Stockpiles shall be covered to protect them from being contaminated by unsuitable materials and rain, snow, frost etc.

Stockpiles shall be placed, graded, and shaped for proper drainage. Storage or stockpiling of material shall not be permitted on a completed subgrade. Stockpiles of cohesive soil shall be protected from freezing.

8.4 Placing of Fill

Lift thicknesses and compaction methods shall be aligned with [B37] Table 6/4.

Each layer shall be spread, levelled and compacted over the full width of the area in accordance with section 8.6 before the next layer is placed. Necessary compaction trials, where the different layer thickness of each material is established for the different compaction equipment to be used on site shall be performed by SUB-CONTRACTOR. The Method Statement for the trials should be submitted to CONTRACTOR / COMPANY for approval in advance of the work taking place.

Fill around and above piping, or concrete encased duct banks shall be carefully compacted by hand in accordance with the requirements of [A5] In constrained areas where the compaction of the backfill is difficult SUB-CONTRACTOR shall consider using the CLSM as per section 8.1.

8.5 Laboratory Control Tests

SUB-CONTRACTOR shall submit the testing plan prior to starting of the work for CONTRACTOR / COMPANY review and approval.

Tests of gradation, plasticity, density, and moisture content shall be performed for each type of fill material in accordance with [B4] to [B12] . These tests shall include the following:

Required tests for cohesive soils:

- Sieve analysis
- Plasticity Index determination
- Modified Proctor Test with corresponding Proctor curve including voids percentage.

Required tests for cohesionless soils:

- Sieve analysis

When the backfill, material cannot clearly be classified as cohesive or cohesionless both Relative Density and Proctor density tests must be performed per the above paragraph. The backfill shall then be compacted to the greater density.

The control tests shall be conducted at a minimum for every 10,000m^3 where the fill material is uniform or for every change of source or material type.

SUB-CONTRACTOR shall ensure that the fill material is uniform. However, in situations when the fill is (1) from a single borrow area but non-uniform in composition, or (2) a stockpile from multiple sources, the tests in section 8.7.1 shall be conducted at a minimum for every 5,000 m^3 using a combined sample of four random samples of the fill material.

8.6 Compaction criteria and testing frequency

Compaction shall take place as soon as practicable after deposition and spreading of the layer. Each layer shall be thoroughly compacted before the next layer is applied.

Compaction of fill materials shall be in accordance with [B37] Clause 612, Table 6/2 and Table 6/4 and compaction of granular sub-base materials shall be in accordance with [B38] Table 8/5.

Backfill layers shall be uniformly compacted in accordance with the following density requirements:

Fill beneath and/or adjacent to	Material	Compaction criteria	Testing Frequency
- minor foundations, - grade beams, - lightly loaded mats, - lined slopes, - drainage channels,	STRUCTURAL FILL as per 8.1.4	Method compaction as per [B37] Clause 612, Table 6/2 and Table 6/4	NA
- foundations with static loads over 100 kPa - foundations for vibrating or heavy machinery	STRUCTURAL FILL as per 8.1.4	Method compaction as per [B37] Clause 612, Table 6/2 and Table 6/4 And Plate Loading test E>80MPa [B12] or equivalent CBR or Dynamic Penetration Test	PLT: - every two lift, - 1/2000m² - Min. one per foundation, Or DPT: - 1/2000m² - Min. one per foundation,

Fill beneath and/or adjacent to	Material	Compaction criteria	Testing Frequency
Asphalt and concrete pavement subgrades:	STRUCTURAL FILL as per 8.1.4	Method compaction as per [B37] Clause 612, Table 6/2 and Table 6/4 And Plate Loading test E>80MPa [B12]	PLT: - every two lift, - 1/2000m²
Areas not designated as open or landscaped	GENERAL FILL as per 8.1.3	Method compaction as per [B37] Clause 612, Table 6/2 and Table 6/4 And Plate Loading test E>50MPa [B12]	PLT: - every two lift, - 1/2000m²
Areas designated as open or landscaped	GENERAL FILL as per 8.1.3	Method compaction as per [B37] Clause 612, Table 6/2 and Table 6/4	NA
Asphalt Pavement and Reinforced concrete Pavement Sub-Base	Sub-Base materials as per 8.1.5	Method compaction as per [B38] Table 8/5 And Plate Loading test E>100MPa [B12]	PLT: - 1/1000m² or 50 m along road axis
Backfill of trenches	Cf. Section 8.1.1 and 8.1.2	Method compaction	NA

Topsoil identified as “for planting purposes” is exempted from compaction requirements.

The moisture content where necessary, shall be maintained within +/- 2% of the optimum moisture content unless otherwise specified and if additional water is necessary to achieve this, then the water shall be evenly sprayed and worked into the material as the compaction proceeds. For cohesionless freely draining soils there is no applicable optimum moisture content.

Different types of material shall normally be spread and compacted in separately defined areas, but where it is necessary to use several different types of material in small adjacent areas the

compaction method over the entire area shall be for the material that requires the greatest compaction effort.

As a minimum, at least one in-place density test must be performed every 2 lifts of fill and further placement shall not be allowed until the required density has been achieved.

The number of tests shall be increased if a visual inspection determines that the moisture content is not uniform or if the compacting effort is variable and not considered sufficient to attain the specified density.

8.7 Tolerances

For excavation and backfilling the allowable tolerance from those specified on drawings shall be as follows:

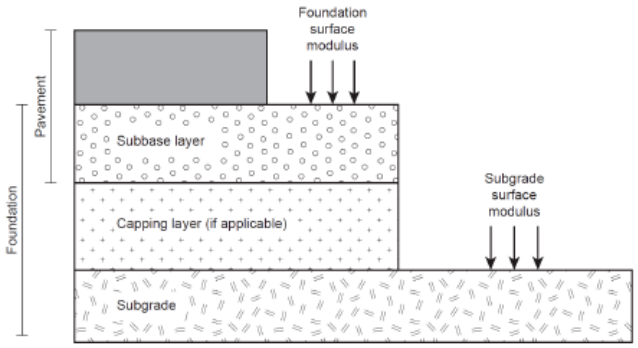
- In plan + 50 mm from location shown
- In elevation +/- 30 mm from levels shown for the process areas grading.

In elevation +/- 20 mm from levels shown for the foundations and structures.

9. ROADS AND PAVING

9.1 Pavement Foundation

According to [B20] definition, the foundation surface modulus to be considered in the design will be established based on [B20] table 3.7.



Note: According to [C12] the remediated material was systematically tested, and would provide a Subgrade surface modulus exceeding:

- *50MPa in more than 90% of the cases and*
- *100 MPa in more than 50% of the cases.*

Assuming a granular subbase layer, 225mm as per [B38] clause 803-804-806-807 would result in a foundation class 2.

9.2 Roads

Roads, or “flexible pavement” will be of the “asphalt base” or “HBGM” type. Base and binder course will be chosen in Table 2.10 or 2.13 from [B21] specification and controls for the execution will be as per [B41] :

- Annex B for the production, placement and control of Asphalt Concrete,
- Annex C for the production, placement and control of Hot Rolled Asphalt,
- Annex D for the production, placement and control of Stone Mastic Asphalt,
- Annex E for the production, placement and control of Mastic Asphalt.

Construction details shall be as per [A5]

9.3 Paving

Rigid pavement will be made of reinforced concrete. Construction details shall be as per [A6] and [A5]

Appendix A Engineering Specification[1]

[1] Standards for Highways, Manual of Contract Documents for Highways Works: Volume 1 – Specification for Highways Works: Series 600 Earthworks, 2017

Requirement for Acceptability of Earthworks Materials

1. All earthworks materials will be classified for acceptability in terms of their geotechnical properties.
2. With reference to the MCHW Volume 1, Specification for Highways Works, Series 0600 Earthworks, a modified copy of Table 6/1 for use in the works is included to follow.
3. The classification and confirmation of acceptability of the earthworks materials will be carried out by the Contractor at excavation for on-site materials and at the point of deposition for imported and recycled site-won materials. Sampling locations for classification purposes will be agreed with the Designer's Site Representative in advance of works commencing. The rate of testing required will be sufficient to ensure the correct classification of materials taking into account the variation in their properties, see to follow.

Table 6/1. Schedule of Acceptable Earthworks Materials: Classification and Compaction Requirements (See Footnotes)

CLASS	GENERAL MATERIAL DESCRIPTION	TYPICAL USE	PERMITTED CONSTITUENTS (All subject to requirements of Clause 601 (SHW)	MATERIAL PROPERTIES REQUIRED FOR ACCEPTABILITY (in addition to requirements on use of fill materials in Clause 601 (SHW) and testing in Clause 631 (SHW)					COMPACTION REQUIREMENTS IN CLAUSE 612 (SHW)
				PROPERTY (See exception in previous column)		DEFINED AND TESTED IN ACCORDANCE WITH:-	ACCEPTABLE LIMITS WITHIN: Lower	Upper	
1A, 1B, 1C	Granular Material	General fill	Any materials or combination of materials other than chalk. Recycled aggregate.	(i)	grading	BS 1377 Part 2	Table 6/2	Table 6/2	Table. 6/4
				(ii)	shear strength	Clause 636	Phi 25^0 Cohesion 0	-	
2A, 2B, 2C	Cohesive Material	General fill	Any material or combination of materials other than chalk	(i)	grading	BS 1377 Part 2	Table 6/2	Table 6/2	Table 6/4
				(ii) (PL)	plastic limit	BS 1377 Part 2	-	-	
				(iii)	mc	BS 1377 Part 2	PL – 4%	PL + 4%	
				(v)	undrained shear strength of remoulded material	Clause 633	50 kN/m^2 Phi 25^0 Cohesion 0	-	
6A	Selected Well Graded Granular Material	Starter Layer Below Water	Natural gravel, natural sand, crushed gravel, crushed rock, crushed concrete, well burnt colliery spoil or any combination thereof. Recycled aggregate	(i)	grading	BS 1377 Part 2 (On-site)	Table 6/2	Table 6/2	Below water – no compaction
						BS EN 933-2 (Off-site)	Table 6/5	Table 6/5	Above water – Table 6/4 Method 5
				(ii)	plasticity index	BS 1377 Part 2	Non-plastic		

Notes: For Table 6/1

1. For material classes 1A, 1B, 2A, 2B and 2C the optimum moisture content (omc) and the maximum dry density (mdd) will be determined on material passing a 37.5 mm sieve in accordance with BS1377 Part 4 Method 3.6 using the CBR mould and modified number of blows. Fresh material will be used for each compaction point.
2. The moisture content will be determined on the material passing the 37.5 mm BS sieve.

Requirements for Testing Of Earthworks Materials

1. Acceptable limits for the earthworks materials, and the testing required on these materials are detailed in the modified Table 6/1 of this Appendix.
2. The frequency of testing required to determine materials acceptability is provided in Table F1 .
3. The classification and confirmation of acceptability of the earthworks materials will be carried out by the Contractor at excavation for on-site materials and at the point of deposition for imported materials.
4. Samples for classification purposes will be agreed with the Designer in advance. If in the opinion of the Designer the material has altered its classification or become unacceptable for whatever reason, the Contractor will repeat the classification and acceptability tests given in Table 6/1 and Table F1. The rate of further testing required will be sufficient to ensure the correct classification of materials taking into account the variation in their properties.

Work, Goods or Material	Test	Frequency of Testing
Series 600		
TABLE F1 GEOTECHNICAL TESTING		
General Fill Granular Material Class 1A, B, C	Grading to BS 1377 (1990) Part 2 by dry sieving	Once Weekly and significant change in material
	Shear Strength (300mm shear box) BS1377: Part 7: Clause 5 1990)	1 test / 25,000 m^3 with a min. of 1 tests per classification of material compacted at o.m.c. / m.d.d.
General Fill Cohesive Material Class 2A, B, C	Grading to BS 1377 (1990) Part 2 by wet sieving and every 5th test completing a sedimentation test	Once Weekly and significant change in material
	Liquid/Plastic Limits to BS 1377 (1990) Part 2	Once Weekly and significant change in material
	Shear Strength (effective stress) BS1377 (1990) Part 8	1 test / 25,000 m^3 with a min. of 1 tests per classification of material compacted at o.m.c. / m.d.d.
Starter Layer Class 6A	Grading to BS 1377 (1990) Part 2 by dry sieving	Once Weekly and significant change in material

Appendix G Soil Screening Criteria

Contaminant of Concern	Proposed Soil WAC (mg/kg)
Ammoniacal nitrogen	4.40
Cyanide	15
Aluminium	84,600
Arsenic	101
Cadmium	33.2
Copper	244
Lead	4,588
Mercury	24.0
Vanadium	3,598
Zinc	9,003
Acenaphthene	2.22
Acenaphthylene	3.6
Anthracene	25.4
Benzo(a)anthracene	26.6
Benzo(a)pyrene	18.2
Benzo(b) & (k)fluoranthene	32.1
Benzo(b)fluoranthene	23.1
Benzo(g,h,i)perylene	13.6
Benzo(k)fluoranthene	9.00
Chrysene	19.9
Dibenzo(a,h)anthracene	3.04
Fluoranthene	60.2
Fluorene	5.9
Indeno(1,2,3-cd)pyrene	13.3
Naphthalene	5.2
Phenanthrene	44.2
Pyrene	40.2

Appendix H DCO Funding Statement

Appendix I Review of Applicable Legislation and Strategy

Appendix J Financial Summary

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