PARRYS QUARRY
GEOLOGICAL BARRIER

Construction Quality Assurance Proposals for the Installation of the Engineered Geological Barrier

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ATTACHMENT: MANUAL OF CONTRACT; Documents for Highways Works Volume1 Specification for Highways Works. Series 600.Earthworks

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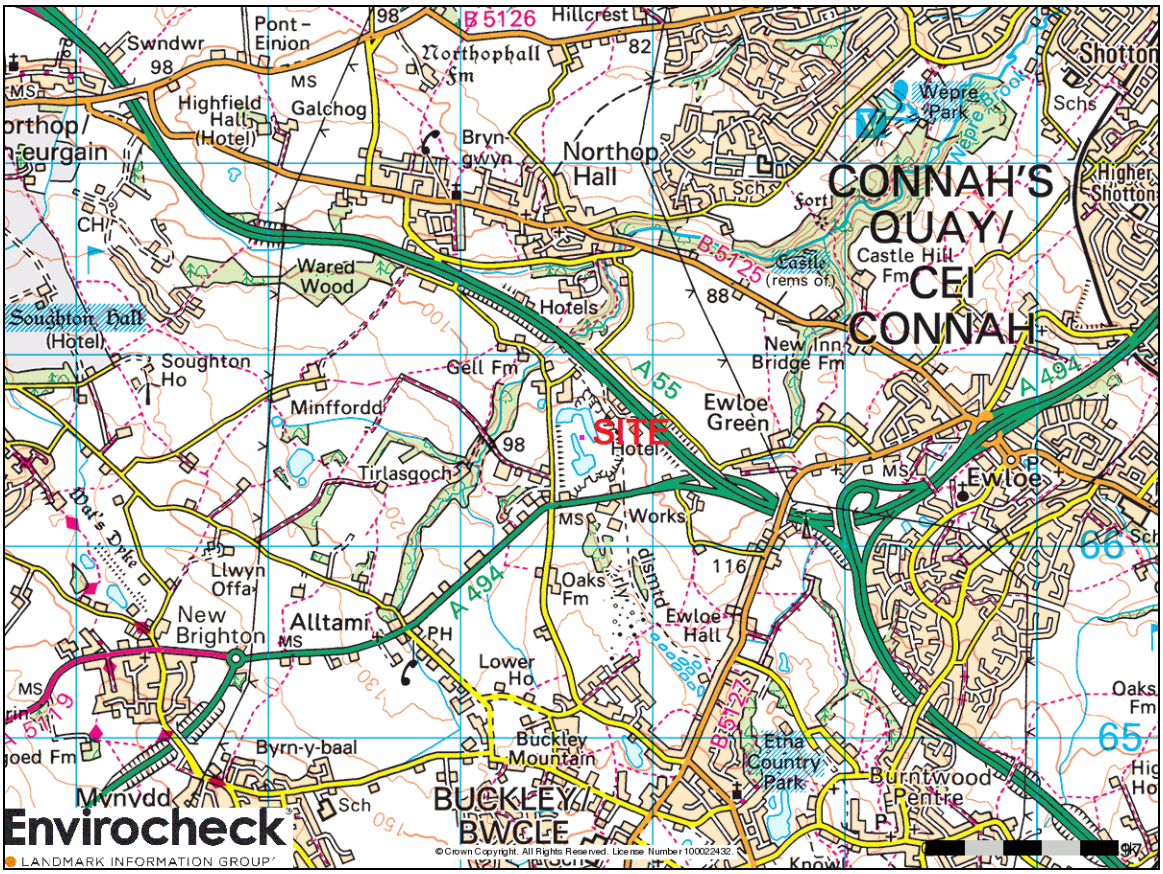
1. INTRODUCTION

1.1 The site is situated within the existing Parry's Quarry in Alltami, Flintshire and bounded by the A494 to the south, A55 to the north and Pinfold Road to the west. The National Grid Reference (NGR) for the entrance to the site is SJ 27478 66278, presented at Figure 1.

Figure 1: Site Location



1.2 The Parrys Quarry landfill site Geological Barrier is to be constructed using suitable inert fill materials such as on site Etruria Marl.

1.3 Definitions

(a) "Contractor" means Mold Investments Ltd, (MIL),appointed operator/tenant in accordance with the signed lease for the site and includes the Contractor's personal representatives, and covers all works the Contractor carries out under the lease in accordance with current and future Planning Permissions, Permits and Exemptions;

(b) Engineer means Third Party Consulting Engineers and includes the Engineer's personal representatives;

(c) Geological Barrier means a 1 metre thick geological side wall seal constructed using clay that will achieve a permeability of 1 x 10^{-7}m/s and have a minimum 7% clay content and a fines content of 15%;

(d) Suitable Fill will be in accordance with Clause conditions Department of Transport Specification for Highways Works: Part 2: 601.

(e) Placement and Compaction shall be in accordance with Clause 612 Compaction of Fills conditions Department of Transport Specification for Highways Works: Clause 612 and Tables 6/1 and 6/4.

(f) Environmental Permit means a Permit issued for inert landfilling at the site issued under the Environmental Permitting Regulations 2010 and any subsequent amendments.

(g) Town and Country Planning Act 1990 means any planning permission issued for the site in relation to infilling for either restoration or commercial development at the site.

1.4 The geological barrier is to provide a 1 metre seal that is placed in four distinct layers and subjected to compaction in accordance with the method specification set out in Tables 6/1 and 6/4 around the sides and the base will be rolled following excavation.

1.5 It is the responsibility of the MIL on issue of any new Planning Permission or Environmental Permit to comply with all of the requirements and to also comply with this specification, but the highest standard. Therefore if there is a more onerous requirement in the Permit than the CQA Plan and Method Statement contained herein the Permit standard shall be achieved. If the specification contained below is higher then this shall be the minimum standard.

2. DESCRIPTION OF THE WORKS

2.1 General

2.1.1 The Works to be performed by MIL will comprise:

2.1.1.1 All cleaning and setting out necessary for carrying out the Works.

2.1.1.2 The Construction of associated temporary access roads and temporary drainage and the diversion and modification of any existing drainage ditches.

2.1.1.3 Construction of the 1 metre geological barrier on the sides walls of released Phases and the rolling of the base.

2.1.1.4 The phasing for infilling is set out on Drawing No. ESSD 6 the following process is to be adopted for the terms of the contract and conditions pertained herein.

2.1.1.5 Satisfactory will be defined that all of the relevant Construction Quality Assurance Validation Reports have been completed by third party consulting engineers appointed on behalf of MIL and confirm compliance with this specification.

2.1.2 The Works to be performed by the appointed Engineer will comprise:

2.1.2.1 The Construction Quality Control (CQC) by way of independent testing both chemical and physical.

2.1.2.2 Construction Quality Assurance (CQA) by way of independent verification that the Works have been carried out in accordance with the Construction Quality Assurance Plan (CQAP) on a part time basis.

2.1.2.3 The production of the Construction Quality Assurance Validation Reports (CQAVR).

3. EARTHWORKS

3.1 General

3.1.1 The geological barrier shall be placed on the sides of all landfill areas. Compacted fill shall be placed in individual layers of uncompacted thickness of approximately 300mm and compacted to achieve a 250mm compacted layer in accordance with Table 6/1 and 6/4, and any approved modifications prior to commencement of the Earthworks.

3.2 Fill Materials for the Geological Barrier

3.2.1 Acceptable materials will fall into one of the following general classifications;

(i) Acceptable material; material excavated within the site or imported to the site, which meets the requirements of Table 6/1 and Appendix 6/1 for acceptable use in the Permanent Works.

(ii) Unacceptable material Class U1 or U2 as defined in sub clauses 3.2.2 and 3.2.3: material, which shall not be used in the Permanent Works.

3.2.2 Unacceptable material Class U1 shall be;

(i) Material which does not comply with the permitted constituents and material properties of Table 6/1 for acceptable material

(ii) The following materials and constituents

- Material from swamps, marshes and bogs;
- Peat, logs, stumps and perishable materials;
- Material susceptible to spontaneous combustion;
- Material in a frozen condition;
- Suitable fill having a liquid limit exceeding 90 or a plasticity index exceeding 65.

3.2.3 Unacceptable material Class U2 shall be;

(i) Material having a hazardous chemical or physical properties requiring special measures for its excavation, handling, storage transportation deposition and disposal.

3.3 Compaction

3.3.1 Compaction shall be carried out in uniform layers as soon as practicable after deposition. Plant and methods will only be used that have been proved satisfactory by site compaction trials and approved in writing by the Engineer.

3.3.2 The methodology for compaction will be as per Highways Specification standards attached in Tables 6/1 and 6/4. The earthworks shall therefore be carried out in the following sequence.

3.3.2.1 Deposition of suitable fill with no material greater than 150mm in diameter.

3.3.3.2 Blading out of material to a uniform uncompacted thickness (**D**), as defined by the compaction trials, to achieve a compacted lift thickness (**T**).

3.3.3.3 Compaction by **N** passes of the compactors as defined by the compaction trials.

3.3.3.4 Finish with smooth drum roller to provide uniform surface for testing and sampling.

3.3.3.5 Prior to placement of further layers, the surface will be traversed by the tamping roller to enable the next layer to be keyed in, with a minimum penetration of the previous layer by 30mm or scarified to ensure that sufficient bonding of the individual lifts occur.

4. QUALITY CONTROL

4.1 British Standards

4.1.1 All materials and workmanship shall comply with the appropriate British Standard Specification as described in the British Standard Yearbook, or such other standards as approved in writing by the Engineer. The abbreviation BS is used when referring to a British Standard and CP when referring to a Code of Practice.

4.1.2 The primary control documents are BS1377:1990 Methods for Testing Soils for Civil Engineering Purposes and BS 5930:1999+ A2 2010 Code of Practice for Site Investigation and Environment Agency Guidance on Inert Landfill.

4.2 Test Definitions

4.2.1 Throughout this CQAP unless otherwise stated, the following test definitions shall apply:

4.2.2 **Classification Tests** shall be that defined in *Methods 4.3, 5.3 and 5.4,8 in BS 1377, Part 2: 1990.*

4.2.3 **Particle Size Distribution** shall be that defined in *Method 9 of BS 1377, Part 2: 1990.*

4.2.4 **Permeability Test** will be as per Environment Agency Guidance for Inert Landfills.

4.3 Testing Schedule

4.3.1 During the various phases of the Works, the Engineer will undertake testing and will take samples for laboratory testing to ensure the integrity of the perimeter seals. These tests will include:

- Particle Size Distribution and Classification 1No.test per 5,000m^3
- Permeability Tests 2 per phase and one per lift of each phase.
- Triaxial Permeability One per Phase
- WAC Test 1No.Test per 1,000m^3 when imported materials are used

4.3.2 In addition to the above, thickness surveys are to be carried out by the Engineer to demonstrate that the correct thickness of compacted suitable fill has been constructed. The Engineer shall carry out visual and physical observations and shall verify observations using a measuring staff and photographs.

4.4 Material Sampling Procedures

4.4.1 All material samples shall be taken in accordance with BS 5930:1999+A2 2010, and any subsequent revisions. All samples shall be given a unique reference and placed in sealed containers before removal to a secure site store for transfer to the approved soils laboratory. Both a despatch advice note and two copies of the Laboratory Testing Schedule, all signed by the Engineer on site, shall accompany the samples during their transfer.

4.5 Material Testing Procedures

4.5.1 All materials sampled will be taken to a UKAS accredited laboratory. Upon receipt at the laboratory the samples will be logged into the sample store (and into the computer system) where they will be kept until required for testing. All laboratory testing will be in accordance with *BS 1377; 1990,* or other approved method. After testing, any material remaining will be disposed of in accordance with the *Duty of Care.*

4.6 Material for Compaction

4.6.1 Source materials shall be taken by the Engineer for independent laboratory testing in accordance with Clause 4.4.1 for the geological barrier. Source testing shall consist of:

4.6.1.1 **Particle Size Distribution** *BS 1377: 1990: Part 2: Test 9.*

4.6.1.2 **Classification Tests** *BS 1377 Methods 4.3, 5.3 and 5.4,8 in BS 1377, Part 2: 1990.*

4.6.1.3 **Inert WAC Test** for imported materials

4.6.2 The testing shall be carried out in advance of the works as a form of source evaluation and the results Approved by the Engineer prior to commencement of placement of the geological barrier and a record of assessment and approval kept which shall form part of the Construction Quality Assurance Validation Report.

4.7 Site Clearance

4.7.1 The surface to be occupied by the geological barrier shall be graded. Any debris, angular or sharp rocks larger than 150mm in diameter shall be removed as well as any other deleterious materials. The sub-grade should be compacted if appropriate such that no significant rutting is caused by installation equipment or vehicles.

4.7.2 Materials removed in the clearing operations shall be stockpiled for removal or re-use on site.

4.7.3 The Contractor shall take all reasonable precautions against the site being flooded or water-logged. The Contractor shall conduct his cleaning

operations in such a way as to minimise the disturbance to the ground surface. In the event of surface deterioration by any cause, the Engineer may direct the Contractor to trim, scarify and roll the formation as appropriate. The Engineer must certify that surfaces are suitable for compacting on or against.

4.7.4 Material originally deposited under Waste Recovery to produce bunds for water removal will be excavated at the edges and a side wall seal constructed, that is keyed into the clay base as detailed on Drawing ESID 4.

4.8 Emplaced Material

4.8.1 Particle size distribution gradings shall be carried out on emplaced geological barrier material every 5,000m^3 on a regular grid pattern.

4.8.2 Placed material will be regularly checked using a Cone Penetrometer and Shear Vanes on compacted lifts of the development platform with random Core Cutter samples collected.

4.8.5 Soil contamination testing will be carried out as part of the infill quality assurance protocol to ensure that the material is inert by definition with the Landfill Regulations (England and Wales) 2002 and the Environmental Permitting Regulations 2010, to comply with an Environmental Permit Waste Acceptance Criteria and will be acceptable as suitable material for inert landfill acceptance.

4.9 Adverse Conditions

4.9.1 The Contractor shall not carry out any placing or compaction of geological barrier materials when conditions are such that, in the opinion of the Engineer, the quality of the work or adjacent completed works would be adversely affected. After any operation has been stopped due to adverse conditions, it shall not be re-started without the verbal approval of the Engineer, and recorded on the daily logs.

4.10 Instability

4.10.1 The Contractor shall take all necessary precautions to prevent instability in any part of the Works. The Contractor shall make good both any damage or defect and remove reject material caused by instability and provide backfill or other reinstatement to the written approval of the Engineer.

4.11 Placement Methodology

4.11.1 The Contractor shall place un-compacted lifts of thickness D, and traverse with N passes, to achieve a minimum compacted thickness T as per Table 6/1 and Table 6/4 for the side wall Geological Barrier.

4.11.2 Placement of the suitable fill will be in un-compacted lifts of thickness D, and traversed with N passes, in uniform strips, to allow for visual examination as per Table 6/1 and Table 6/4.

4.11.3 The side wall will be built up in layers but in 2 metre lifts in a Christmas tree type construction. The typical construction process is presented in the SRA and Working Plan for Meriden Quarry Area G.

4.11.4 Typical values for silt and clay have been modelled to assess the short and medium term stability as the walls will be retained with inert fill within a short period of time. The values have been obtained from the Government Publication Handbook on the Design of Tips and Related Structures, HMSO.

5. DRAINAGE

5.1 General

5.1.1 The Contractor shall construct all necessary drainage works as required or as approved by the Engineer.

5.1.2 The areas to be occupied by the suitable fill shall be drained and maintained dry by the use of appropriate pumping equipment as necessary.

5.1.3 No surface water will be allowed to freely leave the site and should at all times be intercepted by the surface water cut-off ditches.

5.1.4 All water will be discharged a so as to comply with the Discharge Consent.

6. WORKS SUPERVISION

6.1 Quality Control Procedures for Supervision of the Works shall be in accordance with those specified within this document.

6.2 When compaction works are being carried out, the Engineer or approved site personnel shall be on site at sufficient frequency to be able to sign off each section of the works to the standard set out herein, and it shall be demonstrated that the material is suitable by collecting samples pre-start for WAC testing, particle size distribution and a section rolled to demonstrate compaction capability.

6.3 The Engineer shall be a Civil Engineer, Geotechnical Engineer, Engineering Geologist as required or other persons with relevant experience and suitable training. In addition site staff will be trained to undertake physical measurements of clay liner thickness, to undertake permeability testing to photograph the cores and keep a site diary when the engineer is not present on site.

7. PROJECT MANAGEMENT STRUCTURE

7.1 Staff and there responsibilities are to be forwarded to Environment Agency prior to commencement of any lining works.

7.2 Liaison meetings will be held to discuss progress and any matters arising. These meetings will be attended by the Contractor and the Engineer.

8. CONSTRUCTION QUALITY ASSURANCE VALIDATION REPORTS

8.1 Upon completion of each of the phase of compaction both of the Geological Barrier, the Engineer will present a Construction Quality Assurance Report describing the construction work undertaken in each phase, together with the quality control monitoring, sampling and testing of the Works and the results of all testing and test locations, both in the field and in the laboratory. These will be known as the Construction Quality Assurance Validation Reports (CQAVR's) and shall be submitted in writing to Environment Agency on completion of each phase of compaction.

REFERENCES

BRITISH STANDARDS AND CODES OF PRACTICE

BS 1377: 1990: Methods of Testing for Soils for Civil Engineering Purposes. British Standards Institution.

BS 5930: 1999+A2 2010: Code of Practice for Site Investigations. British Standards Institution.

ORDNANCE SURVEY MAPS

OS Sheet 1:50,000 topographical map. Landranger Series. 116 Denbigh and Colwyn Bayarea

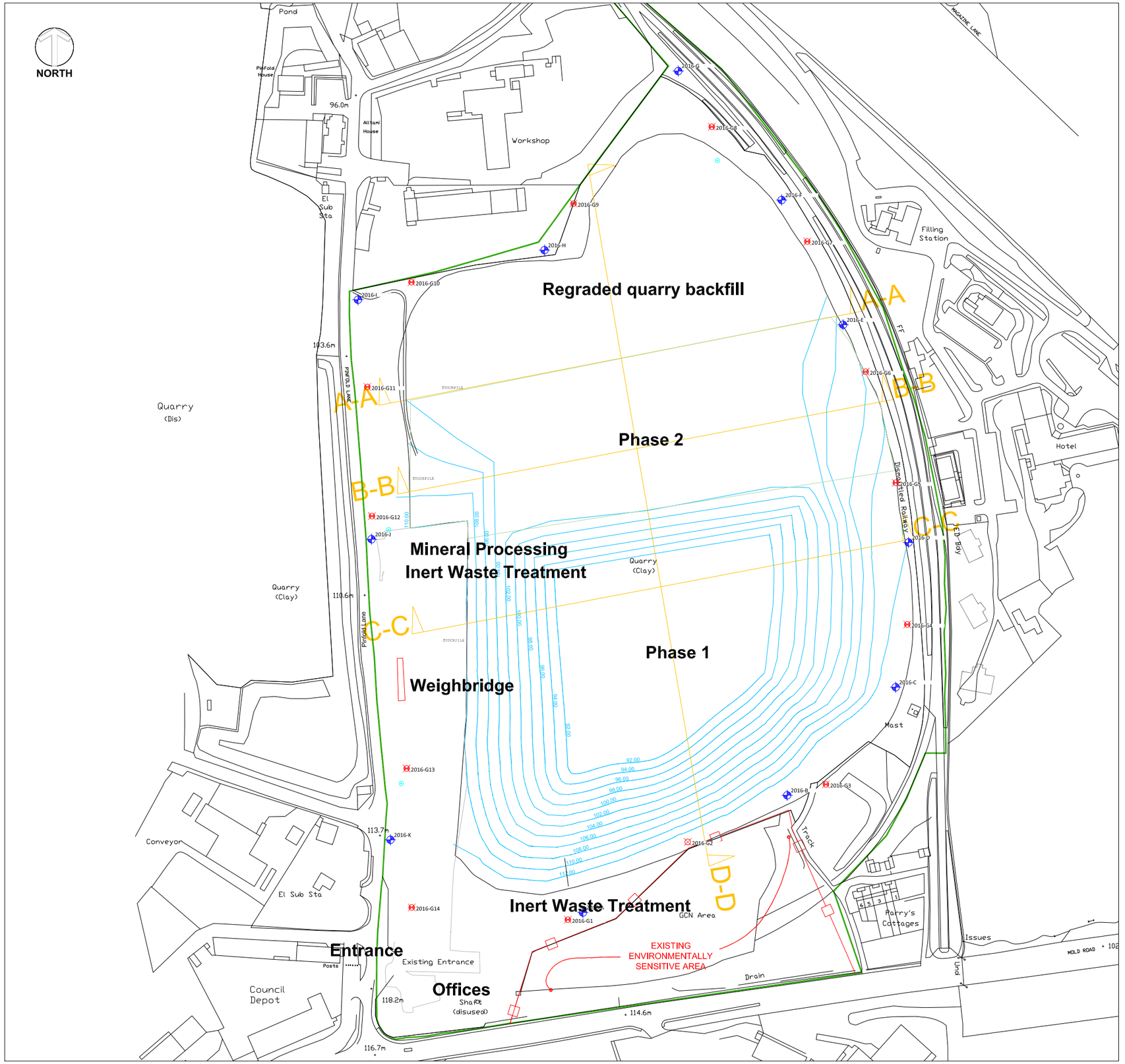
PUBLICATIONS AND REPORTS

Department of the Transport: Specification for Highways Works Part 1 and 2. Series 600 Earthworks

Department of Environment: Handbook on the Design of Tips and Related Structures.

Environment Agency: Guidance on Inert Landfills

Drawings



Legend

Proposed Permit Boundary

Excavation contours

Client: **Mold Investments Ltd**

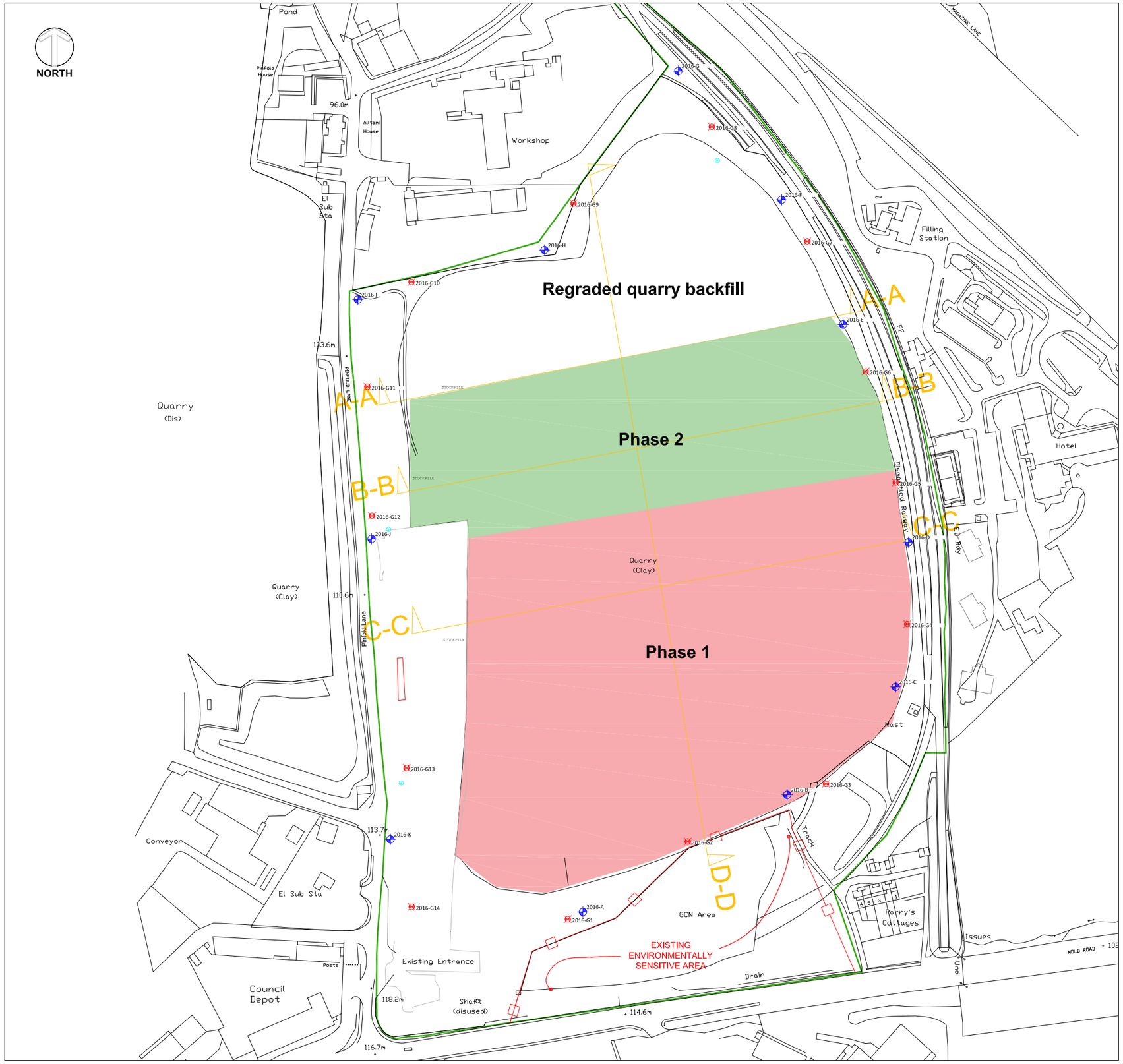
Project: **Parrys Quarry**

Title: Site Layout and Waste Deposition

CAD Ref:	Version:	Drawn by:	Scale:	Date:
EL/MQBH/1	1	ARM		June 2020

WHITE ROCK GEO-ENVIRONMENTAL LIMITED

Drawing: **ESSD4**



Legend

Proposed Permit Boundary

Client: **Mold Investments Ltd**

Project: **Parrys Quarry**

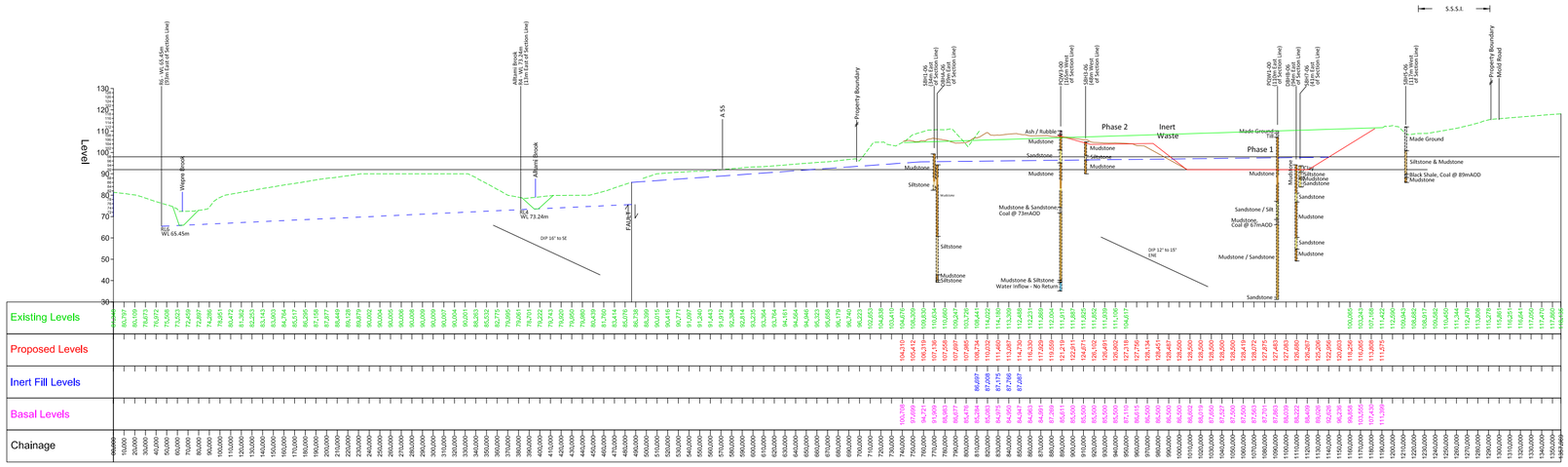
Title: Site Phasing

CAD Ref:	Version:	Drawn by:	Scale:	Date:
EL/MQBH/1	1	ARM		June 2020

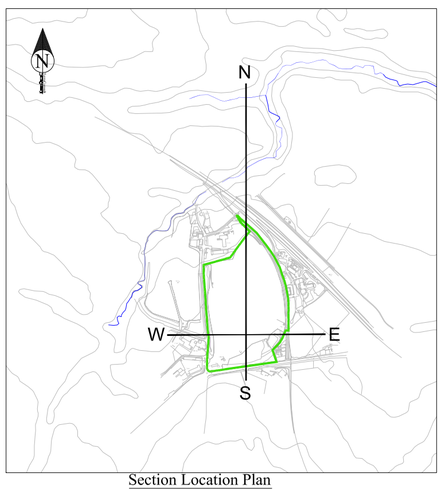
WHITE ROCK GEO-ENVIRONMENTAL LIMITED

Drawing: **ESSD6**

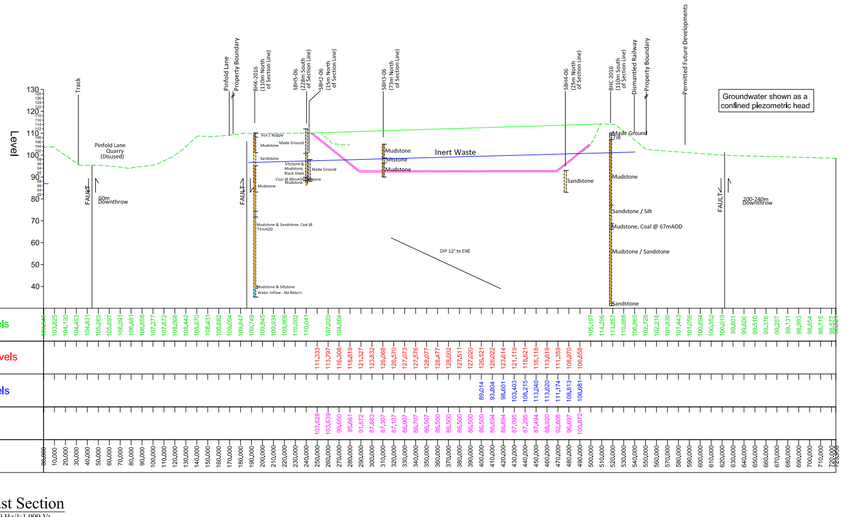
NORTH



North-South Section
Scale 1:2,000 Hz/1:1,000 Vt



Section Location Plan
Scale 1:10,000



West-East Section
Scale 1:2,000 Hz/1:1,000 Vt

Legend

Client: **Mold Investments Ltd**

Project: **Parrys Quarry**

Title: Geological and Hydrogeological Cross Sections

CAD Ref:	Version:	Drawn by:	Scale:	Date:
EL/MQBH/1	1	ARM		June 2020

WHITE ROCK GEO-ENVIRONMENTAL LIMITED

Drawing: **ESSD11**

Tables

TABLE 6/1: (11/05) **Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes)**

Class				General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612	Class		
							Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:					
									Lower	Upper				
GENERAL GRANULAR FILL	1	A	-	Well graded granular material	General Fill	Any material, or combination of materials, other than material designated as Class 3 in the Contract. (Properties (i), (ii) and (iv) in next column, shall not apply to chalk). Recycled aggregate	(i) grading	BS 1377 : part 2	Tab 6/2	Tab 6/2	Tab 6/4 Method 2	1	A	-
							(ii) uniformity coefficient	See Note 5	10	-				
							(iii) mc	BS 1377 : Part 2	App 6/1	App 6/1				
							(iv) MCV	Clause 632	App 6/1	App 6/1				
							(v) IDD of chalk	Clause 634	-	App 6/1				
	1	B	-	Uniformly graded granular material	General Fill	Any material, or combination of materials, other than chalk. Recycled aggregate	(i) grading	BS 1377 : Part 2	Tab 6/2	Tab 6/2	Tab 6/4 Method 3	1	B	-
							(ii) uniformity coefficient	See Note 5	-	10				
							(iii) mc	BS 1377 : Part 2	App 6/1	App 6/1				
							(iv) MCV	Clause 632	App 6/1	App 6/1				
	1	C	-	Coarse granular material	General Fill	Any material, or combination of materials, other than material designated as Class 3 in the Contract. (Properties (i) and (ii) in next column, shall not apply to chalk). Recycled aggregate	(i) grading	BS 1377 : Part 2	Tab 6/2	Tab 6/2	Tab 6/4 Method 5	1	C	-
							(ii) uniformity coefficient	See Note 5	5	-				
							(iii) Los Angeles coefficient	Clause 635	-	50				

TABLE 6/1: (11/05) **Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)**

Class				General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612	Class		
							Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:					
									Lower	Upper				
GENERAL COHESIVE FILL	2	A	-	Wet cohesive material	General Fill	Any material, or combination of materials, other than chalk.	(i) grading	BS 1377 : part 2	Tab 6/2	Tab 6/2	Tab 6/4 Method 1 except for materials with liquid limit greater than 50, determined by BS1377 : Part 2, only deadweight tamping or vibratory tamping rollers or grid rollers shall be used.	2	A	-
							(ii) plastic limit (PL)	BS 1377 : part 2	-	-				
							(iii) mc	BS 1377 : Part 2	PL -4%	App 6/1				
							(iv) MCV	Clause 632	App 6/1	App 6/1				
							(v) Undrained shear strength of remoulded material	Clause 633	App 6/1	App 6/1				
	2	B	-	Dry cohesive material	General Fill	Any material, or combination of materials, other than chalk	(i) grading	BS 1377 : Part 2	Tab 6/2	Tab 6/2	Tab 6/4 Method 2	2	B	-
							(ii) plastic limit (PL)	BS 1377 : Part 2	-	-				
							(iii) mc	BS 1377 : Part 2	App 6/1	PL -4%				
							(iv) MCV	Clause 632	App 6/1	App 6/1				
							(v) undrained shear strength of remoulded material	Clause 633	App 6/1	App 6/1				

TABLE 6/1: Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)

Class				General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612	Class		
							Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:					
									Lower	Upper				
GENERAL COHESIVE FILL	2	C	-	Stony cohesive material	General Fill	Any material, or combination of materials, other than chalk	(i) grading	BS 1377 : part 2	Tab 6/2	Tab 6/2	Tab 6/4 Method 2	2	C	-
							(ii) plastic limit (PL)	BS 1377 : part 2	-	-				
							(iii) mc	BS 1377 : Part 2	App 6/1	App 6/1				
							(iv) MCV	Clause 632	App 6/1	-				
							(v) Undrained shear strength of remoulded material	Clause 633	App 6/1	-				
	2	D	-	Silty cohesive material	General Fill	Any material, or combination of materials, other than chalk	(i) grading	BS 1377 : Part 2	Tab 6/2	Tab 6/2	Tab 6/4 Method 3	2	D	-
							(ii) mc	BS 1377 : Part 2	App 6/1	App 6/1				
							(iii) MCV	Clause 632	App 6/1	App 6/1				
							(iv) undrained shear strength of remoulded material	Clause 633	App 6/1	App 6/1				
	2	E	-	Reclaimed pulverised fuel ash cohesive material	General Fill	Reclaimed material from lagoon or stockpile containing not more than 20% furnace bottom ash	(i) mc	BS 1377 : Part 2	To enable compaction to Clause 612		End product 95% of maximum dry density of BS 1377 : Part 4 (2.5 kg rammer method)	2	E	-
							(ii) bulk density	BS 1377 : Part 9	App 6/1	App 6/1				

TABLE 6/1: (11/05) **Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)**

Class				General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612	Class		
							Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:					
									Lower	Upper				
GENERAL CHALK	FILL	3	-	-	Chalk	General Fill	Chalk and associated materials all designated as Class 3 in the Contract	(i) mc	BS 1377 : Part 2	-	App 6/1	Tab 6/4 Method 4, or Method 1 if required in App 6/1. All types of vibratory rollers of Categories over 1800 kg shall not be used	3	-	-
								(ii) IDD	Clause 634	App 6/1	App 6/1			
LANDSCAPE	FILL	4	-	-	Various	Fill to landscape areas	See App 6/1	(i) grading	BS 1377 : Part 2	App 6/1	App 6/1	See Clause 620 and App 6/1	4	-	-
								(ii) mc	BS 1377 : Part 2	-	App 6/1			
								(iii) MCV	Clause 632	App 6/1	App 6/1			
TOPSOIL		5	A	-	Topsoil, or turf, existing on site	Topsoiling	Topsoil or turf designated as Class 5A in the Contract	(i) grading	Clause 618	-	Clause 618	-	5	A	-
		5	B	-	Imported topsoil	Topsoiling	General purpose grade complying with BS 3882	-	-	-	-	-	5	B	-

TABLE 6/1: (11/05) **Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)**

Class				General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612	Class		
							Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:					
									Lower	Upper				
SELECTED GRANULAR FILL	6	A	-	Selected well graded granular material	Below water	Natural gravel, natural sand, crushed gravel, crushed rock other than argillaceous rock, crushed concrete, chalk, well burnt colliery spoil or any combination thereof. (Properties (i) and (ii) in next column, shall not apply t chalk.) Recycled aggregate	(i) grading	BS 1377 : Part 2 (On-site)	Tab 6/2	Tab 6/2	No compaction	6	A	-
								BS EN 933-2 (Off-site)	Tab 6/5	Tab 6/5				
							(ii) uniformity	See Note 5	10	-				
							(iii) SMC of chalk index	Clause 634	-	20%				
							(iv) plasticity index	BS 1377 : Part 2	Non-plastic					
	6	B	-	Selected coarse granular material	Starter layer	Natural gravel, natural sand, crushed gravel, crushed rock, crushed concrete, chalk, well burnt colliery spoil, slag or any combination thereof. (Properties (ii) and (iii) in next column, shall not apply to chalk.) Recycled aggregate	(i) grading	BS 1377 : Part 2 (On-site)	Tab 6/2	Tab 6/2	Tab 6/4 Method 5	6	B	-
								BS EN 933-2 (Off-site)	Tab 6/5	Tab 6/5				
							(ii) plasticity index	BS 1377 : Part 2	Non-plastic					
							(iii) Los Angeles coefficient	Clause 635	-	50				

TABLE 6/1: (11/05) **Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)**

Class				General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612	Class		
							Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:					
									Lower	Upper				
SELECTED GRANULAR FILL	6	C	-	Selected uniformly graded granular material	Starter layer	Natural gravel, natural sand, crushed gravel, crushed rock other than argillaceous rock, crushed concrete, chalk, well burnt colliery spoil, slag or any combination thereof. (Property (iii) in next column, shall not apply to chalk.) Recycled aggregate	(i) grading	BS 1377 : Part 2 (On-site)	Tab 6/2	Tab 6/2	Tab 6/4 Method 3	6	C	-
								BS EN 933-2 (Off-site)	Table 6/5	Tab 6/5				
							(ii) uniformity coefficient	See Note 5	-	10				
							(iii) plasticity index	BS 1377 : Part 2	Non-plastic					
							(iv) Los Angeles coefficient	Clause 635	-	50				
							(v) mc	BS 1377 : Part 2	App 6/1	App 6/1				
	6	D	-	Selected uniformly graded granular material	Starter layer below pulverised fuel ash	Natural gravel, natural sand, crushed gravel, crushed rock other than argillaceous rock, crushed concrete, chalk, well burnt colliery spoil, slag or any combination thereof. Recycled aggregate	(i) grading	BS 1377 : Part 2 (On-site)	Tab 6/2	Tab 6/2	Tab 6/4 Method 4	6	D	-
								BS EN 933-2 (Off-site)	Tab 6/5	Tab 6/5				
							(ii) uniformity coefficient	See Note 5	-	10				
							(iii) plasticity index	BS 1377 : Part 2	Non-plastic					
							(iv) mc	BS 1377 : Part 2	App 6/1	App 6/1				
							(v) MCV	Clause 632	App 6/1	App 6/1				

TABLE 6/1: (11/08) **Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)**

Class				General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612	Class		
							Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:					
									Lower	Upper				
SELECTED GRANULAR FILL	6	E	-	Selected granular material (Class 9A)	For stabilisation with cement to form capping	Any material, or combination of materials, other than unburnt colliery spoil and argillaceous rock. (Properties (i), (ii) and (iii) in next column, shall not apply to chalk.) Recycled aggregate	(i) grading	BS 1377 : Part 2 (On-site)	Tab 6/2	Tab 6/2	Not applicable	6	E	-
								BS EN 933-2 (Off-site)	Tab 6/5	Tab 6/5				
							(ii) mc	BS 1377 : Part 2	-	App 6/1				
							(iii) liquid limit	BS 1377 : Part 2	-	45				
							(iv) plasticity index	BS 1377 : Part 2	-	20				
							(v) organic matter	BS 1377 : Part 3	-	App 6/1				
							(vi) water soluble (WS) sulfate content	TRL Report 477, Test No. 1	-	3000 mg/l as SO_4				
							(vii) oxidisable sulfides (OS) content	TRL Report 477, Tests No. 2 and 4	-	0.6% as SO_4				
							(viii) SMC of chalk	Clause 634		20%				

TABLE 6/1: (11/08) **Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)**

Class				General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612	Class		
							Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:					
									Lower	Upper				
SELECTED GRANULAR FILL	6	F	1	Selected granular material (fine grading)	Capping	Any material, or combination of materials, other than unburnt colliery spoil argillaceous rock and chalk. Recycled aggregate. Property (vi) in the next column shall not apply if Class A (asphalt) content is 20% or less.	(i) grading	BS 1377 : Part 2	Tab 6/2	Tab 6/2	Tab 6/4 Method 6	6	F	1
							(ii) optimum mc	BS 1377 : Part 4 (vibrating hammer method)	-	-				
							(iii) mc	BS 1377 : Part 2	Optimum mc - 2%	Optimum mc				
							(iv) Los Angeles coefficient	Clause 635	-	60				
							(v) Class A (asphalt) content	Clause 710	-	50%				
							(vi) bitumen content	BS EN 12697-1 or BS EN 12697-39	-	2.0%				
	6	F	2	Selected granular material (coarse grading)	Capping	Any material, or combination of materials, other than unburnt colliery spoil and argillaceous rock. (Property (i) in next column shall not apply to chalk.) Recycled aggregate. Property (vi) in the next column shall not apply if Class A (asphalt) content is 20% or less.	(i) grading	BS 1377 : Part 2	Tab 6/2	Tab 6/2	Tab 6/4 Method 6	6	F	2
							(ii) optimum mc	BS 1377 : Part 4 (vibrating hammer method)	-	-				
							(iii) mc	BS 1377 : Part 2	Optimum mc - 2%	Optimum mc				
							(iv) Los Angeles coefficient	Clause 635	-	50				
							(v) Class A (asphalt) content	Clause 710	-	50%				
							(vi) bitumen content	BS EN 12697-1 or BS EN 12697-39	-	2.0%				

TABLE 6/1: (11/08) **Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)**

Class				General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612	Class		
							Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:					
									Lower	Upper				
SELECTED GRANULAR FILL	6	F	3	Selected granular material	Capping	Recycled bituminous planings and granulated asphalt, but excluding materials containing tar or tar-bitumen binders. Recycled aggregate.	(i) grading	BS 1377 : Part 2 (On-site)	Tab 6/2	Tab 6/2	Tab 6/4 Method 6 Maximum Compacted layer thickness shall be 200 mm	6	F	3
								BS EN 933-2 (Off-site)	Tab 6/5	Tab 6/5				
							(ii) optimum mc	Clause 613	-	-				
							(iii) mc	Clause 613	Optimum mc - 2%	Optimum mc				
							(iv) Class A (asphalt) content	Clause 710	-	50%				
							(v) bitumen content	BS EN 12697-1 or BS EN 12697-39	-	10%				
	6	F	4	Selected granular material (fine grading) - imported on to the Site	Capping	Unbound mixtures complying with BS EN 13285. Any material, or combination of materials - including recycled aggregate, but excluding unburnt colliery spoil, argillaceous rock, chalk, recycled bituminous planings and granulated asphalt. Property (x) in the next column shall not apply if Class A (asphalt) content is 20% or less.	(i) Size designation and overall grading category	BS EN 13285 - 0/31.5 and G_E	Tab 6/2	Tab 6/2	Tab 6/4 Method 6	6	F	4
							(ii) Maximum fines and oversize categories	BS EN 13285 - UF_{15} and OC_{75}	Tab 6/5	Tab 6/5				
							(iii) Los Angeles coefficient	BS EN 13242 - LA_{15}	-	60				
							(iv) Volume stability of blast furnace slag	BS EN 13242 - free from dicalcium silicate and iron disintegration	-	-				

TABLE 6/1: (11/08) **Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)**

Class				General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612	Class		
							Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:					
									Lower	Upper				
SELECTED GRANULAR FILL	6	F	4	(contd)			(v) Volume stability of steel (BOF) and EAF) slag	BS EN 13242 - V_5	-	-				
							(vi) Other aggregate requirements	BS EN 13242 - Category $_{NR}$ (no requirement)	-	-				
							(vii) Laboratory dry density and optimum water content	BS EN 13285, clause 5.3 - declared values	-	-				
							(viii) Water content	BS EN 1097-5	Optimum wc - -2%	Optimum wc				
							(ix) Clas A (asphalt) content	Clause 710	-	50%				
							(x) bitumen content	BS EN 12697-1 or BS EN 12697-39	-	2.0%				

TABLE 6/1: (11/08) **Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)**

Class				General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612	Class		
							Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:					
									Lower	Upper				
SELECTED GRANULAR FILL	6	F	5	Selected granular material (coarse grading) - imported on to the Site	Capping	Unbound mixtures complying with BS EN 13285. Any material, or combination of materials - including recycled aggregate, but excluding unburnt colliery spoil, argillaceous rock, chalk, recycled bituminous planings and granulated asphalt. Property (x) in the next column shall not apply if Class A (asphalt) content is 20% or less.	(i) Size designation and overall grading category	BS EN 13285 - 0/80 and G_E	Tab 6/2	Tab 6/2	Tab 6/4 Method 6	6	F	5
							(ii) Maximum fines and oversize categories	BS EN 13285 - UF_{12} and OC_{75}	Tab 6/5	Tab 6/5				
							(iii) Los Angeles coefficient	BS EN 13242 - LA_{50}	-	60				
							(iv) Volume stability of blast furnace slag	BS EN 13242 - free from dicalcium silicate and iron disintegration	-	-				
							(v) Volume stability of steel (BOF) and EAF) slag	BS EN 13242 - V_5	-	-				
							(vi) Other aggregate requirements	BS EN 13242 - Category $_{NR}$ (no requirement)	-	-				
							(vii) Laboratory dry density and optimum water content	BS EN 13285, clause 5.3 - declared values	-	-				
							(viii) Water content	BS EN 1097-5	Optimum wc - -2%	Optimum wc				
							(ix) Clas A (asphalt) content	Clause 710	-	50%				
							(x) bitumen content	BS EN 12697-1 or BS EN 12697-39	-	2.0%				

TABLE 6/1: (11/05) **Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)**

Class				General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612	Class		
							Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:					
									Lower	Upper				
SELECTED GRANULAR FILL	6	G	-	Selected granular material	Gabion filling	Natural gravel, crushed rock, crushed concrete or any combination thereof. None of these constituents shall include any argillaceous rock..	(i) grading	BS 1377 : Part 2 (On-site)	Tab 6/2	Tab 6/2	None	6	G	-
								BS EN 933-2 (Off-site)	Tab 6/5	Tab 6/5				
							(ii) Los Angeles coefficient	Clause 635	-	50				
	6	H	-	Selected granular material	Drainage layer to reinforced soil and anchored earth structures	Natural gravel, natural sand, crushed gravel, crushed rock, crushed concrete, chalk, well burnt colliery spoil or any combination thereof. None of these constituents shall include any argillaceous rock. (Properties (vi), (vii), (viii), (ix), (x), (xi) and (xii) in next column only apply when metallic reinforcing or anchor elements, facing units or fastenings are used.) (Properties (ii) and (v) in next column shall not apply to chalk.) Recycled aggregate except recycled asphalt	(i) grading	BS 1377 : Part 2 (On-site)	Tab 6/2	Tab 6/2	Tab 6/4 Method 3	6	H	-
								BS EN 933-2 (Off-site)	Tab 6/5	Tab 6/5				
							(ii) plasticity index	BS 1377 : Part 2	Non-plastic					
							(iii) Los Angeles coefficient	Clause 635	-	50				
							(iv) mc	BS 1377 : Part 2	App 6/1	App 6/1				
							(v) MCV	Clause 632	App 6/1	App 6/1				
							(vi) pH value	BS 1377 : Part 3	Tab 6/3	Tab 6/3				
							(vii) chloride ion content	BS EN 1744-1	-	Tab 6/3				
							(viii) water soluble (WS) sulfate content	TRL Report 447, Tests No. 1	-	Tab 6/3				
							(ix) oxidisable sulfides (OS) content	TRL Report 447, Tests Nos. 2 and 4	-	Tab 6/3				
							(x) restivity	Clause 637	Tab 6/3	-				
							(xi) redox potential	Clause 638	Tab 6/3	-				
							(xii) organic content	BS 1377 : Part 3	-	Tab 6/3				
							(xiii) microbial activity index	Table 6/3	-	Tab 6/3				

TABLE 6/1: (11/05) **Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)**

Class				General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612	Class		
							Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:					
									Lower	Upper				
SELECTED GRANULAR FILL	6	I	-	Selected well graded granular material	Fill to reinforced soil and anchored earth structures	Natural gravel, natural sand, crushed gravel, crushed rock, crushed concrete, slag, chalk, well burnt colliery spoil or any combination thereof except that chalk shall not be combined with any other constituent. None of these constituents shall include any argillaceous rock. (Properties (i), (ii) and (v) in next column shall not apply to chalk.) (Properties (viii), (ix), (x), (xi), (xii), (xiii) and (xiv) only apply when metallic reinforcing or anchor elements, facing units or fastenings are used.) Recycled aggregate except recycled asphalt	(i) grading	BS 1377 : Part 2 (On-site)	Tab 6/2	Tab 6/2	Tab 6/4 Method 2	6	I	-
								BS EN 933-2 (Off-site)	Tab 6/5	Tab 6/5				
							(ii) uniformity coefficient	See Note 5	10	-				
							(iii) SMC of chalk	Clause 634	-	20%				
							(iv) mc	BS 1377 : Part 2	App 6/1	App 6/1				
							(v) MCV	Clause 632	App 6/1	App 6/1				
							(vi) effective angle of friction (φ') and effective cohesion (c')	Clause 636	App 6/1	-				
							(vii) coefficient of friction and adhesion (fill/elements)	Clause 639	App 6/1	-				
							(viii) pH value	BS 1377 : Part 3	Tab 6/3	Tab 6/3				
							(ix) chloride ion content	BS EN 1744-1	-	Tab 6/3				
							(x) water soluble (WS) sulfate content	TRL Report 447, Test No. 1	-	Tab 6/3				
							(xi) oxidisable sulfides (OS) content	TRL Report 447, Tests Nos. 2 and 4	-	Tab 6/3				
							(xii) resistivity	Clause 637	Tab 6/3	-				
							(xiii) redox potential	Clause 638	Tab 6/3	-				
							(xiv) organic content	BS 1377 : Part 3	-	Tab 6/3				
							(xv) microbial activity index	Table 6/3	-	Tab 6/3				

TABLE 6/1: (11/05) **Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)**

Class				General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612	Class		
							Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:					
									Lower	Upper				
SELECTED GRANULAR FILL	6	J	-	Selected uniformly graded granular material	Fill to reinforced soil and anchored earth	Natural gravel, natural sand, crushed gravel, crushed rock, crushed concrete, slag, chalk, well burnt colliery spoil or any combination thereof, except that chalk shall not be combined with any other constituent. None of these constituents shall include any argillaceous rock. (Properties (viii), (ix), (x), (xi), (xii), (xiii) and (xiv) in next column only apply when metallic reinforcing or anchor elements, facing units or fastenings are used.) (Properties (i), (ii) and (v) in next column shall not apply to chalk.) Recycled aggregate except recycled asphalt	(i) grading	BS 1377 : Part 2 (On-site)	Tab 6/2	Tab 6/2	Tab 6/4 Method 3	6	J	-
								BS EN 933-2 (Off-site)	Tab 6/5	Tab 6/5				
							(ii) uniformity coefficient	See Note 5	5	10				
							(iii) SMC of chalk	Clause 634	-	20%				
							(iv) mc	BS 1377 : Part 2	App 6/1	App 6/1				
							(v) MCV	Clause 632	App 6/1	App 6/1				
							(vi) effective angle of friction (φ') and effective cohesion (c')	Clause 636	App 6/1	-				
							(vii) coefficient of friction and adhesion (fill/elements)	Clause 639	App 6/1	-				
							(viii) pH value	BS 1377 : Part 3	Tab 6/3	Tab 6/3				
							(ix) chloride ion content	BS EN 1744-1	-	Tab 6/3				
							(x) water soluble (WS) sulfate content	TRL Report 447, Test No. 1	-	Tab 6/3				
							(xi) oxidisable sulfides (OS) content	TRL Report 447, Tests Nos 2 and 4	-	Tab 6/3				
							(xii) resistivity	Clause 637	Tab 6/3	-				
							(xiii) redox potential	Clause 638	Tab 6/3	-				
							(xiv) organic content	BS 1377 : Part 3	-	Tab 6/3				
							(xv) microbial activity index	Table 6/3	-	Tab 6/3				

TABLE 6/1: (11/05) **Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)**

Class				General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612	Class		
							Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:					
									Lower	Upper				
SELECTED GRANULAR FILL	6	K	-	Selected granular material	Lower bedding for corrugated steel buried structures	Natural gravel, natural sand, crushed gravel, crushed rock, crushed concrete, well burnt colliery spoil or any combination thereof. None of these constituents shall include any argillaceous rock. Recycled aggregate except recycled asphalt	(i) grading	BS 1377 : Part 2 (On-site)	Tab 6/2	Tab 6/2	End product 90% of maximum dry density of BS 1377 : Part 4 (Vibrating hammer method)	6	K	-
								BS EN 933-2 (Off-site)	Tab 6/5	Tab 6/5				
							(ii) uniformity coefficient	See Note 5	5	-				
							(iii) plasticity index	BS 1377 : Part 2	-	6				
							(iv) optimum mc	BS 1377 : Part 4 (vibrating hammer method)	-	-				
							(v) mc	BS 1377 : Part 2	Optimum mc -2%	Optimum mc +1%				
							(vi) MCV	Clause 632	App 6/1	App 6/1				
							(vii) Los Angeles coefficient	Clause 635	-	40				
							(viii) resistivity	Clause 637	2000 ohm cm	-				
							(ix) water soluble (WS) sulfate content	TRL Report 447, Test No. 1	-	300 mg/l as SO_4				
							(x) oxidisable sulfides (OS) content	TRL Report 447, Tests Nos 2 and 4	-	0.06% as SO_4				
							(xi) chloride ion content	BS EN 1744-1	-	0.025%				
							(xii) pH value	BS 1377 : Part 3	6	9				
							(xiii) sulfide and hydrogen sulfide	Standard textbook of qualitative inorganic analysis	-	Rapid blackening of lead acetate paper				

TABLE 6/1: (11/05) **Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)**

Class				General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612	Class		
							Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:					
									Lower	Upper				
SELECTED GRANULAR	FILL	6	L	-	Selected uniformly graded granular material	Upper bedding for corrugated steel buried structures	Natural gravel, natural sand, crushed gravel, crushed rock, crushed concrete, well burnt colliery spoil or any combination thereof. None of these constituents shall include any argillaceous rock. Recycled aggregate except recycled asphalt	(i) grading	BS 1377 : Part 2 (On-site)	Tab 6/2	Tab 6/2	None	6	L	-
									BS EN 933-2 (Off-site)	Tab 6/5	Tab 6/5				
								(ii) resistivity	Clause 637	2000 ohm cm	-				
								(iii) water soluble (WS) sulfate content	TRL Report 447, Test No. 1	-	300 mg/l as SO_4				
								(iv) oxidisable sulfides (OS) content	TRL Report 447, Tests Nos. 2 and 4	-	0.06% as SO_4				
								(v) chloride ion content	BS EN 1744-1	-	0.025%				
								(vi) pH value	BS 1377 : Part 3	6	9				
								(vii) sulfide and hydrogen sulfide	Standard textbook of qualitative inorganic analysis	-	Rapid blackening of lead acetate paper				

TABLE 6/1: (11/05) **Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)**

Class				General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612	Class		
							Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:					
									Lower	Upper				
SELECTED GRANULAR FILL	6	M	-	Selected granular material	Surround to corrugated steel buried structures	Natural gravel, natural sand, crushed gravel, crushed rock, crushed concrete, well burnt colliery spoil or any combination thereof. None of these constituents shall include any argillaceous rock. Recycled aggregate except recycled asphalt	(i) grading	BS 1377 : Part 2 (On-site)	Tab 6/2	Tab 6/2	End product 90% of maximum dry density of BS 1377 : Part 4 (Vibrating hammer method) unless otherwsie stated in App 6/1	6	M	-
								BS EN 933-2 (Off-site)	Tab 6/5	Tab 6/5				
							(ii) uniformity coefficient	See Note 5	5	-				
							(iii) plasticity index	BS 1377 : Part 2	-	6				
							(iv) optimum mc	BS 1377 : Part 4 (vibrating hammer method)	-	-				
							(v) mc	BS 1377 : Part 2	Optimum mc -2%	Optimum mc +1%				
							(vi) MCV	Clause 632	App 6/1	App 6/1				
							(vii) Los Angeles coefficient	Clause 635	-	40				
							(viii) resistivity	Clause 637	2000 ohm cm	-				
							(ix) water soluble (WS) sulfate content	TRL Report 447 Test No. 1	-	300 mg/l as SO_4				
							(x) oxidisable sulfides (OS) content	TRL Report 447 Tests Nos. 2 and 4	-	0.06% as SO_4				
							(xi) chloride ion content	BS EN 1744-1	-	0.025%				
							(xii) pH value	BS 1377 : Part 3	6	9				
							(xiii) sulfide and hydrogen sulfide	Standard textbook of qualitative inorganic analysis	-	Rapid blackening of lead acetate paper				

TABLE 6/1: (11/05) **Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)**

Class				General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612	Class		
							Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:					
									Lower	Upper				
SELECTED GRANULAR	FILL	6	N	-	Selected well graded granular material	Fill to structures	Natural gravel, natural sand, crushed gravel, crushed rock, crushed concrete, slag, well burnt colliery spoil or any combination thereof. None of these constituents shall include any argillaceous rock. Recycled aggregate except recycled asphalt	(i) grading	BS 1377 : Part 2 (On-site)	Tab 6/2	Tab 6/2	End product 95% of maximum dry density of BS 1377 : Part 4 (vibrating hammer method)	6	N	-
									BS EN 933-2 (Off-site)	Tab 6/5	Tab 6/5				
								(ii) uniformity coefficient	See Note 5	10	-				
								(iii) Los Angeles coefficient	Clause 635	-	40				
								(iv) undrained shear parameters (c and φ)	Clause 633	App 6/1	-				
								(v) effective angle of internal friction (φ') and effective cohesion (c')	Clause 636	App 6/1	-				
								(vi) permeability	Clause 640	App 6/1	-				
								(vii) mc	BS 1377 : Part 2	App 6/1	App 6/1				
								(viii) MCV	Clause 632	App 6/1	App 6/1				
								(ix) slope stability test (where required in App 6/6)	Clause 610	App 6/6					

TABLE 6/1: (11/05) **Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)**

Class				General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612	Class		
							Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:					
									Lower	Upper				
SELECTED GRANULAR FILL	6	P	-	Selected granular material	Fill to structures	Natural gravel, natural sand, crushed gravel, crushed rock, crushed concrete, slag, chalk, well burnt colliery spoil or any combination thereof. None of these constituents shall include any argillaceous rock. (Properties (i), (ii) and (ix) in next column shall not apply to chalk.) Recycled aggregate except recycled asphalt	(i) grading	BS 1377 : Part 2 (On-site)	Tab 6/2	Tab 6/2	End product 95% of maximum dry density of BS 1377 : Part 4 (vibrating hammer method)	6	P	-
								BS EN 933-2 (Off-site)	Tab 6/5	Tab 6/5				
							(ii) uniformity coefficient	See Note 5	5	-				
							(iii) IDD of chalk	Clause 634	-	App 6/1				
							(iv) Los Angeles coefficient	Clause 635	-	60				
							(v) undrained shear parameters (c and φ)	Clause 633	App 6/1	-				
							(vi) effective angle of internal friction (φ') and effective cohesion (c')	Clause 636	App 6/1	-				
							(vii) permeability	Clause 640	App 6/1	-				
							(viii) mc	BS 1377 : Part 2	App 6/1	App 6/1				
							(ix) MCV	Clause 632	App 6/1	App 6/1				
							(x) slope stability test (where required in App 6/6)	Clause 610	App 6/6					

TABLE 6/1: (11/08) **Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)**

Class				General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612	Class		
							Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:					
									Lower	Upper				
SELECTED GRANULAR FILL	6	Q	-	Well graded uniformly graded or coarse granular material	Overlying fill for corrugated steel buried structures	As Class 1A, 1B or 1C granular fill materials, but not to include argillaceous rock, slag or PFA in any proportions. Recycled aggregate except recycled asphalt	As for Class 1A, 1B or 1C with the addition of the following:					6	Q	-
							(i) water soluble (WS) sulfate content	TRL Report 447, Test No. 1	-	300 mg/l as SO_4				
							(ii) oxidisable sulfides (OS) content	TRL Report 447, Tests Nos. 2 and 4	-	0.06% as SO_4				
							(iii) chloride ion content	BS EN 1744-1	-	0.025%				
							(iv) pH value	BS 1377 : Part 3	6	9				
							(v) sulfide and hydrogen sulfide	Standard textbook of qualitative inorganic analysis	-	Rapid blackening of lead acetate paper				
	6	R	-	Selected granular material	For stabilisation with lime and cement to form capping (Class 9F)	Any material, or combination of materials, other than unburnt colliery spoil and argillaceous rock. (Properties (i), (ii) and (iii) in text column, shall not apply to chalk.)	(i) grading	BS 1377 : Part 2 (On-site)	Tab 6/2	Tab 6/2	Not applicable	6	R	-
								BS EN 933-2 (Off-site)	Tab 6/5	Tab 6/5				
							(ii) mc	BS 1377 : Part 2	App 6/1	-				
							(iii) liquid limit	BS 1377 : Part 2	-	45				
							(iv) plasticity index	BS 1377 : Part 2	-	20				
							(v) organic matter	BS 1377 : Part 3	-	App 6/1				
							(vi) water soluble (WS) sulfate content	TRL Report 447, Test No. 1	-	3000 mg/l as SO_4				
							(vii) oxidisable sulfides (OS) content	TRL Report 447, Tests Nos. 2 and 4	-	0.6% as SO_4				
							(viii) IDD of chalk	Clause 634	-	App 6/1				

TABLE 6/1: (11/05) **Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)**

Class				General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612	Class		
							Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:					
									Lower	Upper				
SELECTED GRANULAR FILL	6	S	-	Selected well graded granular material	Filter layer below subbase	Crushed rock or sand	(i) grading	BS 1377 : Part 2 (On-site)	Tab 6/2	Tab 6/2	-	6	S	-
								BS EN 933-2 (Off-site)	Tab 6/5	Tab 6/5				
							(ii) plasticity index	BS 1377 : Part 2	-	Non-plastic				

TABLE 6/1: (11/05) **Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)**

Class				General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612	Class		
							Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:					
									Lower	Upper				
SELECTED COHESIVE	FILL 7	A	-	Selected cohesive material	Fill to structures	Any material or combination of materials, other than argillaceous rock and materials designated as Class 3 in the Contract. If chalk is used it shall form 100% of constituents. (Properties (i) and (iii) shall not apply to chalk.) (Properties (vii) and (viii) may be increased to 54% and 31% respectively for Lias Clay only and subject to the requirements of Appendix 6/6)	(i) grading	BS 1377 : Part 2	Tab 6/2	Tab 6/2	End product: 100% of maximum dry density of BS 1377 : Part 4 (2.5 kg rammer method) or a dry density corresponding to 5% air voids at field mc whichever is lower	7	A	-
							(ii) mc	BS 1377 : Part 2	App 6/1	App 6/1				
							(iii) MCV	Clause 632	App 6/1	App 6/1				
							(iv) undrained shear parameters (c and φ)	Clause 633	App 6/1	App 6/1				
							(v) effective angle of internal friction (φ') and effective cohesion (c')	Clause 636	App 6/1	App 6/1				
							(vi) IDD of chalk	Clause 634	App 6/1	App 6/1				
							(vii) liquid limit	BS 1377 : Part 2	-	45				
							(viii) plasticity index	BS 1377 : Part 2	-	25				

TABLE 6/1: Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)

Class				General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)			Compaction Requirements in Clause 612	Class		
							Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within: Lower	Upper			
SELECTED COHESIVE	FILL	7	B	-	Selected conditioned pulverised fuel ash cohesive material	Fill to structures and to reinforced soil	Conditioned material direct from power station dust collection system and to which a controlled quantity of water has been added	(i) mc	BS 1377 : Part 2	To enable compaction to Clause 612		End product: 95% of maximum dry density of BS 1377 : Part 4 (2.5 kg rammer method)	7	B	-
								(ii) bulk density	BS 1377 : Part 9	App 6/1	App 6/1				
								(iii) undrained shear parameters (c and φ)	Clause 633	App 6/1	-				
								(iv) effective angle of internal friction (φ') and effective cohesion (c')	Clause 636	App 6/1	-				
								(v) coefficient of friction and adhesiion (fill/elements)	Clause 639	App 6/1	-				
								(vi) permeability	Clause 640	App 6/1	-				
								(vii) slope stability test (where required in App 6/6)	Clause 610	App 6/6					

TABLE 6/1: (05/04) **Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)**

Class				General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612	Class		
							Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:					
									Lower	Upper				
SELECTED COHESIVE FILL	7	C	-	Selected wet cohesive material	Fill to reinforced soil	Any material, or combination of materials, other than unburnt colliery spoil, argillaceous rock and chalk. (Properties (viii), (ix), (x), (xi) and (xii) in next column only apply when metallic reinforcing elements, facing units or fastenings are used)	(i) grading	BS 1377 : Part 2	Tab 6/2	Tab 6/2	Tab 6/4 Method 1	7	C	-
							(ii) mc	BS 1377 : Part 2	App 6/1	App 6/1				
							(iii) MCV	Clause 632	App 6/1	App 6/1				
							(iv) effective angle of internal friction (φ') and effective cohesion (c')	Clause 636	App 6/1	-				
							(v) coefficient of friction and adhesiion (fill/elements)	Clause 639	App 6/1	-				
							(vi) liquid limit	BS 1377 : Part 2	-	45				
							(vii) plasticity index	BS 1377 : Part 2	-	25				
							(viii) pH value	BS 1377 : Part 3	Tab 6/3	Tab 6/3				
							(ix) chloride ion content	BS EN 1744-1	-	Tab 6/3				
							(x) water soluble (WS) sulfate content	TRL Report 447, Test No. 1	-	Tab 6/3				
							(xi) oxidisable sulfides (OS) content	TRL Report 447, Tests Nos. 2 and 4	-	Tab 6/3				
							(xii) resistivity	Clause 637	Tab 6/3	-				
							(xiii) redox potential	Clause 638	Tab 6/3	-				

TABLE 6/1: (05/04) **Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)**

Class				General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612	Class		
							Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:					
									Lower	Upper				
SELECTED COHESIVE FILL	7	D	-	Selected stony cohesive material	Fill to reinforced soil	Any material, or combination of materials, other than unburnt colliery spoil, argillaceous rock and chalk. (Properties (vi), (vii), (viii), (ix), (x), (xi) and (xii) in next column only apply when metallic reinforcing elements, facing units or fastenings are used)	(i) grading	BS 1377 : Part 2	Tab 6/2	Tab 6/2	Tab 6/4 Method 2	7	D	-
							(ii) mc	BS 1377 : Part 2	App 6/1	App 6/1				
							(iii) MCV	Clause 632	App 6/1	App 6/1				
							(iv) effective angle of internal friction (φ') and effective cohesion (c')	Clause 636	App 6/1	-				
							(v) coefficient of friction and adhesiion (fill/elements)	Clause 639	App 6/1	-				
							(vi) liquid limit	BS 1377 : Part 2	-	45				
							(vii) plasticity index	BS 1377 : Part 2	-	25				
							(viii) pH value	BS 1377 : Part 3	Tab 6/3	Tab 6/3				
							(ix) chloride ion content	BS EN 1744-1	-	Tab 6/3				
							(x) water soluble (WS) sulfate content	TRL Report 447, Test No. 1	-	Tab 6/3				
							(xi) oxidisable sulfides (OS) content	TRL Report 447, Tests Nos. 2 and 4	-	Tab 6/3				
							(xii) resistivity	Clause 637	Tab 6/3	-				
							(xiii) redox potential	Clause 638	Tab 6/3	-				

TABLE 6/1: (11/03) **Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)**

Class				General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612	Class		
							Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:					
									Lower	Upper				
SELECTED COHESIVE FILL	7	E	-	Selected cohesive material	For stabilisation with lime to form capping (Class 9D)	Any material, or combination of materials, other than unburnt colliery spoil	(i) grading	BS 1377 : Part 2	Tab 6/2	Tab 6/2	Not applicable	7	D	-
							(ii) mc	BS 1377 : Part 2	-	App 6/1				
							(iii) MCV	Clause 632	App 6/1	-				
							(iv) plasticity index	BS 1377 : Part 2	10	-				
							(v) organic matter	BS 1377 : Part 3	-	App 6/1				
							(vi) water soluble (WS) sulfate content	TRL Report 447, Test No. 1	-	App 6/1				
							(vii) oxidisable sulfides (OS) content	TRL Report 447, Tests Nos. 2 and 4	-	App 6/1				
							(viii) total potential sulfate (TPS) content	TRL Report 447, Test No. 4	-	App 6/1				
	7	F	-	Selected silty cohesive material	For stabilisation with cement to form capping (Class 9B)	Any material, or combination of materials, other than chalk, unburnt colliery spoil and argillaceous rock	(i) grading	BS 1377 : Part 2	Tab 6/2	Tab 6/2	Not applicable	7	F	-
							(ii) uniformity coefficient	See Note 5	5	-				
							(iii) mc	BS 1377 : Part 2	App 6/1	App 6/1				
							(iv) MCV	Clause 632	App 6/1	App 6/1				
							(v) liquid limit	BS 1377 : Part 2	-	45				
							(vi) plasticity index	BS 1377 : Part 2	-	20				
							(vii) organic matter	BS 1377 : Part 3	-	App 6/1				
							(viii) water soluble (WS) sulfate content	TRL Report 447, Test No. 1	-	App 6/1				
							(ix) oxidisable sulfides (OS) content	TRL Report 447, Tests Nos. 2 and 4	-	App 6/1				
							(x) total potential sulfate (TPS) content	TRL Report 447, Test No. 4	-	App 6/1				

TABLE 6/1: (11/05) **Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)**

Class				General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612	Class		
							Property (See exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:					
									Lower	Upper				
SELECTED COHESIVE FILL	7	G	-	Selected conditioned pulverised fuel ash cohesive material	For stabilisation with cement to form capping (Class 9C)	Conditioned material direct from power station dust collection system and to which a controlled quantity of water has been added	(i) mc	BS 1377 : Part 2	App 6/1	App 6/1	Not applicable	7	G	-
							(ii) water soluble (WS) sulfate content	TRL Report 447, Test No. 1	-	3000 mg/l as SO_4				
							(iii) oxidisable sulfides (OS) content	TRL Report 447, Tests Nos. 2 and 4	-	0.6% as SO_4				
							(iv) total potential sulfate (TPS) content	TRL Report 447, Test No. 4	-	1.2% as SO_4				
	7	H	-	Wet, dry, stony or silty cohesive material and chalk	Overlying fill for corrugated steel buried structures	As Class 2A, 2B, 2C, 2D general cohesive fill material or Class 3 chalk fill material, except that argillaceous rock, slag, PFA or any combination thereof shall not be used	As for Class 2A, 2B, 2C, 2D or 3 with the addition of the following					7	H	-
							(i) water soluble (WS) sulfate content	TRL Report 447, Test No. 1	-	300 mg/l as SO_4				
							(ii) oxidisable sulfides (OS) content	TRL Report 447, Tests Nos. 2 and 4	-	0.06% as SO_4				
							(iii) chloride ion content	BS EN 1744-1	-	0.025%				
							(iv) pH value	BS 1377 : Part 3	6	9				

TABLE 6/1: (11/03) **Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)**

Class				General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612	Class		
							Property (See exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:					
									Lower	Upper				
SELECTED COHESIVE FILL	7	I	-	Selected cohesive material	For stabilisation with lime and cement to form capping (Class 9E)	Any material, or combination of materials, other than unburnt colliery spoil	(i) grading	BS 1377 : Part 2	Tab 6/2	Tab 6/2	Not applicable	7	I	
							(ii) mc	BS 1377 : Part 2	-	App 6/1				
							(iii) MCV	Clause 632	App 6/1	-				
							(iv) plasticity index	BS 1377 : Part 2	10	-				
							(v) organic matter	BS 1377 : Part 3	-	App 6/1				
							(vi) water soluble (WS) sulfate content	TRL Report 447, Test No. 1	-	App 6/1				
							(vii) oxidisable sulfides (OS) content	TRL Report 447, Tests Nos. 2 and 4	-	App 6/1				
							(viii) total potential sulfate (TPS) content	TRL Report 447, Test No. 4	-	App 6/1				

TABLE 6/1: Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)

Class				General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612	Class		
							Property (See exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:					
									Lower	Upper				
MISC FILL	8	-	-	Class 1, Class 2 or Class 3 material	Lower trench fill	Any; except there shall not be any stones or lumps of clay >40 mm nominal diameter. Recycled aggregate	(i) mc	BS 1377 : Part 2	App 6/1	App 6/1	Tab 6/4	8	-	-
							(ii) MCV	Clause 632	App 6/1	App 6/1				
STABILISED MATERIALS	9	A	-	Cement stabilised well graded granular material	Capping	Class 6E with addition of cement according to Clause 614	(i) pulverisation	BS 1924 : Part 2	60%	-	Tab 6/4 Method 6	9	A	-
							(ii) bearing ratio	BS 1924 : Part 2	App 6/1	-				
							(iii) mc	BS 1924 : Part 2	App 6/1	App 6/1				
	9	B	-	Cement stabilised silty cohesive material	Capping	Class 7F with addition of cement according to Clause 614	(i) pulverisation	BS 1924 : Part 2	App 6/1	-	Tab 6/4 Method 7	9	B	-
							(ii) MCV immediately before compaction	Clause 632	App 6/1	12				
							(iii) bearing ratio	BS 1924 : Part 2	App 6/1	-				
							(iv) mc	BS 1924 : Part 2	App 6/1	App 6/1				
	9	C	-	Cement stabilised conditioned pulverised fuel ash cohesive material	Capping	Class 7G with addition of cement according to Clause 614	(i) pulverisation	BS 1924 : Part 2	60%	-	End product 95% of maximum dry density of BS 1924 : Part 2 (2.5 kg rammer method)	9	C	-
							(ii) bearing ratio	BS 1924 : Part 2	App 6/1	-				
							(iii) mc	BS 1924 : Part 2	To enable compaction to Clause 612					
	9	D	-	Lime stabilised cohesive material	Capping	Class 7E with addition of lime according to Clause 615	(i) pulverisation	BS 1924 : Part 2	30%	-	Tab 6/4 Method 7	9	D	-
							(ii) MCV immediately before compaction	Clause 632	App 6/1	App 6/1				
							(iii) bearing ratio	BS 1924 : Part 2	App 6/1	-				
							(iv) mc	BS 1924: Part 2	App 6/1	App 6/1				

TABLE 6/1: (11/04) **Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)**

Class				General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612	Class		
							Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:					
									Lower	Upper				
STABILISED MATERIALS	9	E	-	Lime and cement stabilised cohesive material	Capping	Class 7I with addition of lime and cement according to Clause 643	(i) pulverisation	BS 1924 : Part 2	30%	-	Tab 6/4 Method 7	9	E	-
							(ii) MCV immediately before completion	Clause 632	App 6/1	App 6/1				
							(iii) bearing ratio	BS 1924 : Part 2	App 6/1	-				
							(iv) mc	BS 1924 : Part 2	App 6/1	App 6/1				
	9	F	-	Lime and cement stabilised well graded granular material	Capping	Class 6R with addition of lime and cement according to Clause 643	(i) pulverisation	BS 1924 : Part 2	60%	-	Tab 6/4 Method 6	9	F	-
							(ii) bearing ratio	BS 1924 : Part 2	App 6/1	-				
							(iii) mc	BS 1924 : Part 2	App 6/1	App 6/1				

Footnotes to Table 6/1

1. App = Appendix
2. Tab = Table
3. Where in the Acceptable Limits column reference is made to App 6/1, only those properties having limits ascribed to them in Appendix 6/1 shall apply. Where Appendix 6/1 gives limits for other properties not listed in this Table such limits shall also apply.
4. (05/04) Where BS 1377 : Part 2 is specified for mc, this shall mean BS 1377 : Part 2 or BS EN 1097-5 as appropriate.
5. Uniformity coefficient is defined as the ratio of the particle diameters D_{60} to D_{10} on the particle-size distribution curve, where:
   D_{60} = particle diameter at which 60% of the soil by weight is finer
   D_{10} = particle diameter at which 10% of the soil by weight is finer
6. (11/04) The limiting values for Class U1B material are given in Appendix 6/14 and Appendix 6/15.

TABLE 6/2: (05/04) **Grading Requirements for Acceptable Earthworks Materials Other Than Classes 6F4, 6F5 and 6S**

Percentage by Mass Passing the Size Shown																					
Class	**Size (mm)**		**Size(mm) BS Series**													**Size (microns) BS Series**				**Size (micr-ons)**	**Class**
	500	**300**	**125**	**90**	**75**	**37.5**	**28**	**20**	**14**	**10**	**6.3**	**5**	**3.35**	**2**	**1.18**	**600**	**300**	**150**	**63**	**2**	
1A		100	95-100																<15		1A
1B			100																<15		1B
1C	100		10-95													0-25			<15		1C
2A & 2B			100											80-100					15-100		2A & 2B
2C			100											15-80					15-80		2C
2D			100																80-100	0-20	2D
6A	100									0-100		0-85				0-45			0-5		6A
6B	100		0-10																		6B
6C			100			0-100					0-100		0-35	0-10		0-2					6C
6D										100		89-100		60-100	30-100	15-80	5-48	0-15 except 0-20 for crushed rock			6D
6E & 6R			100	85-100						25-100						10-100			<15		6E & 2R
6F1					100	75-100				40-95		30-85				10-50			<15		6F1
6F2			100	80-100	65-100	45-100				15-60		10-45				0-25			0-12		6F2
6F3			100	80-100	65-100	45-100				15-60		10-45				0-25			0-12		6F3
6H								100				60-100			15-45	0-25		0-5			6H
6I & 6J			100		85-100				25-100					15-100		9-100			<15		6I & 6J
6K								100											0-10		6K
6L										100		89-100		60-100	30-100	15-100	5-70	0-15 except 0-20 for crushed rock			6L

TABLE 6/2: (11/05) **Grading Requirements for Acceptable Earthworks Materials (continued)**

Percentage by Mass Passing the Size Shown																					
Class	Size (mm)		Size(mm) BS Series													Size (microns) BS Series				Size (micr-ons)	Class
	500	300	125	90	75	37.5	28	20	14	10	6.3	5	3.35	2	1.18	600	300	150	63	2	
6M					100														0-10		6M
6N & 6P					100														<15		6N & 6P
6S					100									60-100		30-90		4-45	0-16		6S
7A					100														15-100		7A
7C			100		85-100				83-100					80-100		60-100			15-45	0-20	7C
7D			100		85-100				40-90					15-79		15-75			15-45	0-20	7D
7E					100		95-100												15-100		7E
7F			100																15-100		7F
7I					100		95-100												15-100		7I

TABLE 6/4: Method Compaction for Earthworks Materials: plant and Methods (Method 1 to Method 6)
(This Table is to be read in conjunction with sub-Clause 612.10)

Type of Compaction Plant	Ref No.	Category	Method 1		Method 2		Method 3		Method 4		Method 5		Method 6		
			D	N#	D	N#	D	N#	D	N	D	N	N for D = 110 mm	N for D = 150 mm	N for D = 250 mm
Vibratory roller		Mass per metre width of a vibratory roll:													
	1	over 270 kg up to 450 kg	unsuitable		75	16	150	16	unsuitable		unsuitable		unsuitable	unsuitable	unsuitable
	2	over 450 kg up to 700 kg	unsuitable		75	12	150	12	unsuitable		unsuitable		unsuitable	unsuitable	unsuitable
	3	over 700 kg up to 1300 kg	100	12	125	10	150	6	125	10	unsuitable		16	unsuitable	unsuitable
	4	over 1300 kg up to 1800 kg	125	8	150	8	200	10*	175	4	unsuitable		6	16	unsuitable
	5	over 1800 kg up to 2300 kg	150	4	150	4	225	12*	unsuitable		unsuitable		4	6	12
	6	over 2300 kg up to 2900 kg	175	4	175	4	250	10*	unsuitable		400	5	3	5	11
	7	over 2900 kg up to 3600 kg	200	4	200	4	275	8*	unsuitable		500	5	3	5	10
	8	over 3600 kg up to 4300 kg	225	4	225	4	300	8*	unsuitable		600	5	2	4	8
	9	over 4300 kg up to 5000 kg	250	4	250	4	300	6*	unsuitable		700	5	2	4	7
	10	over 5000 kg	275	4	275	4	300	4*	unsuitable		800	5	2	3	6
Vibrating plate compactor		Mass per m^2 of base plate:													
	1	over 880 kg up to 1100 kg	unsuitable		unsuitable		75	6	unsuitable		unsuitable		unsuitable	unsuitable	unsuitable
	2	over 1100 kg up to 1200 kg	unsuitable		75	10	100	6	75	10	unsuitable		unsuitable	unsuitable	unsuitable
	3	over 1200 kg up to 1400 kg	unsuitable		75	6	150	6	150	8	unsuitable		unsuitable	unsuitable	unsuitable
	4	over 1400 kg up to 1800 kg	100	6	125	6	150	4	unsuitable		unsuitable		8	unsuitable	unsuitable
	5	over 1800 kg up to 2100 kg	150	6	150	5	200	4	unsuitable		unsuitable		5	8	unsuitable
	6	over 2100 kg	200	6	200	5	250	4	unsuitable		unsuitable		3	6	12
Vibro-tamper		Mass:													
	1	over 50 kg up to 65 kg	100	3	100	3	150	3	125	3	unsuitable		4	8	unsuitable
	2	over 65 kg up to 75 kg	125	3	125	3	200	3	150	3	unsuitable		3	6	12
	3	over 75 kg up to 100 kg	150	3	150	3	225	3	175	3	unsuitable		2	4	10
	4	over 100 kg	225	3	200	3	225	3	250	3	unsuitable		2	4	10
Power rammer		Mass:													
	1	100 kg up to 500 kg	150	4	150	6	unsuitable		200	4	unsuitable		5	8	unsuitable
	2	over 500 kg	275	8	275	12	unsuitable		400	4	unsuitable		5	8	14
Dropping-weight compactor		Mass of rammer over 500 kg weight drop:													
	1	over 1 m up to 2 m	600	4	600	8	450	8	unsuitable		unsuitable		unsuitable	unsuitable	unsuitable
	2	over 2 m	600	2	600	8	unsuitable		unsuitable		unsuitable		unsuitable	unsuitable	unsuitable

TABLE 6/4: Method Compaction for Earthworks Materials: Plant and Methods (Method 7)
(This Table is to be read in conjunction with sub-Clause 612.10)

Type of Compaction Plant	Ref No.	Category	Method 7	
			N for D = 150 mm	N for D = 250 mm
Smooth wheeled roller (or vibratory roller operating without vibration)		Mass per metre width of roll:		
	1	over 2100 kg up to 2700 kg	unsuitable	unsuitable
	2	over 2700 kg up to 5400 kg	unsuitable	unsuitable
	3	over 5400 kg	12	unsuitable
Grid roller		Mass per metre width of roll:		
	1	over 2700 kg up to 5400 kg	unsuitable	unsuitable
	2	over 5400 kg up to 8000 kg	16	unsuitable
	3	over 8000 kg	8	unsuitable
Deadweight tamping roller		Mass per metre width of roll:		
	1	over 4000 kg up to 6000 kg	4	8
	2	over 6000 kg	3	6
Pneumatic-tyred roller		Mass per wheel:		
	1	over 1000 kg up to 1500 kg	unsuitable	unsuitable
	2	over 1500 kg up to 2000 kg	12	unsuitable
	3	over 2000 kg up to 2500 kg	6	unsuitable
	4	over 2500 kg up to 4000 kg	5	unsuitable
	5	over 4000 kg up to 6000 kg	4	16
	6	over 6000 kg up to 8000 kg	unsuitable	8
	7	over 8000 kg up to 12000 kg	unsuitable	4
	8	over 12000 kg	unsuitable	4
Vibratory tamping roller		Mass per metre width of vibrating roll:		
	1	over 700 kg up to 1300 kg	unsuitable	unsuitable
	2	over 1300 kg up to 1800 kg	unsuitable	unsuitable
	3	over 1800 kg up to 2300 kg	16	unsuitable
	4	over 2300 kg up to 2900 kg	12	unsuitable
	5	over 2900 kg up to 3600 kg	10	unsuitable
	6	over 3600 kg up to 4300 kg	8	16
	7	over 4300 kg up to 5000 kg	7	14
	8	over 5000 kg	6	12
Vibratory roller		Mass per metre width of vibrating roll:		
	1	over 270 kg up to 450 kg	unsuitable	unsuitable
	2	over 450 kg up to 700 kg	unsuitable	unsuitable
	3	over 700 kg up to 1300 kg	unsuitable	unsuitable
	4	over 1300 kg up to 1800 kg	unsuitable	unsuitable
	5	over 1800 kg up to 2300 kg	12	unsuitable
	6	over 2300 kg up to 2900 kg	10	unsuitable
	7	over 2900 kg up to 3600 kg	10	unsuitable
	8	over 3600 kg up to 4300 kg	8	unsuitable
	9	over 4300 kg up to 5000 kg	8	unsuitable
	10	over 5000 kg	6	12
Vibratory plate compactor		Mass per m^2 of base plate:		
	1	over 880 kg up to 1100 kg	unsuitable	unsuitable
	2	over 1100 kg up to 1200 kg	unsuitable	unsuitable
	3	over 1200 kg up to 1400 kg	unsuitable	unsuitable
	4	over 1400 kg up to 1800 kg	10	unsuitable
	5	over 1800 kg up to 2100 kg	8	unsuitable
	6	over 2100 kg	6	unsuitable
Vibro-tamper		Mass:		
	1	over 50 kg up to 65 kg	unsuitable	unsuitable
	2	over 65 kg up to 75 kg	unsuitable	unsuitable
	3	over 75 kg up to 100 kg	unsuitable	unsuitable
	4	over 100 kg	8	unsuitable
Power rammer		Mass:		
	1	100 kg up to 500 kg	8	unsuitable
	2	over 500 kg	6	10
Dropping weight compactor		Mass of rammer over 500 kg height drop:		
	1	over 1 m up to 2 m	unsuitable	unsuitable
	2	over 2 m	unsuitable	unsuitable