QTS Project Wind

Earthworks Specification – Enabling Works

QTS

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X	X Chris Lazenby	X
Principal author	Checked by	Verified by
Signed by: Lily Bee	Signed by: Lily Bee	Signed by: g.kellett

Contents

1.0 Introduction

1.1 The Site

The site is situated approximately 3km north of Blyth town centre in Cambois, Northumberland. The approximate centre of the site is National Grid Reference (NGR) NZ 29820 84164.

Drawing GBR1-ENA1-XXX-UG-DR-B-01-10 shows the site ownership boundary delineated by the blue line and the Phase A Enabling Works boundary). This specification relates only to the Phase A Enabling works area of the wider Data Centre Campus site.

1.2 Scheme Proposals

The current proposals within the Phase A Enabling Works boundary include for the construction of DC01 and DC02 buildings and their associated generator yards, the substation, external hardstanding, drainage infrastructure and site access roads.

At this stage and for the purposes of this specification, it is understood that DC01 and DC02 will be supported on piled foundations with a ground bearing floor slab solution bearing upon ground improved through the installation of vibro stone columns. A piled foundation solution is also anticipated for the substation building.

Ground improvement of the shallow soils below the data centre buildings will be undertaken following the completion of the Phase A enabling works. A specification for the ground improvement works is not available at the time of writing but shall be produced as the scheme develops.

Areas outside the proposed data centre comprise a substation (detailed design not available at the time of writing), an attenuation pond and external areas for general enabling works operations, such as trafficking, material storage and processing. A summary of the bulk excavation and filling requirements is shown on Cundall Drawing GBR1-ENA1-XXX-UG-DR-B-01-10.

1.3 Purpose of Document

This document presents the specification for the earthworks (excavation and filling) that will be required as part of the redevelopment of the site. The Specification follows on from the production of Cundall's Remediation and Earthworks Strategy (Document Ref. GBR1-ENA1-XXX-UG-RP-B-00-11 V03), which sets out the concept of the proposed enabling works and both documents must be read in conjunction to fully understand the scope of the works.

This specification is specific to the enabling works contract only and earthworks undertaken by the general building contractor will require a separate specification.

1.4 Roles and Responsibilities

1.4.1 Roles

- Employer: QTS
- Contract Administrator (CA): TBC
- Principal Designer: Ridge
- Principal Contractor: TBC
- Engineer: Cundall
- Overseeing Organisation: Referred to as Contract Administrator for purposes of this specification.

1.4.2 Responsibilities

The Client will be the employer for the earthworks and will appoint the enabling works contractor and the Contract Administrator, who will be responsible for providing technical oversight of the enabling works. The Client will initiate discussions with the relevant regulator's (Local Authority and Environment Agency) to commence the Environmental Permitting process for the reuse of the relevant materials. If required, the Environmental Permit will be completed and adopted by the Principal Contractor for the enabling works.

The Principal Contractor for the purposes of the enabling works contract will be the enabling works contractor. The contractor will be responsible for completing the earthworks in accordance with this Earthworks Specification and providing the earthworks verification report and remediation verification report to discharge the relevant planning conditions. The verification will be required to be undertaken by an independent consultant.

The Contractor will be responsible for completing a Material Management Plan (MMP) for the works.

2.0 Excavation and Filling

Generally / The Site

112 Site investigation report

1. Rolton Group Limited (07 April 2021). Phase 1 Geo-environmental Desk Study for Former Coal Stocking Yards, Cambois. Report reference: PHX-RGL-XX-XX-RP-G-000005 Rev S2-P05.
2. Rolton Group Limited (14 May 2021). Geotechnical and Geo-Environmental Report for Former Coal Stocking Yards, Cambois. Report reference: PHX-RGL-XX-XX-RP-G-000010 Rev S2-P01..
3. Rolton Group Limited (18 February 2021). Coal Mining Risk Assessment for Former Coal Stocking Yards, Cambois. Report reference: PHX-RGL-XX-XX-RP-G-000008 Rev S2-P04.
4. Rolton Group Limited (2022) Burnt Shale Trial Pit Investigations (PHX-RGL-XXXX-XX-RP-G-000014A)
5. Arcadis, October 2024, Project Wind, Blyth, Coal Mining Risk Assessment; 30226657-AUK-XX-XX-RP-ZZ-0010-01
6. Arcadis, January 2025, Ground Investigation Factual Report – Stage 1 Project Wind, Blyth. Report reference: 30226657-AUK-XX-XX-RP-ZZ-0015-01 Rev 03.
7. Arcadis, January 2025, Ground Investigation Factual Report – Stage 2 Project Wind, Blyth. Report reference: 30226657-AUK-XX-XX-RP-ZZ-0015-01 Rev 03.
8. Arcadis, November 2024, Cambois Data Centre Campus, Phase 2 Geoenvironmental Assessment; 30226657-AUK-XX-XX-RP-ZZ-0012-01
9. Arcadis, January 2025, Cambois Data Centre Campus Ground Investigation Report. Report reference: 30226657-AUK-XX-XX-RP-ZZ-0017-01 Rev 01.
10. Cundall, May 2025, Project Wind Ground Conditions Summary Report, GBR1-DCZZ-XXX-UG-RP-B-00-01 V03.

These documents can be provided upon request

145 Variations in ground water level

1. **Give notice:** If levels encountered are significantly different from levels in the site investigation report or previously measured.

150 Existing services, features and structures

1. **Services:** The Contractor shall be responsible for obtaining their own, individual service records and for the safe disconnection and/or diversion of any existing services entering the site, except any which are to remain operational.
   Previously identified existing services are presented on drawing GBR1-ENA1-STE-XX-DR-C-01-02.
2. **Site features to be retained:** Refer to Contract Drawings for details.
3. **Structures:** Refer to Contract Drawings for details. The Contractor shall give notice to the CA if unrecorded features such as foundations, voids, basements, tanks, pipes, cables, drains, manholes, ditches, etc. are encountered that are not shown on the existing constraints plan (GBR1-ENA1-STE-XX-DR-C-01-02).

Clearance/excavating

164 Tree roots

1. **Cutting**
   1.1. Make clean smooth cuts with no ragged edges.
   1.2. Treatment of cut roots: To be confirmed with the Ecologist and Landscape Architect.
2. **Backfill:** To be confirmed with the Ecologist and Landscape Architect.

168 Site clearance

1. **Timing:** Following site mobilisation and prior to any excavation or ground break.
2. **General:** Clear site of rubbish, debris and vegetation.

170 Removing small trees, shrubs, hedges and roots

1. **Requirements:** Where tree, shrub and hedge removal is required, this must be complete in accordance with the requirements of the project ecologist and in accordance with the arboriculturist requirements.
2. **Identification:** Clearly mark trees to be removed.
3. **Small trees, shrubs and hedges:** Cut down in areas as indicated on contract drawings.
4. **Roots:** Grub up and dispose of without undue disturbance of soil and adjacent areas.
5. **Safety:** Comply with HSE and Forest Industry Safety Accord safety leaflets.

175 Felling large trees

1. **Requirements:** Where tree removal is required, this must be complete in accordance with the requirements of the project ecologist and in accordance with the arboriculturist requirements.
2. **Definition:** Girth over 600 mm.
3. **Identification:** Clearly mark trees to be removed.
4. **Safety:** Comply with HSE and Forest Industry Safety Accord safety leaflets.
5. **Felling:** As close to the ground as possible.
6. **Stumps:** Remove mechanically to a minimum depth of 300 mm below ground level and replace with suitable material in accordance with App 6/1 and 6/3
7. **Work near retained trees:** Take down trees carefully in small sections to avoid damage to adjacent trees that are to be retained, where tree canopies overlap and in confined spaces generally.

180 Chipping and shredding

1. **General:** Permitted, remove arisings from site.

220 Stripping topsoil

1. **General:** Existing Topsoil is predominately present across Area D, Area E and Area F as shown on drawing GBR1-ENA1-XXX-UG-DR-B-01-10. BS3882 testing has not been undertaken
2. Depth
   2.1. Thicknesses typically vary from 100mm to 300mm, with an average thickness of approximately 200 mm.
3. **Handling:** Refer to Landscape Architect's specification.
4. **Around trees:** Refer to Landscape Architect's specification.

240 Adjacent excavations

1. **Requirement:** Where an excavation encroaches below a line drawn at an angle from the nearest formation level of another higher excavation, the lower excavation, all work within it and backfilling thereto, must be completed before the higher excavation is made.
2. Where adjacent earthworks zones abut the Contractor should confirm the working arrangement for the interface in advance of the commencement of works in that zone.
3. **Angle of line below horizontal:** 45°
4. **Backfill material:** In accordance with Appendix 6/3.

242 Excavations adjacent to existing backfilled trenches

1. Proximity: When width of undisturbed ground between the two excavations will be less than 1.0m.

2. Action**:** Assume that the ground between the trenches is unstable and provide side support accordingly.

248 Backfill to excavations lower than foundation formation level

1. Critical level
   1.1. **Distance between near faces of foundation and lower excavation less than 1 m:** 150mm above level at which line defined in Clause 240 cuts near face of lower excavation.
2. Backfill material
   2.1. **General:** Refer to Appendix 6/3.

250 Permissible deviations from formation levels

1. **Embankments and cuttings:** ±50 mm.
2. **Ground abutting external walls:** ±50 mm, but such as to ensure that finished level is not less than 150 mm below dpc.

260 Inspecting formations

1. Give notice: Make advance arrangements for inspection of formations for foundations and filling formations and roads and paving's.
   1.1. **Notice (minimum):** 3 working days
2. **Preparation:** Just before inspection remove the last 150 mm of excavation. Trim to required profiles and levels.
   2.1. **Loose material:** Remove
3. Seal: Within 4 hours of inspection, seal formations with blinding concrete or suitable material in accordance with Appendix 6/1 and 6/3.

265 Inspecting formations in sand and gravel

1. **General :** Based on the ground conditions recorded during the site investigation, formations may comprise sands and gravel and the following procedure shall be adhered to.
2. **Notice for inspection (minimum):** 3 working days
3. **Preparation:** Just before inspection remove the last 150 mm of excavation. Trim to required profiles and levels and mechanically compact formation.
4. Seal: Within 4 hours of inspection, seal formations with a Class 6F2 / 6F5 Fill in accordance with Appendix 6/3.

267 Inspection of formations in shrinkable soils

1. **Inspect formation:** For signs of conducting and fine moisture absorbing roots.
2. **Give notice:** If significant quantities of roots are visible in the formation or in the bottom 75 mm of the walls of the excavation.

283 Formations for pile supported structures

1. **Excavate:** To the design formation level as defined on the contract drawings.
2. **Compact:** As defined on the contract drawings
3. **Blinding to formation:** Contractor's choice

310 Unstable ground

1. **Generally:** Ensure that the excavation remains stable at all times.
2. **Give notice:** Without delay if any newly excavated faces are too unstable to allow earthwork support to be inserted.

3. **Take action:** If instability is likely to affect adjacent structures or roadways, take appropriate emergency action.

320 Recorded features

1. **Recorded foundations, beds, drains, manholes, etc.:** Recorded below ground obstructions are presented on the 'Below Ground Features Plan' (GBR1-ENA1-XXX-UG-DR-B-01-11). These obstructions include features such as:
    1. Historically culverted watercourses (Cow Gut specifically).
    2. Foundations associated with historical buildings such as the factory in the south east and the old conveyor.
    3. Former PFA Lagoon.
    4. Possible tunnels (although no evidence of these has been observed during recent ground investigation).
    5. Relict test piles installed as part of the recent development works.
2. **Contaminated earth:** Reference should be made to Cundall Remediation and Earthworks Strategy (GBR1-ENA1-XXX-UG-RP-B-00-11).

330 Unrecorded features

1. **Give notice:** If unrecorded foundations, beds, voids, basements, filling, tanks, pipes, cables, drains, manholes, watercourses, ditches, etc. not shown on the drawing GBR1-ENA1-XXX-UG-RP-B-00-11 are encountered.

337 Old foundations or walls beneath new ground supported slab

1. Break out: Completely remove known or encountered obstructions to full depth below proposed ground bearing slab in accordance with the requirements detailed in Appendix 6/3.
2. **Backfill:** Backfill in accordance with Appendix 6/3.

350 Existing watercourses

1. **Diverted watercourses which are to be filled:** Refer to contract drawings and documents for details of the diversion of Maw Burn (located outside the Phase I Enabling Works boundary) and Cow Gut (drawing GBR1-DCZZ-STE-XX-DR-C-01-04). An unnamed watercourse once extended through the centre of the site and is understood to have been culverted (drawing 401-12510874-DWG-C-004). None of the existing watercourses are to be filled as they are to be retained, although the culverted watercourse will be required to be excavated below plot footprints.
2. **Backfill:** Placement of suitable material shall be undertaken in accordance with Appendix 6/1 and 6/3.

360 Excess excavation

1. Excavation taken wider than required
    1.1. **Backfill:** Refer to Appendix 6/3.
2. Excavation taken deeper than required
    2.1. **Backfill:** Refer to Appendix 6/3.

370 Underground structures in landscape areas

1. **Generally:** Below ground structures to be removed, where required, to facilitate the construction of service corridors. Further information is included in Appendix 6/3.
2.
    2.1. **Services:** Structures should be grubbed out a minimum of 500mm below the base of any proposed service corridors.

Disposal of materials

441 Surplus subsoil

1. **Excavated material:** Reference should be made to Cundall Remediation and Earthworks Strategy (GBR1-ENA1-XXX-UG-RP-B-00-11).
2. **Retained material:** Reference should be made to Cundall Remediation and Earthworks Strategy (GBR1-ENA1-XXX-UG-RP-B-00-11).
3. **Remaining material:** Reference should be made to Cundall Remediation and Earthworks Strategy (GBR1-ENA1-XXX-UG-RP-B-00-11).

450 Water

1. **Generally:** Keep all excavations free from water until:
   1.1. Formations are covered.
   1.2. Below ground constructions are excavated, broken out and / or cropped.
2. **Drainage:** Form surfaces of excavations and fill to provide adequate falls.
3. **Removal of water:** Provide temporary drains, sumps and pumping as necessary. Any pumping shall be undertaken in a manner to avoid disturbance of excavated faces or the stability of adjacent ground or structures. Sumps shall be constructed clear of excavations and filled upon completion. Watercourses shall not be polluted with silt laden water. Further information is included within Cundall Remediation and Earthworks Strategy (GBR1-ENA1-XXX-UG-RP-B-00-11) and Cundall Drawing NCL1-ENA1-STE-XX-DR-C-01-33.

454 Ground water level, springs or running water

1. **Give notice:** If it is considered that the excavations are below the water table, where groundwater is encountered significantly shallower than expected.
2. **Springs/ Running water:** Give notice immediately if encountered.

457 Pumping

1. **General:** Do not disturb excavated faces or stability of adjacent ground or structures.
2. **Pumped water:** Discharge without flooding the site or adjoining property. The Contractor will be required to obtain discharge consents or licenses from the relevant authority. All water shall be disposed of in accordance with current legislation and in accordance with the agreed permit, if relevant.
3. **Sumps:** Construct clear of excavations. Fill on completion. Sumps shall be constructed clear of excavations and filled upon completion. The Contractor shall liaise with the EA to agree on discharge of groundwater.

Filling

500 Proposed fill materials

1. **Details:** Fill materials are detailed in Appendix 6/1.

   Geochemical testing requirements are noted in Appendix 6/15 and Table 1/5.

   Submit full details of proposed fill materials to demonstrate compliance with specification, including:
   1.1. Type and source of imported fill.
   1.2. Proposals for processing and reuse of material excavated on site.
   1.3. Test reports as required elsewhere.
2. **Timing:** At least 10 working days before starting filling.

510 Hazardous, aggressive or unstable materials

1. **General:** Where suspected Class U1B (potentially contaminated) or U2 (potentially hazardous) materials are encountered by the Contractor, they shall follow the procedures in Appendix 6/2 and inform the CA.
   Do not use fill materials which would, either in themselves or in combination with other materials or ground water, give rise to a health hazard, damage to building structures or instability in the filling, including material that is:
   1.1. Frozen or containing ice.
   1.2. Organic.
   1.3. Contaminated or noxious.
   1.4. Susceptible to spontaneous combustion.
   1.5. Likely to erode or decay and cause voids.
   1.6. With excessive moisture content, slurry, mud or from marshes or bogs.
   1.7. Clay of liquid limit exceeding 80 and/or plasticity index exceeding 55.
   1.8. Unacceptable, class U2 as defined in the 'Specification for highway works', clause 601.

512 Limitation of sulphate content in fill materials

1. Test specification: To BS 1377-3.
2. Sulfate content: Expressed as SO4.
   2.1. **Water soluble sulphate (maximum):** 3000 mg/l in 2:1 water/ soil extract
   2.2. **Total potential sulphate (maximum):** <1.2%
   2.3. **Oxidisable sulfides (maximum):** 0.3% of total potential sulphate
3. **Certificates of test result:** Shall be submitted to CA.

520 Frost susceptibility

1. **General:** Except as allowed below, fill must be non frost-susceptible as defined in the 'Specification for highway works', clause 801.8.
2. **Test reports:** If the following fill materials are proposed, submit a laboratory report confirming they are non frost- susceptible:
   2.1. Fine grained soil with a plasticity index less than 20%.
   2.2. Coarse grained soil or crushed granite with more than 10% retained on a 0.063 mm sieve.
   2.3. Crushed chalk.
   2.4. Crushed limestone fill with average saturation moisture content in excess of 3%.
   2.5. Burnt colliery shale.

525 Testing of suitability of fill materials before start of filling

1. **General :** Refer to Appendix 1/5 and Appendix 6/1.
2. **Laboratory:** UKAS accredited laboratory.
3. **Submit report to:** CA.
   3.1. **Timing:** 10 working days before starting filling
4. **Samples:** Deliver to laboratory as required.
5. **Tests:** Refer to Appendix 1/5 and Appendix 6/1.
6. **Frequency:** Refer to Appendix 1/5 and Appendix 6/1.

530 Placing fill

1. **Surfaces of excavations and areas to be filled:** Free from loose soil, topsoil, organic material, rubbish and standing water.

2. **Freezing conditions:** Do not place fill on frozen surfaces. Remove material affected by frost. Replace and recompact if not damaged after thawing.
3. Adjacent structures, membranes and buried services
   3.1. Do not overload, destabilise or damage.
   3.2. Submit proposals for temporary support necessary to ensure stability during filling.
   3.3. Allow 14 days (minimum) before backfilling against in situ concrete structures.
4. **Layers:** Place so that only one type of material occurs in each layer.
5. **Earthmoving equipment:** Vary route to avoid rutting.

535 Compaction generally

1. **General:** Requirements for the placement and compaction of fill shall be undertaken in accordance with Appendix 6/1 and Appendix 6/3.

   Compact fill not specified to be left loose as soon as possible after placing.
2. **After compaction:** Surface of each layer must be well closed, showing no movement under compaction plant, and without cracks, holes, ridges, loose material and the like.
3. **Defective areas:** Remove and recompact to full thickness of layer using new material.

540 Benching in fill

1. **Adjacent areas:** If, during filling the difference in level between adjacent areas of filling exceeds 500 mm, cut into edge of higher filling to form benches 500mm minimum width and height equivalent to depth of a layer of compacted filling.
2. **New filling:** Spread and compact in accordance with Appendix 6/1 and 6/3 to ensure maximum continuity with previous filling.

550 Geotextile sheet

1. **Manufacturer:** To be determined by the Contractor
   1.1. **Product reference:** Contractor's choice
2. **Type:** Contractor's choice
3. **Polymer type:** Contractor's choice
4. **Recycled content:** Contractor's choice
5. **Jointing:** In accordance with Manufacturer's Guidance but at least 300 mm overlap
6. **Preparation of subgrade:** Before laying sheet, remove humps and sharp projections. Fill hollows and soft spots in accordance with Appendix 6/1 and 6/3. Proof roll exposed surface.
7. Protect from
   7.1. Exposure to light.
   7.2. Contaminants.
   7.3. Materials listed as potentially deleterious by geotextile manufacturer.
   7.4. Wind uplift.

626 Compacted general fill

1. **Suitable material:** See Appendix 6/1 and Appendix 6/3.
2. **Excavated material:** Select suitable material and keep separate.
3. **Filling:** Spread and level material in layers. As soon as possible thoroughly compact each layer. Each layer shall comprise a single material type.
4. **Required compaction:** See Table 6/1 in Appendix 6.1.
5. **Proposals:** Well in advance of starting work submit details of proposed:

5.1. Materials to be used, including quantities of each type.
5.2. Type of plant.
5.3. Maximum depth of each compacted layer.
5.4. Minimum number of passes per layer.

650 Protection of compacted filling

1. **Water:** Contractor responsible for submitting proposals to ensure that surface water does not accumulate or 'pond' on finished formation.

730 Blinding

1. **Surfaces to receive sheet overlays or concrete:**
2. Blind with
   2.1. Concrete where shown on drawings; or
3. Sand, fine gravel, or other approved fine material applied to fill interstices. Moisten as necessary before final rolling to provide a flat, closed, smooth surface.
4. **Sand for blinding:** To BS EN 12620, grade 0/4 or 0/2 (MP).

850 Compacted general filling/ earthworks

1. Specification: MCHW Volume 1: 'Specification for highway works' (SHW), Earthworks section, clauses 601, 602, 603, 604, 606, 608, 610, 611, 612, 613, 616, 617, 618, 630, 631-636 and 644.
   1.1. **Appendices (see clauses 900-970 in this section):** 1/5, 6/1, 6/2, 6/3, 6/6, 6/7, 6/8, 6/14 and 6/15
   1.2. **Amendments to requirements in the 'Specification for highway works':** None.
2. **Definition:** References to the CA are deemed to be to the issuer of this specification.
3. Fill material
   3.1. **Permitted classes/ source:** See details in Appendix 6/1 and 6/3.
   3.2. Assessment of acceptability: Tests as Table 6/1 carried out by Contractor.
   3.3. **Preliminary tests:** Not required
4. **Compaction:** See details in Appendix 6/1 and 6/3.
5. **Temporary Works**
   The Contractor is responsible for the design and undertaking of all temporary works, including any required working platforms, haul roads or similar and shall assess the likely ground conditions to inform their design.
6. **Environmental Controls**
   The Contractor shall comply with the Cundall Remediation and Earthworks Strategy and all EA and Local Authority requirements regarding environmental controls and industry best practice.

Appendix 1/5 Testing to be Carried Out by the Contractor

In the following schedules are details of testing to be carried out by the Contractor and test certificates to be supplied by the Contractor.

Unless stated below, all sampling and testing in this Appendix shall be undertaken by the Contractor.

The Contractor shall also include in his method statements for each activity specific Inspections and Tests, extracted from the Schedule of Proposed Inspections and Tests that will be carried out.

As part of the provision of samples and testing undertaken by the Contractor, the Contractor shall keep a daily record of samples of goods and materials taken by or on behalf of the Contractor for testing. Records shall be in sufficient detail to record the nature and the source of goods and materials; and shall identify the locations and means of selection and sampling. The Contractor on the next working day shall provide a copy of the daily record for retention and use by the CA.

Test reports and certificates shall bear suitable identification compatible with the Contractor's registration of the samples tested; and shall indicate the edition dates of specifications used for compliance evaluation.

The Schedule of Proposed Inspections and Tests that will be required for the Works shall be as the testing requirements in Table 1/5.

The following testing shall be undertaken as per the material class.

Clause	Acceptable Material	Test	Frequency of Testing	Test Certificate
601, 610, 612, 613, 618, 620, 631-637, 640, 644.	Class 1A or 1B Granular Fill	Moisture Content (MC) and Grading	1 per 500m^3	UKAS
		OMC/MDD (4.5kg compaction)	1 per 2,000m^3	
		pH, Water soluble sulfate, Oxidisable sulfate, Total potential sulfate.	1 per 2,000m^3	
		Combustibility (flash point)	1 per 2,000m^3	
	Class 2A, 2B, 2C Cohesive Fill	Moisture Content (MC), Grading, Atterberg Limits	1 per 500m^3	UKAS
		OMC/MDD (2.5kg compaction)	1 per 2,000m^3	UKAS
		pH, Water soluble sulfate, Oxidisable sulfate, Total potential sulfate.	1 per 2,000m^3	UKAS/MCERTS
		Combustibility (flash point)	1 per 2,000m^3	UKAS
		Organic matter Content	1 per 1,000m^3	UKAS/MCERTS
		Undrained Shear Strength of Remoulded Material	1 per 1,000m^3	UKAS
	Class 2E Reclaimed Pulverised Fuel Ash	Moisture Content (MC),	1 per 500m^3	UKAS
		Grading, Atterberg Limits	1 per 1,000m^3	UKAS
		OMC/MDD (2.5kg compaction)	1 per 2,000m^3	UKAS
		pH, Water soluble sulfate, Oxidisable sulfate, Total potential sulfate.	1 per 2,000m^3	UKAS
		Soaked CBR	1 per 2,000m^3	UKAS
	Class 4 Landscape Fill	To landscape architects' requirements		
	Class 5A or 5B Topsoiling	To landscape architects' requirements		
	Class 6C	Moisture Content (MC), Grading, Atterberg Limits, uniformity coefficient	1 per 500m^3	UKAS
		Los Angeles Coefficient	1 per 1000m^3	UKAS
	Class 6D	Moisture Content (MC), Grading, Atterberg Limits, uniformity coefficient	1 per 500m^3	UKAS
	6F2 - Selected well graded granular material. Coarse Grading or capping	Grading	1 per 1000m^3	UKAS
		Los Angeles Coefficient	1 per 2000m^3	UKAS
		Moisture content	1 per 500m^3	UKAS
		Constituents of Coarse Recycled Aggregate	1 per 1000m^3	UKAS
		OMC and MDD (BS 1377: Part 4 Vibrating Hammer Method)	1 per 2000m^3	UKAS

Clause	Acceptable Material	Test	Frequency of Testing	Test Certificate
		pH, Water soluble sulfate, Oxidisable sulfate.	1 per 2000m^3	UKAS/MCERTS
		Chemical suitability (See Appendix 6/15 for exact suite of testing required)	(See Appendix 6/15 for exact suite of testing required)	UKAS/MCERTS
	6F3 – Selected granular material	Grading	1 per 1000m^3	UKAS
		OMC and MDD (BS 1377 Part 4 4.5kg rammer method)	1 per 2000m^3	UKAS
		Moisture Content	1 per 500m^3	UKAS
		Class Ra (asphalt) content	1 per 1000m^3	UKAS
		Bitumen Content	1 per 1000m^3	UKAS
	6F5 Selected well graded granular material. Coarse Grading or Capping – imported on to site	Grading (including oversize and fines)	1 per 1000m^3	UKAS
		Los Angeles Coefficient	1 per 2000m^3	UKAS
		Moisture content	1 per 500m^3	UKAS
		OMC and MDD (BS 1377: Part 4 Vibrating Hammer Method)	1 per 2000m^3	UKAS
		pH, Water soluble sulfate, Oxidisable sulfate.	1 per 2000m^3	UKAS/MCERTS
		Chemical suitability (Imported Virgin Quarried Material - See Appendix 6/15 for exact suite of testing required)	1 or 2 depending on the type of stone utilised, to confirm the nature of the material.	UKAS/MCERTS
		Chemical Suitability (Imported Crushed Hardcore, Stone, Brick - See Appendix 6/15 for exact suite of testing required)	(See Appendix 6/15 for exact suite of testing required)	UKAS/MCERTS

Table 1/5.1 Testing to be carried out by the Contractor

NOTE: A minimum of three tests shall be undertaken per material classification. For imported materials, the minimum of three tests will apply to each individual source.

Compliance Testing Results

Clause	Testing Specification	Tests	Frequency	Test Certificates	Comments
612	End Product Compaction	In situ density; Nuclear Density Test	1 per 30m x 30m area on every layer placed. (Lab or field calibration tests required to determine correlation between NDT and in situ density)	UKAS	Testing location to be surveyed and recorded.
		In situ density; Sand Replacement Test / core cutter (where applicable)	1 per 6 NDTs	UKAS	Testing location to be surveyed and recorded.
		Plate load Test	Every 30m x 30m at 1m depth intervals of fill placed.	UKAS	Minimum 600mm diameter plate required. Calculation of stiffness of tested material to be provided. Testing location to be surveyed and recorded. Undertaken in accordance with BS1377 1990: Part 9.
	Method Compaction	Plate load Test	Every 25m x 25m at surface of engineered granular fill to measure settlement.	UKAS	Minimum 600mm diameter plate required. Minimum plate load pressure of 250kN/m^2 required with maximum settlement allowance of 10mm. Testing location to be surveyed and recorded. Undertaken in accordance with BS1377 1990: Part 9.

Table 1/5.2 Compliance Testing to be Carried out by the Contractor

Alternative testing methodologies, such as the use of lightweight deflectometers or soil stiffness surveys may be acceptable provided that the Contractor can demonstrate that the results are reasonably comparable with plate load testing results during a compaction trial. Any alternative testing shall be agreed with the Engineer prior in advance of works.

Nuclear density tests on PFA material may be problematic when providing accurate measurements of the moisture content. When testing PFA using the nuclear density gauge, representative samples should be taken immediately adjacent to the test and scheduled for moisture content. The results of the testing should be presented to the CA for review.

Environmental Testing Frequency

The environmental testing shall be undertaken in strict accordance with the Cundall Earthworks and Remediation Strategy prepared for the Phase A Enabling Works (GBR1-ENA1-XXX-UG-RP-B-00-11).

Appendix 6/1: Requirements for Acceptability and Testing, Etc. of Earthworks Material

General Requirements for Fill Materials

Material shall comply with Clause 601, 602, 603, 606, 608, 609, 610, 611, 612, 613, 631 to 636, 640, 644 and Table 6/1 of this Appendix as well as any additional requirements detailed within this Appendix.

Should the Contractor want to use any other fill materials than those presented within this Appendix, they shall obtain permission (and any additional specification or testing requirements) from the CA prior to importing or placing the proposed fill.

The Contractor shall be responsible for the management of all testing, assessment and use of all earthworks materials.

No material shall be placed within 500mm of cement containing materials that contain sulphates or oxidisable sulphides at a concentration that may adversely affect them, as per the guidance in TRL Report 447 'Sulfate Specification for Structural Backfills' (2005).

Proposed Fill Material

Proposed fill materials for the works are as follows:

Class 1 Granular Fill (Class 1A or Class 1B) – Site won or imported for use as engineered general fill.

Class 2 Cohesive Fill (Class 2A, Class 2B, Class 2C or Class 2E) – Site won for use as engineered general fill.

Class 4, Class 5 (Class 5A or Class 5B) – Refer to landscape architect's specification.

Class 6C – For use as starter layer, if required.

Class 6D – For use as starter layer below Class 2E fill.

Class 6F2 / 6F5 – Site won (6F2) or imported (6F5) for use as engineered granular fill.

Testing of Fill Material

The classification and acceptability testing of the earthworks materials shall be carried out by the Contractor at the point of excavation/production for on-site materials and prior to import to site for imported materials.

The required testing is specified in Appendix 1/5 and shall be carried out by the Contractor on each class of earthworks material at least seven days prior to placement (excluding moisture contents which are to be carried out on the same day as placement) or as agreed by the CA.

The Contractor shall provide copies of all classification test results and acceptability testing to the CA prior to placement of the material but not more than five days from completion of the testing, or as agreed by the CA. Testing results shall be submitted in AGS digital format as well as PDF certificates.

The Contractor shall maintain full and accurate records of where the samples were taken and when and where earthworks material is placed in the permanent works. Similarly, the Contractor shall maintain full records on each sub unit of imported materials including, but not limited to, the location of the sources, the suppliers' details, the acceptability testing and the location it has been incorporated into the works.

Groundwater Lowering and Treatment

No placement of fill is permitted into standing water and the Contractor shall determine any requirements for groundwater lowering and / or treatment. Shallow perched water is present, particularly within the granular material and this shall be drained prior to the placement of engineered general fill or engineered granular fill.

The Contractor shall be responsible for all aspects of any dewatering and monitoring systems they consider necessary to complete the contract. This shall include design, installation, operation, monitoring, protection, maintenance and removal. Wherever temporary dewatering systems are used the Contractor shall ensure that no damage occurs to

adjacent vulnerable assets such as structures, services, pipelines, roads, etc. immediately or in the long term and they shall put in place monitoring to demonstrate that they are controlling the work in a safe manner.

Any groundwater lowering proposed shall be agreed with the CA. Treatment of groundwater to be discharged from site shall be in accordance with requirements of the Environment Agency / Local Authority and Water Authority

Surface Water

Temporary and permanent drainage shall be installed as part of the enabling works contract in accordance with Drawing GBR1-ENA1-STE-XX-DR-C-01-33 and Cundall Civil Engineering Specification. The Contractor will be responsible for providing a temporary surface water management plan to accompany the initial drainage design and if deemed necessary, the Contractor can revise the temporary drainage requirements to better align with their design. Any design changes to the temporary layout shall be agreed with the CA and Northumberland County Council. Treatment of groundwater to be discharged from site shall be in accordance with requirements of Northumbrian Water Ltd.

Table 6/1 Acceptable Earthworks Materials: Classification and Compaction Requirements

Class	General Material Description	Permitted Constituents (All subject to requirements of Table 6/1 SHW Series 600 and Appendix 6/1)	Typical Use	Material Properties				Compaction Requirements
				Property	Test	Lower Limit	Upper Limit	
1A	Well graded granular material	See Table 6/1 of SHW Series 600 but with no more than 1% Class B1 constituents (municipal incinerator bottom ash), Class D2 constituents (air cooled blast furnace slag), Class D4 constituents (electric arc furnace slag) or Class E constituents (nonferrous steel industry)	Engineered General Fill	Grading	BS1377: Part 2	Table 6/2	Table 6/2	Table 6/4 Method 2 in Zone B, D, E and F. End product specification to achieve 97% of maximum dry density of BS1377: Part 4 (4.5kg rammer) in Zone A and Zone C.
				Uniformity Coefficient	see Note 5	10	-	
				Moisture Content (see Note 4)	BS 1377: Part 2	OMC-2%	OMC+2%	
1B	Uniformly graded granular material	See Table 6/1 of SHW Series 600 but with no more than 1% Class B1 constituents (municipal incinerator bottom ash), Class C1 constituents (coal fly ash), Class C4 constituents (coal bottom ash), Class D2 constituents (air cooled blast furnace slag), Class D3 constituents (basic oxygen furnace slag), Class D4 constituents (electric arc furnace slag) or Class E constituents (nonferrous steel industry), Class F constituents	Engineered General Fill	Grading	BS1377: Part 2	Tab 6/2	Tab 6/2	Table 6/4 Method 3 in Zone B, D, E and F. End product specification to achieve 97% of maximum dry density of BS1377: Part 4 (4.5kg rammer) in Zone A and C.
				Uniformity Coefficient	see Note 5	-	10	
				Moisture Content (see Note 4)	BS 1377: Part 2	OMC-2%	OMC+2%	

Class	General Material Description	Permitted Constituents (All subject to requirements of Table 6/1 SHW Series 600 and Appendix 6/1)	Typical Use	Material Properties				Compaction Requirements
				Property	Test	Lower Limit	Upper Limit	
2A	Wet cohesive material	Any material, or combination of materials, other than chalk	Engineered General Fill	Grading	BS 1377: Part 2	Tab 6/2	Tab 6/2	Table 6/4 Method 1 in Zone B, D, E and F. End product compaction to achieve 97% target compaction below Zone A and C.
				Plastic limit (PL)	BS 1377: Part 2	-	-	
				Moisture content (See note 4)	BS 1377: Part 2	PL - 4%	-	
				Moisture content	BS 1377: Part 2	OMC - 2%	OMC -2%	
				Organic Matter	BS1377-Part 3	-	5%	
				Flash Point	BS13736	>100ºC		
				Undrained shear strength of remoulded material	Clause 633	50kN/m^2	120kN/m^2	

Class	General Material Description	Permitted Constituents (All subject to requirements of Table 6/1 SHW Series 600 and Appendix 6/1)	Typical Use	Material Properties				Compaction Requirements
				Property	Test	Lower Limit	Upper Limit	
2B	Dry cohesive material	Any material, or combination of materials, other than chalk	Engineered General Fill	Grading	BS 1377: Part 2	Tab 6/2	Tab 6/2	Table 6/4 Method 2 in Zone B, D, E and F. End product compaction to achieve 97% target compaction below Zone A and C.
				Plastic limit (PL)	BS 1377: Part 2	-	-	
				Moisture content (See note 4)	BS 1377: Part 2	-	PL - 4%	
				Moisture content	BS 1377: Part 2	OMC - 2%	OMC -2%	
				Organic Matter	BS1377-Part 3	-	5%	
				Flash Point	BS13736	>100ºC		
				Undrained shear strength of remoulded material	Clause 633	50kN/m^2	120kN/m^2	
2C	Stony cohesive material	Any material, or combination of materials, other than chalk	General Fill	Grading	BS 1377: Part 2	Tab 6/2	Tab 6/2	Table 6/4 Method 2 in Zone B, D, E and F. End product compaction to achieve 97% target compaction below Zone A and C.
				Plastic limit (PL)	BS 1377: Part 2	-	-	
				Moisture content (See note 4)	BS 1377: Part 2	OMC-2%	OMC+2%	
				Undrained shear strength of remoulded material	Clause 633	50kN/m^2	120kN/m^2	

Class	General Material Description	Permitted Constituents (All subject to requirements of Table 6/1 SHW Series 600 and Appendix 6/1)	Typical Use	Material Properties				Compaction Requirements
				Property	Test	Lower Limit	Upper Limit	
2E	Reclaimed pulverised fuel ash cohesive material	Reclaimed material from lagoon or stockpile containing not more than 20% furnace bottom ash	Engineered General Fill	Moisture content (See note 4)	BS 1377: Part 2	To enable end product compaction		End product compaction to achieve 97% target compaction of BS 1377 Part 4 (2.5kg rammer)
				Water soluble sulfate content	BS EN 1744-1 Clause 10	-	3000 mg/l as SO_4	
				Oxidisable sulphides content	BS EN 1744-1 Clause 13	-	0.3% as SO_4	
				pH value	BS 1377: Part 3	6	9	
				Remoulded CBR (Swelling)	BS 1377: Part 4	No result over 10mm and the average should be less than 5mm.		
4	Various	To Landscape Architect's requirements.	Fill to landscaped areas	To Landscape Architect's requirements.				
5A	Site won topsoil	To Landscape Architect's requirements.	Topsoiling	To Landscape Architect's requirements.				
5B	Imported topsoil	To Landscape Architect's requirements.	Topsoiling	To Landscape Architect's requirements.				

Class	General Material Description	Permitted Constituents (All subject to requirements of Table 6/1 SHW Series 600 and Appendix 6/1)	Typical Use	Material Properties				Compaction Requirements
				Property	Test	Lower Limit	Upper Limit	
6C	Selected uniformly graded granular material	See Table 6/1 of SHW Series 600	Starter layer	Grading	BS 1377: Part 2 (on site) BS EN 933-2 (imported)	Table 6/2 (on site) or Table 6/5 (imported material)	Table 6/2 (on site) or Table 6/5 (imported material)	Table 6/4 Method 3
				Uniformity Coefficient	See Note 5	-	10	
				Plasticity Index	BS 1377: Part 2	Non plastic- Plasticity Index		
				Los Angeles Coefficient	Clause 635	-	50	
				Moisture Content	BS 1377: Part 2	OMC-2%	OMC+2%	
6D	Selected uniformly graded granular material	See Table 6/1 of SHW Series 600	Starter layer below PFA	Grading	BS 1377: Part 2 (on site) BS EN 933-2 (imported)	Table 6/2 (on site) or Table 6/5 (imported material)	Table 6/2 (on site) or Table 6/5 (imported material)	Table 6/4 Method 4
				Uniformity Coefficient	See Note 5	-	10	
				Plasticity Index	BS 1377: Part 2	Non plastic Plasticity Index		

Class	General Material Description	Permitted Constituents (All subject to requirements of Table 6/1 SHW Series 600 and Appendix 6/1)	Typical Use	Material Properties				Compaction Requirements
				Property	Test	Lower Limit	Upper Limit	
				Moisture Content	BS 1377: Part 2	OMC-2%	OMC+2%	
6F2 (site won)	Selected granular material (coarse grading)	Recycled aggregates including concrete, brick and masonry with not more 5% bituminous materials and asphalt	General Fill or Capping	Grading	BS 1377: Part 2	Table 6/2	Table 6/2	Table 6/4 Method 6. End product specification to achieve 97% of maximum dry density of BS1377: Part 4 (Vibrating hammer method) in Zone A and Zone C.
				Moisture Content	BS 1377: Part 2	OMC-2%	OMC+2%	
				Los Angeles Coefficient	Clause 635 – SHW Series 600	-	50	
				Class Ra (asphalt) content	Clause 710	-	50	
				Bitumen content	BS EN 12697-1 or BS EN 12697-39	-	2.0	
				Constituents of Coarse Recycled Aggregate	BS EN 933-11	-	-	
				Water soluble sulfate content	BS EN 1744-1 Clause 10	-	3000 mg/l as SO4	
				Oxidisable sulphides content	BS EN 1744-1 Clause 13	-	0.3% as SO4	
				pH value	BS 1377: Part 3	6	9	

Class	General Material Description	Permitted Constituents (All subject to requirements of Table 6/1 SHW Series 600 and Appendix 6/1)	Typical Use	Material Properties				Compaction Requirements
				Property	Test	Lower Limit	Upper Limit	
				Determinant (see Appendix 6/15)	As relevant to determinant	Limiting Value in Appendix 6/15	Limiting Value in Appendix 6/15	
6F5 (imported)	Selected granular material (coarse grading) – imported on to site	Unbound mixture complying with BS EN 13285 containing aggregate confirming to BS EN 13242 form one or more of the following source codes: P (natural aggregates except chalk, siltstone or slate) A2 (crushed concrete) A3 (crushed bricks, masonry)	General Fill or Capping	Size designation and overall grading category	BS EN 13285 - 0/80 and G_E	Table 6/5	Table 6/5	Table 6/4 Method 6 End product specification to achieve 97% of maximum dry density of BS1377: Part 4 (Vibrating hammer method) in Zone A and Zone C.
				Maximum fines and oversize categories	BS EN13285 – UF_{12} and OC_{75}	Table 6/5	Table 6/5	
				Los Angeles Coefficient	BS EN 13242 – LA_{50}	-	50	
				Moisture Content	BS EN 1097-5	OMC-2%	OMC+2%	
				Water soluble sulfate content	BS EN 1744-1 Clause 10	-	3000 mg/l as SO_4	
				Oxidisable sulphides content	BS EN 1744-1 Clause 13	-	0.3% as SO_4	

Class	General Material Description	Permitted Constituents (All subject to requirements of Table 6/1 SHW Series 600 and Appendix 6/1)	Typical Use	Material Properties				Compaction Requirements
				Property	Test	Lower Limit	Upper Limit	
				pH value	BS 1377: Part 3	6	9	
				Determinant (see Appendix 6/15)	As relevant to determinant	Limiting Value in Appendix 6/15	Limiting Value in Appendix 6/15	

Footnotes to Table 6/1

App = Appendix

Tab = Table

Where in the Acceptable Limits column reference is made to Appendix 6/1, only those properties having limits ascribed to them in Appendix 6/1 shall apply. Where other appendices give limits for other properties not listed in this Table such limits shall also apply.

Where BS 1377: Part 2 is specified for mc, this shall mean BS 1377: Part 2 or BS 812: Part 3 as appropriate.

Uniformity coefficient is defined as the ratio of the particle diameters D60 to D10 on the particle-size distribution curve, where:

D60 = particle diameter at which 60% of the soil by weight is finer

D10 = particle diameter at which 10% of the soil by weight is finer

Materials shall comply with the current Environmental Regulations at the time of use. Reference shall be made to Annex ZA (informative) of BS EN 13242.

Acceptability limits are generic and shall be revised based on site specific source approval testing.

The limiting values of Class U1B are given in Cundall's Remediation and Earthworks Strategy.

Table 6/1 Acceptable Earthworks Materials: Classification and Compaction Requirements

Appendix 6/2: Requirements for Dealing with Class U1B and U2 Unacceptable Materials

General Requirements

The Contractor shall comply with all current legislation concerning the import, handling, transportation and disposal of materials, including those which could be regarded as hazardous, including the Collection and Disposal of Waste Regulations (1992), the Controlled Waste (England and Wales) Regulations (2012), the Control of Pollution Act (1974), the Pollution Prevention & Control Act (1999), the Environmental Protection Act (1990), Guidance on the classification and assessment of waste – (1st edition 2015) – Technical Guidance WM3, and the Landfill (England and Wales) Regulations (2002), as well as any subsequent amendments, and obtain all relevant permits.

The Contractor shall be responsible for the detailed classification of any waste (Class U1B & U2) materials for disposal purposes in accordance with the Local Authority / EA Regulations and for any testing on imported materials in order to ensure they are not classed as Hazardous under WM3. The Contractor shall be deemed to be the producer of the waste.

Suspected Class U1B or U2 Materials

If the Contractor encounters or suspects the presence of any Class U1B or U2 material that has not already been identified in the Contract, they shall cease any excavation work in that area immediately and notify the Contract Administrator and relevant Authority.

The Contractor shall provide instruction and training to appropriate workers to enable them to identify visual and olfactory evidence of contaminants (including asbestos, hydrocarbons, etc.) and previously unidentified contamination.

The Contractor is to keep a watching brief during all excavation works for any bio-degradable / putrescible material, material containing visual or olfactory evidence of contamination, and/or free phase oil/creosote/tar etc.

Any materials found to be impacted by fibrous materials and/or hard bonded materials suspected to contain asbestos shall be assessed by a suitably qualified and licenced asbestos specialist to allow disposal / containment options.

The Contractor shall record the location, volume, nature and extent of all suspected contamination.

Should coal seams be encountered during earthworks operations they should be assumed as representing U2 and should be treated as such and removed from site.

A method statement shall be prepared by the Contractor in consultation with the Contract Administrator detailing how this or any other potentially contamination material will be sampled and tested before commending any works in that vicinity. The Contractor shall carry out sampling and testing according to Appendix 6/15 of this specification.

The Contractor shall ensure that the working faces and arisings from all excavations are carefully inspected for signs of potential contamination such as:

- Fuel and oil contamination, including the presence of free phase hydrocarbon product.
- Tar and tarry wastes.
- Putrescible waste materials.
- Suspected ordnance.
- Drums, tanks, underground structures, redundant services, canisters or other containers containing unknown materials.
- Ash, clinker, bricks and other indicators of Made Ground.
- Colliery waste.
- Asbestos containing materials (ACM).
- Coal; and
- Other visually or olfactory impacted material, including contaminated liquids or sludge.

Stockpiling of Potentially Contaminated Materials

Unclassified material suspected of being contaminated or other wastes shall be stockpiled or sampled in-situ and tested prior to re-use or disposal. Stockpiles should be segregated depending on the source of the material and the apparent nature of the contamination and shall be located away from adjacent human, surface water and sensitive ecological receptors. Where Class U1B and / or U2 material is suspected, or proven, stockpiles should be placed on an impermeable liner within a bunded area and shaped to allow surface water run-off to be directed for collection in secure containers for disposal off-site or treatment and disposal under licensed consent. They should be suitably protected from damage by earthmoving plant with suitable barriers or sheeting erected and maintained to reduce emission of dust, vapours and odours and to control water ingress and leachate generation from stockpiles. Proposed stockpile areas should be adequately tested prior to and after use to prove that no cross-contamination has occurred.

Each stockpile shall be uniquely numbered, and its source, classification and destination recorded. Stockpile samples and test results shall be uniquely numbered and traceable to the stockpile.

Liquid and sludge contaminated materials shall be stored in suitable tanks or purpose-built lagoons prior to testing and treatment/disposal in accordance with current guidelines.

Testing Requirements for Suspected U1B / U2 Material

Any tests on suspected U1B / U2 material shall be undertaken as per the requirements of Appendix 6/15.

Refer to Appendix 1/5 for sampling and testing frequencies of excavated materials. Stockpiles suspected of containing U2, hazardous material shall also be subject to Waste Acceptance Criteria (WAC) testing prior to disposal at an appropriate waste treatment facility.

Proven Class U1B or U2 Materials

If the material is confirmed as Class U1B or U2 material, it is not permitted to be used and will require to be disposed of.

Disposal of U1B / U2 Material

Transportation off site of Class U1B / U2 material will be in accordance with Local Authority requirements, statutory regulations and relevant legislation. If the Contractor does not possess the relevant licences for handling the Class U1B / U2 material, including asbestos, they shall appoint a licenced subcontractor (approved by the relevant Authorities) to handle the material.

Material shall be disposed of to an appropriately licenced facility in accordance with the current Waste Management legislation and associated statutory instruments. Prior to removal of U1B / U2 material from the site, the Contractor shall submit to the CA copies of Waste Disposal Noticed and Waste Carrier Notices. During the tipping operation, the Contractor shall submit to CA copies of the transfer notes which shall include a description of each classification of U1B / U2 contaminated material.

No such material shall leave the site without the approval of the Contract Administrator. The Contractor shall keep records of the materials removed.

Disposal of Groundwater/Leachate

Groundwater or leachate from contaminated areas shall not be discharged to any surface-water, foul sewers or groundwaters, without prior approval from the appropriate Statutory Authority. Should contaminated groundwater or leachate be encountered it shall be contained to prevent cross-contamination prior to disposal, as agreed by the appropriate Statutory Authority.

Chemical testing shall be carried out by a UKAS and where available MCerts approved laboratory, acceptable to the Designer's Representative. The UKAS and MCerts approval shall cover all of the analytical tests that are required by in the Cundall Remediation and Earthworks Strategy. The results shall be made available within 10 working days of collection of the samples on-site. Test methods to be used for chemical analysis of contaminated soil, groundwater or leachate shall be carried out in accordance with current Environment Agency guidance. Sample deviation times should be noted with samples dispatched to the laboratory and scheduled for analysis with 48 hours of collection.

Transport of Class U1B/U2 Materials

The Contractor shall take all practicable measures to prevent the deposition of soils, slurries or rubbish, etc. on any highway (including pavements or footways) or on any land adjoining or adjacent to the site. The Contractor shall immediately remove any such material deposited and cleanse the area.

Vehicle wheels, bodies and cabs shall be thoroughly washed and cleaned before leaving site. All loads are to be covered during transportation. Drivers shall wear appropriate PPE if leaving their vehicles within areas of known or suspected contamination.

Vehicles shall exhibit the appropriate markings and signs in respect of the load they are carrying.

The Contractor shall take the steps necessary to prevent fly tipping of any material removed from site and shall obtain fully completed consignment or waste transfer notes for each load.

All vehicle drivers shall be fully instructed and equipped as to the nature and hazard of their loads and the containment methods to be used in the event of a vehicle accident or spillage.

The Contractor shall prepare contingency plans for use in the event of an emergency such as spillages or vehicle accidents. These shall be fully co-ordinated with representatives from the appropriate emergency services.

All vehicles used for the carriage of Class U1B or U2 material on-site shall be washed down at appropriate intervals to remove contamination. This is to ensure that no cross-contamination of subsequent “clean” material occurs. Hazardous materials are not to be stored in vehicles overnight.

Appendix 6/3: Requirements for Excavation, Deposition, Compaction (other than Dynamic Compaction)

General Requirements

All works to be carried out in accordance with SHW Series 600 Clauses 601, 602, 603, 604, 606, 608, 610, 611, 612, 613, 616, 618, 630, 631 to 636, 640 and 644.

Earthworks Principles and Phasing

The earthworks have been separated into six key development areas (Zone A to Zone F) based on the anticipated works and a summary of the requirements is provided in Cundall's Earthworks and Remediation Strategy (GBR1- ENA1-XXX-UG-RP-B-00-11).

The installation of vibratory stone columns will be undertaken following the completion of the Phase A enabling works and is not included within the enabling works package.

Permitting

To allow for the reuse of material on site, a relevant permit will be required to be obtained by the Contractor. Where general fill is to be reused, the material is likely to be suitable for reuse in accordance with a Material Management Plan, which shall be obtained by the Contractor

However, at the time of writing, discussions between the Environment Agency and the Client were ongoing to understand whether the Burnt Shale can be reused under an MMP or whether an Environmental Permit is required. Depending on the permitting requirements and if an Environmental Permit is needed, the Contractor will be required to obtain this following on from the initial discussions and will be responsible for the submission of the required documentation.

Environmental Monitoring

Environmental monitoring shall be undertaken as defined within the Contract. During periods of material handling, noise and dust monitoring shall be undertaken, with monitoring stations located in the proximity of nearby receptors, i.e. towards residential properties in the south and commercial units in the west.

When compacting fill within the vicinity of sensitive structures (i.e. adjacent to electricity pylons or below ground infrastructure), vibration monitoring shall be undertaken to satisfy the Contractor that the structures will not be adversely affected by the works.

The Contractor shall include monitoring proposals within a monitoring and testing plan in advance of the enabling works and this shall be reviewed by the CA.

Excavations and Cuttings

Excavated material shall be stockpiled separately according to visual assessment of their class until further testing is undertaken to inform disposal routes. The Contractor shall ensure that the excavated material is managed in accordance with the relevant legislation and / or environmental permitting (if applicable). Stockpiled material shall be protected from the weather by ensuring the surface is sealed using mechanical plant and stockpiles should be domed to promote surface run off.

Hard material, such as asphalt and concrete surfacing, shall be excavated and segregated for processing and crushing. In addition to this, oversize material such as cobbles of concrete and brick and granular sub base should be combined with the hard material and processed to form suitable engineered granular material.

Obstructions

Known obstructions from the available are shown on Drawing GBR1-ENA1-XXX-UG-DR-B-01-11 and should be referred to by the Contractor. In addition to this, a number of existing services and drainage infrastructure are present and these are identified on Drawing GBR1-ENA1-STE-XX-DR-C-01-01 and GBR1-ENA1-STE-XX-DR-C-01-0.4

Obstructions shall be removed by the Contractor as follows:

- **Zone A and Zone C** – Full depth removal of all known obstructions and those encountered as part of the reduced level excavation.
- **Zone B** – Known obstructions and those encountered as part of the reduced level excavation shall be removed to a maximum depth of 0.50m below proposed service corridors. At the time of writing, the scheme design was not progressed sufficiently to confirm the exact depth, but reference shall be made to Cundall Drawing GBR1-DCZZ-STE-XX-DR-C-01-40 prior to mobilisation and during the earthworks to understand the true extent of the proposed service network.
- **Zone D** – As no significant reduced level excavation is proposed at this stage and the scheme design is in development, there is no requirement to remove obstructions within Zone D. However, given that the construction of the permanent surface water will be undertaken by the enabling works contractor, any obstructions or hard spots shall be excavated and broken out as part of these construction works in accordance with Cundall Civil Engineering Specification GBR1-ENA1-STE-UG-SP-C-00-01.
- **Zone E** – Known obstructions and those encountered during the reduced level excavation shall be excavated and broken out to a maximum depth of 0.50m below the base of the pond and invert level of drainage infrastructure. Further information on levels and drainage infrastructure is included on Cundall Drawing GBR1-ENA1-STE-XX-DR-C-01-33.
- **Zone F** – Where previously unidentified obstructions are recorded during the reduced level dig, these shall be broken out to a maximum depth of 0.50m below services corridors.

If relict pile foundations are encountered, the following procedures should be followed:

- Zone A – Piles to be broken out and cropped to a depth of at least 3.0m below finished enabling levels.
- Zone B – Piles to be broken out and cropped to a depth of at least 0.5m below invert level of proposed services shown on Cundall Drawing GBR1-DCZZ-STE-XX-DR-C-01-40.
- Zone C – Piles to be broken out and cropped at the base of the reduced level excavation.
- Zone D – No specific works required at this stage of the scheme design.
- Zone E – Piles to be broken out and cropped to a depth of 0.5m below invert level of pond.

To the east of the Zones there is an area where piles have been installed as part of the recent development. These piles shall be broken out and cropped to a depth of 0.50m below the proposed service corridor in locations identified on Cundall Drawing Cundall Drawing GBR1-DCZZ-STE-XX-DR-C-01-40.

Watercourses

Refer to contract drawings and documents for details of the diversion of Maw Burn (located outside the Phase I Enabling Works boundary) and Cow Gut (drawing GBR1-DCZZ-STE-XX-DR-C-01-04). Works within the watercourse

An unnamed watercourse historically extended through the centre of the site and is understood to have been culverted (drawing 401-12510874-DWG-C-004). The watercourse has historically been diverted to the west of Zone A and now trends north to south, leading towards Cow Gut. Any works required to repair the diversion connections will be undertaken by the enabling works contractor in accordance with GBR1-ENA1-STE-XX-DR-C-01-33.

Material Management Area – Stockpiling of U1A and U1B

Part of Zone D will be designated as a material management area and will be utilised during the Phase A enabling works as an area for stockpiling and treating U1A and U1B material. The specific technique and method of treatment will be dependent on the material properties and proposed end use, once confirmed.

Material shall be stockpiled based on the material properties (i.e. organic material, wet soils, potentially contaminated soils) and sealed using mechanical plant to facilitate surface run off until a treatment methodology is confirmed. If material is confirmed to be contaminated (U1B) and does not comply with the testing criteria specified in Appendix 6/15, the material shall be placed upon an impermeable membrane that is bunded to avoid surface run off.

Formation of Cutting Faces

Cut faces shall be restricted to a maximum of 1(V):3(H) unless otherwise specified on the contract drawings. Where localised steepening is required, the Contractor shall inform the CA, and the measures required to ensure the long-term stability of the over steepened slopes agreed. It is the Contractor's responsibility to supply and design any required Temporary Works.

The Contractor shall be responsible for all necessary temporary supports and / or restrictions on sequence of construction. The work will be carried out with suitable plant in such a way that it will not cause slope failures by overloading the crest of undercutting the final faces. Foundation excavations on slopes shall be carried out in a manner that will not cause slope failures. Any slope failures on final cutting faces shall be made good by the Contractor.

Temporary slope faces shall not be left unprotected or unsupported in the long term prior to the construction of any retaining structures or grading to final slope angle.

The PFA stockpile to the north of Zone A is outwith the proposed area of 'ground break' but the stockpile shall be graded to a safe angle of repose (maximum of 1V:3H) as part of this contract package.

Undercutting Restrictions

Any undercutting excavations shall only remain open for minimum periods necessary to prevent risks to permanent works and/or existing structures. It is the Contractor's responsibility to assess the need for any Temporary Works and then design and supply them as required.

Trenches at the base of slopes shall be offset by a minimum of 1m (or as agreed by the CA) and excavated so that no more than 20m length of trench (where 1m deep or greater) shall be open in a continuous run. Where conditions are soft this will be limited to 10m. No further excavation for the trench shall take place within 10 metres of the start of the end of this open length until the open trench has been backfilled.

Structures to be Retained

Existing services and site features to be retained are presented on the following contract drawings:

- GBR1-ENA1-STE-XX-DR-C-01-01 Existing Services
- GBR1-ENA1-STE-XX-DR-C-01-02 Existing Site Constraints
- GBR1-ENA1-STE-XX-DR-C-01-04 Existing Site Drainage and Survey Schedule

Fill Construction

Fill material shall be placed in the areas described in the contract drawings.

Prior to the placement of any fill material, the existing ground surface shall be surveyed in order to allow contour plots of the base of fill to be produced.

The base of any excavation surface shall then be prepared to accept fill material and shall be proof rolled and any soft/loose spots encountered shall be removed as necessary and replaced with suitable material (Class 6F2 / 6F5).

Soft spots shall be defined as areas where the soil does not meet the minimum shear strength requirements (50 kN/m^2) and should be identifiable by the fact that the soil does not support the roller weight during proof-rolling without excessive deformation. The extent of soft spots shall be determined by inspection during proof-rolling.

Loose spots will be defined as areas that show significant deterioration / deformation as a result of proof rolling the base with a minimum of two passes of the vibratory roller. Where it is clear the sub grade does not support the weight of the vibratory roller during the prof rolling exercise, dewatering of the subgrade or removal of loose deposits of material should be undertaken prior to placement and compaction of suitable fill.

Once a clean sub-grade surface has been exposed and approved, suitable fill material shall be placed and compacted in accordance with Appendices 6/1 and 6/3.

All areas of fill shall be made level (unless otherwise indicated by the contract drawings), by terracing, if necessary, with a nominal fall of 1 in 50. All loose materials, including all soft sports, shall be made good.

Where several different classifications of fill material are to be placed, they shall be deposited in such a way that as far as possible, the material is deposited evenly across the site in approximately the same sequence, thus ensuring a uniform distribution of fill types over the whole fill thickness.

Cobbles, boulders, rock or waste fragments whose largest dimension is greater than two-thirds of the loose layer thickness shall not be incorporated into the fill. If discovered, they shall be stockpiled for processing.

Where fill is to be constructed on existing ground or cuttings steeper than 1 (V):5 (H), the contractor shall bench the existing ground. Each benching step shall be at least 0.5m in height and 1.0m wide and have an adequate fall to prevent any ponding of water.

The chronology of the earthworks shall be determined by the Contractor but shall be planned to allow for the generation of suitable material to be placed within each individual zone.

PFA is a sensitive material and is susceptible to changes in moisture content. Where PFA is to be placed, it shall be done under favourable conditions and PFA should not be left exposed to dry (risk of dust generation) or wet conditions. PFA shall only be exposed immediately before relocating or placing and compacting.

PFA shall only be placed and compacted above a minimum 150mm thick starter layer (Class 6D) and shall not be left exposed at the end of the day or at finished formation level.

Material susceptible to frost heave, such as PFA, shall not be placed within 450mm of finished development levels.

Following placement of fill, an as built survey shall be produced to National Grid Co-ordinates and made available for the CA as part of the verification.

This earthworks specification does not include for the modification or stabilisation of materials using lime or cement and if required, proposals should be submitted by the Contractor for the CA review and if approved, this Earthworks Specification will be required to be revised.

Starter Layer

If required, a starter layer may be placed as the first layer of fill and shall comply with the requirements in Table 6/1 for a Class 6C material.

Placement of PFA (Class 2E) is only permitted following the placement of a Class 6D Starter layer.

Fill adjacent to Existing Structures

Placement and compaction of fill adjacent to structures, shall be undertaken in accordance with Clause 610 of the SHW Series 600 and shall comprise Class 6N only.

Temporary Drainage

During the enabling works and in addition to Clause 602, the Contractor shall allow for the creation of drainage channels and sumps in order to remove temporary surface water. Further information on discharge locations and a temporary surface water management plan will be required to be provided by the Contractor. The Contractor shall ensure that any perched water and or groundwater is managed and controlled and all excavations and dry prior to placement of fill.

Upon completion of the bulk excavation and placement and compaction of fill, the installation of both a temporary and permanent surface water drainage system will be required and this shall be in accordance with Cundall's Civil Engineering Specification and Cundall Drawing GBR1-ENA1-STE-XX-DR-C-01-33.

Testing Requirements

Testing requirements for compacted fill material are detailed in Appendix 1/5.

Compaction

Compaction Trials

A compaction trial will be required to be undertaken on each material type and the results of the compaction trial shall be submitted to the Engineer at least 7 days prior to backfilling. The Contractor will be responsible for proposing the location and dimensions of the compaction trial, but it must be at least 10m wide x 15m long and comprise at least three layers of fill. Testing will include for density, stiffness and settlement testing.

The Contractor must submit their proposals for the compaction trial in advance of the works.

As part of the compaction trials on PFA, moisture content testing should be undertaken alongside each and every nuclear density test to determine the accuracy and relevance of the moisture content results recorded using a nuclear density gauge. The results of the compaction trial will determine the preferred testing methodology for the works.

Compaction Requirements

The proposed method of compaction that shall be adopted is detailed within Table 6/1.

The contractor will be responsible for assessing the suitability of the site won material for placement.

The earthwork requirements are largely dependent on the material type and the proposed end use in each individual Zone.

Zone A and Zone C

Engineered general fill shall be placed and compacted to an end product specification and testing shall be undertaken in accordance with Appendix 1/5 and Table 6/1.

Where engineered granular fill is to be placed within these zones, this shall be compacted to an end product specification and testing shall be undertaken in accordance with Appendix 1/5 and Appendix 6/1.

Zone B, Zone D to Zone F

Engineered general fill and engineered granular fill shall be placed and compacted to a method specification and testing shall be undertaken in accordance with Appendix 1/5 and Table 6/1.

Appendix 6/5: Geotextiles Used to Separate Earthworks Material

A non-woven geotextile marker layer is required to be placed on top of the subgrade in landscaped areas that require a clean cover system. The clean cover system will incorporate a geotextile marker as a basal layer, followed by the placement of at least 300mm of suitable soils.

The geotextile shall act as a marker layer and shall be installed as per manufacturer's recommendations and with a minimum overlap of 500mm.

The Contractor shall provide their proposed product details and all certification prior to its purchase for review (and approval if appropriate) by the CA, including CE declarations or performance. Upon review the CA may require the Contractor to undertake testing on samples of the proposed geotextile.

The geotextile shall have the following properties:

Property	Mean Value Requirements	Test
CBR Puncture Resistance	1500N	EN ISO 12236
Tensile Strength (MD)	8kN/m	EN ISO 10319
Tensile Elongation	<60%	EN ISO 10319
Permeability	≥90 litres/m2s	EN ISO 11058
Pore Size (O90)	90 micro m	EN ISO 12956

Appendix 6/6: Fill to Structures and Fill Above Structural Foundations

General Requirements

The fill materials to structures shall be 6F2, 6F5, 6N or 6P and the Contractor shall use a compaction method as detailed in Table 6/1.

All works to be carried out in accordance with SHW Series 600 Clauses 608, 610, 611 and 612.

Appendix 6/7: Sub-Formation and Capping and Preparation and Surface Treatment of Formation

Reference should be made to the Phase A Enabling Works (PH1) Civil Engineering Specification (GBR1-ENA1-SYE-UG-SP-C-00-01) for further information, if required.

Appendix 6/8: Landscape Areas

Topsoil will be present across the site in discrete areas and where dense vegetation is present. Topsoil shall be excavated across all areas of the Phase A Enabling Works within Zone A to Zone F to depths described within the Arcadis Ground Investigation (where available).

The excavation, handling and stockpiling of topsoil shall be undertaken in accordance with Clause 602 and Clause 618 and be described as Class 5A fill. Testing shall be undertaken as detailed within Table 6/1 and within Landscape Architect specification. The Contractor shall comply with guidance in DEFRA's 'Construction Code of Practice for the Sustainable Use of Soils on Construction Sites'.

The current scheme proposal requires topsoil to be placed within the pond basin to achieve finished development levels. Class 5A topsoil shall be placed in a layer no thicker than 200mm

Appendix 6/13: Ground Improvement

Not required.

Appendix 6/15: Limiting Values for Harm to Human Health and the Environment

The Contractor shall follow the requirements of the Cundall Earthworks and Remediation Strategy prepared for the Phase A Enabling Works (GBR1-ENA1-XXX-UG-RP-B-00-11).

The testing threshold limits frequency is detailed in Table 5-1 and Table 5-2 within Phase A Enabling Works (GBR1-ENA1-XXX-UG-RP-B-00-11).

Cundall Johnston & Partners LLP
One Carter Lane London EC4V 5ER
Tel:+44 (0)20 7438 1600
Asia Australia Europe MENA UK and Ireland
www.cundall.com

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