EARTHWORK VALIDATION REPORT

Envision Giga One

ENV1-RPS-XX-XX-RP-G-114004
P01

21 July 2023

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1 INTRODUCTION & BACKGROUND

1.1 Project Background

1.1.1 RPS Consulting Services Ltd was commissioned by Wates Construction North East to provide an earthworks specification, part time earthworks monitoring and preparation of a validation report on the laboratory and field testing undertaken during the earthworks contract for the construction of a manufacturing facility with associated access infrastructure and hardstanding.

1.1.2 This Validation Report has been prepared to demonstrate that placed materials meet the specification limits for the placement and compaction of earthwork materials during the contract.

1.2 Site Details

1.2.1 The site is located at National Grid Reference NZ 3318 5851. The site is located at land off the A1290, Washington, Sunderland to the north of the Nissan Manufacturing plant. The site comprises a large, relatively flat approximately triangular parcel of land presently covered by arable fields bound by the A19 to the east and the A1290 to the south. A site location plan is provided as Figure 1.

1.2.2 The site occupies an area of approximately 25 hectares and is to the north of the proposed residential development site. It formerly comprised two undeveloped grass covered fields adjacent to the golf course in the west. The site slopes gently downwards towards the southeast.

1.2.3 The earthworks undertaken comprised bulk excavation, placement and compaction of site-won material to create a level development platform. The northern slopes of the ponds have been cut into the landscape, and the site-won material has been used to construct bunds that form the southern slopes of the ponds. A site development plan is provided as Figure 2.

1.3 Roles and Responsibilities

1.3.1 The roles of the various parties involved with the earthworks are detailed in Table 1.1

Table 1-1 Site Roles

Client & Project Manager	Principal Contractor	Earthworks Contractor	Validation Supervisor
Wates Construction North East	North East Earthworks Limited	North East Earthworks Limited	RPS Consulting Services Ltd

1.3.2 As Earthworks Contractor, North East Earthworks Ltd has undertaken the works in accordance with the earthworks specification (Ref: ENV1-RPS-XX-XX-SP-G-111905 Envision Giga One Earthworks Specification) dated July 2022 and have arranged all field and laboratory testing to confirm that the works meet the earthworks specification. RPS were appointed to undertake regular inspections of the earthworks to ensure they were undertaken in general accordance with the Specification and to report on the results of the field and laboratory compliance and validation testing.

1.4 Report Objectives

1.4.1 The objectives of this report are:

- To collate and comment on the results of all field and laboratory testing undertaken to demonstrate that the placed fill material meets the requirements of the Earthworks Specification.
- To provide a record of supervisory inspections of the earthworks construction phase to demonstrate that works were undertaken in accordance with the Earthworks Specification.

2 EARTHWORKS CONTRACT

2.1 Contractual Arrangements

2.1.1 North East Earthworks Ltd are the Earthworks Contractor, undertaking all earthworks construction operations during the period June 2022 to July 2023.

2.2 Earthworks Specification

2.2.1 The contract required the delivery of the earthworks to be undertaken in accordance with the earthwork specification (Ref: ENV1-RPS-XX-XX-SP-G-111905 Envision Giga One Earthworks Specification) dated July 2022. A copy of the Specification is contained in Appendix A.

2.3 Earthworks Objectives and Scope

2.3.1 The objectives of the Specification were to:

- Provide a platform as defined under the contract to the standards defined in the Specification suitable to support the construction of a battery manufacturing facility, with associated access infrastructure and hardstanding;
- The excavation, processing and replacement of all arisings as engineered fill where material appropriate for reuse;
- To reuse materials from within the site to minimise the requirement to import/export materials except for specialist fill materials; and
- To remove all materials classified as unsuitable from the site and disposal of these.

2.3.2 The earthworks drawings comprised the following:

- ENV1-RPS-ST-XX-DR-A-111150-P03-Site Layout
- ENV1-RPS-ST-XX-DR-C-111401-P03-External Works - External Constructions Layout - Sheet 1.
- ENV1-RPS-ST-XX-DR-C-111402-P03-External Works - External Constructions Layout - Sheet 2.
- ENV1-RPS-ST-XX-DR-C-111403-P03-External Works - External Constructions Layout - Sheet 3.
- ENV1-RPS-ST-XX-DR-C-111404-C01-External Works - Site Finished Levels - Key Plan
- ENV1-RPS-ST-XX-DR-C-111405-C01-External Works - Site Finished Levels - Sheet 1
- ENV1-RPS-ST-XX-DR-C-111406-C01-External Works - Site Finished Levels - Sheet 2.
- ENV1-RPS-ST-XX-DR-C-111407-C01-External Works - Finished Site Levels - Sheet 3.
- ENV1-RPS-ST-XX-DR-C-111408-C01-External Works - Finished Site Levels - Sheet 4.
- ENV1-RPS-ST-XX-DR-C-111409-C01-External Works - Finished Site Levels - Sheet 5.
- ENV1-RPS-ST-XX-DR-C-111410-C01-External Works - Site Finished Levels - Sheet 6.
- ENV1-RPS-ST-XX-DR-C-111411-C01-External Works - Site Finished Levels - Sheet 7.
- ENV1-RPS-ST-XX-DR-C-111412-C01-External Works - Site Finished Levels - Sheet 8.
- ENV1-RPS-ST-XX-DR-C-111413-C01-External Works - Site Finished Levels - Sheet 9.
- ENV1-RPS-ST-XX-DR-C-111500-P02-External Works - Site Sections - Sheet 1.

- ENV1-RPS-ST-XX-DR-C-111501-P02-External Works - Site Sections - Sheet 2.
- ENV1-RPS-ST-XX-SK-C-112903-P02-Earthworks - Bulk Earthworks Evaluation
- NK020439P/103/P03 - Proposed Landscape Plan

2.3.3 The earthworks operations were as follows:

Excavation

2.3.4 Excavations are necessary to form the proposed development levels as part of the enabling works for subsequent development of the Site. These include creation of a storm water attenuation pond

2.3.5 Excavations will produce arisings of topsoil, possible reworked / made ground and natural strata.

2.3.6 All excavation arisings of differing types shall be excavated, stockpiled and re-used / disposed separately.

2.3.7 The Contractor shall excavate/grub up all concrete hardstanding, bases, former foundations and obstructions, and process so that processed arisings meet both the geotechnical and geoenvironmental requirements of this Specification.

2.3.8 The earthworks will involve the following excavation works, (indicative volumes only are provided below and are critically subject to assessment by the Contractor):

- Topsoil strip. Strip of approximately 300mm of soil across the development area,
- Stockpiling of topsoil for subsequent later reuse for soft landscaping, with offsite disposal of surplus topsoil
- Excavation of naturally occurring strata for reuse as engineered fill. Materials to be assessed for need for moisture conditioning or treatment to meet end product specification depending on placement area
- Proof rolling of the formation surface

Filling

2.3.9 Placement and compaction of suitable selected as dug materials to meet the requirements of a Class 2 fill or imported Class 6F5 material will be used to create the final levels across the development area

2.3.10 Placement and compaction of suitable selected material to meet the requirements of a Class 6F5 fill to backfill voids created by removal of trees or other vegetation, and backfill voids created by removal of obstructions, and for general fill as required.

2.3.11 The earthworks required to backfill any areas shall be undertaken such that the finished ground profile achieves a CBR 3% / Subgrade Stiffness Modulus 35MPa in areas of general fill and CBR 5% Subgrade Stiffness Modulus 50MPa in building footprint areas.

2.3.12 It should be recognised that the source materials may be present at moisture contents outside of the Optimum Moisture Contents and specified limits for compaction. Conditioning of the materials using drying or wetting techniques to reach a moisture content compliant with the requirements of the specification will therefore be a requirement of the works as may be consideration of soil treatment to meet engineered performance requirements.

2.3.13 The earthworks will involve the following filling works:

- Placement of naturally occurring strata as engineered fill to meet end product specification depending on placement area.
- Importation and placement of imported Type1/Class 6F2 material for use as a piling mat.

- Double handling and placement of topsoil to soft landscaping areas

2.3.14 Prior to the commencement of works Groundworks Services (Durham) completed a Cut/Fill assessment which determined that the following volumetrics :

- Cut – 72,876m³ of Pelaw clays;
- Reuse/Fill – 49,876m³ of site won Pelaw Clay materials to achieve proposed site levels;
- Import – c.45,000m³ Type 1/6F2 materials to achieve formation level.
- Export - c. 27,000m³ Topsoil to Thrislington Quarry

2.4 Completed Earthworks Volumes

2.4.1 Following completion of the earthwork enabling package of works, North East Earthworks Ltd. reviewed their cut/fill assessment and determined the following volumes where generated and placed to achieve site levels:

General Cut/Fill:

- 53,246m³ of cut
- 72,615m³ of fill
- A shortfall of 19,368m³ of material was determined

Attenuation Works Cut/Fill:

- 20,326m³ of cut
- 10,432m³ of fill
- An excess of 9,894m³ of material was determined

Overall Cut/Fill:

- A shortfall of 9,474m³ of material was determined

2.4.2 It is understood that the following quantities of stone (Type 1/6F2) materials were imported to the site for use to achieve proposed site levels and make up the identified net shortfall associated with the earthworks programme:

- 1,305m³ was transferred from the Biffa, Washington site;
- 15m³ was transferred from the Bowburn School site;
- 1,328m³ was transferred from the Breedon Coxhoe site;
- 200m³ was transferred from the Burnigill Bank site;
- 2,085m³ was transferred from the Ebchester Quarry site;
- 14m³ was transferred from the Hexham Bunker site;
- 28,159m³ was transferred from the Quarrington site;
- 107,595m³ was transferred from the Thrislington Quarry sites; and,
- 120m³ was transferred from the Wallsend site.

3 ANITICIPATED GROUND CONDITIONS AND MATERIAL CHARACTERISATION

3.1 Ground Conditions

3.1.1 The ground conditions at the site were assessed from the results of a site investigation reported by RPS in February 2022 to obtain further information at the location of the proposed battery manufacturing facility.

3.1.2 The RPS ground investigation encountered Topsoil/Made Ground in all exploratory hole locations underlain by the Pelaw Clay, recovered as variously sandy gravelly clay. The depths of the strata are summarised in the table below.

Table 3-1 Encountered Strata

Strata	Depth to Top of Strata m BGL (m AOD)	Thickness (m)
Topsoil / Subsoil	GL	0.20 – 0.60 (Locally up to 1.15m)
Made Ground	0.20 – 0.30	0.60 – 0.90
Pelaw Clay	0.20 – 1.30	1.90 – 3.80
Tyne and Wear Complex (Laminated Clay)	Absent to 3.30	0.0 – 8.20
Lower Glacial Till	Absent to 13.40	0.0 – 9.70
Weathered Pennine Middle Coal Measure Formation	1.90 – 13.60	0.0 – 0.90
Pennine Middle Coal Measure Formation	2.00 – 14.00	Proven to greater than 20m thickness

3.2 Material Characteristics

Site Materials

3.2.1 The fill material used for the development platform comprised the Pelaw Clay. In accordance with the Highways MCHW Series 600, the materials excavated at the site were determined to generally be classified as Class 2A (Wet Cohesive) and Class 2B (Dry Cohesive) material, based on the testing undertaken during GI works.

3.2.2 Laboratory testing of samples recovered during the site investigation gave the following material parameters listed in Table 3.2.

Table 3-2 Determined Geotechnical Parameters During RPS 2022 Site Investigation

Test	Parameter Range
Liquid Limit (%)	27 – 69
Plastic Limit (%)	27 – 69
Plasticity Index (%)	6 - 41
Moisture Content (%)	8 – 36
Maximum Dry Density (Mg/m^3)	1.63 – 1.77
Optimum Moisture Content (%)	14.0 – 19.0

3.3 Earthwork Material Specification

3.3.1 The earthworks material specification requirements as set out in the RPS Earthworks Specification (reference NK020439 ENV1-RPS-XX-XX-SP-G-111905 P01 dated 11 May 2022, are shown in Table 3-3 below

Table 3-3 Testing to be carried out by the Contractor

Clause	Work, Goods or Material		Test	Frequency of Testing	Test Certificate	Comments
SERIES 600 EARTHWORKS						
601, 608, 631 to 637, 640	Acceptable material					(Cross-reference should be made to any requirements in Appendix 6/1)
	Class	General Description				
	2	General cohesive material	Grading	1 per 500m^3	Required	Wet sieving and sedimentation by pipette method to be used. Min 4 from each Area prior to commencement
			Moisture Content	Daily	Required	Min 4 from each Area prior to commencement
			Dry Density Moisture Content Relationship (2.5kg)	1 per 1000m^3	Required	Min 4 from each Area prior to commencement
			Particle density	1 per 1000m^3	Required	Min 4 from each Area prior to commencement
			Plasticity Index	1 per 500m^3	Required	Min 4 from each Area prior to commencement
			Contamination Suite	See Table 1/5.2	Required	
			pH/chloride ion content (N)	Weekly	Required	
			Resistively (N)	*(As required)*	Required	
			Contamination Suite	See Table 1/5 2	Required	
			Effective angle of internal friction and effective cohesion (N)	Source approval (3 tests) and then every 2000 m^3	Required	(Cross reference should be made to any requirements in Appendix 6/1)
	7	Selected Cohesive Fill	Grading (N)	1 per 25m^3	Required	
			PI/LL/mc (N)	Daily	Required	
			Dry Density Moisture Content Relationship (2.5kg)	1 per 50m^3 or weekly whichever greater	Required	
			Water soluble sulphate (WS) and Total sulfar (TS) content (N)	Weekly	Required	
			pH/chloride ion content (N)	Weekly	Required	

3.3.2 In addition, compaction compliance verification testing were set to monitor placement of the materials as set out in table 3-4 below

3.3.3 For the purposes of initially assessing acceptability, the maximum dry density (MDD) for the Class 2A site-won material was specified at 1.72 Mg/m^3 based on a 2.5kg rammer. The materials were to be placed with within the range of acceptable moisture contents (15 to 24%) and achieve a maximum air voids content of not greater than 5%. based upon a specific gravity of 2.62

4 MATERIAL SOURCE TESTING

4.1 Source Testing Requirements

4.1.1 As part of the works Earthworks compliance testing was undertaken to provide additional information on the source materials. This testing comprised the following:

- Moisture Content Determination
- Atterberg Limit Determination
- Particle Size Distribution
- Compaction Study
- Determination of Particle Density

4.1.2 The results of the testing are presented in Appendix B, and in summary the results of which showed the following:

Table 4-1 Determined Geotechnical Parameters During Construction Works

Test	Construction Stage Results Parameter Range	RPS 2022 SI Parameter Range
Liquid Limit (%)	29 - 66	27 – 69
Plastic Limit (%)	15- 30	27 – 69
Plasticity Index (%)	13 - 34	6 - 41
Moisture Content (%)	15 - 29	8 – 36
Maximum Dry Density (Mg/m^3)	1.54 – 1.79	1.63 – 1.77
Optimum Moisture Content (%)	12 - 21	14.0 – 19.0

4.1.3 As can be seen from the above the majority of the material used during the construction phase was within the anticipated range of material characteristics and as such the acceptance criteria for material placement remained as set out in the Earthworks Specification.

5 EARTHWORKS PLACEMENT

5.1 Compaction Plant and Requirements

5.1.1 The Earthworks Specification required that the engineered fill be placed and compacted in accordance with the requirements of the Earthworks Specification with reference to the Manual of Contract Documents for Highway Works, Volume 1 Specification for Highway Works (SfHW), published by the Stationery Office.

5.1.2 A Hamm H13 I Padfoot (H13i P) Vibratory roller was used to compact the placed fill with maximum layers of 225mm and a minimum of four passes. According to the specification sheet for the plant the operating weight is 13,090kg and the width of the roller is 2.14m.

5.2 Compaction Trial

5.2.1 A compaction trial was undertaken on the 9th June 2022 to determine the method of compaction necessary for the earthworks to be able to demonstrate compliance with the end product requirements of the earthworks specification.

5.2.2 The following plant items were being used to carry out the compaction trial as follows:

- Hammtronic H13i smooth boar roller
- Bomag BW213DH smooth boar roller with Pad foot casing fitted
- Volvo A30G dumper
- CAT D6N dozer complete with gps levelling device fitted

5.2.3 The main area of the trial location had been pre-rolled with smooth roller prior to any material being transferred from the borrow pit to the location of the trial with a plan area of approximately 25m wide by 90m long.

5.2.4 Three layers of excavated material over the trial area in the following method:

- Loose place 350mm of excavated material then level off to 300mm with the dozer over test area
- Carry out compaction of each layer of deposited material by means of vibrating compaction with the Padfoot roller with a maximum of eight passes for each layer
- Material samples are to be taken after passes two, four, six and eight, consisting of 2 x Cores and 1 x Sand Replacement test
- Handheld shear vane testing it to be carried out at each sample location with three shear vanes carried out at each
- Plate bearing test are to be carried out after passes four and six

5.2.5 The diary record of the compaction trial together with subsequent site monitoring records are presented in Appendix E.

5.3 Earthworks Summary Statement

5.3.1 An earthworks summary statement was prepared by Groundwork Services Limited on behalf of North East Earthworks Ltd which provides a summary of the works undertaken and sets out a Zoning Plan used to record the excavation, placement and testing of the works. A copy of this is included in Appendix D. This confirmed that material was to be compacted in 275mm layers, scarified with the ripper on the bulldozer. Once the layer was scarified water was added to the clay using a tractor and bowser, the layer was then reworked and compacted using the roller.

5.3.2 Drawings showing the commencement and final construction levels are presented in the Material Management Plan Validation Report enclosed within Appendix C.

5.4 Contaminated and Unsuitable Materials

5.4.1 As set out in the Materials Management Plan Verification Report (Appendix C), there were no contaminated or unsuitable materials within the site area that required removal prior to the commencement of earthworks.

5.5 Disposal of Materials Off Site

5.5.1 As outlined by the Material Management Plan Validation Report, materials which were deemed unsuitable to remain on site were removed throughout the works. It is understood that waste transfer/consignment notes for all materials exported from site for disposal were appended to the MMP report as appendix IX, however these were not available in the version provided to RPS for review.

5.5.2 A waste transfer note is appended to the Materials Management Plan for the transfer of 60,000 of soil and stones (EWC code: 17 05 04).

6 MONITORING AND VERIFICATION TESTING

6.1 Monitoring

6.1.1 Site visits to monitor the placement and testing of the earthworks materials were undertaken by RPS on a part time monitoring basis. Copies of RPS site monitoring records are included as Appendix E.

6.1.2 On each visit the following were assessed:

- Work Progress,
- Material movement and storage,
- Suitability of material for earthworks,
- Non conformances,
- Visual assessment of formation layer,
- Material placement and compaction,

6.2 Verification Testing

6.2.1 As outlined in the RPS Earthworks Speciation, in-situ testing every was undertaken in areas of engineered fill which comprised the following.

Core Cutter Testing

6.2.2 Bulk density and moisture content was determined by using core cutters to recover samples of the compacted fill with samples taken at grid intersections for individual layers. The dry density was subsequently derived from the bulk density by determining the moisture content of the recovered sample. Air voids percentage were derived from dry density and moisture content using a specific gravity of 2.62. The results of the core cutter testing are shown in Appendix G.

Hand Shear Vane Testing

6.2.3 The undrained shear strength of the compacted fill was determined by the use of a hand shear vane. The tests were undertaken at the test locations on individual layers and three determinations were recorded at each location to determine an average value. The results of the hand vane testing are shown in Appendix G .

Plate Load Testing

6.2.4 Plate Bearing Tests were undertaken at selected grid intersections and the results determined were used to make an assessment of bearing pressure, modulus of sub-grade reaction and CBR. The results of the Plate Load tests are shown in Appendix H.

7 ASSESSMENT OF VERIFICATION TESTING

7.1 Dry Density Testing

7.1.1 A total of 582 Core Cutter tests were undertaken during the works distributed on a typically grid pattern across areas of fill. The total number of tests being equivalent to one test per 142m3 (i.e. equivalent to one test per 516m^2 on a 275mm thickness layer). Drawings showing the location of test results prepared by the Contractor are presented in Appendix G, with test certificates from the laboratory analysis of core cutter samples compiled in Appendix G

7.1.2 Of the total 581 tests 490 (84%) passed initial compaction testing to achieve the criteria of greater than 95% Maximum Dry Density (2.5kg rammer) being greater than 1.72Mg/m^3 with less than 5% air voids and moisture contents between 15 and 24%.

7.1.3 The test results of the final earthworks fill is presented in Appendix G. The testing determined the following for the accepted test results

- Bulk Density ranging between 1.97 and 2.32Mg/m^3,
- Moisture Content ranging between 15 and 24.0%, with the exception of a single result at 25% moisture.

7.1.4 The aforementioned results allowed the following results to be derived:

- Dry Density ranging between 1.63 and 1.98Mg/m^3, thus meeting the minimum 95% MDD compaction criteria.
- Air Voids ranging between 4.88 -10.97%. It is noted that a number of test results plot above the zero air voids line and these may be as a result of variable specific gravity for the materials which may result in miscalculation of air voids and / or laboratory errors in calculation of bulk density. These have been assumed to be acceptable given the range of moisture contents and corresponding hand vane and/or CBR testing undertaken on the materials.

7.1.5 The 91 No. failures were subject to a range of remedial works. A copy of the contractor remedial works summary sheet is presented in Appendix G. The remedial works comprising either:

- Re-rolling to increase the compaction,
- Scarifying to allow wet materials to dry before recompaction; or
- Scarifying and wetting of dry materials with a bowser before recompaction.

7.1.6 The failed areas were typically subject to retesting as necessary or if only reported as being a marginal failure due to compaction were simply rerolled to increase compaction and hence equivalent dry density. As such the remedial works summary presented by the Contractor contained within Appendix G shows that where compaction test failures were reported that remedial action was taken accordingly.

7.2 Hand Shear Vanes

7.2.1 566 No Hand shear vanes were undertaken Tests recorded equivalent undrained shear strength values between 131kN/m^2 and >240kN/m^2. The results of the Hand Shear Vane tests are presented in Appendix G.

7.2.2 None of the hand shear vanes results resented fail either the external area validation criteria or 75kN/m^2, or the internal building area validation criteria of 100kN/m^2.

7.2.3 With the package of information provided to allow validation, no drawing showing the location of all the hand shear vane tests. In addition, the zone and layer information are not provided on all test

results. However, a review of the provided information suggests that the tests have been undertaken across the site area, in all zones where fill was placed. In addition, the information indicates that the tests were taken on multiple layers.

7.2.4 Reviews of the results undertaken throughout the ongoing earthworks confirmed the results were acceptable and following the initial stages of testing there was a relaxation in testing volume. This was agreed with all parties.

7.3 Plate Bearing Test

7.3.1 210 plate load test results have been provided to RPS which are understood to have been undertaken on the upper final layer of the earthworks development platform, prior to the piling mat being installed. The results of the tests are presented in Appendix H.

7.3.2 RPS has not been provided with a plan showing the location of all of the plate load tests, nor has RPS been provided any details of remedial action undertaken where failures were recorded.

7.3.3 Where co-ordinates have been provided these have been plotted on a development plan to confirm whether the locations are beneath proposed building or not. It should be noted that the plotted CBRs show no CBRs to be undertaken within Zones 7,8 and 9 in the west. However, we have test results for a number of CBRs labelled as being within Zone 7 (7), and Zone 8 (10). Although no CBRs are specifically labelled as Zone 9, there are several labelled as road. It is also understood that Zone 9 fall under temporary works and therefore is not included within this validation report.

7.3.4 There are several CBRs of which the precise location cannot be determined , either due to co-ordinates not provided or the zone defined. Therefore, is have been assumed as a conservative assessment that all of these are located within the development footprint.

7.3.5 The minimum criteria for CBRs is:

- 3% in external areas; and
- 5% beneath proposed buildings.

7.3.6 For the external areas of the site a total of six CBRs failed to meet the 3% criteria, all of these are located in Zone 3 in the north of the site. It is recognised that there has been a large number of CBRs undertaken in this area, and it has been assumed that some of these relate to retesting of the final formation following completion of remedial works as a result of earlier non-compliance with respect to density testing (See Section 7.1 above). Whilst no documentation relating to remedial works has been provided, these lower CBRs are not considered to be representative of the overall value of the final layer of the earthworks.

7.3.7 For the proposed building internal areas, (and conservatively including those CBRs whose precise location has not been advised), there are a total of 20 results which are below the criteria of 5%. These are all dated between the 17 June 2022 and 22 June 2022, and are generally located in the north east within Zone 2. There are a number of other results in this area which provide results greater than 5% and therefore it has been assumed that some remedial works were undertaken in relation to additional compactive effort (See Section 7.1 above). However, details of these have not been provided to RPS.

7.3.8 It should also be noted that the CBR values of the piling mat area across the whole site area are all above 25% and are inline with the relevant criteria.

7.3.9 In general terms the CBRs undertaken across the site have been undertaken in line with the specification, with few exceptions as discussed above.

8 CONCLUSION

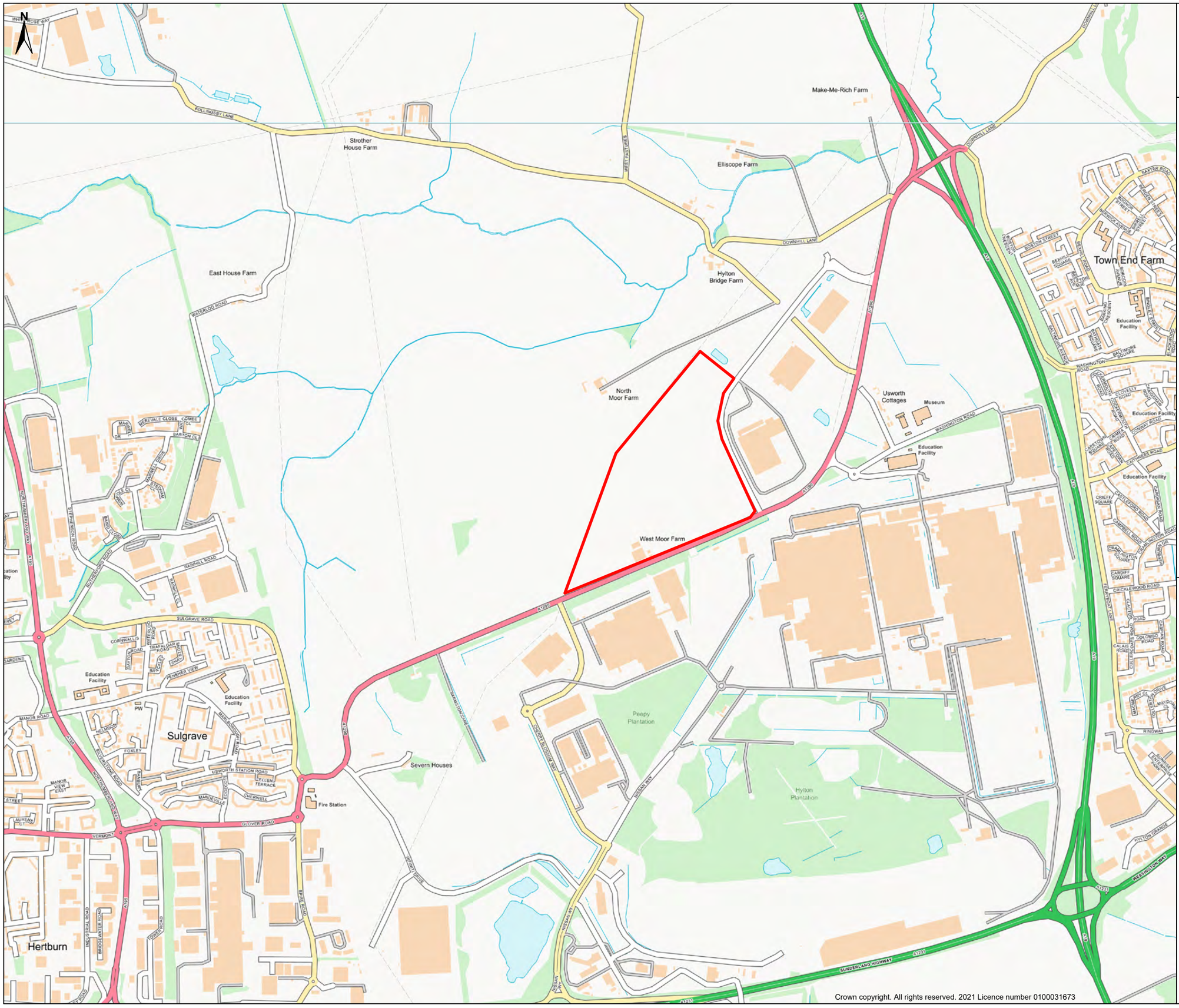
8.1.1 Based on results of the field work and verification testing undertaken and the laboratory test data provided, it is considered that the placed and compacted earthworks material is in general accordance with the Earthworks Specification

8.1.2 Where compaction test failures were recorded they were typically as a result of materials either being too dry during hot periods of weather or too wet following periods of inclement weather. Remedial action comprising either: re-rolling to increase the compaction, scarifying to allow wet materials to dry before recompaction; or scarifying and wetting of dry materials with a bowser were undertaken before recompaction.

8.1.3 The failed areas were typically subject to retesting as necessary or if only reported as being a marginal failure due to compaction were simply rerolled to increase compaction and hence equivalent dry density.

8.1.4 No areas of contamination were identified as part of the works and as such materials were considered suitable for reuse as part of the earthworks.

8.1.5 The earthworks are considered therefore to have been completed to a satisfactory standard with remedial works undertaken to address areas where compliance criteria were not originally met.



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MAKING COMPLEX EASY

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Client Wates Construction North East

Project Envision Battery Plant Sunderland

Title Site Location Plan

Status	Drawn By	PM/Checked by
Final	TF	KD
Job Ref	Scale @ A3	Date Created
JER8968	NTS	JUL 2021
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Key

- Planning boundary
- Fence line, refer to drawing ENV1-RPS-ST-XX-DR-A-111419 for details
- Retaining walls
- Dock Wing Walls

Existing Pylon
Existing fence
Flood plain
Fencing / gates to transformer compound are subject to design scope and utility provider. specification to be agreed.
Existing Pylon
Land drainage diversion by others (Indicative and subject to agreement)
Car Park
685 no. Spaces Total
40 no. EV Charging (upto 80 no.)
35 no. Accessible
Visitor Car Park
40 no. Spaces Total
5 no. EV Charging
2 no. Accessible
Fence
Existing Pylon
Amber line indicates areas within 30m of national grid power infrastructure (Note: Waste canopy and HV/LV transformer compound & Energy Centre Plant Room are within 30m clearance zone).
Extent of overhead power line cable swing
Waste Collection Canopy 1
Waste Collection Canopy 2
Waste Compactors (TBA)
2m Security Fence
Site Entrance and Highway Works
Highway works emergency access form part of S278 Agreement Works. Refer to drawing ENV1-RPS-XX-XX-DR-H-113001
A space to be provided for use by the Fire Service Emergency Response vehicle when dispatched to site. Subject to COMAH requirements.
Emergency Access (spatial provisions)
Gatehouse
Weighbridge
Bicycle and motor cycle shelters
Stair Tower
Energy Centre
Potential smoke extract fan platforms (subject to MEP design)
Stair Towers
Bulk Stores Canopy with pipe gantry to building (TBC)
Smoking Shelter
Future Provision for Office / Welfare & Accommodation
External lifting platforms
Potential smoke extract fan platforms (subject to MEP design)
Tote Store (Modular)
Bulk nitrogen tank farm, requirements TBA
RTO/VOC Exhaust system requirements TBA
Cold Store (Containerised)
Goods Out Yard
REV P15
NMP Canopy with pipe gantry to main building shown indicatively.
Area & MEP system requirements under project review.
Stair Tower
Goods In Yard
Emergency Standby Generator
3No. Dock Levellers (1300mm with tail gate allowance)
Switch Room
External lifting platforms
Potential new fire fighting stair with internal fire fighting corridors at levels 2F and 3F. Subject to project agreement.
Factory Building
Level Access Canopy
2No. Dock Levellers (1300mm with tail gate allowance)
Retaining Wall
Sub-station
Roof Access Ladder
Switch Room
INTERNATIONAL DRIVE
Level Access Canopy
2No. Dock Levellers (1300mm with tail gate allowance)
Emergency Standby Generator
Goods Out Yard
Area & MEP system requirements under project review.
Stair Tower
Potential smoke extract fan platforms (subject to MEP design)
Stair Tower
Potential smoke extract fan platforms (subject to MEP design)
Stair Tower
Goods In Yard
External lifting platforms
Pump house
Fire Water Tanks (TBA)
Retaining Wall
Fence
HGV Layby
Access Road
Tank and pump house provisions subject to MEP design e.g. Add booster / balancing tanks and pump house.
Emergency Access subject to S278 agreement
Existing trees retained in accordance with landscaping scheme
Future provision for Tank (potential use as buffer / booster tank)
Sprinkler Tanks (TBA)
Pylon
A1290
Gas Govt
10m
SCALE 1:1000

Rev	Description	By	Ckd	Date
P15	NMP coanopy & yard area updated in line with ENV1-RPS-ST-XX-SK-A-116991. Substation access points adjusted.	HAC	MM	11/11/22
P14	Footpath for fire escape and fire fighting access on eastern elevation updated.	HAC	MM	09/09/22
P13	Building footprint updated to incorporate project VE Factory Building length reduction (Eastern Elevation)	TRu	MM	02/09/22
P12	Road width reduced to 6.3m. Footpath to Eastern, Southern and Western boundary removed. Office / Welfare accommodation building removed with future provision indicated. LV compound removed.	TRu	LMA	26/08/22
P11	Parking numbers corrected	TRu	JAT	17/08/22
P10	Key updated, note for potential crane access updated. Loading dock pits highlighted, Good in dock wing wall position adjusted.	TRu	MM	12/08/22
P09	Dock leveller height indicated	LMA	MM	07/07/22
P08	Issued for WS3 submission. General notes 4 amended. Areas of particular project review & development identified.	LMA	MM	24/06/22
P07	Energy Centre detached from Factory Building	LMA	MM	01/06/22
P06	60m coater dryer north and south change incorporated. External platform provisions indicated. Tank requirement review outlined	LMA	MM	29/04/22
P05	Fencing references updated in line with Fencing Layout drawing ENV1-RPS-ST-XX-DR-A-111413 P03 . General Notes Updated	LMA	MM	25/03/22
P04	Energy Centre Plant Rooms separated from main building. Main building moved south 2m	LMA	TSR	25/02/22
P03	Update to incorporate VE options	LMA	TH	11/02/22
P02	General update	LMA	TH	14/12/21
P01	First Issue.	LMA	JAT	08/10/21

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Client: Envision AESC / Wates

Project: Giga One

Title: Site Layout

RPS Project Number	Scale @ A0	Date Created
NK020439	1:1000	08/10/21
Task Team Manager	Information Author	Task Information Manager
TH	LMA	JAT

Status: S2 (For Information)

Document Number: ENV1-RPS-ST-XX-DR-A-111150 (Project Code - Originator - Function - Space - Type - Role - Number)

Revision: P15

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Appendix A
EARTHWORKS SPECIFICATION

EARTHWORKS SPECIFICATION

Envision Giga One

NK020439
ENV1-RPS-XX-XX-SP-G-111905
C01
4 July 2022

rpsgroup.com

Document status

Version	Purpose of Document	Authored by	Reviewed by	Approved by	Review date
P01	First Issue for Information	PJ	JT	PJ	11 May 2022
C01	Construction Issue and amendments to Section 3, App 1/5, App 6/3 and App 6/7	PJ	JT	PJ	4 July 2022

Approval for issue

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Contents

Specification for Highway Works Numbered Appendices

1 SITE LOCATION AND DESCRIPTION

1.1 The Site is centred at National Grid Reference NZ 3318 5851, approximately 6.5 km west north-west of Sunderland Town Centre.

1.2 The site is located at Land off the A1290, Washington, Sunderland to the north of the Nissan Manufacturing plant. The site is predominately occupied by agricultural land associated to West Moor Farm, with farm buildings present in the western part of the site. The site comprises a large, relatively flat approximately triangular parcel of land presently covered by arable fields bound by the A19 to the east and the A1290 to the south.

1.3 It is proposed to construct a battery manufacturing facility, with associated access infrastructure and hardstanding. The development comprises a single large area building with an approximate geometry of 260m wide by 400m long. An adjacent area of car parking is proposed, approximately 125m wide by 450m long, to the north of the building. A substation is also proposed to the north of the car parking area. Around the buildings and car parking, an area of hardstanding/vehicular access is proposed as well as a highway connection to the local road infrastructure and an emergency access road. Additional ancillary buildings and structures are also proposed at the site including a gate house, office buildings, transformer substation, sprinkler and water tanks and retaining wall to the east of the main building.

1.4 Cut/fill earthworks are required to create a level development platform and this specification is associated with those enabling earthworks.

1.5 For the purpose of this documents the following parties are defined as follows:

- Overseeing Organisation - Wates Group Ltd.
- Contractor – The appointed earthworks/enabling works sub-contractor

2 SPECIFICATION

2.1 This specification is intended to be used in connection with the proposed development. The specification is considered to be suitable for most purposes but there may be special conditions existing at the site which are not treated in this document and which should be taken into account in arriving at a properly engineered fill. It is emphasised that clay fills can be at least as susceptible to settlement or heave due to climatic, vegetation or other effects, as naturally occurring cohesive soils. Where any discrepancy between the model specification and this specification occurs, the contents of this specification shall take precedence.

2.2 Note should be taken of the requirements of the Construction (Design and Management) Regulations 2015, to the extent that they may be relevant to the works.

2.3 The Earthworks shall be undertaken in accordance with the Manual of Contract for Highway Works, Volume 1, Specification for Highway Works, February 2016 with all current amendments at time of issue, hereinafter referred to as the SHW. The following Clauses and Appendices further amplify and amend the SHW.

2.4 It is not a standalone document and is to be incorporated into the Works Information for the proposed scheme.

2.5 Notwithstanding any compliance limits or acceptability criteria specified in SHW, or other Standards or guidance, the Contractor shall ensure that all earthworks materials (Series 600) are chemically and physically stable, and in all respects suitable for the chemical environment in which they will be placed in service.

2.6 This document should be read in conjunction with the Site Information Pack that includes information regarding ground and other site conditions. A remediation strategy has been prepared for the Site and the Contractor shall be expected to conduct the earthworks in a manner that satisfies the requirements of the remediation strategy.

2.7 In so far as any of the additional clauses conflict or are inconsistent with the SHW then the additional clauses below shall prevail. In any event of ambiguity between this or other referenced documents the Overseeing Organisation’s decision will be final.

2.8 The Contractor shall be deemed to have read the relevant site investigation logs and test results, relevant drawings, have visited the Site, and have consulted all available information concerning the Site conditions.

3 BRIEF DESCRIPTION OF WORKS

3.1 The earthworks drawings comprise the following:

- ENV1-RPS-ST-XX-DR-A-111150-P03-Site Layout
- ENV1-RPS-ST-XX-DR-C-111401-P03-External Works - External Constructions Layout - Sheet 1.
- ENV1-RPS-ST-XX-DR-C-111402-P03-External Works - External Constructions Layout - Sheet 2.
- ENV1-RPS-ST-XX-DR-C-111403-P03-External Works - External Constructions Layout - Sheet 3.
- ENV1-RPS-ST-XX-DR-C-111404-C01-External Works - Site Finished Levels - Key Plan
- ENV1-RPS-ST-XX-DR-C-111405-C01-External Works - Site Finished Levels - Sheet 1
- ENV1-RPS-ST-XX-DR-C-111406-C01-External Works - Site Finished Levels - Sheet 2.
- ENV1-RPS-ST-XX-DR-C-111407-C01-External Works - Finished Site Levels - Sheet 3.
- ENV1-RPS-ST-XX-DR-C-111408-C01-External Works - Finished Site Levels - Sheet 4.
- ENV1-RPS-ST-XX-DR-C-111409-C01-External Works - Finished Site Levels - Sheet 5.
- ENV1-RPS-ST-XX-DR-C-111410-C01-External Works - Site Finished Levels - Sheet 6.
- ENV1-RPS-ST-XX-DR-C-111411-C01-External Works - Site Finished Levels - Sheet 7.
- ENV1-RPS-ST-XX-DR-C-111412-C01-External Works - Site Finished Levels - Sheet 8.
- ENV1-RPS-ST-XX-DR-C-111413-C01-External Works - Site Finished Levels - Sheet 9.
- ENV1-RPS-ST-XX-DR-C-111500-P02-External Works - Site Sections - Sheet 1.
- ENV1-RPS-ST-XX-DR-C-111501-P02-External Works - Site Sections - Sheet 2.
- ENV1-RPS-ST-XX-SK-C-112903-P02-Earthworks - Bulk Earthworks Evaluation
- NK020439P/103/P03 - Proposed Landscape Plan

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3.2 The earthworks operations covered by this specification are as follows:

Excavation

3.3 Excavations are necessary to form the proposed development levels as part of the enabling works for subsequent development of the Site. These include creation of a storm water attenuation pond

3.4 Excavations will produce arisings of topsoil, possible reworked / made ground and natural strata.

3.5 All excavation arisings of differing types shall be excavated, stockpiled and re-used / disposed separately.

3.6 The Contractor shall excavate/grub up all concrete hardstanding, bases, former foundations and obstructions, and process so that processed arisings meet both the geotechnical and geoenvironmental requirements of this Specification.

3.7 The earthworks will involve the following excavation works, (indicative volumes only are provided below and are critically subject to assessment by the Contractor):

- Topsoil strip. Strip of approximately 300mm of soil across the development area, approximately 59,130m3.
- Stockpiling of 19,127m3 of topsoil for subsequent later reuse for soft landscaping.
- Offsite disposal of surplus topsoil
- Vegetation clearance, removal of soft spots.
- Excavation of approximately 44,800m3 of naturally occurring strata for reuse as engineered fill. Materials to be assessed for need for moisture conditioning or treatment to meet end product specification depending on placement area
- Proof rolling of the formation surface

Filling

3.8 Placement and compaction of suitable selected as dug materials to meet the requirements of a Class 2 (A/B or C) fill or imported Class 6F5 material will be used to create the final levels across the development area. Class 7A material shall be only utilised for backfill to structural foundations following construction of foundations.

3.9 Placement and compaction of suitable selected material to meet the requirements of a Class 6F5 fill to backfill voids created by removal of trees or other vegetation, and backfill voids created by removal of obstructions, and for general fill as required.

3.10 The earthworks required to backfill any areas shall be undertaken such that the finished ground profile achieves a CBR 3% / Subgrade Stiffness Modulus 35MPa in areas of general fill and CBR 5% Subgrade Stiffness Modulus 50MPa in building footprint areas.

3.11 It should be recognised that the source materials may be present at moisture contents outside of the Optimum Moisture Contents and specified limits for compaction. Conditioning of the materials using drying or wetting techniques to reach a moisture content compliant with the requirements of the specification will therefore be a requirement of the works as may be consideration of soil treatment to meet engineered performance requirements.

3.12 The earthworks will involve the following filling works:

- Placement of approximately 44,800m^3 of naturally occurring strata as engineered fill to meet end product specification depending on placement area.
- Importation and placement of approximately 45,000m^3 of imported Class 6F5 material. Volume subject to confirmation depending on final depth of piling mat.
- Double handling and placement of topsoil to soft landscaping areas

4 COMPLIANCE WITH BRITISH STANDARDS, GUIDANCE DOCUMENTS, ETC

4.1 All documents referred to or implied in this Specification shall be those current at the time of Tender, including all the latest amendments.

4.2 All work at, below or above ground level shall be in accordance with all relevant British Standards and other relevant guidance documents, particularly the following and any other documents noted therein, except the requirements of this Specification, which shall be applied wherever they are at variance with the British Standards. Should there be any discrepancy with this specification or any of the above documents the Overseeing Organisation's decision shall be sought in writing. Such a decision shall be final and absolute.

4.3 The workmanship throughout the Works is to be to the standard required by this Specification, relevant British Standard Specifications and Codes of Practice, and is to be done to the complete satisfaction of the Overseeing Organisation both in regard to method and order. The following list shall not be considered as being exhaustive and the contractor shall undertake the works with regard to all current guidance or standards relevant at the time of undertaking the works.

- BS6031: Code of Practice for Earthworks.
- Manual of Contract for Highway Works, Volume 1, Specification for Highway Works, February 2016 with all current amendments at time of issue, hereinafter referred to as the SHW.
- EPA 1990: Environmental Protection Act including the Section 34 Duty of Care requirements.
- EA 1995: Environment Act.
- Relevant Health and Safety Executive Guidance Notes in particular HS(G)66.
- The Control of Asbestos Regulations 2012

4.4 The works will be carried out in accordance with "SHW Specification", with reference to the Notes for Guidance and subject to the additional clauses given below.

5 GROUND INVESTIGATION AND PRE-COMMENCEMENT TESTING

5.1 Prior to commencement of any fill works, representative samples shall be taken of each material type and geotechnical and geo-environmental analyses undertaken in order to confirm material suitability and compliance targets in accordance with the requirements of Appendix 1/5 6/1, 6/14 and 6/15.

5.2 At least 5 days in advance of commencement the Contractor shall provide copies of all test data to the Overseeing Organisation for their review and subsequent agreement of target parameters.

6 METHOD STATEMENTS AND PROGRESS REPORTING

6.1 At least 5 days in advance of commencement the Contractor shall provide a detailed method statement setting out the earthworks approach, phasing and sequencing plant and programme. The method statement must be cognisant of the differing material types and be specific with regards to source materials and their use in different fill areas.

6.2 The main works shall not commence until receipt of a satisfactory method statement and record sheet have been submitted and agreed.

6.3 The Contractor shall on a weekly basis provide the Overseeing Organisation within the following information:

- Compliance test results and the locations of sampling;
- Site compaction records of layer thicknesses and compactive effort;
- Details of compaction plant used;
- Verification test results and their location;
- Material placement records (e.g. what materials were placed where);
- Photographs of the work;
- As-Built' final topographical survey; and
- The results of any geotechnical instrumentation monitoring.

7 TRAFFIC SAFETY AND MANAGEMENT

7.1 All works are to be undertaken in accordance with a detailed Construction Environmental Management Plan (CEMP) to be produced by the contractor.

7.2 Notwithstanding the requirements of the CEMP, the Contractor shall comply in all respects with Chapter 8 of the Traffic Signs Manual for works on or affecting public highways and/or any private roads forming the highway access to/from the Site. The Contractor should obtain all necessary consents from the Local Highway Authority for works on the public highway.

7.3 Accesses to the site shall be agreed with the Local Authority and other interested parties and haul routes within the site should be provided and maintained by the Contractor in such a manner so as not to endanger either the user, those working in the vicinity of the accesses/haul routes and/or the works.

8 PRIVATE AND PUBLICLY OWNED SERVICES

8.1 Prior to commencing work the Contractor shall obtain copies of all available records for services within and the joining the site and excavate investigation trial pits as necessary to confirm their locations and depths.

8.2 During the progress of the works the Contractor shall:

- Take all measures reasonably required by any Public or Statutory Authority for the full protection of its sewers, drains, pipes, mains, cables or any other apparatus, and shall afford proper facilities to accredited representatives of such authorities for access as may be necessary for inspection, repair, renewal or removal of any such apparatus;
- If necessary provide temporarily support to any sewers, drains, pipes, mans, cables or other services affected by the works;
- Take responsibility for ensuring that all hydrant covers, stop tap boxes, manhole covers and the like are raised or lowered to suit the finished levels of the road and footway, margin or verge;
- Comply with the requirements of the local Water Authority on all matters relating to services;
- Indemnify the Client and the Overseeing Organisation against any claim arising in consequence of the operations.

8.3 During the progress of the work and before any privately-owned service for water, electricity and the like passing through the site and affected by the works is cut or disconnected, the Contractors shall provide an alternative service in full working order to the satisfaction of the owner of the service and Overseeing Organisation.

8.4 For all known existing services to be retained, trial pits shall be excavated by hand as necessary in order to verify their positions.

9 DAMAGE TO PROPERTY

9.1 The Contractor shall ensure that all precautions are taken in order to avoid any damage to existing property arising from the works and shall be responsible for the same in the event that any damage should arise from his failure to exercise due care. Any adjacent structures, services and the like shall be inspected prior to commencement of the works for evidence of existing defects and, if necessary, a dilapidation survey shall be carried out by the Contractor, prior to works commencing on site. A re-inspection shall take place on completion of the Contract to verify that no damage or deterioration of the said structure, service or apparatus has occurred as a result of the works. A schedule of the findings of this re-inspection shall be circulated to all parties concerned for their records.

9.2 The Contractor shall execute the works with care so as to avoid damage to existing structures and drains or other services to be retained.

9.3 All fences, trees, hedges, paths, shrubs, grassed areas and other surfaces required to be retained shall be protected from spillage and damage caused by site operations and upon completion of the works they shall be handed over in an undamaged and proper state to the satisfaction of the Overseeing Organisation. The Contractor shall not raise or lower the ground level beneath the spread of the branches of any tree to be retained without the approval of the Overseeing Organisation.

9.4 The Contractor shall make reference to the Proposed Landscape Plan RPS Drawing NK020439P/103/P03 Proposed Landscape Plan RPS Drawing NK020439P/103/P03 with respect to the following restrictions

- Where existing trees & shrubs are to be retained, they should be subject to a full arboricultural inspection for safety.
- Any surgery required shall be in accordance with BS 3998 (2010) 'Tree Work - recommendations', shall comply with any existing T.P.O requirements and shall require the prior approval of the Landscape Architect.
- Avoid damage to branches, trunks and roots of trees. All existing trees & hedges to be retained are subject to BS 5837 (2012) 'Trees in relation to design, demolition and construction - Recommendations', and should be fully fenced off, prior to the commencement of any works, in accordance with Figure 2 (p20) at the full extent of the root protection area, as determined by section 4.6 (p10-11) and Annex D (p40).
- No storage of materials, disposal of rubbish, site fires, spillage of oil and chemicals, , excavation or changes in level shall be carried out within existing tree / hedge canopies.

10 SETTING OUT

10.1 The Contractor shall be responsible for the true and proper setting out of the works and for the correctness of the position, levels, dimensions and alignment of all parts of the Works and for the provision of all necessary instruments, appliances and labour in connection therewith.

10.2 The Contractor shall carefully protect and preserve all benchmarks, sight rails, pegs and other things used in setting out the works.

10.3 Should the Contractor find any discrepancies on the drawings they are to refer the matter to the Overseeing Organisation for verification before proceeding with the part of the works affected.

11 SITE CLEARANCE

11.1 Before starting the site clearance works, the Contractor shall verify which existing fences, gates, walls, roads, paved areas, trees, hedges, shrubs, etc. are to be removed. In addition, all works will need to be undertaken in accordance with any site-specific ecological requirements detailed elsewhere within the contract documents. Should the development require the series of an Ecological Clerk of Works (ECOW), the contractor shall enter into regular liaison with them as required by the contract and obtain their consent prior to commencing any area works in ecologically sensitive area.

11.2 Non earthworks materials removed as part of the site clearance shall be disposed of to an appropriately licenced waste management facility unless as otherwise discussed with the Overseeing Organisation.

11.3 On-site burning of materials shall not be permitted.

11.4 The Contractor shall demolish, break up and remove any redundant concrete slabs, structures, drains and other superficial obstructions in the way of the works or otherwise obstructing the construction of the works as instructed. Where old foundations, basements, tanks, service pipes, drains, etc. not shown on the drawings are encountered, obtain instructions from the Overseeing Organisation before proceeding.

11.5 Any demolished or cleared materials may only be retained on site for use as filling material provided that they are acceptable or are treated so as to become acceptable materials to comply in all respects with this specification for such use and approved by the Overseeing Organisation.

11.6 All fossils, coins, bottles, articles of value or antiquity and structures or other remains or things of geological or archaeological interest discovered on the site shall be immediately reported to the Overseeing Organisation and shall be deemed to be the absolute property of the Client. In addition to this the contractor shall adhere to any requirements deemed necessary by the project archaeologist, if required, or enacted as a result of any watching brief employed at the site.

12 MATERIALS ARISING FROM THE SITE

12.1 The Contractor shall set up specific temporary storage areas for holding classified contaminated (Class U1B) and hazardous material (Class U2) or potentially contaminated and hazardous material whilst it is tested and awaiting removal from the site.

12.2 All waste or superfluous material or any substance deposited by the Contractor or his sub-contractors shall be promptly removed. The Overseeing Organisations may instruct the Contractor to carry out such additional measures as the Overseeing Organisation considers are necessary.

12.3 The Contractor shall hold a current waste carriers licence for the removal of all waste from site in accordance with the Waste (England & Wales) Regulations SI 2011/988. The transfer of all waste will be accompanied by relevant waste transfer note / consignment note documentation in accordance with the Regulations.

13 COMPLETION

13.1 Completion shall include the removal of all temporary works, roads, crossings, gangways and hard standings required for undertaking the works, and reinstating these areas back to their original condition.

13.2 Completion shall include the provision of all as-built records, verification reports and information for the Health and Safety File.

14 VERIFICATION REPORT

14.1 On completion of the works, an Earthworks Verification Report shall be prepared by the Contractor presenting a record of the works carried out, full records of all loads delivered to and removed from site, and full records of all acceptability and compliance testing, including supporting as-built drawings for earthworks. In addition to meeting the requirements defined herein, the Earthworks Verification Report shall be provided to meet the requirements of the Materials Management Plan under the CL:AIRE Definition of Waste: Code of Practice.

14.2 The Earthworks Verification Report shall be presented in a single document together with a copy of the report in pdf format and digital data in AGS4 format. As a minimum therefore the report will include the following:

- A summary of progress data such as emissions control data, volume and characteristics of material treated or disposed, waste consignment notes, compliance with regulatory or licence requirements, variations, etc.
- Details of all communications held with the Environment Agency and other regulatory bodies during implementation.
- Plans showing location of Verification testing and extent of any excavations over and above the proposed dig profile.
- Verification test results.
- Reference to the Health and Safety File assuming that the remedial activities were performed in accordance with the Construction Design and Management (CDM) Regulations.
- Where appropriate, the principal findings of any residual risk assessment undertaken.

APPENDIX 0/1 - List of Regional and Scheme Specific Additional, Substitute and Cancelled Clauses in the Contract

Appendix 0/1 - Substitute, Additional and Cancelled Clauses

The following Scheme Specific Substitute, Additional and Cancelled Clauses are included in the Specification. A suffix 'AR' indicates a Contract-specific Additional Clause to the Specification.

Clause No (etc)	Additional and Revised Clauses
602 AR	1. The Contractor shall prepare a detailed Earthworks Quality Control Method Statement, including risk assessments and plans, in advance of the commencement of the earthworks operations, demonstrating the process by which he will achieve the requirements of all sub-Clauses. The Contractor is to submit such document to the Overseeing Organisation not less than 10 working days prior to the start of Earthworks. 2. The Earthworks Quality Control Method Statement shall include details of the environmental control measures the Contractor will employ, and the measures to be adopted to mitigate any identified risks to human health or the environment. 3. The Contractor shall also provide within his Earthworks Quality Control Method Statement details of all testing to be undertaken, in accordance with the provisions of all numbered appendices and provide details of the method of the tests and the laboratories to be utilised for such. 4. The Contractor shall provide details of all offsite disposal and reference should be made to Appendices 6/2, 6/14 and 6/15.
608 AR	1. The Contractor shall ensure that fill comprises material from a single source only. Cohesive and granular materials shall be excavated, placed and compacted separately without intermixing; use of interbedded cohesive and granular fill is not acceptable. 2. In addition to any grading requirements the maximum particle size of any fill material placed by method compaction shall be no more than two-thirds of the compacted layer thickness. 3. Where a sheep's foot, pad foot or similar compaction plant is adopted the testing shall be undertaken on the layer below the layer being compacted. Where the tested layer fails to meet the required specification both layers and any further overlying layers shall be removed and reworked at the Contractor's expense.
612 AR	1. The compaction of fill shall be end product compaction in compliance with SHW Section 608 Construction of Fills and Section 612 Compaction of Fills but with additional acceptability and compliance testing requirements as defined in Appendix 1/5 and Appendix 6/1. It should be noted that the compaction compliance requirements are provisional and may be amended following the Contractor's provision of the acceptability data. This source testing data should be provided by the Contractor 5 days in advance of the commencement of the works to enable the data to be reviewed and acceptance limits to be defined.

APPENDIX 0/3 - List of Numbered Appendices Referred to in the Specification and included in the Contract

Appendix 0/3 - Numbered Appendices

The following numbered appendices are included in the Specification

Completed by	App No.	Title
		INTRODUCTION
	0/1	Contract-specific Additional, Substitute and Cancelled Clauses and Tables Included in the Contract
	0/3	List of Numbered Appendices Referred to in the Specification and Included in the Contract
		PRELIMINARIES
	1/5	Testing to be Carried out by the Contractor
		EARTHWORKS
	6/1	Requirements for Acceptability and Testing etc of Earthworks Materials
	6/2	Requirements for Dealing with Class U2 Unacceptable Material
	6/3	Requirements for Excavation, Deposition, Compaction (Other than Dynamic Compaction)
	6/5	Geotextiles Used to Separate Earthworks Materials
	6/6	Fill to Structures and Fill above Structural Foundations
	6/7	Sub-formation and capping and preparation and surface treatment of formation
	6/8	Topsoiling
	6/9	Earthwork Environmental Bunds, Landscape Areas, Strengthened Embankments
	6/12	Instrumentation and Monitoring
	6/14	Limiting Values for Pollution of Controlled Waters
	6/15	Limiting Values for Harm to Human Health and The Environment

APPENDIX 1/5 - Testing to be Carried Out by the Contractor

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

1. The Contractor is responsible for all on-site and off-site testing.
2. For all geotechnical tests a UKAS test report or certificate shall be provided with the testing undertaken in accordance with British Standard 1377 (1990) or as superseded by ISO17892 (various dates) or as otherwise specified in Appendix 1/5. For all geoenvironmental/chemical tests, hereafter referred to as contamination tests, a MCERTS test report or certificate shall be provided unless specifically agreed with the Overseeing Organisation. All contamination tests should be undertaken with sufficient sensitivity to meet the Limit of Detection (LoD) as specified in Appendix 6/14 and 6/15.
3. Unless otherwise shown in this Appendix, tests and test certificates for work, goods or materials as scheduled under any one Clause are required for all such work, goods or materials in the Works.
4. All samples/tests shall be given a site reference number (not the laboratory reference number) that enables ease of reference and location. Such reference should include the co-ordinates of each test location and depth/elevation as a minimum.
5. Preliminary records of all test results shall be provided within 48 hours of completion of the test except for compaction tests which shall be provided within 5 working days of sampling. 0%, 5% and 10% air void lines are to be produced on compaction test results using a specific gravity to be agreed with the Overseeing Organisation either based on sample specific testing or 2.72 Mg/m^3 for quartz based granular materials or 2.65 Mg/m^3 for cohesive materials. No material shall be imported to site until approved by Overseeing Organisation.
6. In situ density tests to ensure compliance with the specification shall be undertaken using the sand replacement test method or core cutter method at the frequency specified in Table 1/5. The Contractor may use the soil density gauge (SDG), or similar, for their own materials control only. The SDG shall be calibrated for each source material being tested in accordance with the manufacturer's requirements.
7. Visual and olfactory assessments of soils for the presence of contamination shall be carried out by the Contractor. Any potentially contaminative or unsuitable materials are to be segregated and quarantined and the Contractor shall notify the Overseeing Organisation and await further instructions.
8. Contamination testing shall be undertaken in accordance with the requirements of Appendix 6/14, 6/15 and Table 1/5.2 of this Appendix. Should any of the contamination testing exceed the site specific acceptability criteria outlined, the materials from which the testing was undertaken are to be segregated and the Contractor shall await further instructions from the Overseeing Organisation.
9. Sample handling, preservation and testing protocols shall be to current industry standards and full sample tracking shall be implemented. Samples for contamination testing shall be placed in correct sample containers and stored in cool boxes immediately on sampling and transferred to a fridge on site at the earliest opportunity.
10. Visual and olfactory assessments are to be carried out by the Contractor. Any potentially contaminative or unsuitable materials (including asbestos or asbestos containing materials) are to be segregated and quarantined and the 'qualified person' shall undertake further assessment. Should any of the contamination testing exceed the acceptability criteria outlined in Appendix 6/14 or 6/15, the materials from which the testing was undertaken are to be segregated and the Contractor shall await further instructions from the Project Manager.
11. Selected samples shall be collected for contamination testing during the project to confirm the source material is acceptable unless the material is a primary aggregate with adequate BBA (British Board of Agreement) certification or similar approved by the Overseeing Organisation. The samples should be tested for the contamination suites given in Appendix 6/14 and 6/15 and tested at the frequency set out in Table 1/5 and on all quarantined materials.
12. For geoenvironmental/chemical analysis the Contractor shall provide the Overseeing Organisation with full details, including copies of accreditation for tests, and details of limits of detection for the Overseeing

Organisations approval. Such details should be provided to the Overseeing Organisation at least two weeks prior to commencement of earthworks testing. Please note that for comparative purposes the test methodologies, limits of detection and sample preparation and extraction details will need to be identical to those previously adopted for the investigation and assessment stage.

13. Site derived material intended for use on site (Acceptable Material) and any being imported shall be subject to Acceptability testing at the rates detailed in Table 1/5 in advance of the works to confirm that they are in an acceptable condition. Ongoing further Acceptability Testing is required to confirm that the fill material being used remains acceptable for use throughout its importation and placement. The sampling of the fill material for initial Acceptability testing shall take place before the material is placed on site and before compaction.
14. A minimum of three tests for each material subject to approval by the Overseeing Organisation shall be undertaken by the Contractor. Additional Acceptability testing may be required to determine the characteristics of the materials and to assess whether the material has changed.
15. Compliance testing, at the frequency detailed in Table 1/5, is required to confirm that the acceptable fill material has been compacted in accordance with the requirements in Table 6/1.
16. The frequency of testing given in Table 1/5.1 1/5.2 and 1.5.3 is for general guidance and is only indicative of the frequency that may be appropriate. Where materials are known to be marginal or if initial test results show them to be such, the frequency of testing shall be increased. Where materials fail to meet specified requirements a replacement test of compliant materials will be required at the frequencies set out below. Conversely where material properties are consistently in excess of specified minimum requirements or well below specified maximum limits, then the frequency of testing may be reduced but only with the written consent of the Overseeing Organisation. The Contractor shall be deemed to allow a quantity of testing for audit purposes of up to 10% of the full testing regime required under Appendix 1/5.
17. All test failures or observed anomalies shall be notified to the Overseeing Organisation immediately in order that timely action to resolve the problem can be implemented.
18. Records shall be maintained of volumes of soils encountered and disposed of off-site together with supporting waste disposal documentation.
19. On completion of the works, an Earthworks Validation Report shall be prepared by the Contractor presenting a record of the works carried out, full records of all loads delivered to and removed from site, and full records of all monitoring, acceptability and compliance testing. The Earthworks Validation Report shall be presented in a single document together with a copy of the report in pdf format on CD, and digital data in AGS4 format. A draft report is to be provided within two weeks of completion of the earthworks.

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

Clause	Work, Goods or Material		Test	Frequency of Testing	Test Certificate	Comments
SERIES 600 EARTHWORKS						
601, 608, 631 to 637, 640	Acceptable material					(Cross-reference should be made to any requirements in Appendix 6/1)
	Class	General Description				
	2	General cohesive material	Grading	1 per 500m^3	Required	Wet sieving and sedimentation by pipette method to be used. Min 4 from each Area prior to commencement
			Moisture Content	Daily	Required	Min 4 from each Area prior to commencement
			Dry Density Moisture Content Relationship (2.5kg)	1 per 1000m^3	Required	Min 4 from each Area prior to commencement
			Particle density	1 per 1000m^3	Required	Min 4 from each Area prior to commencement
			Plasticity Index	1 per 500m^3	Required	Min 4 from each Area prior to commencement
			Contamination Suite	See Table 1/5.2	Required	
	4	Fill to Landscaped Areas	Grading /mc/MCV (N)	Daily	Required	
			Contamination Suite	See Table 1/5.2	Required	
	5	Topsoil	Grading and BS 3882 Classification	1 per 300m³ of materials excavated and reused on site with a minimum of 3 No sets of tests	Required	BS 3882:2015 Specification for Topsoil
	6	Selected Granular Material	Grading / uniformity coefficient	1 per 500m^3	Required	
			PI/LL(N)	Daily*	Required	
			Omc/mc, mc or MCV (N)	1 per 500m3	Required	(Not for Class 6F4 and 6F5)
			Water soluble sulphate (WS) and Total sulfar (TS) content (N)	Weekly	Required	(At least 5 tests per source for sulphur compounds over the course of the contract in accordance with TRL Report 447, tests 1-5)
			pH/chloride ion content (N)	Weekly	Required	
			Resistively (N)	*(As required)*	Required	
			Contamination Suite	See Table 1/5 2	Required	
			Effective angle of internal friction and	Source approval (3 tests) and then every 2000 m3	Required	(Cross reference should be made to any requirements in Appendix 6/1)

Clause	Work, Goods or Material		Test	Frequency of Testing	Test Certificate	Comments
			effective cohesion (N)			
	7	Selected Cohesive Fill	Grading (N)	1 per 25m3	Required	
			PI/LL/mc (N)	Daily	Required	
			Dry Density Moisture Content Relationship (2.5kg)	1 per 50m^3 or weekly whichever greater	Required	
			Water soluble sulphate (WS) and Total sulfar (TS) content (N)	Weekly	Required	
			pH/chloride ion content (N)	Weekly	Required	
602	Capping within 450mm of finished road level		Frost heave	1 per source and then any change in consistency of material	Required	
609 / 621	Geotextiles		Tensile load	1 per grade per source	Required	Quality scheme applies. Any specific requirements are given in Appendix 6/5 or 6/9 as appropriate.
			Permeability			
			Pore size			
612	Compaction of fills (End product)		Compaction Trial	Each source and for each type of compaction plant	Required	
			In-situ Dry Density and moisture content (General Fill)	Min. 3 per layer placed or 1 per 250m^2 whichever the greater staggered across earthwork	Required	Sand replacement method and/or core cutter method as appropriate
			In-situ Dry Density and moisture content (Class 7A)	Min. 1 per 2m^3 placed for each structure face	Required	Sand replacement method and/or core cutter method as appropriate
			Dry Density Moisture Content Relationship (2.5kg)	1 per 1000m^3	Required	
			Undrained shear strength	Daily Min. 3 per layer placed or 1 per 250m^2 whichever the greater	Required	Hand shear vane – Calibration certificate to be provided for device used prior to use on site
613	Cut Formation or final fill surface		In-situ CBR	1 per 2500m2 (50m grid) on the final layer of completed earthworks or subgrade	Required	Dynamic Cone Penetrometer with one 450mm diameter Plate Load Test every 10 DCP results
622 638 639	Drainage layers		Grading	1 per 400 tonnes per source or as required	Required	

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
710	Recycled concrete aggregate	Particle size distribution (BS 1377 Part 2)	1 per 200m^3	Required	
		Testing for constituent materials in accordance with Specification for Highway Works Clause 710 (BS EN 933-11)	1 per 400m^3	Required	
		Asbestos content	1 per 400m^3	Required	

Notes:

1. Unless otherwise stated above, all sampling and testing in this Appendix shall be carried out by the Contractor. The Contractor shall be deemed to allow a quantity of testing for audit purposes of up to 10% of the full testing regime required under Appendix 1/5.
2. Contamination testing to be undertaken in accordance with the requirements of Appendix 6/14 and 6/15 and table 1/5 2 below
3. Frequency of testing to be:

- For natural materials that are imported to site, 1 suite from the first 100m^3 from any one source, thereafter every 2000m^3 from any one source
- For man-made/processed materials that are imported to site, 1 suite from the first 100m^3 from any one source, thereafter every 500m^3 from any one source.
- For site derived materials, 1 suite from the first 100m^3 from any one source and thereafter every 500m^3 from any one source unless directed otherwise by the Project Manager.

4. Tests comparable to those specified in this Appendix will be necessary for any equivalent work, goods or materials proposed by the Contractor (See Sub-clause 105.4).
5. (N) indicates that a UKAS accredited laboratory sampling and test report or certificate is required.
6. Unless otherwise shown in this Appendix tests for work, goods or materials as scheduled under any one Clause are required for all such work, goods or materials in the Works.
7. Unless otherwise shown in this Appendix test certificates for work, goods or materials as scheduled under any one Clause

Table 1/5-2: Contamination Testing Requirements

Material Classification Testing	Frequency of Analytical Testing Suite
Site Derived Fill	1 suite from the first 100m3 from any one source and thereafter every 1000m3 from any one source unless directed otherwise by the Overseeing Organisation
Imported Fill	1 suite from the first 100m3 from any one source, thereafter every 2000m3 from any one source
Recycled or mand made processed materials imported to site	1 suite from the first 100m3 from any one source, thereafter every 500m3 from any one source.
Processed materials	1 suite from the first 100m3 from any one source and thereafter every 1000m3 from any one source unless directed otherwise by the Overseeing Organisation
Groundwater / surface water	Frequency of Analytical Testing Suite to be confirmed by the Overseeing Organisation Chemical analysis as required by the accepting water authority

In addition to the earthworks compliance testing detailed above, the following in-situ testing shall be undertaken following placement and compaction of the material. Material not meeting the speciation limits stated in Table 1/5-3 stall be excavated and replaced at the Contractor's cost.

Table 1/5-3: In-Situ Verification Requirements

Test	Standard	Frequency	Specification Limit
CBR/Modulus of subgrade reaction by Dynamic Cone Test and/or Plate Bearing Test	BS 1377: Part 4, 4.1	One test per 2500m^2 (50m grid) on completed final earthworks layer or cut subgrade. Note: Minimum 1 plate bearing test per 10 DCP tests.	CBR 3% / Subgrade Stiffness Modulus 35MPa in areas of general fill and CBR 5% Subgrade Stiffness Modulus 50MPa in building footprint areas
Field Dry Density & Moisture Content by Nuclear Density Gauge	BS 1377: Part 4, 2.5	One test per 250m^2 on each completed earthworks layer	Minimum acceptable DD = 95% of MDD using 2.5kg rammer and less than 5% air voids Acceptable MC range 15 - 24%
Undrained shear strength by remoulded triaxial test	BS 1377: Part 7, 8	One tests per 50m^2 on each completed earthworks layer in areas of clay fill only	>75kPa in areas of general fill and >100kPa in building footprint areas

14.3 For the purposes of initially assessing acceptability, the maximum dry density (MDD) for the Class 2A site-won material is specified at 1.72 Mg/m^3 based on a 2.5kg rammer. The materials must be placed with within the range of acceptable moisture contents as set out in Appendix 6/1 and achieve a maximum air voids content of not greater than 5%. These figures may be reassessed following receipt of ongoing laboratory test results.

14.4 It is recommended that testing be carried out on any proposed imported material before limits are set for this and this specification revised accordingly.

APPENDIX 6/1 - Requirements for Acceptability and Testing etc. of Earthworks Materials

APPENDIX 6/1 REQUIREMENTS FOR ACCEPTABILITY AND TESTING ETC OF EARTHWORKS MATERIAL

1. The Contractor shall be deemed to have read the relevant site investigation logs and test results, relevant drawings, have visited the site, and have consulted all available information concerning the site conditions, prior to submitting his tender. The Contractor is given due opportunity to take his own samples and undertake such laboratory testing as he deems necessary, and as such he shall be deemed to have done so prior to submitting his tender.
2. The Contractor is to submit an Earthworks Quality Control Method Statement for approval by the Overseeing Organisation not less than 10 working days prior to the start of Earthworks.
3. Acceptable limits and criteria for the Permitted Classes of fills appropriate to the Contract are detailed on Table 6/1 of the SHW, the modified Tables 6/1 included in this Appendix and Appendices 6/14 and 6/15 of the Specification. The Contractor is responsible for appropriate sampling and testing, including testing to determine the concentration of potential contaminants, to classify and determine the acceptability of earthworks materials based on the specified limits and criteria.
4. The Contractor shall be responsible for all materials testing and shall provide copies of all results to the Overseeing Organisation for verification of material acceptability in accordance with the Specification. The classification and confirmation of acceptability of earthworks materials shall be carried out by the Contractor at excavation for on-site materials and at the point of deposition for imported materials. Two copies of all test results and their interpretation to material class shall be submitted to the Overseeing Organisation within 48 hours of the tests being completed.
5. Samples for classification and acceptability testing shall be taken at the point of excavation for on-site materials and at the point of deposition for imported materials. If the material has altered its classification or become unacceptable for whatever reason, the Contractor shall repeat the classification and acceptability tests.
6. Source approval testing is required for all imported fill material. To obtain source approval the Contractor shall carry out a full range of the tests detailed in Appendix 1/5 and Table 6/1 for the Class of fill on at least 3 representative samples to demonstrate compliance. Recent test results may be acceptable for source approval of imported Class 6 fill material if the test date is within 3 months of submission for approval. The Overseeing Organisation may request a site visit to observe the proposed source prior to providing approval of the source.
7. If the material has altered its classification or become unacceptable for whatever reason, the Contractor shall repeat the classification and acceptability tests. The frequency and scope of acceptability testing requirements shall be according to Appendix 1/5 of the Specification.
8. Permitted Constituents of fill materials shall be any natural materials or combinations of natural materials other than chalk and material designated as Class 3. There are no existing on-site materials to be designated as Class 3 and no Class 3 materials are to be used in the works.
9. The use of imported man-made materials complying to source code A2 and A3 (crushed concrete and crushed brick) demonstrating compliance with the WRAP Quality Protocol “Aggregates from inert waste” may be used subject to

   i) concentrations of contaminants not exceeding the acceptable limits (Appendix 6/14 and 6/15)

   ii) no presence of asbestos and

   iii) the requirements of Clause 2.1.2 and Table 6/1 B.

   All other man-made materials are not permitted.

   Where fill materials include recycled aggregates containing crushed concrete and/or brick, the Contractor shall determine the nature of the ground and groundwater beneath and surrounding the areas of proposed fill with respect to sulphur, sulphates, and any other potentially deleterious materials,

in accordance with TRL 447 and other relevant guidance, and shall assess in accordance with TRL 447 and other relevant guidance the suitability of using materials containing recycled aggregates including brick and crushed concrete in the proposed areas

10. The Contractor is responsible for ensuring all statutory and regulatory requirements for the use of the site derived materials are observed. The Contractor is responsible for ensuring a record of each imported material load delivered and accepted is kept giving: i) date, ii) nature and quality, iii) place of origin, vi) quantity by weight/volume, v) carrier, vi) supplier. The Contractor is responsible for ensuring a visual and olfactory assessment is carried out when every load, on initial receipt and after deposition to ensure compliance with the Acceptance Criteria, the findings of the assessment shall be recorded with the record sheet fort the load. As such the Contractor shall ensure that all necessary forms of either: Waste Management Permitting; Use of relevant Waste Permit Exemptions, or an accepted Material Management Plan with associated registered declaration, developed strictly in accordance with the CL:AIRE The Definition of Waste: Development Industry Code of Practise v2 (CL:AIRE, 2011), are in place prior to import and placement of materials derived from other sites, or prior to the reuse and placement of site derived materials.
11. All excavated materials identified for disposal shall be either excavated for immediate disposal, where the waste classification of such materials has been predetermined or placed in stockpiles prior to processing and final classification. Where required, unacceptable material shall be processed by mechanical, chemical or other means to render the materials suitable for disposal or further consideration for reuse in the works. Clearly defined segregated stockpiles are required for different waste types. The Contractor's attention is drawn to the requirements of Clauses 601 and 602 of the Specification regarding the separation and segregation of materials classified as either acceptable or unacceptable Class U2. Material excavated and designated for reuse shall be transported to the appropriate area for filling or temporary stockpiling. Any reusable arisings shall be tested and classified in accordance with Appendix 1/5.
12. The fill materials shall be tested to determine the concentration of potential contaminants in accordance with the methodology and limits of detection defined within Appendix 6/14 and 6/15 of this Specification. The materials shall be classified as Unacceptable Material Class U2 when the concentrations of potential contaminants exceed the acceptability limits given in Appendix 6/14 and Appendix 6/15 and shall be dealt with in accordance with Appendix 6/2.
13. There are no specified requirements for processing to render unacceptable material Class U1A or Class U1B acceptable. There are no specified requirements for the removal off site of excavated acceptable or unacceptable material requiring processing or retention on site of surplus material. The Contractor shall be responsible for removal and / or processing of unacceptable material or surplus acceptable material deemed not acceptable for use in the Permanent Works.
14. Acceptable or unacceptable fill, other than contaminated material may be used in landscape areas. This excludes the environmental, noise bunds, or any other earthworks of structural nature, where the fill parameters are determined through stability or bearing capacity requirements. Class 5 and Class U2 materials shall not be used as landscape fill.
15. There are no specified requirements for groundwater lowering or other treatment. The Contractor shall take all necessary measures (both temporary and permanent) to ensure that the presence or ingress of groundwater, infiltration water and the effects of weather does not compromise the integrity of earthworks. Operations shall not take place during adverse weather conditions. The Contractor shall construct the earthworks with a suitable gradient to promote surface water runoff. At the end of each day and ahead of adverse weather conditions, the Contractor shall seal placed and or compacted materials using a smooth compactor plant to minimise water infiltration. On completion the final surface shall be graded to be free draining with no areas of surface water ponding. The Contractor shall take all necessary measures to protect temporary stockpiles from adverse weather conditions.
16. Compliance testing is required to confirm the degree of compaction achieved is in accordance with the requirements of Table 1/5 and Table 6/1. Reference should be made to Appendix 6/3.

TABLE 6/1A: Acceptable Earthwork Materials: Classification and Compaction Requirements

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
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:		
						Lower	Upper	
2A	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	End product to achieve 95% of Maximum Dry Density of BS 1377: Pt 4 2.5kg and max air void 5% in building footprint area Minimum shear strength (Cu) of 75kPa. CBR value >5%. In other areas to achieve Minimum shear strength (Cu) of 50kPa. CBR value >3%.
				ii) Plastic Limit	BS 1377: Part 2	-	-	
				iii) Moisture Content	BS 1377: Part 2 See Note 4	OMC - 1%	24%	
				iv) Undrained Shear Strength	Hand Vane or BS 1377 : Part 2	See compaction requirement notes	-	
				v) CBR	BS 1377: Part 9	See compaction requirement notes	-	
2B	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	End product to achieve 95% of Maximum Dry Density of BS 1377: Pt 4 2.5kg and max air void 5% in building footprint area Minimum shear strength (Cu) of 75kPa. CBR value >5%. In other areas to achieve Minimum shear strength (Cu) of 50kPa. CBR value >3%.
				ii) Plastic Limit	BS 1377: Part 2	-	-	
				iii) Moisture Content	BS 1377: Part 2 See Note 4	15%	OMC + 1%	
				iv) Undrained Shear Strength	Hand Vane or BS 1377 : Part 2	See compaction requirement notes		
				v) CBR	BS 1377: Part 9	See compaction requirement notes	-	
2C	Stoney 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	95% of Maximum Dry Density of BS 1377: Pt 4 2.5kg and max air void 5% in building footprint area Minimum shear strength (Cu) of 75kPa. CBR value >5%. In other areas to achieve Minimum shear strength (Cu) of 50kPa. CBR value >3%.
				ii) Plastic Limit	BS 1377: Part 2	-	-	
				iii) Moisture Content	BS 1377: Part 2 See Note 4	15%	24%	
				iv) Undrained Shear Strength	Hand Vane or BS 1377 : Part 2	See compaction requirement notes		
				v) CBR	BS 1377: Part 9	See compaction requirement notes	-	
4	Various	Fill to landscape areas	See App 6/1	(i) grading	BS 1377: Part 2	Tab 6/2	Tab 6/2	See Clause 620 and App 6/1
				(ii) mc	BS 1377: Part 2 See Note 4	tbc	tbc	
				(iii) MCV	Clause 632	tbc	tbc	
5A	Topsoil, or turf existing on site	Topsoiling	Topsoil or turf designated Class 5A in the Contract	(i) grading	Clause 618	-	Clause 618	-

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
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:		
						Lower	Upper	
6F5	Selected granular material (coarse grading) Imported onto the site	Capping	Unbound mixture complying with BS EN 13285 containing aggregate conforming to BS EN 13242 from one or more of the following source codes, see Notes 7, 8 and 9: P (natural aggregates – except chalk, shale, siltstone or slate, see Note 7) A2 (crushed concrete) A3 (crushed bricks, masonry)	(i) Size designation and overall grading category	BS EN 13285 – 0/80 and G_E	Tab 6/5 and Table 6/1 B	Tab 6/5 and Table 6/1 B	Tab 6/4 Method 6
				(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}	-	50	
				(vii) Laboratory dry density and optimum water content	BS EN 13285, Clause 5.3 – declared values	-	-	
				(viii) Water content	BS EN 1097-5	OMC -2%	OMC	
				(ix) CBR	BS 1377: Part 9	2.5%	-	
				(x) Bitumen content	BS EN 12697-1 or BS EN 12697-39	-	2.0%	
				(viii) Water content	BS EN 1097-5	OMC -2%	OMC	
				(ix) CBR	BS 1377: Part 9	2.5%	-	
				(x) Bitumen content	BS EN 12697-1 or BS EN 12697-39	-	2.0%	
6N and 6P	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 rock. Where material is imported onto site which is not “as dug” it shall be aggregate conforming to BS EN 13242 from one or more of the following source codes, see Notes 8, 9, and 10: P (natural aggregates except chalk, shale, siltstone or slate, see Note 7) A2 (crushed concrete) A3 (crushed bricks, masonry) D2 (air cooled blast furnace slag) G1 (red coal shale)	(i) Grading	BS 1377: Part 2 (On-Site)	Table 6/2	Table 6/2	End Product 95% maximum dry density of BS 1377: Part 4 (vibrating hammer)
					BS EN 933-2 (Imported onto site)	Tab 6/5 and Table 6/1 B	Tab 6/5 and Table 6/1 B	
				(ii) Uniformity coefficient	See Note 5	10 for 6N and 5 for 6P	-	
				(iii) Los Angeles coefficient	Clause 635	-	40 for 6N and 60 for 6P	
				(iv) Undrained shear strength (c & ϕ')	Clause 636	-	-	
				(v) Effective angle of internal friction (ϕ') and effective cohesion (c')	Clause 640	ϕ' = 35° c' = 0	-	
				(vii) mc	BS1377: Part 2 see Note 4	OMC-2%	OMC	
				(viii) MCV	Clause 632	N/A	N/A	
				(ix) Slope stability test	Clause 610	N/A	N/A	
				(x) Water Soluble Sulfate (WS) as mg of SO_4 per litre	BE EN 1744-1 Clause 10	-	1500	
				(xi) Total Sulfar (TS)	BE EN 1744-1 Clause 10	-	1%	
7A	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. See Appendix 6/6.	(i) Grading	BS 1377: Part 2	Table 6/2	Table 6/2	End product: 100% of Maximum dry density of BS 1377 : Part 4 (2.5 kg rammer method) and maximum air voids of less than 5%, or a dry density corresponding to 5% air voids at field mc whichever is lower
				ii) Moisture Content	BS 1377: Part 2 See Note 4	15% (tbc)	24% (tbc)	
				(iii) undrained shear strength	Clause 633	75kPa		
				(iv) Liquid Limit	BS 1377: Part 2	-	45	
				(vi) Plasticity Index	BS 1377: Part 2	-	25	
				(vii) Water Soluble Sulfate (WS) as mg of SO_4 per litre	BE EN 1744-1 Clause 10	-	1500	
				(viii) Total Sulfar (TS)	BE EN 1744-1 Clause 10	-	1%	

Notes:
1. App = contract specific 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 contract specific Appendix 6/1 shall apply. Where contract specific Appendix 6/1 gives limits for other properties not listed in this Table such limits shall also apply.
4. Where BS EN ISO 17892-1 is specified for water content (wc); this shall mean BS EN ISO 17892-1 where the material is a soil or BS EN 1097-5 where the material is required to conform to a harmonised European Standard.
5. Uniformity coefficient is defined as the ratio of the particle diameters D_{60} to D_{10} on the particle-size distribution curve, where:
6. D_{60} = particle diameter at which 60% of the soil by weight is finer
7. D_{10} = particle diameter at which 10% of the soil by weight is finer
8. The limiting values for Class U1B material are given in contract specific Appendix 6/14 and contract specific Appendix 6/15.
9. Where material source codes are referenced these are as listed in Table 6/7.
10. Where materials are required to be aggregates conforming to BS EN 13242 materials certificated as being compliant with BS EN 13285 are acceptable for use provided that they meet all the specification requirements and the Declaration of Performance for constituent parts to BS EN 13242 are provided to the Overseeing Organisation.
11. 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.
12. tbc = To be confirmed following source testing.
13. Where BS 1377: Part 2 is specified for mc; this shall mean BS 1377: Part 2 where the material is a soil or BS EN 1097-5 where the material is required to conform to a harmonised European Standard

TABLE 6/1B: Acceptable Earthwork Materials: Classification Requirements for Recycled Concrete Aggregate

Test type	Acceptability criteria
Particle size distribution (BS 1377 Part 2)	6F2 Specification for Highway Works Table 6/2.
Testing for constituent materials in accordance with Specification for Highway Works Clause 710 (BS EN 933-11)	Specification for Highway Works Table 8/3. <50% Asphalt <25% glass <1% other materials included wood, plastic and metal.

APPENDIX 6/2 - Requirements for Dealing with Class U1B/U2 Unacceptable Material

APPENDIX 6/2 REQUIREMENT FOR DEALING WITH CLASS U1B AND U2 MATERIALS

1. Whilst the ground investigation works undertaken to date have not identified the presence of likely U1B or U2 materials, their presence cannot be ruled out entirely. Results of the geo-environmental testing undertaken can be found in the Ground Investigation and Remediation Strategy. As such the Contractor shall put in place contingency measures to deal with U1B or U2 materials if encountered during the earthworks.
2. Where Class U1B material is identified, the Contractor shall undertake Waste Acceptance Criteria (WAC) Tests to determine the waste type and whether the waste will comprise U2 material, i.e. Hazardous Waste.
3. The Contractor shall make all necessary enquiries and arrangements for the disposal off-site of all U1B and U2 materials and shall liaise with the relevant regulatory bodies prior to initiating removal of any material from site.
4. The Contractor shall inform the Overseeing Organisation immediately of the discovery of U1B or U2 materials, asbestos or other gross contamination. The Contractor shall define in their Method Statement the procedures for handling asbestos, U1B or U2 materials or other waste. Unacceptable material Class U1B and U2 shall either be treated to render it suitable for reuse or otherwise shall not be permitted to remain on site. The Contractor shall agree with the Overseeing Organisation methods for the safe removal of the material. The Contractor's attention is drawn to the requirements of Clauses 601 and 602 of the Specification regarding separation and segregation of materials classified as either acceptable or unacceptable.
5. Materials crushed and processed by the Contractor on the Site and subsequently found to contain asbestos (following testing as defined in Appendix 1/5), immediately becomes unacceptable material and the Contractor shall remove and dispose of it off site at his own expense.
6. The Contractor is responsible for dealing with Class U1B and Class U2 unacceptable material including where required:
    a. Classification of Class U1B and Class U2 material by appropriate chemical testing including WAC testing.
    b. Preparation of method statements for dealing with any Class U1B and Class U2 materials
    c. Keeping records of the location, volumes, extent, nature and test results for all Class U1B and Class U2 materials encountered.
    d. Agreement of special requirements for dealing with unacceptable materials with the Environmental Health Officer, Environment Agency and other statutory bodies.
    e. Agreement of special requirements for dealing with contaminated water with the Environmental Health Officer, Environment Agency and other statutory bodies.
    f. Dealing with unacceptable materials whether by excavation and disposal, treatment, sealing or other means.
    g. Dealing with leachate and contaminated water whether by pumping and disposal, treatment or other means, including the provision of special drainage where required.
    h. Compliance with all Duty of Care and waste regulation obligations.
7. Where Class U1B and Class U2 material is excavated, the material shall not be left exposed overnight and the Contractor is responsible for providing temporary cover. Cover may be provided by Class U1B materials or other material determined by the Contractor as agreed with the Overseeing Organisation. This shall be placed to give a cover of not less than 150 mm. All temporary cover shall be removed in advance of the permanent works and disposal off site accordingly.

8. The Contractor is to ensure that all Class U1B and U2 materials that are not suitable for treatment and reuse are disposed of at an appropriately licensed landfill or processing facility approved by the Environment Agency in a safe and competent manner and in accordance with relevant Statutory Regulations. The Contractor shall keep records/transfer notes of all waste materials removed from this site and shall include the volume of waste material, the description of the waste material, date of removal, the destination of the waste material and the carrier. The Contractor is required to submit copies of this information to the Overseeing Organisation as soon as it becomes available.
9. No groundwater or surface water encountered during the works shall be discharged to foul or storm sewer, nor to watercourses without a discharge permit or prior written confirmation from the Environment Agency that a permit is not required.
    - The Contractor shall ensure at all times that:
    - The exposure of site personnel and the general public to hazards is avoided; and
    - Contamination or pollution migrating within the site or beyond the site boundaries is prevented.

Handling and disposal of contaminated soils and water

10. Throughout the Works the Contractor shall pay particular attention to the following:
    - The Contractor shall be responsible for all documentation of waste leaving the site and for validation of the chemical composition of waste.
    - Keep the waste safe. Holders should protect the waste both whilst in their possession and for its future handling requirements. Security precautions where waste is to be held prior to removal from site should prevent theft, vandalism, waste scavenging and fly tipping. Waste shall be removed from site in appropriate containers.
    - Transfer to the correct person. Waste may only be handed on to authorised persons or to persons authorised for transport purposes. The Contractor shall pay due regard to Duty of Care and associated regulations.
    - The Contractor shall ensure that waste is collected regularly. The maximum volume of contaminated material stockpiled on site at any time shall not exceed 500m³.
    - The Contractor shall ensure that all waste is stockpiled in accordance with a method statement approved by the Overseeing Organisation and shall as a minimum included for bunding, basal membrane and top cover membrane to prevent rainfall infiltration and run-off.
    - The Contractor shall comply with Duty of Care Regulations and shall keep records of waste dispatched from site, including waste transfer notes. All records are to be made available to the Overseeing Organisation and/or Regulator upon request. The Contractor shall ensure that all landfill gate receipts are copied to the Overseeing Organisation within two working days of dispatch from site.
    - The Contractor shall ensure that all waste is taken to a disposal facility which is licensed to receive that specific waste type (as determined by chemical analyses and WAC tests).
    - All waste leaving the site shall be sheeted, without holes or tears in the sheeting fabric. Where possible, the Contractor shall use self-sheeting lorries to haul waste from the site. Where these are not available, the Contractor shall take appropriate measures to construct a safe and suitable sheeting gantry. Where sheets are to be laid over the container, they shall be secured in place. In the event of any loss of waste during transit, the Contractor shall ensure that the lost waste is collected and transported correctly to the receiving facility.
    - The Contractor shall supply the Overseeing Organisation with a schedule containing vehicle registration number, owner, weight (unladen and gross maximum permitted) and driver details of each vehicle used for transport of materials off-site.

Sub-contracting

11. In order to ensure compliance with the Duty of Care Regulations, the Contractor must nominate all Sub-Contractors before a contract is entered into for undertaking this work.

Site Monitoring

12. A designated person must be made responsible for co-ordinating and ensuring that all appropriate precautions are taken against the escape of hazardous substances. This designated person shall maintain an up to date site record. The Contractor shall demonstrate the competence of this person to the satisfaction of the Overseeing Organisation.
13. Only authorised persons shall be allowed access to the site. All site personnel shall be required to attend a site safety induction prior to commencement of works on the site.
14. All persons entering the site must be made fully aware of the hazards and risks on site prior to entering the site. Instructions shall be issued by the Contractor regarding Health and Safety precautions required. All persons will be required to sign a declaration of understanding and acceptance of site instructions. This is to protect both the individual and other personnel on the site. Non-compliance with this regime must in all cases result in refused entry to site.
15. If any person fails to comply with the health and safety precautions that person is to be removed from site immediately. Return to site would be at the discretion of the Overseeing Organisation. The Contractor shall ensure that any individual who deliberately flaunts the health and safety precautions is dismissed from site and not permitted to return to the site.
16. In the instance of a possible danger occurring, safety on site shall be of utmost priority. Immediate action must be taken for the health and safety of all personnel on site. The location of the danger and any exclusion zone shall be evacuated immediately. The Contractor shall produce a method statement to set out the measures and steps to be followed in the event of such an occurrence and shall include, where applicable, for notification of emergency services, HSE, Planning Co-ordinator and the like.
17. All persons entering the site shall wear appropriate Personal Protective Equipment (PPE) to the task(s) proposed.
18. First Aid facilities and suitably competent personnel shall be available at clearly identifiable locations on site.
19. A Site Safety Officer shall be appointed by the Contractor and shall be responsible for health surveillance on the site.
20. The Contractor shall take appropriate measures to avoid and prevent cross contamination of plant and personnel and also to ensure that all plant and personnel are free from contaminants and mud upon exiting the site.
21. The Overseeing Organisation shall instruct the Contractor regarding the excavation and disposal of any unusual materials which have been discovered. As it may be an offence under the Environmental Protection Act 1990 and associated statutes for certain materials to leave the site without notifying the appropriate Authorities, the Overseeing Organisation shall direct the Contractor to stockpile unusual materials in a separate well defined area, remote from the areas of working and in a safe manner.
22. If, in the Overseeing Organisation's opinion, unusual materials encountered during excavation cannot be transferred to the designated 'stockpile' without compromising, or fear of compromising the health and safety of site personnel or causing an environmental hazard, work shall cease in the affected area whilst specialist advice is sought. Examples of such materials would be friable asbestos and drums whose physical condition is such that their disturbance may result in the loss of their contents.
23. It is the responsibility of the Contractor in consultation with the Environment Agency to locate suitably licensed disposal facilities. The results of previous chemical testing of soil samples from the site are

provided in accompanying documentation to assist in this process. Any further waste classification tests required by the EA or landfill operator are deemed included within the Tender figure.

24. All excavation arisings shall be either loaded directly into lorries for immediate disposal where the waste classification has been predetermined and/or stockpiled in a methodical order. Each stockpile shall be identified according to assumed or confirmed categorisation, source, type and deposition date, and details of any analyses. Stockpiles shall be physically separated to avoid cross contamination and temporary road access provided for placement and loading.

25. All contaminated stockpiles shall be placed on impervious surfaces to collect drainage and prevent loss of contaminated water and leachate to ground. All temporary stockpiles shall be located on impervious surfaces to prevent rainwater leaching of contaminants to ground. All drainage shall be collected and disposed off-site to a suitably licenced facility.

26. The locations of local stockpiles shall be approved by the Overseeing Organisation at least 5 working days before excavation commences. The Contractor shall ensure that the stockpiles will not contaminate or increase the contamination in the areas where they are located. If the Contractor proposes to provide a barrier below the stockpiles to prevent downward migration of contamination, he shall supply the Overseeing Organisation with details of the barrier for approval 5 working days before excavation commences.

27. Prior to the commencement of works, the Contractor is required to consult with all relevant authorities; in particular, the local Environment Agency (EA) and the Contaminated Land Officer/Environmental Health Officer with respect to contamination protection measures and waste disposal operations at the site. The Contractor shall provide specific information, including a full method statement of the nature, logistics and programming of the works (as required by current legislation) prior to commencement.

28. The Contractor shall prior to, during and on completion of relevant stages of work keep records/transfer notes of all waste materials removed from this site and shall include the volume of waste material, the description of the waste material, date of removal, the destination of the waste material and the carrier.

29. The Contractor is required to submit copies of this information to the Overseeing Organisation as soon as it becomes available. The Contractor shall supply the Overseeing Organisation with the following details of appropriately licensed disposal site(s) to which waste are to be transferred at least two weeks in advance of disposal:

    - Name, address and telephone number of disposal site and contact name;
    - Extract of disposal site waste management licence confirming that the waste may be accepted;
    - Name, address and telephone number of the appropriate Environment Agency office
    - In addition, the Contractor shall supply the Overseeing Organisation within three weeks of completion of the works the following:
    - Copy of consignment note for each load of material carried off site including proof of receipt of material at an appropriate landfill site.

30. All vehicles used to transport waste material off the site shall be registered waste carriers under the Control of Pollution (Amendment) Act 1989 and subsequent industry guidance. The Contractor shall supply to the Overseeing Organisation copies of waste carrier registration certification of all vehicles removing waste material on the site prior to the removal of such. The Contractor shall keep records/transfer notes of all waste materials removed from this site and shall include the volume of waste material, the description of the waste material, date of removal, the destination of the waste material and the carrier. The Contractor shall supply the Overseeing Organisation with a summary record of disposal at the end of each day. A cumulative ongoing total shall also be reported weekly and summarised at team meetings.

31. Suitable means to suppress or prevent dust must be employed when excavating, handling and transporting contaminated and potentially contaminated material on site. Containers shall be

maintained in a leak proof condition and shall not be overfilled to the point where there may be a risk of spillage during transport. Vehicle wheels and bodies shall be thoroughly cleaned before travelling on site haul roads or entering uncontaminated areas of the site.

32. The Contractor's off-site traffic movements should not adversely affect the surrounding network. Loading of vehicles will be performed in an organised manner so as to prevent the spread of contaminants. All loads leaving the site will be sheeted and cleaned appropriately prior to leaving site. The sheeting of these loads shall be checked and recorded, to ensure appropriate and complete coverage of the load. The sheeting shall be of durable construction, undamaged, continuous and of sufficient size to completely cover the enclosed load. The sheeting shall be tied down in an appropriate manner and with sufficient tension to ensure that there will be no loss of material during transport.

APPENDIX 6/3 - Requirements for excavation, deposition, compaction (other than dynamic compaction)

APPENDIX 6/3 REQUIREMENTS FOR EXCAVATION, DEPOSITION, COMPACTION (OTHER THAN DYNAMIC COMPACTION)

General

1. The Contractor shall only employ plant and working methods which are suited to the materials to be handled and traversed. He shall be responsible for maintaining the nature of the acceptable material so that when it is placed it remains so. Methods shall be approved in advance with the Overseeing Organisation.
2. Haulage of material to fill areas shall only proceed when sufficient spreading and compaction plant is operating at the place of deposition.
3. Should the Contractor stockpile materials he shall ensure that he does not adversely affect the stability of excavations, plant or surfaces and shall protect such stockpiles so as to prevent any change in the nature of materials. Stockpiles shall be located so as to prevent contamination with other materials or the environment.
4. Acceptable material surplus to the total requirements of the works and all unacceptable material shall, unless the Overseeing Organisation permits otherwise, be run to stockpiles in locations defined by the Overseeing Organisation.
5. All stockpiles are to be maintained in a neat, tidy and safe condition throughout the works to the complete satisfaction of the Overseeing Organisation. If necessary, this may involve the construction of bunding/channels to control surface water and prevent materials saturation at the base of the stockpile. The Contractor's rates are deemed to include for this.
6. The Contractor shall be responsible for potential or actual damage to adjacent land, properties, services etc. as a consequence of his chosen methods of working. The Contractor is to provide a method statement clearly identifying his method of working including details of plant and equipment to be used, areas of working and any moisture conditioning strategy, and monitoring and testing to be undertaken. This is to include details for segregation of unsuitable material and oversize material where encountered.

Topsoil

7. The existing topsoil, subsoil and near-surface soils shall be excavated as required within the area of the proposed works as shown on the Drawings. Where required to be excavated, the topsoil, subsoil and near-surface soils shall be excavated to at least 0.3 m below existing ground level. Unnecessary and premature removal of topsoil and subsoil shall be avoided.
8. Prior to excavation, any topsoil and subsoil present shall be handled, stockpiled for re-use and placed in accordance with BS3882:2015 and BS8601:2013. Topsoil shall be transported in pneumatic tyred dumpers, or similar vehicles and placed by end tipping to form the landscaped areas or stockpiled as required.
9. Compaction shall be limited to 'nominal compaction' from tracked plant operating in the landscaped areas to remove large voids.
10. The Contractor shall minimise vehicular movements over topsoiled areas once it has been placed.

Vegetation

11. All vegetation and unsuitable soft/untrafficable materials shall be removed from the works area. All vegetation will be grubbed-out and removed from areas of active working prior to any filling or excavation works. This may be achieved either in stages or as one total clearance operation prior to

commencement of works. The Contractor will be responsible for ensuring that all major tree or shrub roots are removed as part of this operation. Any resulting voids shall be backfilled in accordance with Class 2 materials in accordance with the Specification.

12. Vegetation will be transported to stockpile as directed by the Overseeing Organisation for subsequent offsite disposal. Burning on site shall not be permitted except with the prior written permission of the Overseeing Organisation, and shall not be pre-assumed as granted. Recycling by using local authority composting facilities is the preferred method of disposal, when available.
13. Any trees or vegetation identified on the Contract drawings as being scheduled for retention will be clearly marked/fenced and the Contractor shall protect the fencing throughout the works by the Contractor. The Contractor will be wholly responsible for the protection of such areas and rectification of any resulting damage at his own cost.

Subgrade preparation

14. Existing hard-standing may subject to the Overseeing Organisations approval, be crushed and stockpiled on the site by the Contractor for possible future re-use during the construction works. Any concrete is to be crushed to meet the grading specification set out in Table 6/2 of the Specification for Highway Works for a Class 6F5 material. The Contractor shall demonstrate that the material meets the specification by undertaking grading analysis of the material at a rate of one test per 100m3 of crushed material. Any concrete which is shown to be contaminated (visibly stained) shall be tested at the discretion of the Overseeing Organisation and if deemed to be unsuitable shall not be used and shall be disposed of off- site to a suitably licensed landfill, in accordance with the provisions of clauses outlined below.
15. The exposed subgrade shall be compacted in accordance with the requirements of Clause 612 (4) to (10) using Method 1 as defined in Table 6/4. Any material exposed in the subgrade having an undrained shear strength less than 75 kPa in building footprint area or 50kPa in other areas as measured by hand vane per 250m^2, or otherwise unacceptable material shall be excavated and the resulting void backfilled with suitable material in accordance with the requirements of the Specification.
16. Excavated voids or natural voids in excavation for foundations shall be filled with ST1 concrete. Excavated voids or natural voids in excavations for utilities shall be filled with Class 6F5 material.
17. The prepared subgrade shall be subject to approval by the Overseeing Organisation prior to placing any fill material.

Groundwater and Surface Water

18. The Contractor shall take all necessary measures (both temporary and permanent) to ensure that the presence or ingress of groundwater, surface water or infiltration water and the effects of weather does not compromise the integrity of earthworks. Operations shall not take place during adverse weather conditions. The Contractors proposals for dealing with groundwater to satisfy the requirements of Clauses 602.15 to 602.17 shall be submitted to the Overseeing Organisation for approval. Groundwater control/ removal shall be maintained until such a time that termination of operations in a given area will not compromise the works in that area or adjacent areas.
19. The exposed fill and natural soils shall be profiled such that there are no areas in which surface water may accumulate. The Contractor shall take all necessary measures (both temporary and permanent) to ensure that the integrity of earthworks is not compromised by adverse affects of construction traffic, weather et cetera as required. Operations shall not take place during adverse weather conditions.
20. The Contractor shall ensure that potentially contaminated waters from the excavations, compacted areas or stockpiles do not reach watercourses, drains, rivers, etc and are not discharged in an uncontrolled manner to ground.

21. Excavation through standing water shall only be undertaken as necessary. It shall be noted that direct discharge of groundwater is not permitted into the Local Authority foul or surface water sewers or any other standing body of water without specific consent or approval.
22. Any waters discharged to sewer must be at the consent of the Overseeing Organisation and the local water authority, and the Contractor must demonstrate that the quality of water complies with any consented limits. It shall remain the Contractor's responsibility to ensure that all necessary consents are in place and that controlled discharges are made with the Overseeing Organisation's permission.
23. The Contractor shall include in his rates for all costs arising from the disposal of groundwater, and chemical testing in this regard, whatever provisions are made.
24. The base of any excavation, or area of fill, which becomes water logged, rough or otherwise spoilt should be cleaned out and re-levelled or re-formed prior to inspection by the Overseeing Organisation.
25. The Contractor shall keep fill areas free of surface water by arranging the rapid removal of watershed onto the fill site or entering the site from any source. Lowering and maintaining the water level by appropriate measures "sufficiently" to enable the works to be constructed shall be included, including appropriate discharge provisions.
26. The Contractor shall include in his rates for all costs arising from the disposal of groundwater, and chemical testing in this regard, whatever provisions are made. Should any discharge of water off site exceed the levels of contamination specified as acceptable by the local water authority or Environment Agency, the Contractor shall allow for removal of contaminated water by tanker for disposal to a treatment plant or suitably licensed facility.

Excavation

27. Excavations shall be excavated to the lines and levels stated on the relevant contract drawings.
28. Excavations requiring backfilling shall remain open only for the minimum period necessary.
29. The precise profile of excavation, including the design of any temporary ground support works shall be determined by the Contractor for the ground conditions described in the site investigation reports, and any other data, and shall comply with all relevant statutory requirements. The Contractor shall be responsible at all times for maintaining stability of excavations and to prevent the ground losing its bearing capacity. Reference should be made to the Site Investigation reports and any large excavations greater than 5m in any dimension shall be inspected by a suitably qualified geotechnical Overseeing Organisation.
30. Where excavations are adjacent to existing excavations, foundations, structures, river walls, roadways, services, culverts, rivers, streams or building etc., and may affect these, the Contractor shall be deemed to have allowed for all temporary works, working sequences etc. necessary to provide adequate support and prevent any movement of such.
31. Details of the Contractors proposed dig profile and method of support, shall be submitted to Overseeing Organisation at least five working days in advance of the excavation.
32. Slopes or toes of cuttings and embankments shall only be undercut when required in the Contract for trench or other excavations. The maximum length of unsupported excavation, not to exceed 5m, shall be open at any one time and shall remain open for the minimum period necessary and in any event for not greater than 24 hours, and must be backfilled with well compacted materials as soon as is practical after temporary works. The Contractor is responsible for the stability of the excavation, and the cutting and embankment slopes and shall ensure that the Permanent Works suffer no damage.
33. Terraced or benched excavations shall be used with batters as appropriate. Trench sheeting shall be utilized where appropriate. The Contractor shall be wholly responsible for the design and construction of all batters or temporary works including security, safety support and stabilisation methods. All sheeting and other excavation supports shall be removed as filling proceeds.

Forming of Cuttings and Cutting Slopes

34. Location, levels and line of cutting are to be as shown on the Contract Drawings.
35. Contractor is to be responsible for any temporary cut slopes which are undertaken on site. The maximum temporary slope angle adopted is at the contractor discretion and qualified/confirmed with a qualified temporary works engineer. Notwithstanding this a temporary cut slope angle no greater than 1:2 is recommended.
36. Final faces of cuttings which are not to receive topsoil shall:
    a. wherever possible be left without scars or damage from construction plant; and
    b. to achieve a natural appearance, when the stratum permits, have the face left irregular with a slope angle no greater than 1:3; and
    c. have boulders or other rock fragments that can be moved by hand without tools, removed; and
    d. have adequate access to enable inspection to be carried out to determine the extent of work required by this sub-Clause.
37. Where required, faces of cuttings which are not required to receive topsoil shall be netted or have other sheet covering.
38. Faces of cuttings which are to receive topsoil shall have one or more of the following measures carried out as appropriate:
    a. Be benched to retain topsoil as described above;
    b. Be harrowed to a depth of 50 mm. Such harrowing shall be carried out immediately prior to topsoiling, diagonally, at an angle between 5º to 45º to the line of the toe, measured on the plane of the slope.
    c. Isolated patches of soft, fragmented or insecure material shall be excavated and either:
        - filled by well ramming in a Class of fill with similar characteristics as the surrounding intact material; or
        - excavated and dealt with as described in sub-Clause 6(i) of this Clause.

Filing and Compaction

39. Compaction of fills is to provide an end product that meets the criteria set out within this specification. Materials placed should in any event also meet the testing required of achieving 95% MDD and a maximum air voids of not greater than 5%.
40. The Contractor shall confirm the method of compaction including layer thickness, type of plant, number of passes and material type with the Overseeing Organisation by undertaking a compaction trial for each and every plant type and material type used for filing prior to starting compaction and will keep contemporaneous records during the earthworks. Should at any time the material change from that identified, the Contractor shall change the method of compaction to ensure compliance with the requirements of the Specification.

    A trial pad of compacted material shall be formed in each compaction trial at least 15m x 6m in area using the plant that it is intended to be used in the fill. A firm area for the trial pad shall be prepared. The fill shall be compacted using a suitable roller with a varying number of passes per drum for each layer. After each variant of passes of the roller on each layer, three in situ density samples and moisture content samples shall be taken. The trial pad shall be built up in a minimum of four layers in total. Each sample tested for moisture content and dry density.

On completion of the trial pad, a pit shall be carefully excavated at the centre of the pad for the full depth of the pad. The sides of the pit shall be examined for the extent of remoulding an interlift bonding.

Records of the compaction trial and photographs of the excavated pit shall be provided to the Overseeing Organisation and the Contractor shall set out his proposed method of compaction, layer thickness, number of passes and any moisture conditioning necessary to meet the requirements of the Specification.

41. Following receipt of test results and assuming that the method achieves compliance that the degree of compaction for the earthworks trial shows at least 9 of out 10 consecutive in-situ dry density determinations of the compacted material attaining 100% of the determined maximum dry density for the material being placed, provided no value falls below 95% of the determined maximum dry density, then a placement strategy based on the type of roller material thickness and number of passes shall be adopted, but critically subject to ongoing compliance testing meeting the specification requirements.
42. Filling shall be in accordance with the requirements of Table 6/1 and Table 6/4. It shall be in uniform layers, compacted as works proceed. Cohesive and granular fills shall not be interlayered. Fill shall be benched into the existing ground in maximum 300mm steps, where required.
43. Compacted layers are to be no greater than 300mm with layer sizing for method compaction in accordance with Table 6/4 for the specified material class or as determined by compaction trials for end product compaction. No oversize materials greater that two thirds of the layer thickness as measured along any axis, shall be incorporated in the works.
44. The Contractor shall demonstrate level control using a system of pegs, or other agreed method.
45. Spreading and compaction shall not take place during periods of wet or cold weather without the prior written consent of the Project Manager. Wet weather conditions are deemed to apply when the placed fill is at a water content such that, upon applying compaction, the material adheres to the wheels of the roller. Cold weather conditions shall be deemed to apply when the air temperature falls below 3º C.
46. It may be necessary to establish an appropriated filling area for wet materials. A suitable filling and compaction methodology shall be agreed with the Project Manager.
47. Compaction shall be completed as soon as possible after the material has been spread and in accordance with requirements for the individual materials.
48. The surface of any layer of material shall on completion of compaction and immediately before overlaying, be well closed free from movement under compaction plant and be free from ridges, cracks, loose materials, pot holes, ruts and other defects. All loose segregated or otherwise defective areas shall be removed to the full thickness of the layer and new material should be laid and compacted.
49. Care should be taken to ensure that no damage is caused to surrounding structures, walls and containment walls retaining consolidated materials or to services placed below consolidated materials. Where work is to be carried out above services liable to damage, consideration should be given to reducing the thickness of each layer and using lighter compaction equipment in accordance with the Specification.
50. The final surface of the fill areas shall be rolled smooth and shall be free of ruts, depressions and debris. The surface shall be levelled to achieve the appropriate surface falls as shown on the Contract drawings.
51. Where the Contractor has prepared areas of compacted fill or final sub-grade he shall protect the area from plant or any other vehicles etc. not undertaking further works on such.
52. Final faces of cuttings which are not to receive topsoil shall be completed in accordance with Clause 603.5 except that use of an airline hose to blow away material will not be required.
53. Cuttings which are not to receive topsoil shall include gravel filled rock trap ditches and fences at the toe of the slope. Use of concrete infilling and netting or other sheet covering as detailed in Clause 603.6

will not be required unless specifically instructed by the Project Manager following inspection of the final face of the cutting.

54. Final faces of cutting which are to receive topsoil shall have isolated patches of soft, fragmented or insecure material excavated and filled by well ramming of a Class of fill with similar characteristics as the surrounding intact material as required by the Project Manager. The final face shall be harrowed to a depth of 50 mm in accordance with Clause 618.5(ii).

Embankments and Filled Slopes

55. Embankments and other areas of unsupported fill shall not be constructed with steeper side slopes or to greater widths than those shown on the Contract Drawings except to permit adequate compaction at the edge before trimming back.

56. Where the existing ground surface is sloping, the existing soil shall be cut in horizontal benches in order to “key” the existing and the new fill materials together. Bench height is to be no greater than 600mm for a bench width to be 600mm..

57. No over steeping of embankment slopes will be permitted except with the prior written permission of the Overseeing Organisation.

58. Embankments shall be constructed in such a way as to ensure unrestricted drainage of water from the earthworks and to prevent perched water tables within the embankments and any associated softening and/or instabilities.

Compliance Testing

59. Compliance testing is required to confirm the degree of compaction achieved is in accordance with the requirements of Appendix 6/1. Compliance testing shall be carried out in accordance with BS 1377 : Part 9 using either the sand replacement or core cutter methods. Where a Nuclear Density Meter (NDM) is used to determine the field dry densities it shall be used in accordance with BS 1377 : Part 9. The NDM shall be subject to initial calibration and calibration checks against the results of sand replacement or core cutter tests on a daily basis or every 10 NDM tests whichever the greater All acceptability and compliance testing are to be carried out by the Contractor. The Overseeing Organisation reserves the right to vary the type of testing carried out and the frequency.

60. The degree of compaction accepted for the earthworks shall be deemed to have been achieved if the in-situ dry density determination of the compacted material attains 95% of the measured maximum dry density for the material with an air voids content of up to 5%. Values below these criteria may be accepted at a frequency of no more than 1 in 10 for in-situ dry density between 90% and 95% of the maximum dry density so long as the air voids content is less than 5%. Values below 90% of the maximum dry density or greater than 5% air voids will not be accepted.

61. The in-situ density test results will be reported as in situ dry density and moisture content and also in terms of percentage of maximum dry density achieved and the residual air voids using a particle density as determined from laboratory results.

62. Dynamic Cone Penetration tests with Plate loading tests at a frequency of one every 10 DCP tests shall be carried out on the final filled surface or cut formation at a frequency of 1 test per 2500m^2 to verify the design subgrade modulus as shown on the drawings has been achieved. The plate loading tests shall be carried out using a plate of a nominal 450mm diameter in accordance with BS 1377 : Part 9. The test results will report the deflection and subgrade modulus achieved and the equivalent CBR value.

63. In the event that the specified requirements of Table 6/1, Appendices 6/1, 6/14 and 6/15 and/or the above compaction criteria contained within this appendix are not satisfied, the complete volume of

material represented by the non-conforming sample(s) and/or test(s) shall be treated in accordance with the following:

- Materials failing to comply with the compaction requirements shall be treated by a method proposed by the Contractor;
- Materials failing to comply with the requirements of Table 6/1 of Appendix 6/3 shall be either removed from site or treated;
- Materials failing to comply with the requirements of Appendix 6/16 shall be removed from site.

APPENDIX 6/5 - Geotextiles used to separate earthworks materials

APPENDIX 6/5 GEOTEXTILES USED TO SEPARATE EARTHWORKS MATERIALS

1. Geotextiles are required to act as separators between the formation and the overlying general fill. The locations and details of the required geotextiles are shown on the Contract Drawings.
2. Geotextiles shall be of synthetic materials.
3. Geotextile used as a separator shall comply with the requirements of Clause 609.
4. Geotextiles for separation shall be manufactured from thermally bonded, woven or non-woven, non-biodegradable synthetic fibres. The design life of the geotextile shall be 120 years. The durability of geotextile separators shall be evaluated in accordance with Annex B of BS EN 12349. Geotextile separating fabric shall be designed for filtration and drainage, which shall allow filtration of water, but shall protect the filled area against migration of materials from underneath or above. The Geotextiles shall have a resistance to chemical degradation and biological degradation, such that when tested in accordance with the index test methods described in BS EN 12226, the reduction in characteristic tensile strength does not exceed 25% of the original value. The Contractor shall provide recognised Certification that confirms the properties of the geotextile for approval by the Overseeing Organisation prior to incorporating into the works.
5. All Geotextiles delivered to site shall be CE Marked in accordance with BS EN 13249 and other if appropriate to the conditions of use. All Geotextiles shall be delivered with the Accompanying Documents showing the values of all specified characteristics and marked in accordance with BS EN 10320 `Geotextiles - Identification on Site'.
6. The Contractor shall store and place the Geotextiles in accordance with the manufacturer’s instructions.
7. The necessary precautions, in accordance with the manufacturer’s design requirements, shall be undertaken at all stages of placing the geotextiles and shall include the following:
    - Before the geotextile is covered, the Overseeing Organisation representative shall inspect the condition to ensure that holes, rips, tears or other defects are not present.
    - Fill material shall not be end tipped directly on to the geotextile.
    - Construction plant is not permitted directly on top of the geotextile.
    - The weight of construction vehicles shall be limited to prevent rutting in excess of 75mm deep of the initial lift of fill.

APPENDIX 6/6 - Fill to structures and fill above structural foundations

APPENDIX 6/6 FILL TO STRUCTURES AND FILL ABOVE STRUCTURAL FOUNDATIONS

1. The extent of fill to structures is shown on the Contract Drawings.
2. The Contractors attention is drawn to the requirements of Clause 610 and prior to placement of materials the Contractor shall provide a method statement for the works demonstrating the adequacy of materials for reuse based on acceptability testing defined in Table 1/5 and Table 6/2, and the plant proposed to be utilised to provide sufficient compaction.
3. The Contractor shall undertake a compaction trial for each material type and plant intended to be used to demonstrate that adequate compaction can be obtained within the requirements of Table 6/2.
4. Unless otherwise stated, fill material to structure shall be Class 6N/6P Fill or Class 7A material complying with Table 6/1.
5. The compaction of the fill around the retaining wall shall be in accordance with this specification and any additional requirements of the fill material supplier with the manufacturer's requirements.
6. A trial to demonstrate slope stability is not required (Clause 610.6)
7. The use of Class 7A material is to be strictly control and critically subject to prior acceptability testing in accordance with Appendix 1/5.
8. Backfill to structures and above structural foundations may only proceed with the written consent of the Overseeing Organisation to allow time for any concrete to have cured sufficiently.
9. All materials to be laid within 500mm of buried concrete or buried services shall have chemical concentrations which do not exceed acceptance criteria stated in Clause 16.
10. The Contractor shall undertake performance tests on each compacted layer as per the requirements detailed in Clause 612, Appendix 6/1 and at the designated testing rate given in Appendix 1/5. The Contractor shall provide the Overseeing Organisation with test results a maximum of 24 hours after completion.

APPENDIX 6/7 - Sub-formation, Capping, Preparation & Surface Treatment of Formation

APPENDIX 6/7 SUB-FORMATION, CAPPING, PREPARATION & SURFACE TREATMENT OF FORMATION

1. The provision of a capping layer and thickness of sub-base shall be subject to confirmation by the Overseeing Organisation dependent upon subgrade modulus values measured on the prepared sub-formation or formation.
2. On site testing of the sub-formation, in accordance Appendix 6/3 (62), shall determine the in-situ subgrade modulus value at the time of construction. If the in-situ CBR is found to be less than the design subgrade modulus, then the subgrade must either be improved or the foundation redesigned.
3. Preparation and surface treatment of formation in soil shall be to levels in accordance with Clause 616. Where in the opinion of the Overseeing Organisation the tolerances in Clause 616.1 cannot be achieved in the preparation of the formation in rock then the material shall be excavated to a minimum depth of 110 mm below the formation and the resulting void filled with Class 6F5 material or other material as agreed by the Contract Administrator and compacted in compliance with Clause 608 and 612 and Table 6/4 Method 6.
4. The requirements for layer thicknesses shall be as described in Clause 643.9.
5. Where a new pavement is to be constructed on an existing sub-base with reuse of the existing sub-base, then the contractor shall undertake testing as per Appendix 7/1. The designer shall then furnish the Contractor with the design details for the pavement.
6. Where the Contractor proposes to use the capping or sub-base as appropriate for weather protection of the sub-formation or formation he shall provide the full thickness of capping or sub-base.
7. Capping shall be constructed with Class 6F5 material complying with the requirements of Table 6/1 and Clause 613 but shall have a minimum stiffness value of 75MPa as required under IAN 73/06
8. Capping material shall achieve a minimum soaked CBR of 30% when tested in the laboratory in accordance with BS 1377 Pt 4 Cl 7 when compacted to 95% of the maximum dry density achieved by BS 1377 Pt 4 Cl 3.
9. In cuttings and on embankments the Contractor shall construct the capping, respectively, in accordance with the requirements of Clause 613.11 and Clause 613.12 depending on the permitted Class of capping to be used, and subject to the prior approval by the Contract Administrator.

APPENDIX 6/8 - Topsoiling

APPENDIX 6/8 TOPSOILING

General

1. Locations where topsoiling is required are shown on the Contract Drawings. Refer also to Appendix 30/1. The requirements of sub-Clause 618.3 shall apply.

Requirements

2. Prior to excavation, any topsoil and subsoil present shall be handled, stockpiled for re-use and placed in accordance with BS3882:2015 and BS8601:2013. Topsoil shall be transported in pneumatic tyred dumpers, or similar vehicles and placed by end tipping to form the landscaped areas.
3. Topsoil thicknesses shall be as follows:
    - 300mm min on planted areas;
    - 75-100mm max on verges and grass areas, unplanted margins to lagoons etc;
4. Topsoil is to be removed prior to the stockpiles of materials for storage and replaced at end of storage period.
5. Areas of former stockpiles are to be ripped to minimum 600mm depth at 600mm centres in two directions and seeded with agricultural grass/clover mix, after removal of stockpiles.
6. Topsoil stored for periods greater than 6 months shall be in stockpiles formed to a maximum 2m in height and shall be sown with a grass/clover mix. Areas are to be maintained in order to discourage the growth and seeding of weed species.
7. Soil placement in areas of landscape fill and areas to be returned to agriculture shall be carried out by dumper and 360 degree excavator. The Contractor shall minimise vehicular movements over topsoiled areas once it has been placed.
8. Soil spreading shall only be carried out during dry conditions (Generally April-September). Keep tracking over spread subsoil to a minimum. No work shall be carried out when rain is falling, when there has been heavy rain within the previous 24 hours or when, in the opinion of the Overseeing Organisation, the subsoil is likely to be damaged.
9. Compaction shall be limited to ‘nominal compaction’ from tracked plant operating in the landscaped areas to remove large voids.
10. Depending on the length of storage of soils, follow up applications of general fertiliser may be necessary, as may selective control of weeds;
11. Grassed and soiled areas damaged by the Contractor shall be reinstated at the Contractor’s own expense with topsoil and grass-seeding complying with the following:
    - where required, imported topsoil shall be Class 5B and comply to BS EN 3882 General Purpose Grade;
    - depth of topsoil to be as existing. Topsoil shall be deposited in layers not exceeding 150mm uncompacted thickness;
    - weed control, ground preparation and grass-seeding shall be in accordance with Appendices 30/2 and 30/5.
12. Depending on length of aftercare commitment, it may be necessary to cut grass on a regular basis.
13. Grass seed, including where approved by the Overseeing Organisation that incorporated in a hydraulic mulch, shall be a tested mixture and certificates of germination and purity shall be provided before sowing, together with the names of varieties used in the mix.

APPENDIX 6/9 - Earthwork Environmental Bunds, Landscape Areas, Strengthened Embankments

APPENDIX 6/9 EARTHWORK ENVIRONMENTAL BUNDS, LANDSCAPE AREAS, STRENGTHENED EMBANKMENTS

1. Landscaped areas shall be constructed using Class 4 material compacted in accordance with Clause 620.2. Method compaction to landscaped areas is not required. Landscape areas may be constructed simultaneously with adjoining embankments where approved by the Overseeing Organisation.

APPENDIX 6/12 - Instrumentation and Monitoring

APPENDIX 6/12 INSTRUMENTATION AND MONITORING

1. All works are to be undertaken in accordance with a detailed Construction Environmental Management Plan (CEMP) to be produced by the contractor.
2. Notwithstanding the requirements of the CEMP, the Contractor shall comply with the recommendation for practical measures to reduce noise, as set out in BS5228: Parts 1, 2 and 4 (2009) and with any specific Main Contractor requirements.
3. The Contractor shall take all reasonable measures to prevent any dirt or foreign matter being deposited upon any public or private highway or access or falling into any surface water course. Where any such material is on any highway or access road the Contractor shall, forthwith, remove the offending material at his own expense, and clean the surface of the highway or access to the satisfaction of the Main Contractor and/or Overseeing Organisation and/or the Highway Authority.
4. The Contractor shall take all reasonable measures to prevent dust nuisance from being generated by construction traffic, etc.

APPENDIX 6/14 - Limiting Values for Pollution of Controlled Waters

Appendix 6/14 Limiting Values For Pollution Of Controlled Waters

1. The frequency of acceptability testing shall be according to Appendix 1/5 of the Specification.
2. All imported fill materials shall be tested to ensure the concentrations of potential contaminants are below the guideline values given in the table below. These values are the Generic Acceptance Criteria for Earthworks

Parameter	Generic Acceptance Criteria	Notes
Metals/Anions		
Antimony	0.006 mg/L	Limit values for compliance leaching test using BS EN 12457 at L/S 10
Arsenic	0.03 mg/L	
Barium	2 mg/L	
Cadmium	0.0006 mg/L	
Chromium	0.007 mg/L	
Copper	0.005 mg/L	
Lead	0.0015 mg/L	
Mercury	0.000065 mg/L	
Molybdenum	0.05 mg/L	
Nickel	0.025 mg/L	
Selenium	0.01 mg/L	
Zinc	0.09 mg/L	
Chloride	80 mg/L	
Fluoride	1 mg/L	
Sulphate	100 mg/L	

Parameter	Generic Acceptance Criteria	Notes
Hydrocarbons		
Total BTEX	6 mg/kg	Limit values for total concentration of each parameter in soil
Benzene	0.019 mg/kg	
Total TPH (C10-C40)	500 mg/kg	
Total PAHs (USEPA 16)	100 mg/kg	
Phenols		
Total phenols	1 mg/kg	Limit value for total concentration in soil
PCBs (7 congeners)		
Each individual congener	0.05 mg/kg	Limit value for each individual congener

Notes to table

This set of generic assumptions is intended to be conservative for the vast majority of situations where soil is re-used or imported to a site. However, there may be occasions where the assumptions selected are not sufficiently protective for the situation being considered, in which case the derivation of site-specific acceptance criteria should be considered. These assumptions are listed below:

- The imported soil is emplaced as a 1m thick compacted layer over a 100m x 100m area, i.e. a total compacted volume of 10,000 m^3.
- After compaction, the imported material has a dry density within the range of 1700 to 2000 kg/m^3 (1.7 to 2.0 g/cm3) and a moisture content within the range 12 to 20%. These ranges are typical for compacted engineered soils.

- The soil organic matter content of the impacted material is 1%, equivalent to a fraction of organic carbon (FOC) content of 0.58%.
- Infiltration through the compacted material is assumed to be 50% of rainfall. The assumption of 50% infiltration is typical for vegetated areas and accounts for evapotranspiration and run-off and is likely to be highly conservative for low permeability material (such as clay) or hard covered areas. Rainfall is assumed to range from 600 to 1000 mm/yr, which is the typical range in average annual rainfall across the majority of areas in England.
- The base of the imported material is 1m above the groundwater table.
- The imported material is underlain by a sand and gravel aquifer which ranges in saturated thickness of 1m to 10m. The hydraulic conductivity of the sand and gravel aquifer is assumed to be 10 m/d and the hydraulic gradient within the aquifer is assumed to be 0.01. In combination with the assumed infiltration rate and source area, this set of parameter values results in the infiltrating contaminants being diluted approximately four times by groundwater. This is considered a reasonable assumption for an aquifer with water supply resource potential.

APPENDIX 6/15 - Limiting Values for Harm to Human Health and The Environment

1. The frequency of acceptability testing shall be according to Appendix 1/5 of the Specification.
2. All fill materials shall be tested to ensure the concentrations of potential contaminants are below the guideline values for residential with plant uptake development given;
   - EA (2009) Soil Guideline Value Reports. CLEA website. http://www.environment-agency.gov.uk/research/planning/33714.aspx Environment Agency, Bristol.
   - CEIH (2009) The LQM/CIEH Generic Assessment Criteria for Human Health Risk Assessment (2nd Edition). The Chartered Institute of Environmental Health, Nottingham.
3. No material exceeding these limits shall be incorporated into the works
4. The frequency of acceptability and check testing shall be according to Table 1/5 above.
5. The contamination testing suite should include the contaminants as contained in Table 6/15 below:

Table 6/15– Contamination Suite

Determinand	Lab Limit of Detection (mg/kg)	Commercial/Development (mg/kg)	Notes
Arsenic	0.6	640	Accredited by UKAS
Asbestos	Screen	Yes/No	Should Asbestos be identified the Project Manager should be informed immediately
Beryllium	0.2	12	Not specified in ALS
Cadmium	0.02	190	Accredited by UKAS
Chromium (Total)	0.9	1700[1,3]	Accredited by UKAS
Copper	1.4	2200[1,3]	Accredited by UKAS
Lead	0.7	750	Accredited by UKAS
Mercury	1.4	1000[1,3]	Accredited by UKAS
Nickel	0.2	980	Accredited by UKAS
Selenium	1	12000	Accredited by UKAS
Vanadium	0.8	3160	Not specified in ALS
Zinc	1.9	2000[1,3]	Accredited by UKAS
Additional Tests			
TPH CWG			
Aliphatics			
C5-C6	0.1	500[4]	Unaccredited
C6-C8	0.1	500[4]	Unaccredited
C8-C10	0.1	500[4]	Unaccredited
C10-C12	0.1	500[4]	Not specified in ALS
C12-C16	0.1	500[4]	Unaccredited
C16-C21	0.1	500[4]	Unaccredited
C21-C35	0.1	500[4]	Unaccredited
Sum C5-C40	5.0	500[4]	Not specified in ALS
Aromatics			
C5-C7	0.05	100[4]	Unaccredited
C7-C8	0.05	100[4]	Unaccredited
C8-C10	0.05	100[4]	Unaccredited
C10-C12	0.1	100[4]	Not specified in ALS
C12-C16	0.1	100[4]	Unaccredited

Determinand	Lab Limit of Detection (mg/kg)	Commercial/Development (mg/kg)	Notes
C16-C21	0.1	100[4]	Unaccredited
C21-C35	0.1	100[4]	Unaccredited
Sum C5-C35	1.0	100[4]	
PAH EPA 16			
Acenaphthene	0.1	100[4]	
Acenaphthylene	0.1	100[4]	
Anthracene	0.1	100[4]	
Benzo(a)anthracene	0.1	100[4]	
Benzo(a)pyrene	0.1	35*	
Benzo(b)fluoranthene	0.1	44*	
Benzo(g,h,i)perylene	0.1	100[4]	
Benzo(k)fluoranthene	0.1	100[4]	
Chrysene	0.1	100[4]	
Dibenzo(a,h)anthracene	0.1	3.5*	
Fluoranthene	0.1	100[4]	
Fluorene	0.1	100[4]	
Indeno(1,2,3-cd)pyrene	0.1	100[4]	
Naphthalene	0.1	100[4]	
Phenanthrene	0.1	100[4]	
Pyrene	0.1	100[4]	

* - GAC for soils with Soil Organic Matter (SOM) of 1%.

[1] Value selected to limit concentration to below the limit for classification as hazardous waste

[2] Value also subject to a maximum for the Sum of aliphatics to 1000mg/kg

[3] Value derived assuming simple oxide or metal compound using HazWaste Online Engine and Database version 01 December 2014.

[4] Value selected to limit concentration for the protection of controlled waters.

Appendix B
MATERIAL CLASSIFICATION RESULTS

EXPLORATION
& TESTING ASSOCIATES

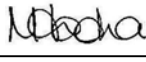
Unit 8B Bowburn South Industrial Estate
Durham, DH6 5AD T: 0191 389 6543

UKAS TESTING

Interim Laboratory Test Report

Client	Groundwork Services (Durham) Limited
Address	Littleburn Industrial Estate Langley Moor Durham DH7 8HJ
F.A.O	Paul Barton / Ben Johnson
Project Number:	D10557
Report Number:	L22-409
Date Received:	30th May 2022

Testing Required:	Moisture Content - BS:1377-2:1990 Particle Size Distribution - BS:1377-2:1990 Particle Density by Gas Jar - BS:1377-2:1990 Clause 8.2 Determination of Maximum Dry Density / Optimum Moisture Content by 2.5kg Rammer - BS:1377-4:1990
Date Started:	6th June 2022
Date Finished:	Ongoing

Report Issue Date:	13th June 2022
Reviewed By:	
	N. Hodson - Materials Director
Authorised By:	
	N O'Brien - Laboratory Manager
Remarks:	(*) denotes testing is outside of UKAS Scope of Accreditation.
	(+) denotes subcontracted testing.

Samples will be stored for one month after the report has been issue before being disposed of.

The published results appertain only to the specimens tested.

EXPLORATION & TESTING ASSOCIATES

Determination of Moisture Content, Liquid Limit, Plastic Limit and Derivation of Plasticity Index

Project No.	Project Name
D10557	Envision, Washington

Hole No.	Sample			Soil Description	Moisture Content %	Passing 425µm %	Liquid Limit %	Plastic Limit %	Plasticity Index %	Remarks
	Type	Ref	Depth							
TP07_060-2-00	B	MS2084/1	0.00	Brown, Slightly Sandy, Very Slightly Gravelly CLAY	19					
TP07_060-2-00	B	MS2084/2	0.00	Brown, Slightly Sandy, Very Slightly Gravelly CLAY	20					
TP07_060-2-00	B	MS2084/3	0.00	Brown, Slightly Sandy, Very Slightly Gravelly CLAY	19					
TP07_060-2-00	B	MS2084/4	0.00	Brown, Slightly Sandy, Very Slightly Gravelly CLAY	19					
TP06_050-2-80	B	MS2085/1	0.00	Brown, Slightly Sandy, Very Slightly Gravelly CLAY	27					
TP06_050-2-80	B	MS2085/2	0.00	Brown, Slightly Sandy, Very Slightly Gravelly CLAY	27					
TP06_050-2-80	B	MS2085/3	0.00	Brown, Slightly Sandy, Very Slightly Gravelly CLAY	19					
TP06_050-2-80	B	MS2085/4	0.00	Brown, Slightly Sandy, Very Slightly Gravelly CLAY	19					
TP06_1.80-4-00	B	MS2086/1	0.00	Brown, Slightly Sandy, Very Slightly Gravelly CLAY	22					
TP06_1.80-4-00	B	MS2086/2	0.00	Brown, Slightly Sandy, Very Slightly Gravelly CLAY	18					
TP06_1.80-4-00	B	MS2086/3	0.00	Brown, Slightly Sandy, Very Slightly Gravelly CLAY	18					
TP06_1.80-4-00	B	MS2086/4	0.00	Brown, Slightly Sandy, Very Slightly Gravelly CLAY	19					
TP1_0-3-1-10	B	MS2087	0.00	Brown, Slightly Sandy, Very Slightly Gravelly CLAY	19					
TP2_0-3-1-10	B	MS2088	0.00	Brown, Slightly Sandy, Very Slightly Gravelly CLAY	19					
TP03_0-15-1-10	B	MS2089	0.00	Brown, Slightly Sandy, Very Slightly Gravelly CLAY	19					
TP04_0-30-1-20	B	MS2090	0.00	Brown, Slightly Sandy, Very Slightly Gravelly CLAY	19					
TP05_0-30-1-10	B	MS2091	0.00	Brown, Slightly Sandy, Very Slightly Gravelly CLAY	18					
TP06_0-2-0-50	B	MS2092	0.00	Brown, Slightly Sandy, Very Slightly Gravelly CLAY	18					
TP07_0-30-0-60	B	MS2093	0.00	Brown, Slightly Sandy, Very Slightly Gravelly CLAY	19					

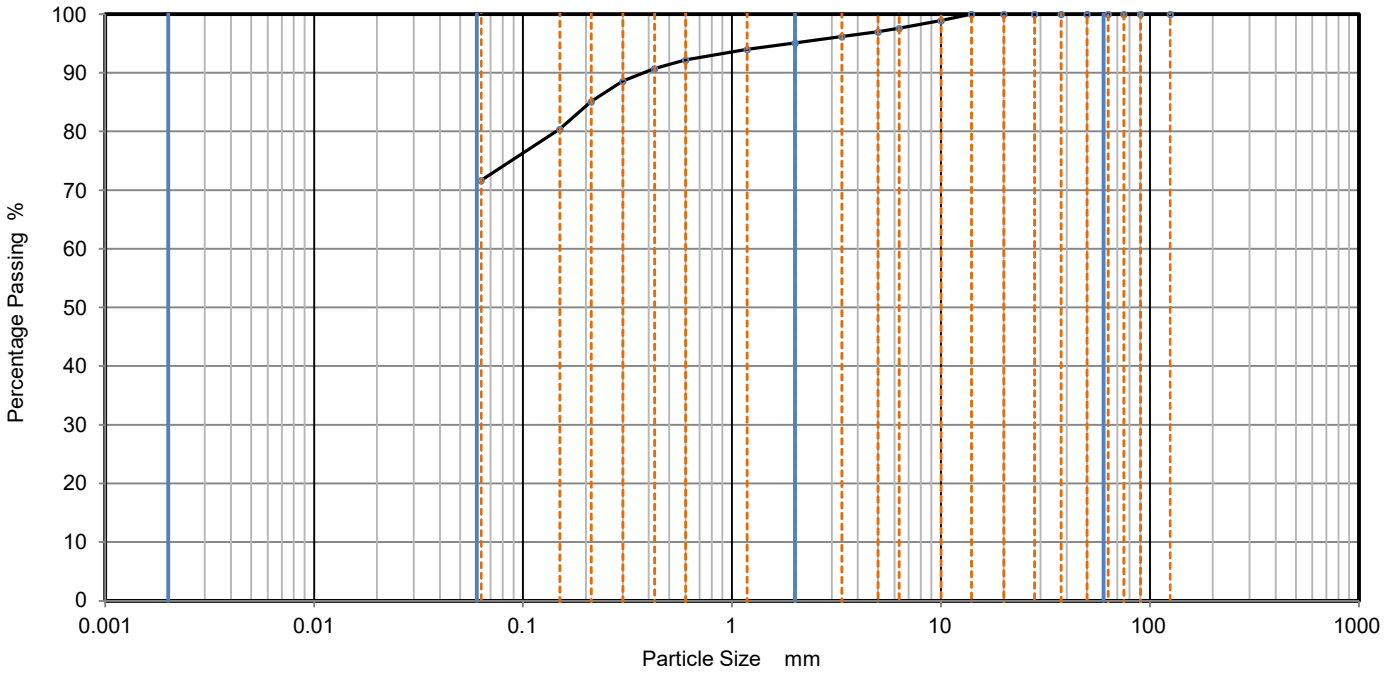
Moisture Content carried out in accordance with BS 1377: Part 2: 1990: Clause 3.2

Date	Approved By	UKAS Accredited Laboratory No. 20632
13/06/2022 13:54	N O'Brien	

EXPLORATION & TESTING ASSOCIATES

PARTICLE SIZE DISTRIBUTION

				Job Ref	**D10557**
				Borehole/Pit No.	TP07_060-2-00
Site Name	Envision, Washington			Sample No.	MS2084/1
Soil Description	Brown, Slightly Sandy, Very Slightly Gravelly CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990 - Wet & Dry Sieving			KeyLAB ID	EAT_202206134



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	99		
6.3	98		
5	97		
3.35	96		
2	95		
1.18	94		
0.6	92		
0.425	91		
0.3	89		
0.212	85		
0.15	80		
0.063	72		

Sample Proportions	% dry mass
Very coarse	0
Gravel	5
Sand	23
Fines <0.063mm	72

Grading Analysis		
D_{100}	mm	
D_{60}	mm	
D_{30}	mm	
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

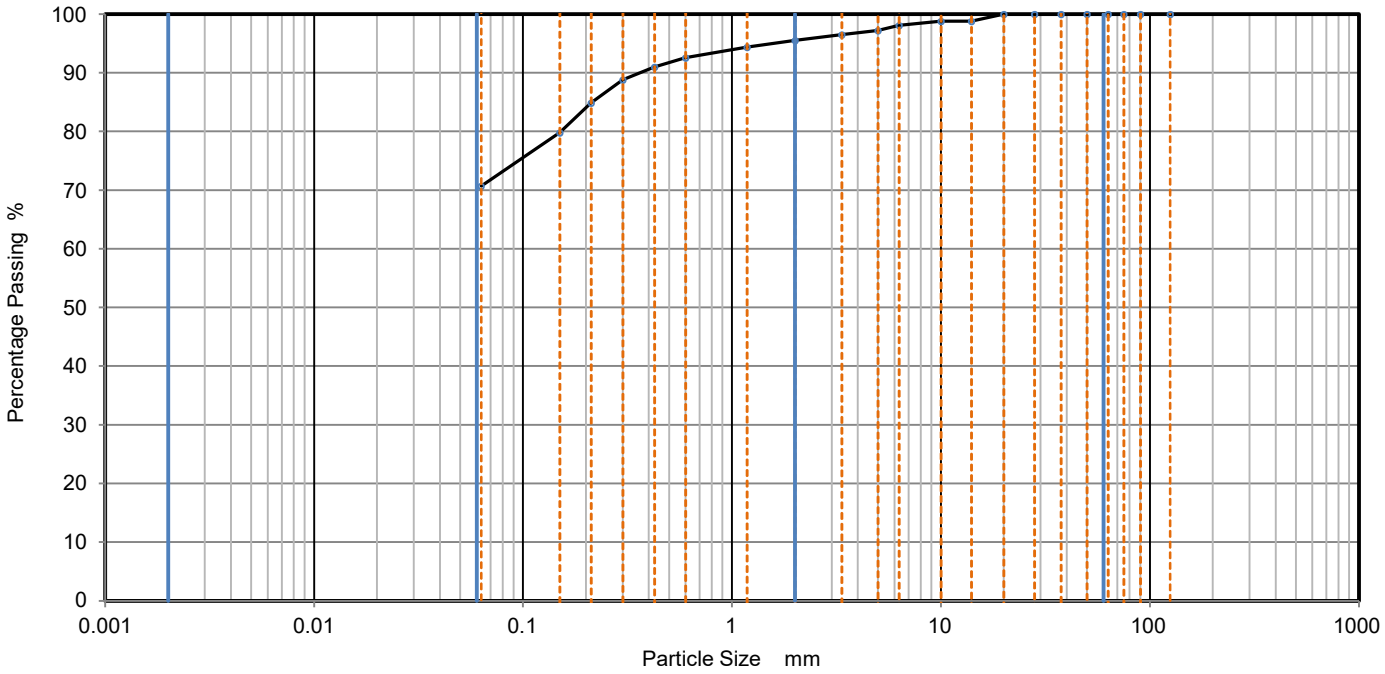
Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		
13/06/2022 14:07	N O'Brien		UKAS Accredited Laboratory No. 20632

EXPLORATION & TESTING ASSOCIATES

PARTICLE SIZE DISTRIBUTION

				Job Ref	**D10557**
				Borehole/Pit No.	TP07_060-2-00
Site Name	Envision, Washington			Sample No.	MS2084/2
Soil Description	Brown, Slightly Sandy, Very Slightly Gravelly CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990 - Wet & Dry Sieving			KeyLAB ID	EAT_202206135



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	99		
10	99		
6.3	98		
5	97		
3.35	97		
2	96		
1.18	94		
0.6	93		
0.425	91		
0.3	89		
0.212	85		
0.15	80		
0.063	71		

Sample Proportions	% dry mass
Very coarse	0
Gravel	5
Sand	25
Fines <0.063mm	71

Grading Analysis		
D_{100}	mm	
D_{60}	mm	
D_{30}	mm	
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

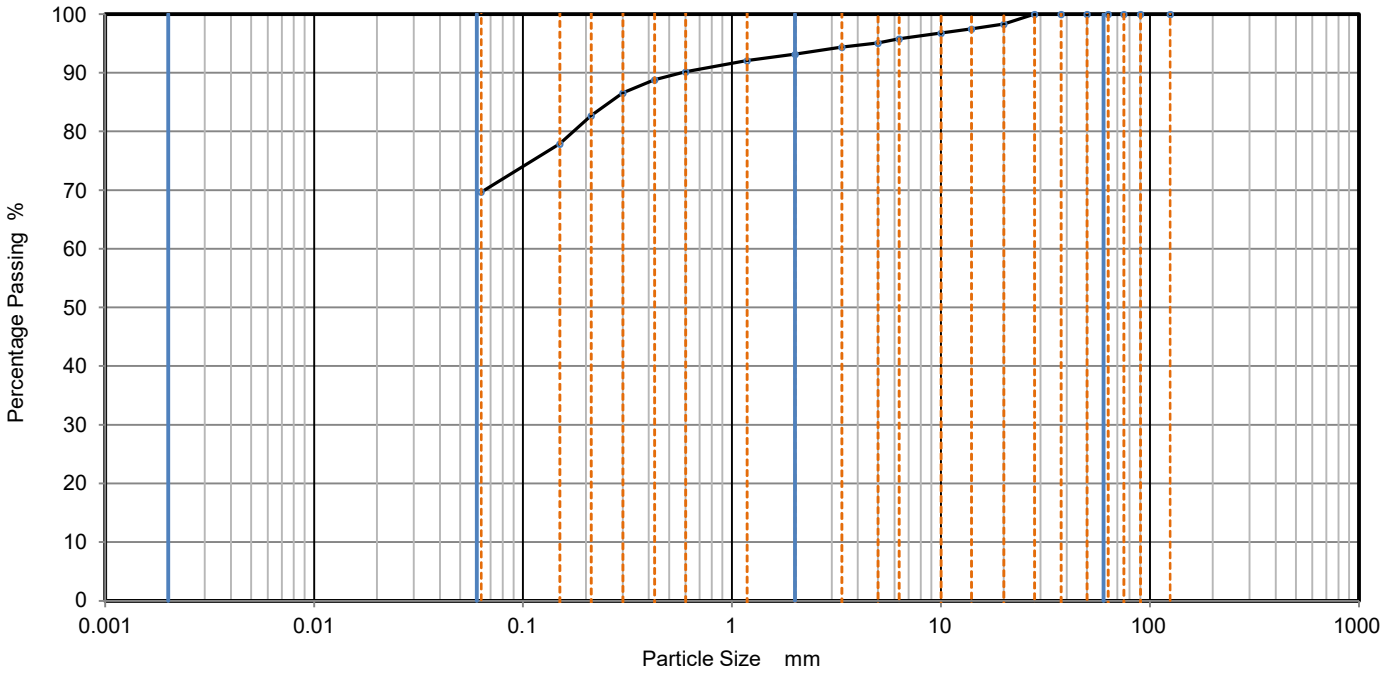
Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		
13/06/2022 14:08	N O'Brien		UKAS Accredited Laboratory No. 20632

EXPLORATION & TESTING ASSOCIATES

PARTICLE SIZE DISTRIBUTION

				Job Ref	**D10557**
				Borehole/Pit No.	TP07_060-2-00
Site Name	Envision, Washington			Sample No.	MS2084/3
Soil Description	Brown, Slightly Sandy, Very Slightly Gravelly CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990 - Wet & Dry Sieving			KeyLAB ID	EAT_202206136



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	98		
14	98		
10	97		
6.3	96		
5	95		
3.35	94		
2	93		
1.18	92		
0.6	90		
0.425	89		
0.3	87		
0.212	83		
0.15	78		
0.063	70		

Sample Proportions	% dry mass
Very coarse	0
Gravel	7
Sand	24
Fines <0.063mm	70

Grading Analysis		
D_{100}	mm	
D_{60}	mm	
D_{30}	mm	
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

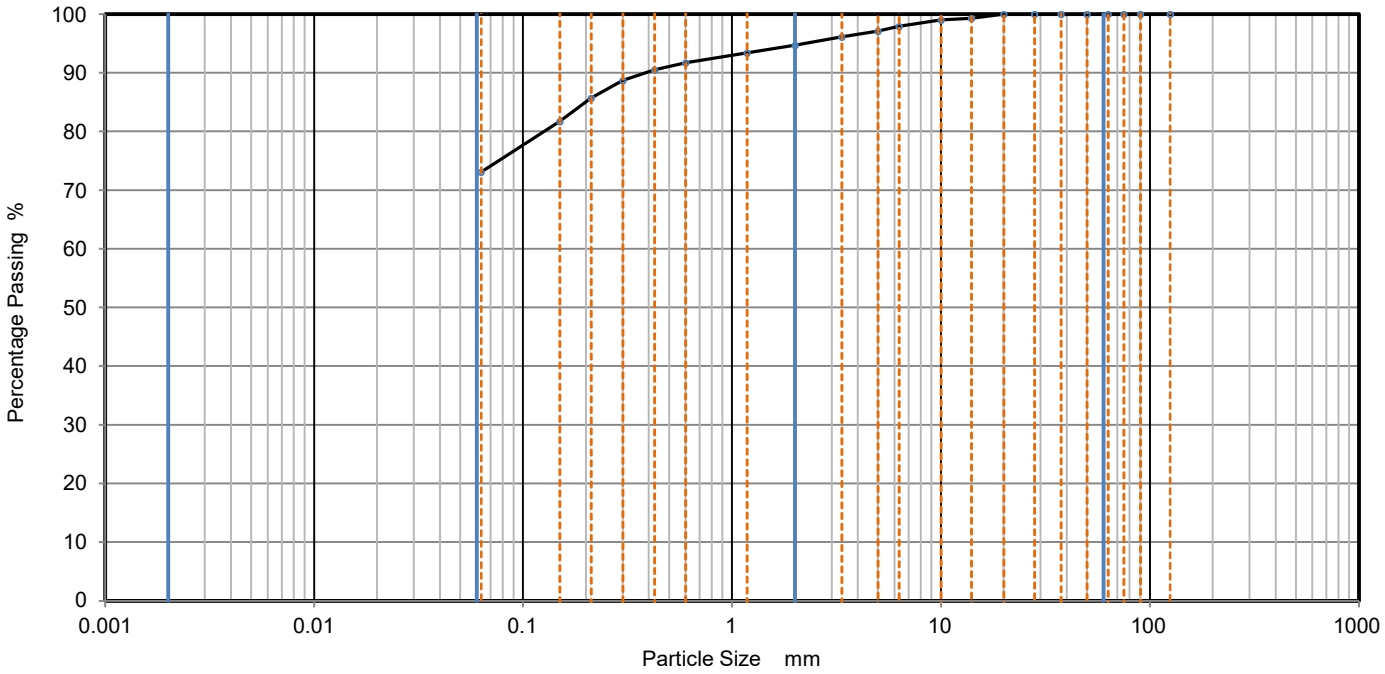
Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		
13/06/2022 14:08	N O'Brien		UKAS Accredited Laboratory No. 20632

EXPLORATION & TESTING ASSOCIATES

PARTICLE SIZE DISTRIBUTION

				Job Ref	**D10557**
				Borehole/Pit No.	TP06_1.80-4-00
Site Name	Envision, Washington			Sample No.	MS2086/4
Soil Description	Brown, Slightly Sandy, Very Slightly Gravelly CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990 - Wet & Dry Sieving			KeyLAB ID	EAT_2022061315



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	99		
10	99		
6.3	98		
5	97		
3.35	96		
2	95		
1.18	93		
0.6	92		
0.425	91		
0.3	89		
0.212	86		
0.15	82		
0.063	73		

Sample Proportions	% dry mass
Very coarse	0
Gravel	5
Sand	22
Fines <0.063mm	73

Grading Analysis		
D_{100}	mm	
D_{60}	mm	
D_{30}	mm	
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

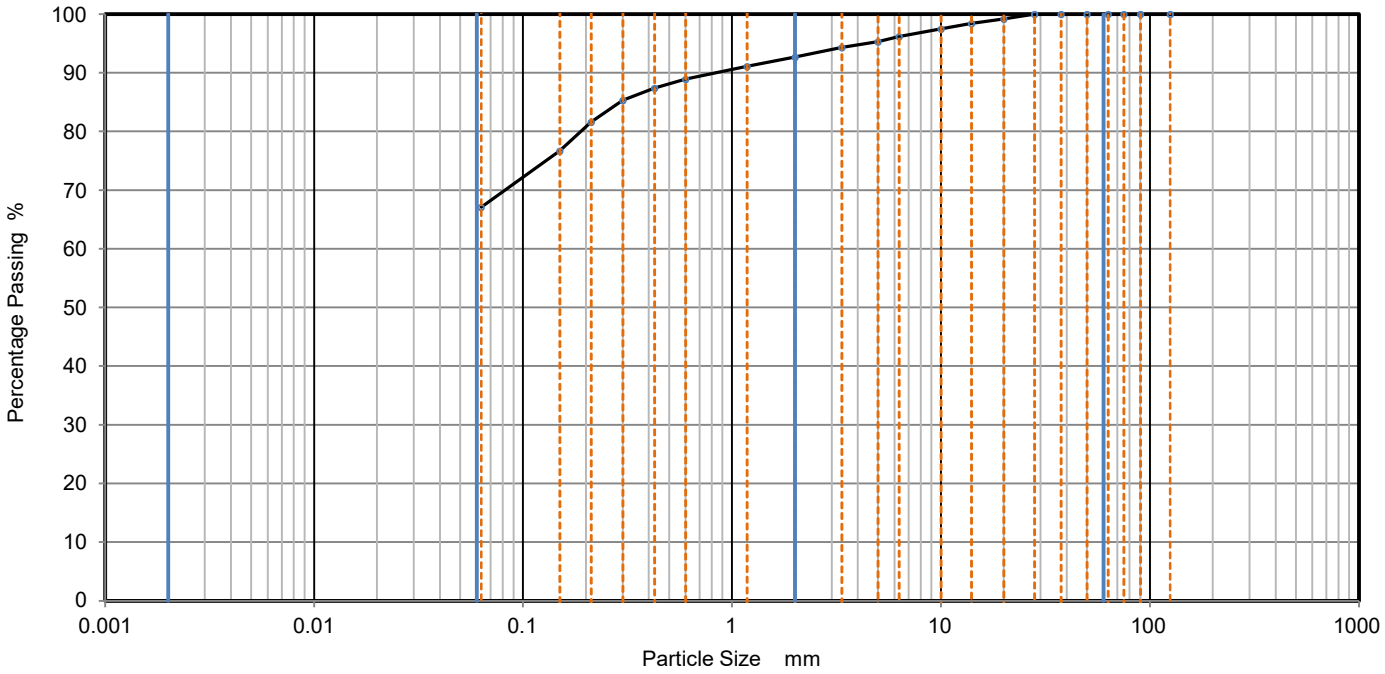
Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		
13/06/2022 14:09	N O'Brien		UKAS Accredited Laboratory No. 20632

EXPLORATION & TESTING ASSOCIATES

PARTICLE SIZE DISTRIBUTION

				Job Ref	**D10557**
				Borehole/Pit No.	TP06_1.80-4-00
Site Name	Envision, Washington			Sample No.	MS2086/2
Soil Description	Brown, Slightly Sandy, Very Slightly Gravelly CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990 - Wet & Dry Sieving			KeyLAB ID	EAT_2022061313



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	99		
14	98		
10	98		
6.3	96		
5	95		
3.35	94		
2	93		
1.18	91		
0.6	89		
0.425	87		
0.3	85		
0.212	82		
0.15	77		
0.063	67		

Sample Proportions	% dry mass
Very coarse	0
Gravel	7
Sand	26
Fines <0.063mm	67

Grading Analysis		
D_{100}	mm	
D_{60}	mm	
D_{30}	mm	
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

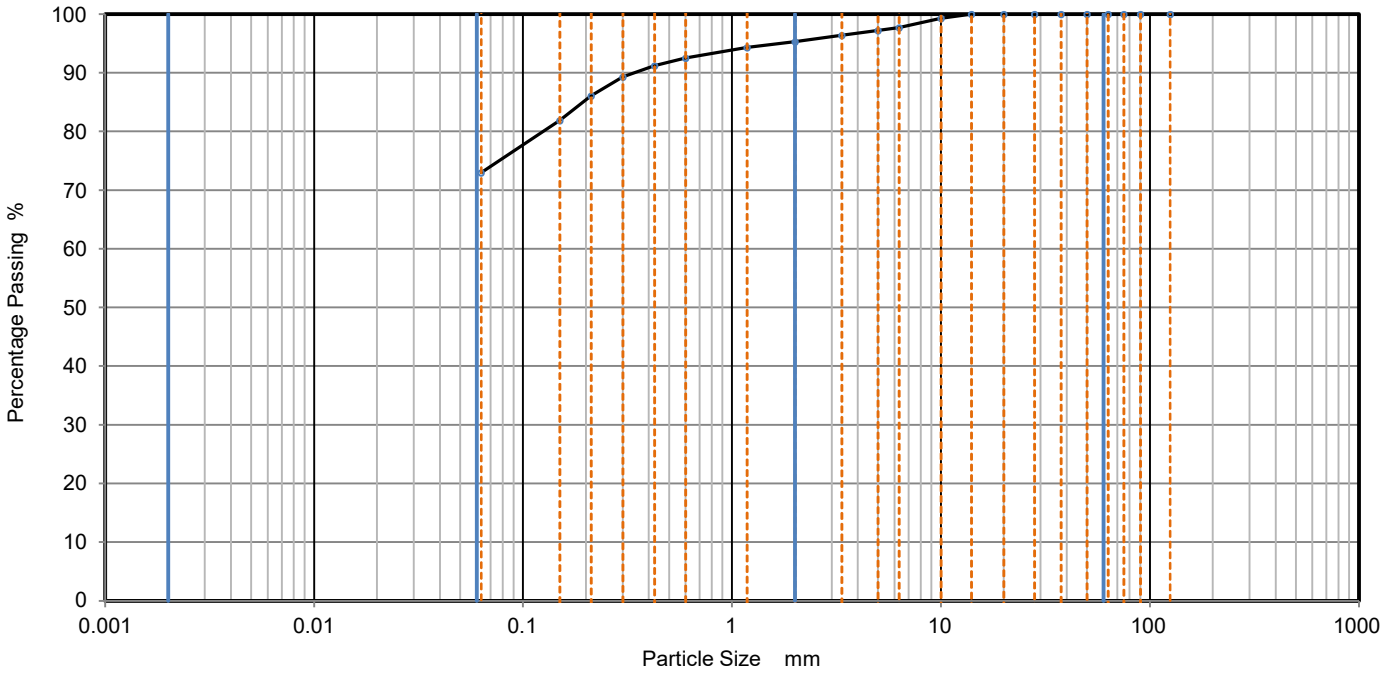
Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		
13/06/2022 14:09	N O'Brien		UKAS Accredited Laboratory No. 20632

EXPLORATION & TESTING ASSOCIATES

PARTICLE SIZE DISTRIBUTION

				Job Ref	**D10557**
				Borehole/Pit No.	TP07_060-2-00
Site Name	Envision, Washington			Sample No.	MS2084/4
Soil Description	Brown, Sandy, Slightly Gravelly CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990 - Wet & Dry Sieving			KeyLAB ID	EAT_202206137



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	99		
6.3	98		
5	97		
3.35	96		
2	95		
1.18	94		
0.6	93		
0.425	91		
0.3	89		
0.212	86		
0.15	82		
0.063	73		

Sample Proportions	% dry mass
Very coarse	0
Gravel	5
Sand	22
Fines <0.063mm	73

Grading Analysis		
D_{100}	mm	
D_{60}	mm	
D_{30}	mm	
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

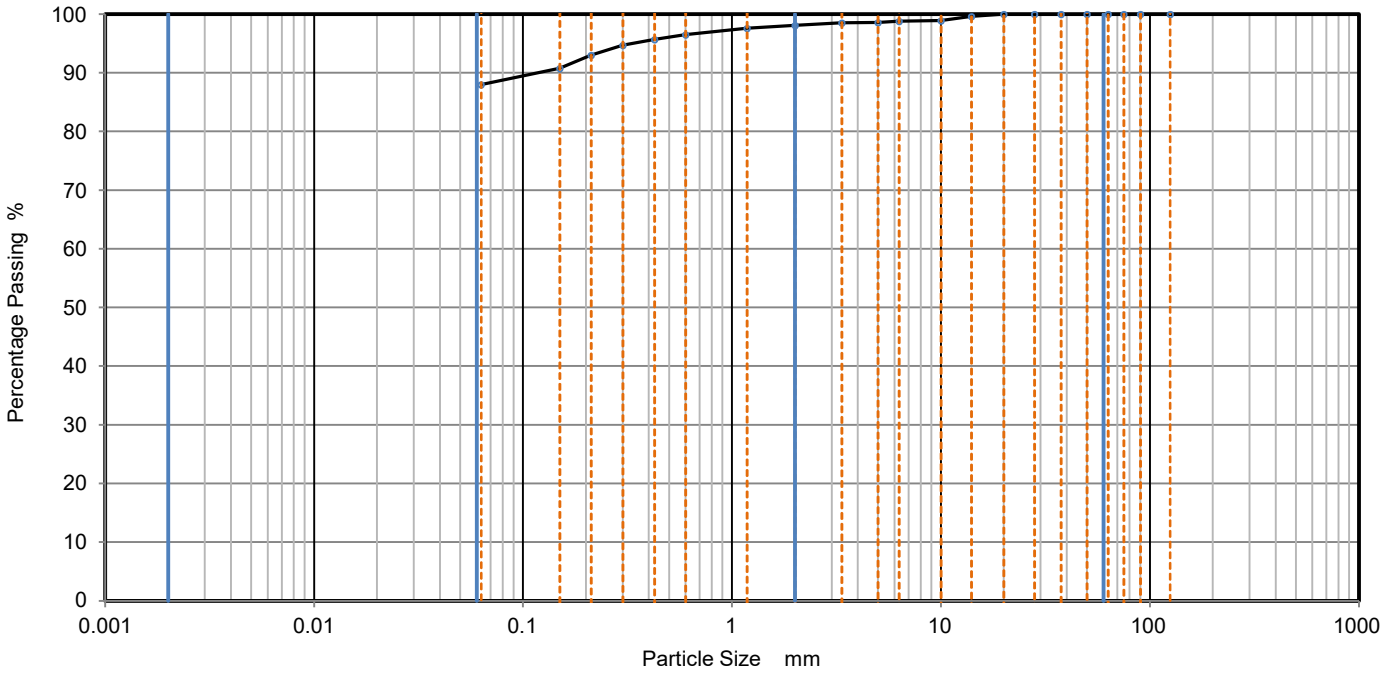
Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		
13/06/2022 15:31	N Hodson		UKAS Accredited Laboratory No. 20632

EXPLORATION & TESTING ASSOCIATES

PARTICLE SIZE DISTRIBUTION

				Job Ref	**D10557**
				Borehole/Pit No.	TP06_050-2-80
Site Name	Envision, Washington			Sample No.	MS2085/2
Soil Description	Brown, Slightly Sandy, Very Slightly Gravelly CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990 - Wet & Dry Sieving			KeyLAB ID	EAT_202206139



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	99		
6.3	99		
5	99		
3.35	99		
2	98		
1.18	98		
0.6	97		
0.425	96		
0.3	95		
0.212	93		
0.15	91		
0.063	88		

Sample Proportions	% dry mass
Very coarse	0
Gravel	2
Sand	10
Fines <0.063mm	88

Grading Analysis		
D_{100}	mm	
D_{60}	mm	
D_{30}	mm	
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

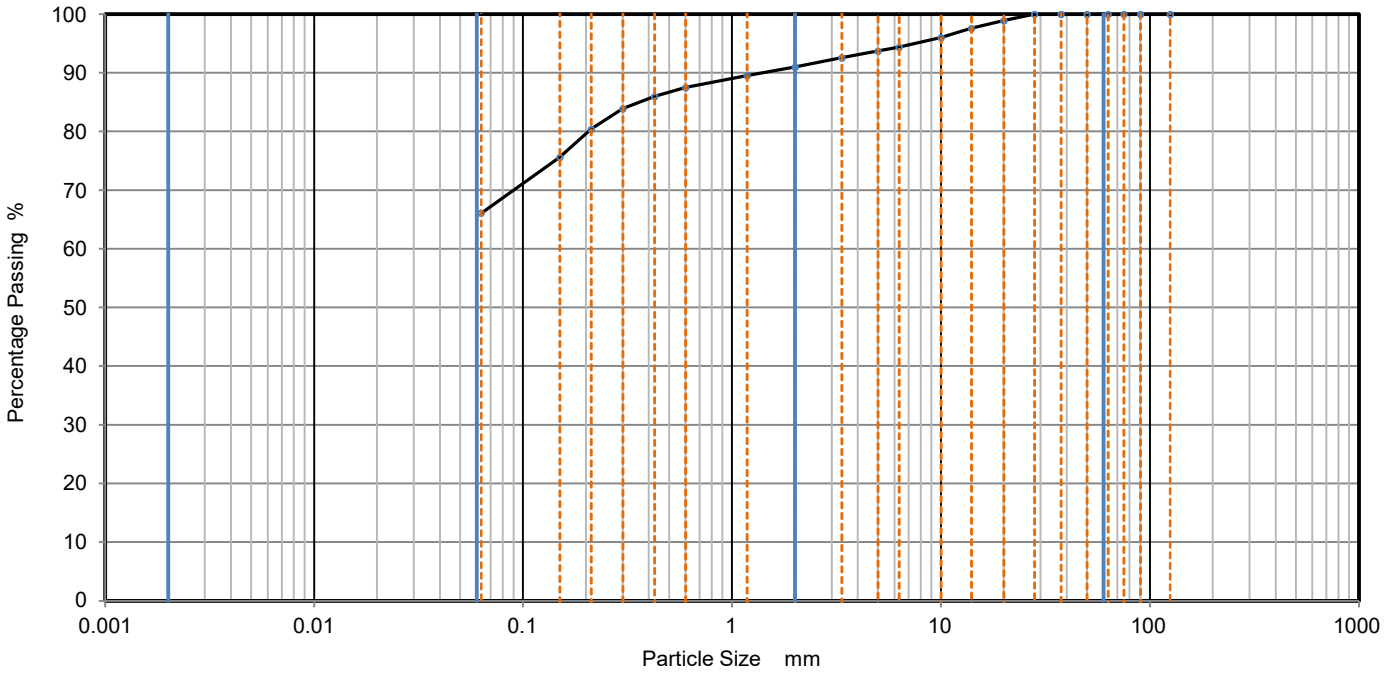
Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		
13/06/2022 15:32	N O'Brien		UKAS Accredited Laboratory No. 20632

EXPLORATION & TESTING ASSOCIATES

PARTICLE SIZE DISTRIBUTION

				Job Ref	**D10557**
				Borehole/Pit No.	TP06_050-2-80
Site Name	Envision, Washington			Sample No.	MS2085/4
Soil Description	Brown, Sandy, Slightly Gravelly CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990 - Wet & Dry Sieving			KeyLAB ID	EAT_2022061311



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	99		
14	98		
10	96		
6.3	94		
5	94		
3.35	93		
2	91		
1.18	90		
0.6	88		
0.425	86		
0.3	84		
0.212	80		
0.15	76		
0.063	66		

Sample Proportions	% dry mass
Very coarse	0
Gravel	9
Sand	25
Fines <0.063mm	66

Grading Analysis		
D_{100}	mm	
D_{60}	mm	
D_{30}	mm	
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

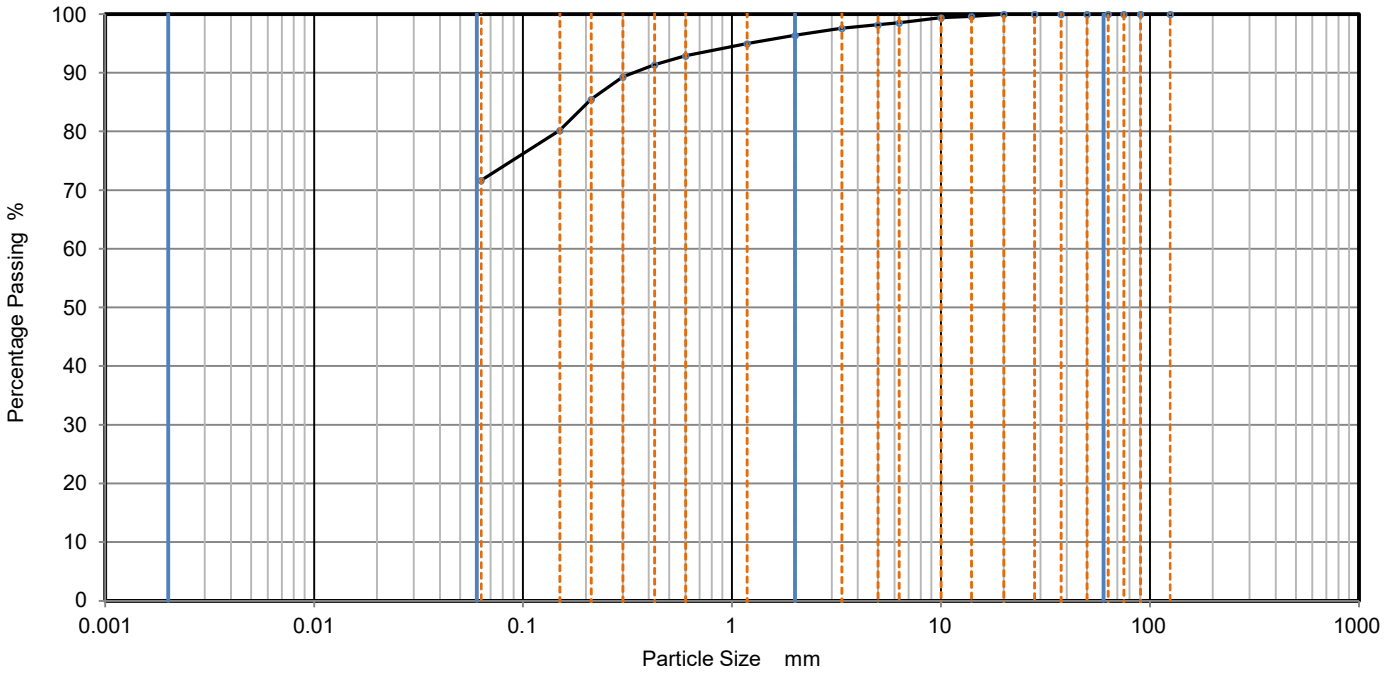
Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		
13/06/2022 15:32	N O'Brien		UKAS Accredited Laboratory No. 20632

EXPLORATION & TESTING ASSOCIATES

PARTICLE SIZE DISTRIBUTION

				Job Ref	**D10557**
				Borehole/Pit No.	TP06_1.80-4-00
Site Name	Envision, Washington			Sample No.	MS2086/1
Soil Description	Brown, Sandy, Slightly Gravelly CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990 - Wet & Dry Sieving			KeyLAB ID	EAT_2022061312



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	99		
6.3	99		
5	98		
3.35	98		
2	96		
1.18	95		
0.6	93		
0.425	91		
0.3	89		
0.212	86		
0.15	80		
0.063	72		

Sample Proportions	% dry mass
Very coarse	0
Gravel	4
Sand	25
Fines <0.063mm	72

Grading Analysis		
D_{100}	mm	
D_{60}	mm	
D_{30}	mm	
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		
13/06/2022 15:33	N O'Brien		UKAS Accredited Laboratory No. 20632

EXPLORATION & TESTING ASSOCIATES

Particle Density by Gas Jar - Summary of Results

Project No.	Project Name
D10557	Envision, Washington

Hole No.	Sample				Soil Description at test horizon	Particle Density Mg/m^3	Remarks
	Ref	Top	Base	Type			
TP07_060-2-00	MS2084/1	0.00		B	Brown, Sandy, Slightly Gravelly CLAY	2.58	
TP07_060-2-00	MS2084/2	0.00		B	Brown, Sandy, Slightly Gravelly CLAY	2.59	
TP07_060-2-00	MS2084/3	0.00		B	Brown, Sandy, Slightly Gravelly CLAY	2.64	
TP07_060-2-00	MS2084/4	0.00		B	Brown, Sandy, Slightly Gravelly CLAY	2.62	
TP06_050-2-80	MS2085/1	0.00		B	Brown, Sandy, Slightly Gravelly CLAY	2.61	
TP06_050-2-80	MS2085/2	0.00		B	Brown, Sandy, Slightly Gravelly CLAY	2.62	
TP06_050-2-80	MS2085/3	0.00		B	Brown, Sandy, Slightly Gravelly CLAY	2.61	
TP06_050-2-80	MS2085/4	0.00		B	Brown, Sandy, Slightly Gravelly CLAY	2.62	
TP06_1.80-4-00	MS2086/1	0.00		B	Brown, Sandy, Slightly Gravelly CLAY	2.56	
TP06_1.80-4-00	MS2086/2	0.00		B	Brown, Sandy, Slightly Gravelly CLAY	2.58	
TP06_1.80-4-00	MS2086/3	0.00		B	Brown, Sandy, Slightly Gravelly CLAY	2.61	
TP06_1.80-4-00	MS2086/4	0.00		B	Brown, Sandy, Slightly Gravelly CLAY	2.60	
TP2_0-3-1-10	MS2088	0.00		B	Brown, Sandy, Slightly Gravelly CLAY	2.63	
TP03_0-15-1-10	MS2089	0.00		B	Brown, Sandy, Slightly Gravelly CLAY	2.63	
TP04_0-30-1-20	MS2090	0.00		B	Brown, Sandy, Slightly Gravelly CLAY	2.63	
TP05_0-30-1-10	MS2091	0.00		B	Brown, Sandy, Slightly Gravelly CLAY	2.64	
TP06_0-2-0-50	MS2092	0.00		B	Brown, Sandy, Slightly Gravelly CLAY	2.66	
TP07_0-30-0-60	MS2093	0.00		B	Brown, Sandy, Slightly Gravelly CLAY	2.66	

Notes
Tests performed in accordance with BS 1377 unless annotated otherwise.
Gas Jar tests to BS1377: Part 2 : 1990, clause 8.2

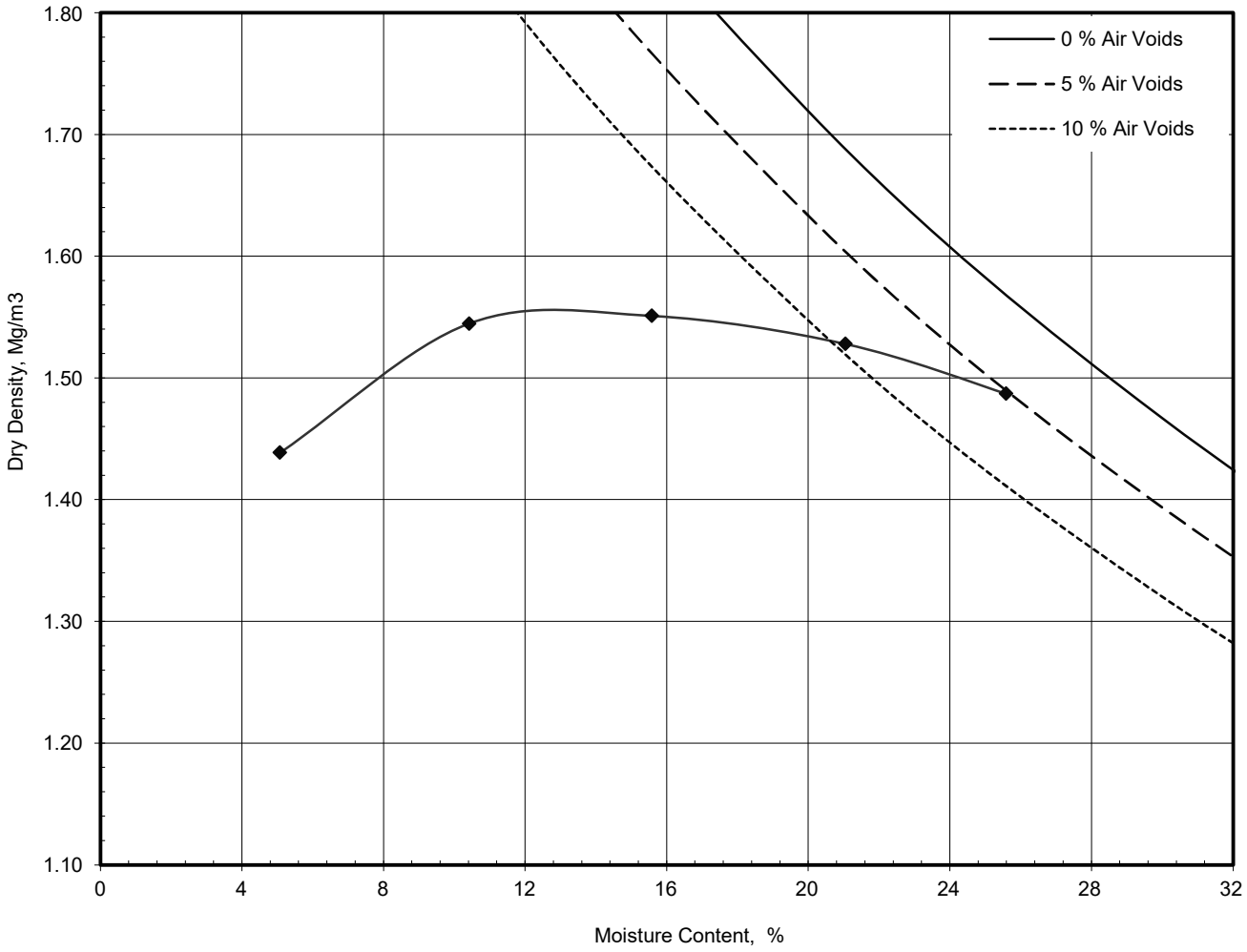
Comments

Date: 13/06/2022 15:34

Approved: N O'Brien

UKAS Accredited Laboratory No. 20632

EXPLORATION & TESTING ASSOCIATES	**Dry Density / Moisture Content Relationship Light Compaction**			Job Ref	**D10557**
				Borehole / Pit No	TP06_050-2-80
Site Name	**Envision, Washington**			Sample No	MS2085/2
Soil Description	Brown, Slightly Sandy, Very Slightly Gravelly CLAY			Depth	0.00 m
Specimen Ref.		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.3, 2.5kg rammer			Keylab ID	EAT_202206139
				Compaction Test Reference/No.	



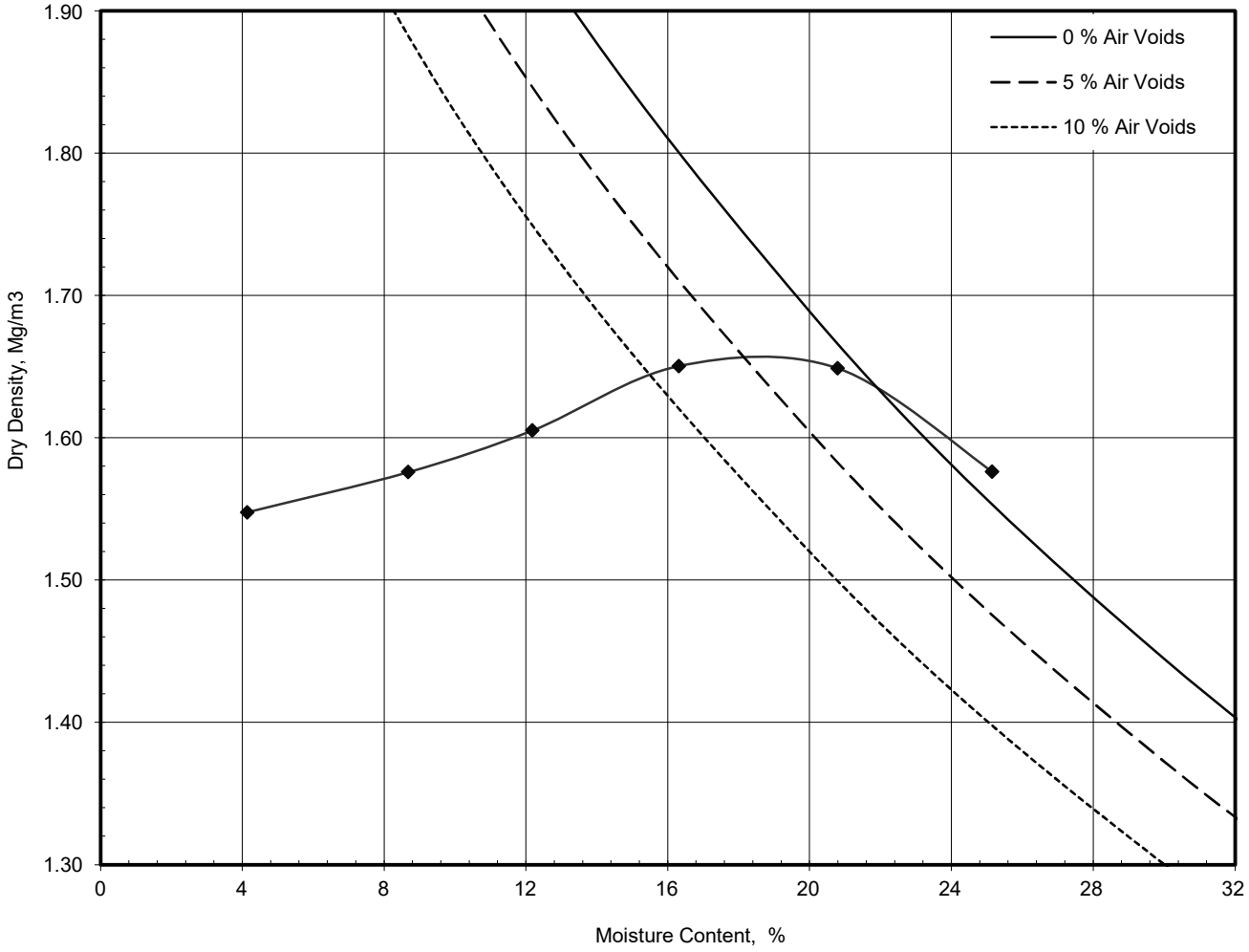
Preparation		Material used was air dried
Mould Type		One Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	2
Particle Density - Measured using gas jar	Mg/m³	2.62

Maximum Dry Density	Mg/m³	**1.55**

Optimum Moisture Content	%	**16**

Comments	Date	Checked By	Approved	UKAS Accredited Laboratory No. 20632
	13/06/2022 14:01		N. O'Brien	

EXPLORATION & TESTING ASSOCIATES	**Dry Density / Moisture Content Relationship Light Compaction**			Job Ref	**D10557**
				Borehole / Pit No	TP06_1.80-4-00
Site Name	**Envision, Washington**			Sample No	MS2086/1
Soil Description	Brown, Slightly Sandy, Very Slightly Gravelly CLAY			Depth	0.00 m
Specimen Ref.		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.3, 2.5kg rammer			Keylab ID	EAT_2022061312
				Compaction Test Reference/No.	



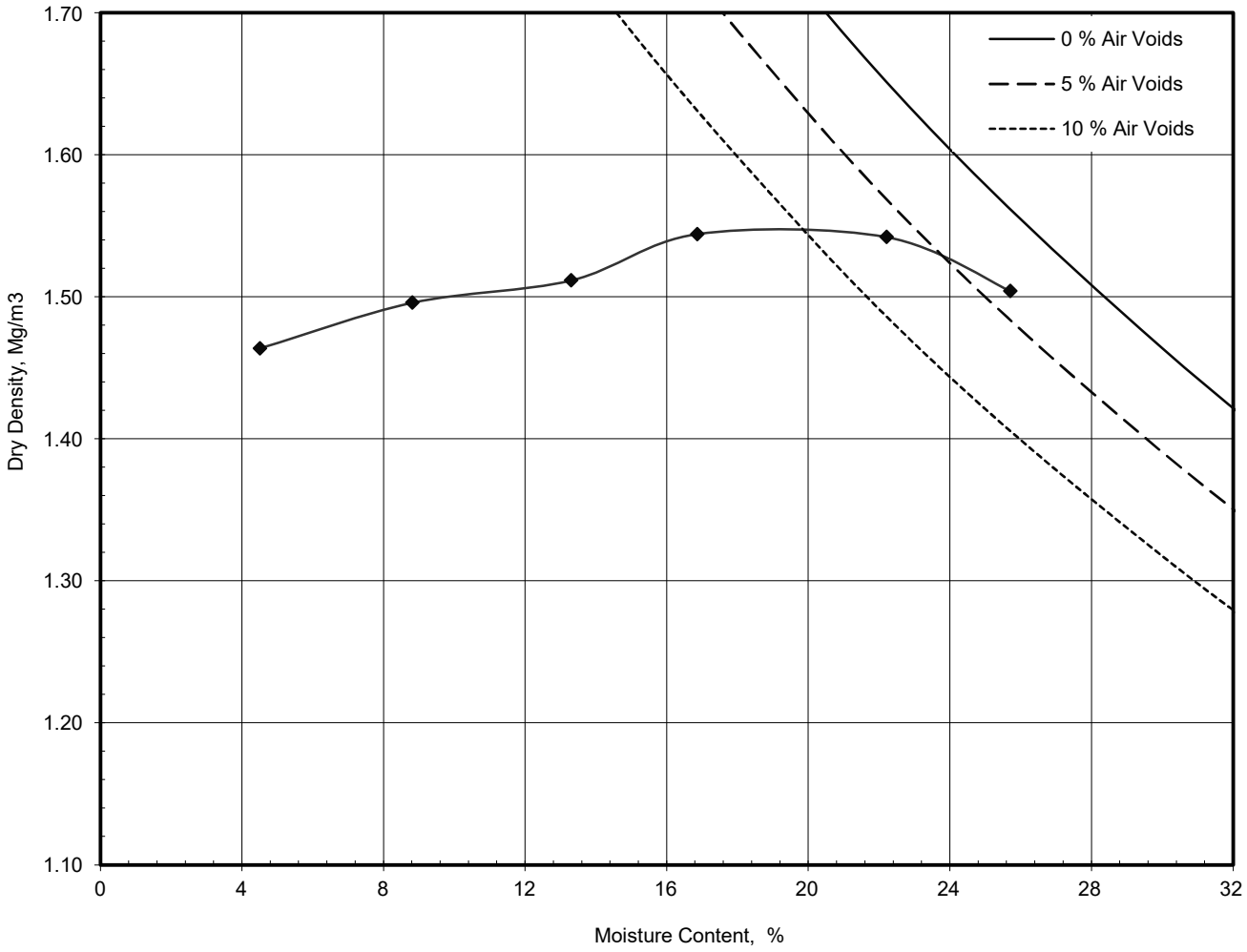
Preparation		Material used was air dried
Mould Type		One Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	1
Particle Density - Measured using gas jar	Mg/m³	2.55

Maximum Dry Density	Mg/m³	**1.65**

Optimum Moisture Content	%	**18**

Comments	Date	Checked By	Approved	UKAS Accredited Laboratory No. 20632
	13/06/2022 14:03		N. O'Brien	

EXPLORATION & TESTING ASSOCIATES	**Dry Density / Moisture Content Relationship Light Compaction**			Job Ref	**D10557**
				Borehole / Pit No	TP06_050-2-80
Site Name	**Envision, Washington**			Sample No	MS2085/1
Soil Description	Brown, Slightly Sandy, Very Slightly Gravelly CLAY			Depth	0.00 m
Specimen Ref.		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.3, 2.5kg rammer			Keylab ID	EAT_202206138
				Compaction Test Reference/No.	



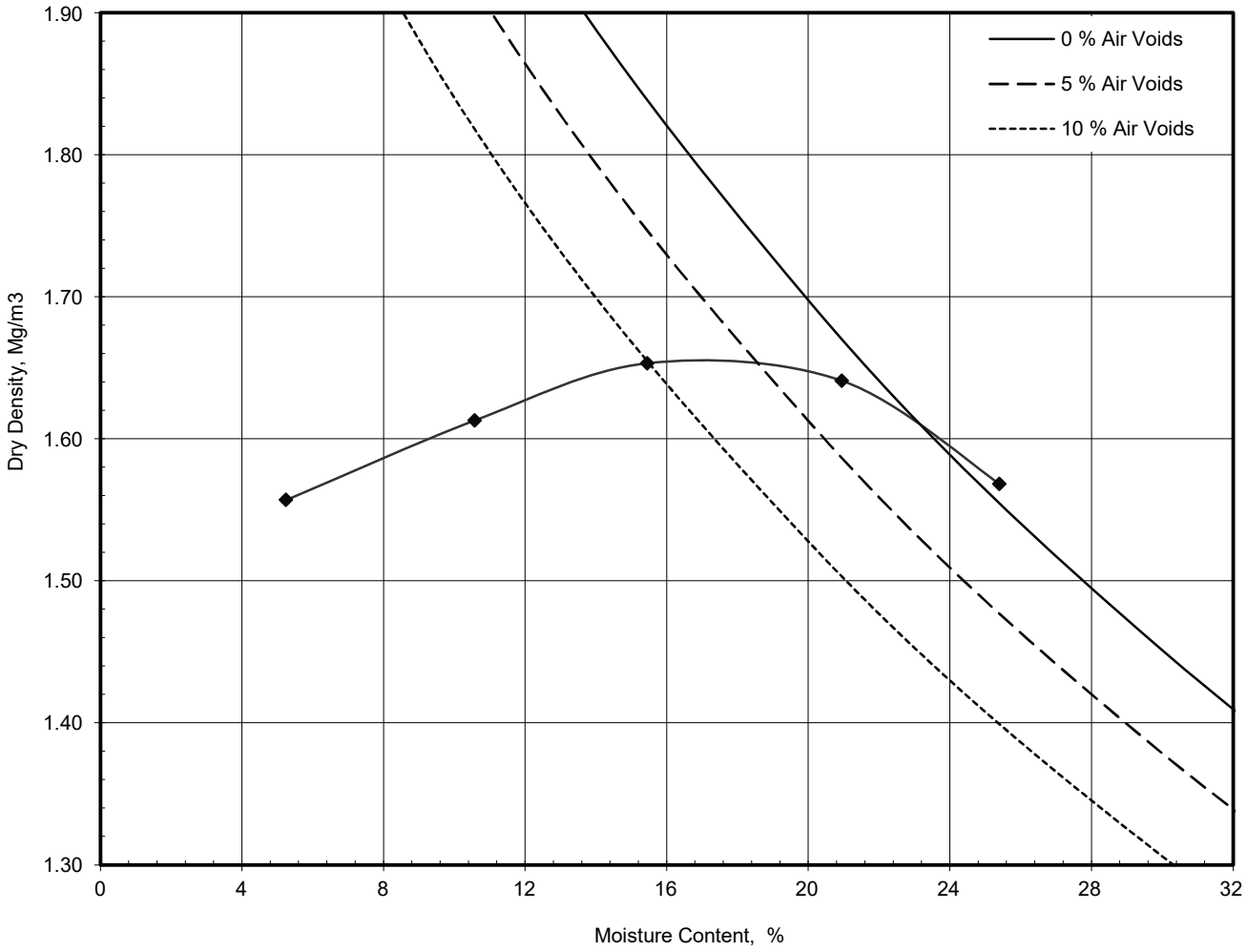
Preparation		Material used was air dried
Mould Type		One Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	1
Particle Density - Measured using gas jar	Mg/m³	2.61

Maximum Dry Density	Mg/m³	**1.54**

Optimum Moisture Content	%	**17**

Comments	Date	Checked By	Approved	UKAS Accredited Laboratory No. 20632
	13/06/2022 14:00		N. O'Brien	

EXPLORATION & TESTING ASSOCIATES	**Dry Density / Moisture Content Relationship Light Compaction**			Job Ref	**D10557**
				Borehole / Pit No	TP06_1.80-4-00
Site Name	**Envision, Washington**			Sample No	MS2086/2
Soil Description	Brown, Slightly Sandy, Very Slightly Gravelly CLAY			Depth	0.00 m
Specimen Ref.		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.3, 2.5kg rammer			Keylab ID	EAT_2022061313
				Compaction Test Reference/No.	



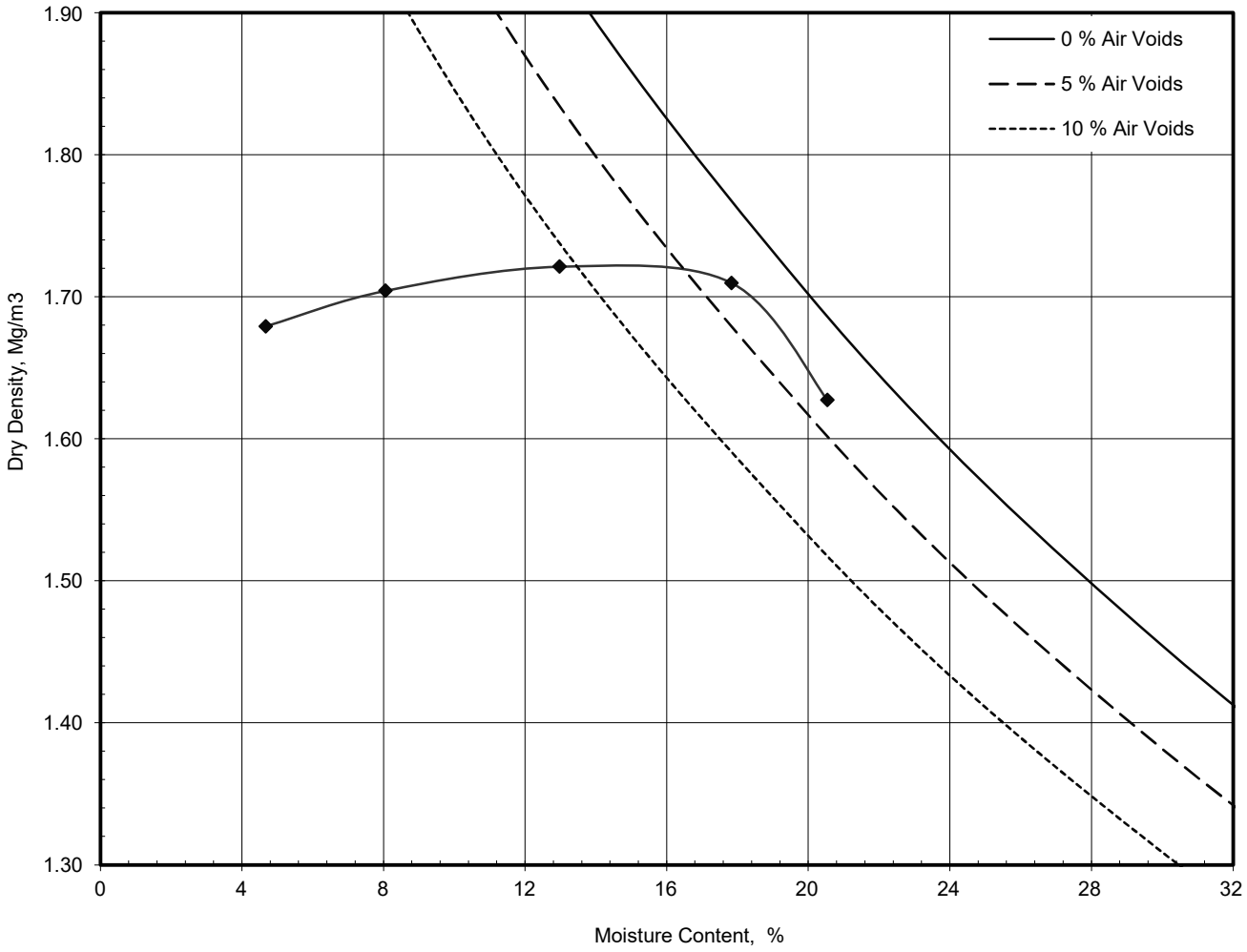
Preparation		Material used was air dried
Mould Type		One Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	2
Particle Density - Measured using gas jar	Mg/m³	2.57

Maximum Dry Density	Mg/m³	**1.65**

Optimum Moisture Content	%	**17**

Comments	Date	Checked By	Approved	UKAS Accredited Laboratory No. 20632
	13/06/2022 14:06		N. O'Brien	

EXPLORATION & TESTING ASSOCIATES	**Dry Density / Moisture Content Relationship Light Compaction**			Job Ref	**D10557**
				Borehole / Pit No	TP07_060-2-00
Site Name	**Envision, Washington**			Sample No	MS2084/1
Soil Description	Brown, Slightly Sandy, Very Slightly Gravelly CLAY			Depth	0.00 m
Specimen Ref.		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.3, 2.5kg rammer			Keylab ID	EAT_202206134
				Compaction Test Reference/No.	



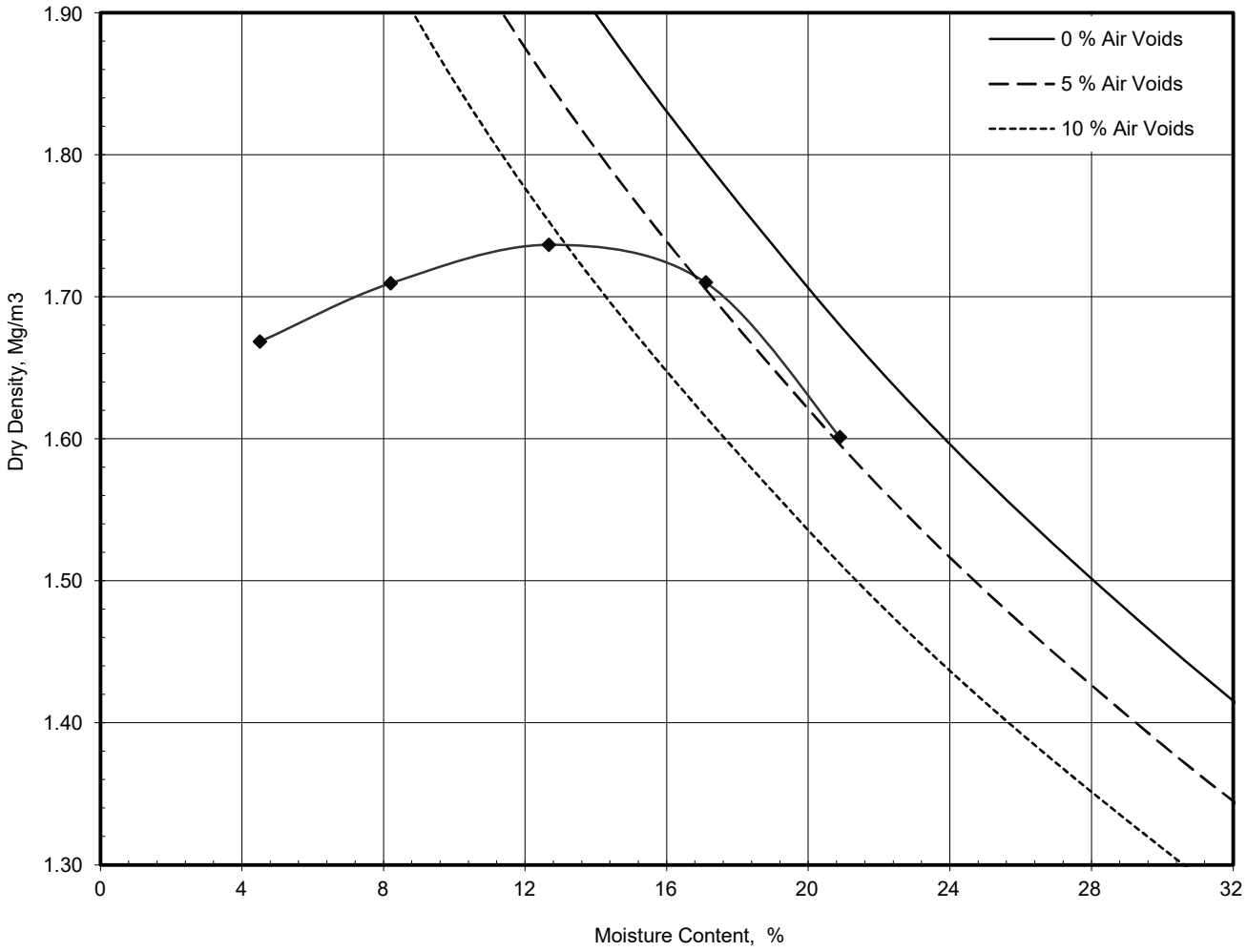
Preparation		Material used was air dried
Mould Type		One Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	1
Particle Density - Measured using gas jar	Mg/m³	2.58

Maximum Dry Density	Mg/m³	**1.72**

Optimum Moisture Content	%	**17**

Comments	Date	Checked By	Approved	UKAS Accredited Laboratory No. 20632
	13/06/2022 13:56		N. O'Brien	

EXPLORATION & TESTING ASSOCIATES	**Dry Density / Moisture Content Relationship Light Compaction**			Job Ref	**D10557**
				Borehole / Pit No	TP07_060-2-00
Site Name	**Envision, Washington**			Sample No	MS2084/2
Soil Description	Brown, Slightly Sandy, Very Slightly Gravelly CLAY			Depth	0.00 m
Specimen Ref.		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.3, 2.5kg rammer			Keylab ID	EAT_202206135
				Compaction Test Reference/No.	



Preparation		Material used was air dried
Mould Type		One Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	1
Particle Density - Measured using gas jar	Mg/m³	2.59

Maximum Dry Density	Mg/m³	**1.74**

Optimum Moisture Content	%	**13**

Comments	Date	Checked By	Approved	UKAS Accredited Laboratory No. 20632
	13/06/2022 13:57		N. O'Brien	

EXPLORATION
& TESTING ASSOCIATES

Unit 8B Bowburn South Industrial Estate
Durham, DH6 5AD T: 0191 389 6543

UKAS TESTING

Laboratory Test Report

Client	Groundwork Services (Durham) Limited
Address	Littleburn Industrial Estate Langley Moor Durham DH7 8HJ
F.A.O	Paul Barton / Ben Johnson
Project Number:	D10557C
Report Number:	L22-481
Date Received:	16th June 2022

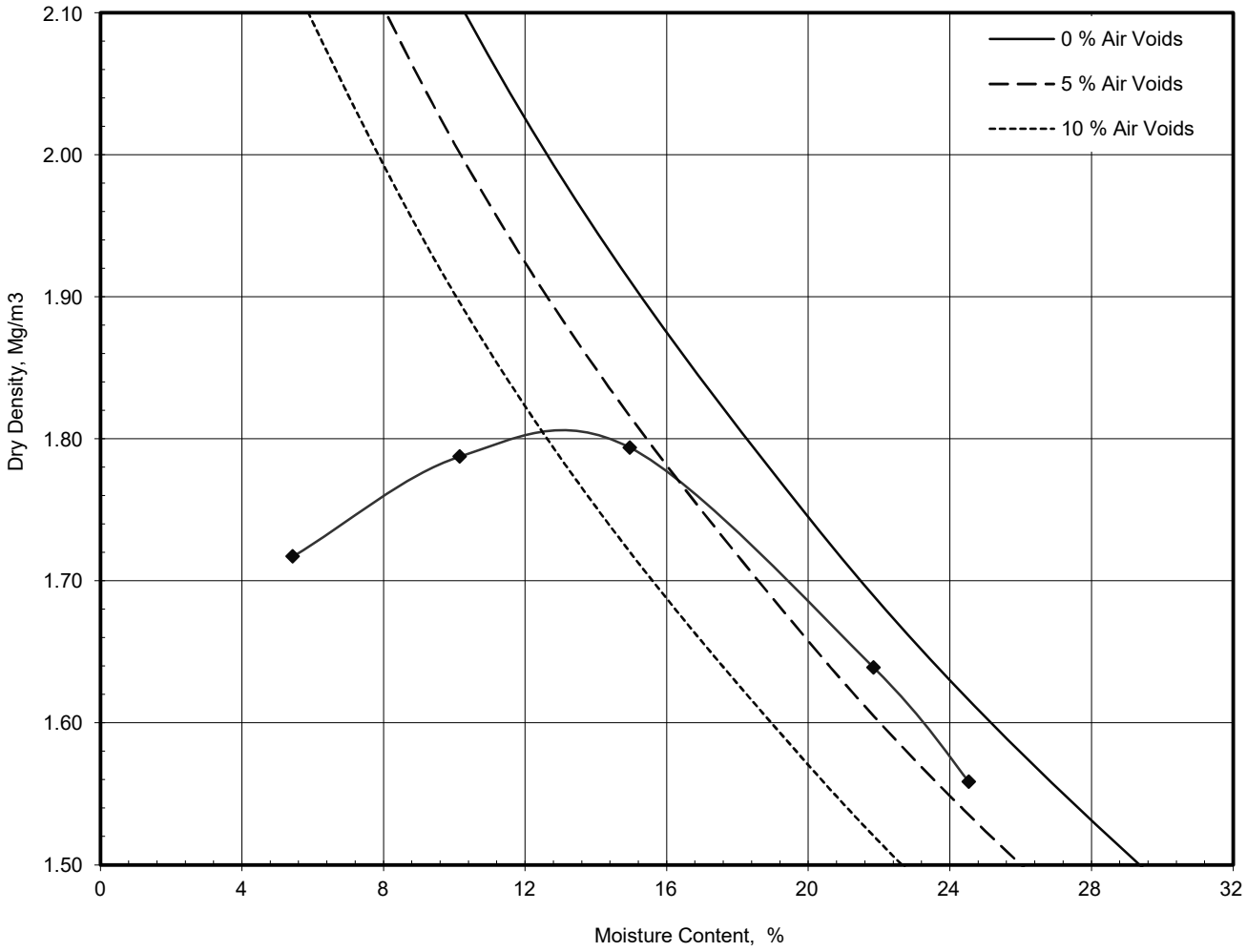
Testing Required:	Determination of Maximum Dry Density / Optimum Moisture Content by 2.5kg Rammer - BS:1377-4:1990 Particle Density by Gas Jar - BS:1377-2:1990 Clause 8.2
Date Started:	16th June 2022
Date Finished:	30th June 2022

Report Issue Date:	30th June 2022
Reviewed By:	
	N. Hodson - Materials Director
Authorised By:	
	N O'Brien - Laboratory Manager
Remarks:	(*) denotes testing is outside of UKAS Scope of Accreditation.
	(+) denotes subcontracted testing.

Samples will be stored for one month after the report has been issue before being disposed of.

The published results appertain only to the specimens tested.

EXPLORATION & TESTING ASSOCIATES	**Dry Density / Moisture Content Relationship Light Compaction**			Job Ref	**D10557C**
				Borehole / Pit No	CLAY
Site Name	**Giga One, Washington**			Sample No	MS2143/1
Soil Description	Brown, Slightly Sandy CLAY with Small Granite Particles			Depth	0.00 m
Specimen Ref.		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.3, 2.5kg rammer			Keylab ID	EAT_20220621109
				Compaction Test Reference/No.	



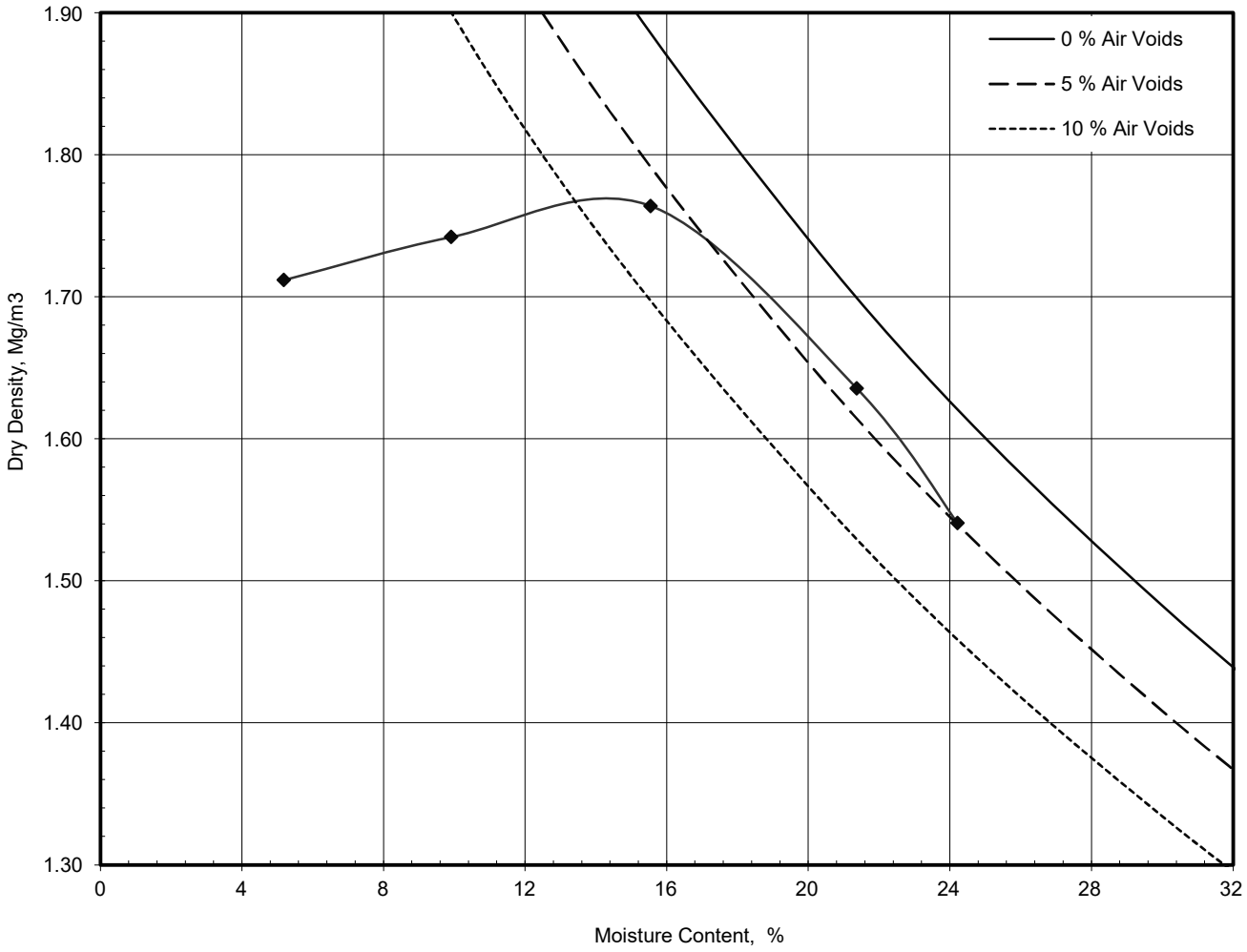
Preparation		Material used was air dried
Mould Type		One Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	0
Particle Density - Measured using gas jar	Mg/m³	2.68

Maximum Dry Density	Mg/m³	**1.79**

Optimum Moisture Content	%	**15**

Comments	Date	Checked By	Approved	UKAS Accredited Laboratory No. 20632
	30/06/2022 11:57	N. Hodson	N. O'Brien	

EXPLORATION & TESTING ASSOCIATES	**Dry Density / Moisture Content Relationship Light Compaction**			Job Ref	**D10557C**
				Borehole / Pit No	CLAY
Site Name	**Giga One, Washington**			Sample No	MS2143/2
Soil Description	Brown, Slightly Sandy CLAY			Depth	0.00 m
Specimen Ref.		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.3, 2.5kg rammer			Keylab ID	EAT_20220621110
				Compaction Test Reference/No.	



Preparation		Material used was air dried
Mould Type		One Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	0
Particle Density - Measured using gas jar	Mg/m³	2.67

Maximum Dry Density	Mg/m³	**1.76**

Optimum Moisture Content	%	**16**

Comments	Date	Checked By	Approved	UKAS Accredited Laboratory No. 20632
	30/06/2022 11:58	N. Hodson	N. O'Brien	

EXPLORATION & TESTING ASSOCIATES

Particle Density by Gas Jar - Summary of Results

Project No.	Project Name
D10557C	Giga One Envision, Washington

Hole No.	Sample				Soil Description at test horizon	Particle Density Mg/m^3	Remarks
	Ref	Top	Base	Type			
CLAY	MS2143/1	0.00		B	Brown, Slightly Sandy, Slightly Gravelly CLAY	2.68	
CLAY	MS2143/2	0.00		B	Brown, Slightly Sandy, Slightly Gravelly CLAY	2.67	

Notes
Tests performed in accordance with BS 1377 unless annotated otherwise.
Gas Jar tests to BS1377: Part 2 : 1990, clause 8.2

Comments

Date: 30/06/2022 12:00

Approved: N O'Brien

UKAS Accredited Laboratory No. 20632

EXPLORATION
& TESTING ASSOCIATES

Unit 8B Bowburn South Industrial Estate
Durham, DH6 5AD T: 0191 389 6543

UKAS TESTING

Test Report

Client	Groundwork Services (Durham) Limited
Address	Littleburn Industrial Estate Langley Moor Durham DH7 8HJ
F.A.O	Paul Barton
Project:	Giga One Factory, Washington
Project Number:	D10557D
Report Number:	L22-443
Date Received:	18th June 2022

Testing Required:	Moisture Content - BS:1377-2:1990
Date Started:	21st June 2022
Date Finished:	22nd June 2022

Report Issue Date:	23rd June 2022
Reviewed By:	
	Natalie Hodson - Materials Director
Authorised By:	
	Nik O'Brien - Laboratory Manager
Remarks:	(*) denotes testing is outside of UKAS Scope of Accreditation.
	(+) denotes subcontracted testing.

Samples will be stored for one month after the report has been issue before being disposed of.

The published results appertain only to the specimens tested.

EXPLORATION & TESTING ASSOCIATES

Determination of Moisture Content

Project No.	Project Name
D10557D	Giga One, Envision

Hole No.	Sample			Soil Description	Moisture Content %	Passing 425µm %	Liquid Limit %	Plastic Limit %	Plasticity Index %	Remarks
	Type	Ref	Depth							
Clay	B	MS2161/1	0.00	Brown, Slightly Sandy CLAY	16					
Clay	B	MS2161/2	0.00	Brown, Slightly Sandy CLAY	16					
Clay	B	MS2161/3	0.00	Brown, Slightly Sandy CLAY	16					

Moisture Content carried out in accordance with BS 1377: Part 2: 1990: Clause 3.2

Date	Approved By	
	N Hodson	UKAS Accredited Laboratory No. 20632
23/06/2022 16:47		

EXPLORATION
& TESTING ASSOCIATES

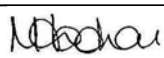
Unit 8B Bowburn South Industrial Estate
Durham, DH6 5AD T: 0191 389 6543

UKAS TESTING

Laboratory Test Report

Client	Groundwork Services (Durham) Limited
Address	Littleburn Industrial Estate Langley Moor Durham DH7 8HJ
F.A.O	Paul Barton / Ben Johnson
Project Number:	D10557E
Report Number:	L22-482
Date Received:	20th June 2022

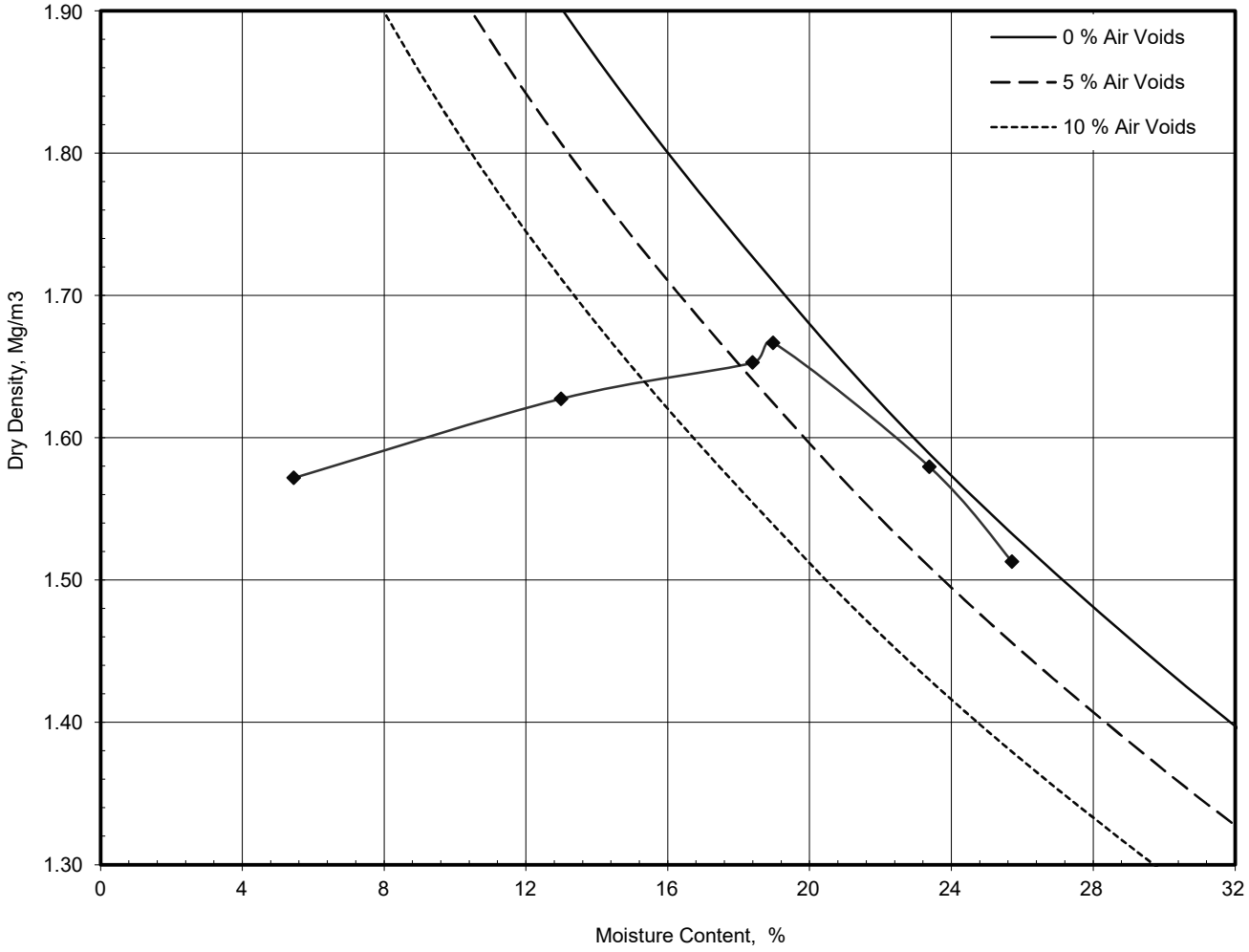
Testing Required:	Determination of Maximum Dry Density / Optimum Moisture Content by 2.5kg Rammer - BS:1377-4:1990 Particle Density by Gas Jar - BS:1377-2:1990 Clause 8.2
Date Started:	21st June 2022
Date Finished:	30th June 2022

Report Issue Date:	30th June 2022
Reviewed By:	
	N. Hodson - Materials Director
Authorised By:	
	N O'Brien - Laboratory Manager
Remarks:	(*) denotes testing is outside of UKAS Scope of Accreditation.
	(+) denotes subcontracted testing.

Samples will be stored for one month after the report has been issue before being disposed of.

The published results appertain only to the specimens tested.

EXPLORATION & TESTING ASSOCIATES	Dry Density / Moisture Content Relationship Light Compaction			Job Ref	D10557E
				Borehole / Pit No	MS2163
Site Name	Giga One, Washington			Sample No	Site
Soil Description	Brown, Slightly Sandy, Slightly Gravelly CLAY			Depth	0.00 m
Specimen Ref.		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.3, 2.5kg rammer			Keylab ID	EAT_2022062931
				Compaction Test Reference/No.	



Preparation		Material used was air dried
Mould Type		One Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	5
Particle Density - Assumed	Mg/m³	2.53

Maximum Dry Density	Mg/m³	**1.67**

Optimum Moisture Content	%	**19**

Comments	Date	Checked By	Approved	UKAS Accredited Laboratory No. 20632
	30/06/2022 12:21	N. Hodson	N. O'Brien	

EXPLORATION
& TESTING ASSOCIATES

Particle Density by Gas Jar - Summary of Results

Project No.	Project Name
D10557E	Giga One, Envision, Washington

Hole No.	Sample				Soil Description at test horizon	Particle Density Mg/m^3	Remarks
	Ref	Top	Base	Type			
MS2163		0.00		B	Brown, Slightly Sandy, Slightly Gravelly CLAY	2.53	

Notes
Tests performed in accordance with BS 1377 unless annotated otherwise.
Gas Jar tests to BS1377: Part 2 : 1990, clause 8.2

Comments

Date	Approved
30/06/2022 12:23	N O'Brien

UKAS Accredited Laboratory No. 20632

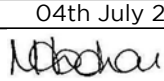
EXPLORATION & TESTING ASSOCIATES
Unit 8B Bowburn South Industrial Estate
Durham, DH6 5AD T: 0191 389 6543

UKAS TESTING

Laboratory Test Report

Client	Groundwork Services (Durham) Limited
Address	Littleburn Industrial Estate Langley Moor Durham DH7 8HJ
F.A.O	Paul Barton / Ben Johnson
Project Number:	D10557P
Report Number:	L22-496
Date Received:	01st July 2022

Testing Required:	Determination of Maximum Dry Density / Optimum Moisture Content by 2.5kg Rammer - BS:1377-4:1990 Particle Density by Gas Jar - BS:1377-2:1990 Clause 8.2
Date Started:	01st July 2022
Date Finished:	04th July 2022

Report Issue Date:	04th July 2022
Reviewed By:	
	N. Hodson - Materials Director
Authorised By:	
	N O'Brien - Laboratory Manager
Remarks:	(*) denotes testing is outside of UKAS Scope of Accreditation.
	(+) denotes subcontracted testing.

Samples will be stored for one month after the report has been issue before being disposed of.

The published results appertain only to the specimens tested.

EXPLORATION & TESTING ASSOCIATES

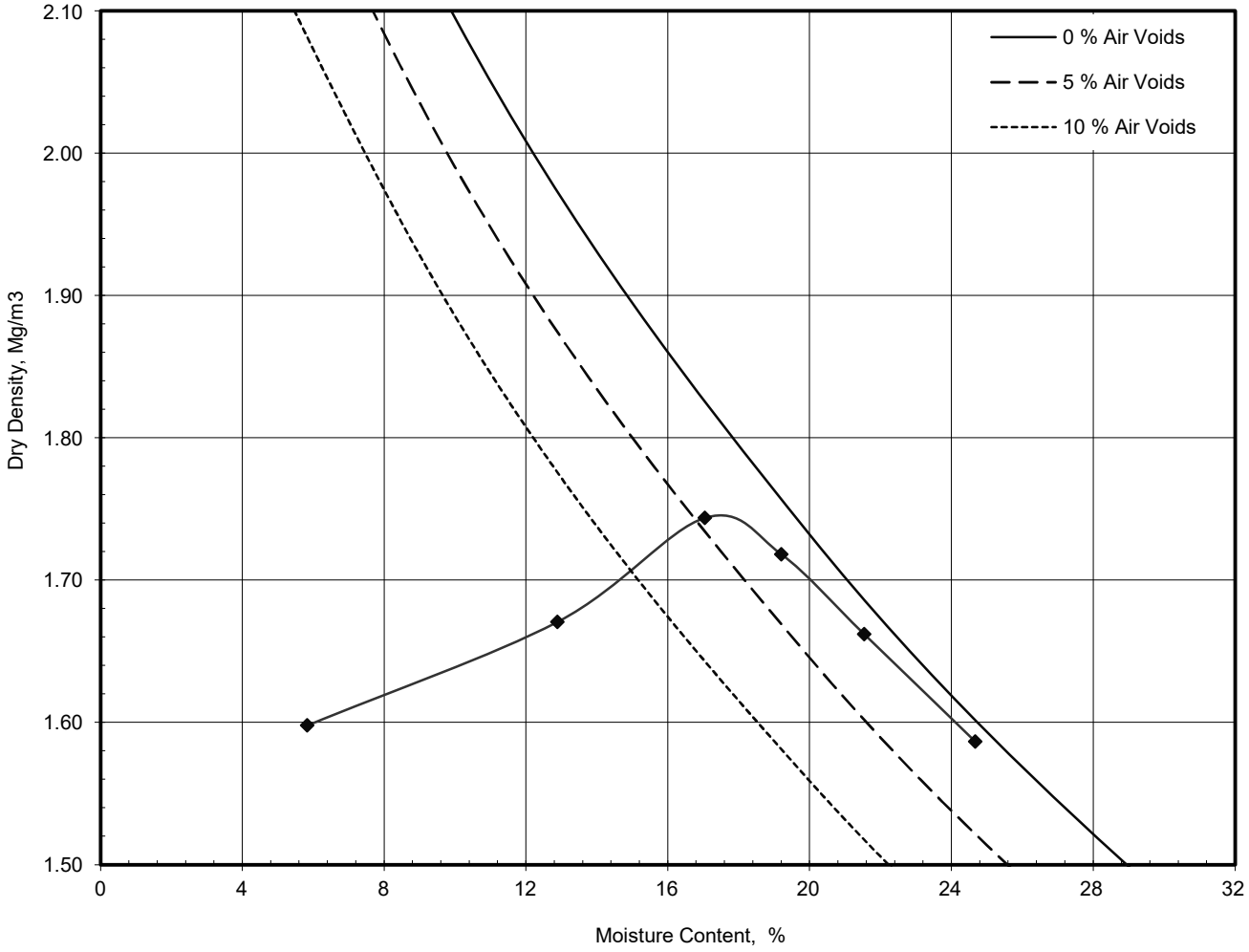
Particle Density by Gas Jar - Summary of Results

Project No.	Project Name
D10557P	Giga One, Envision

Hole No.	Sample				Soil Description at test horizon	Particle Density Mg/m^3	Remarks
	Ref	Top	Base	Type			
Site	MS2212/1	0.00		B	Brown slightly sandy CLAY	2.65	
Site	MS2212/10	0.00		B	Brown slightly sandy CLAY	2.62	
Site	MS2212/2	0.00		B	Brown slightly sandy CLAY	2.64	
Site	MS2212/3	0.00		B	Brown slightly sandy CLAY	2.62	
Site	MS2212/4	0.00		B	Brown slightly sandy CLAY	2.61	
Site	MS2212/5	0.00		B	Brown slightly sandy CLAY	2.65	
Site	MS2212/6	0.00		B	Brown slightly sandy CLAY	2.61	
Site	MS2212/7	0.00		B	Brown slightly sandy CLAY	2.64	
Site	MS2212/8	0.00		B	Brown slightly sandy CLAY	2.61	
Site	MS2212/9	0.00		B	Brown slightly sandy CLAY	2.60	

Notes	Comments	Date	Approved	
Tests performed in accordance with BS 1377 unless annotated otherwise. Gas Jar tests to BS1377: Part 2 : 1990, clause 8.2		04/07/2022 09:38	N O'Brien	UKAS Accredited Laboratory No. 20632

EXPLORATION & TESTING ASSOCIATES	**Dry Density / Moisture Content Relationship Light Compaction**			Job Ref	**D10557P**
				Borehole / Pit No	Site
Site Name	**Giga One, Envision**			Sample No	MS2212/1
Soil Description	Brown slightly sandy CLAY			Depth	0.00 m
Specimen Ref.		Specimen Depth	0 m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.3, 2.5kg rammer			Keylab ID	EAT_202207040
				Compaction Test Reference/No.	



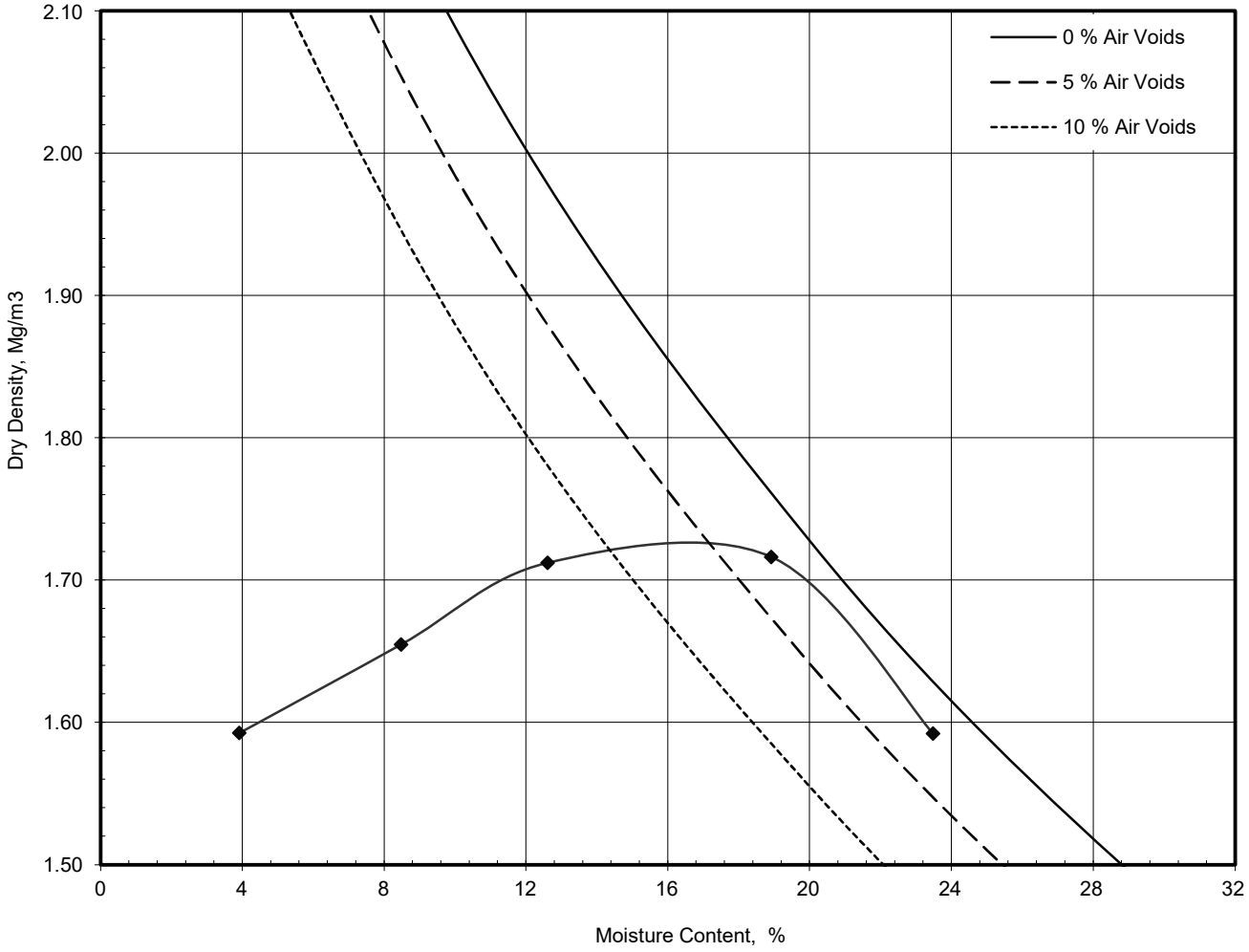
Preparation		Material used was air dried
Mould Type		One Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	0
Particle Density - Measured using gas jar	Mg/m³	2.65

Maximum Dry Density	Mg/m³	**1.74**

Optimum Moisture Content	%	**18**

Comments	Date	Checked By	Approved	UKAS Accredited Laboratory No. 20632
	04/07/2022 09:27	J. Round	N. O'Brien	

EXPLORATION & TESTING ASSOCIATES	**Dry Density / Moisture Content Relationship Light Compaction**			Job Ref	**D10557P**
				Borehole / Pit No	Site
Site Name	**Giga One, Envision**			Sample No	MS2212/2
Soil Description	Brown slightly sandy CLAY			Depth	0.00 m
Specimen Ref.		Specimen Depth	0 m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.3, 2.5kg rammer			Keylab ID	EAT_202207041
				Compaction Test Reference/No.	



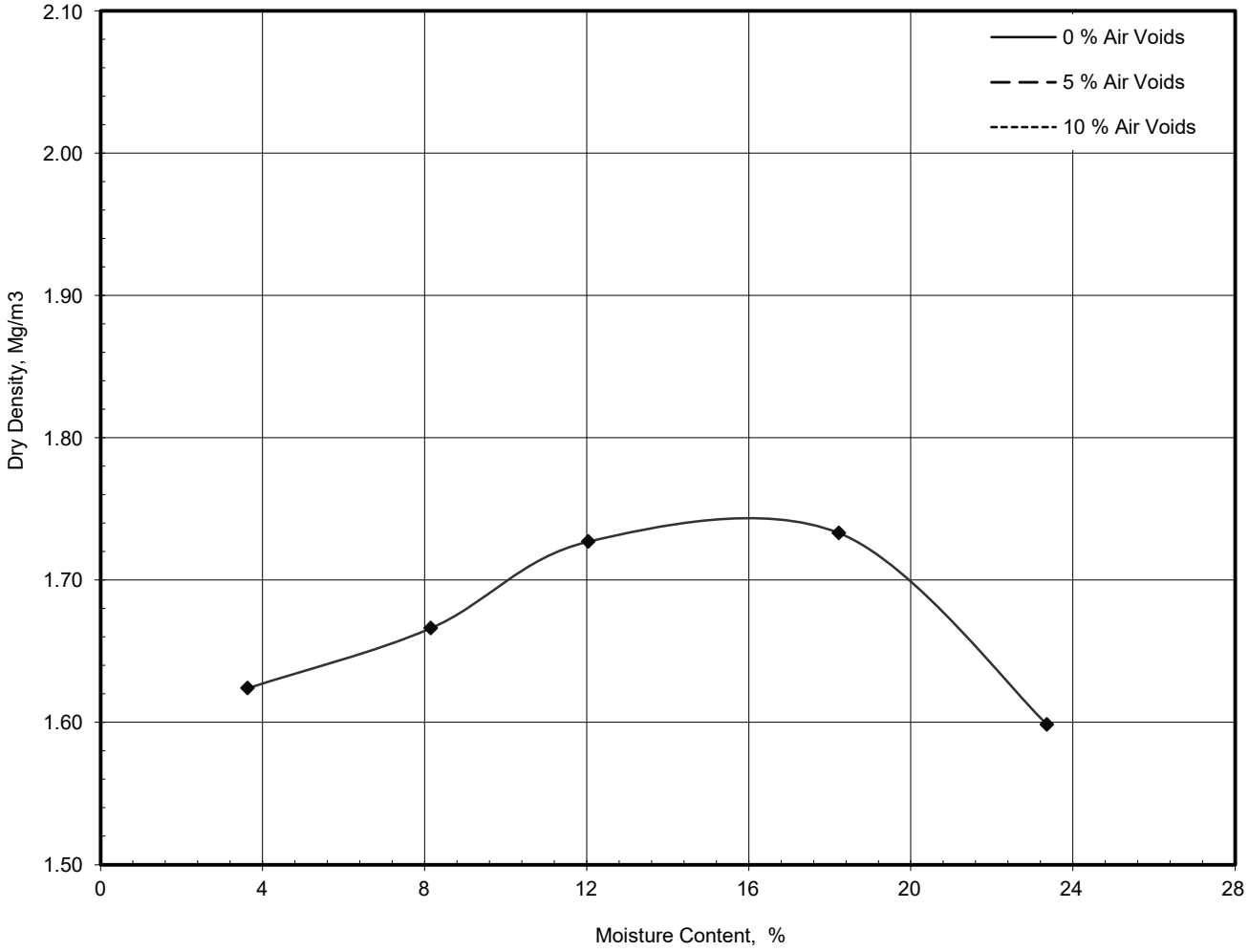
Preparation		Material used was air dried
Mould Type		One Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	0
Particle Density - Measured using gas jar	Mg/m³	2.64

Maximum Dry Density	Mg/m³	**1.72**

Optimum Moisture Content	%	**16**

Comments	Date	Checked By	Approved	UKAS Accredited Laboratory No. 20632
	04/07/2022 09:30	N. Hodson	N. O'Brien	

EXPLORATION & TESTING ASSOCIATES	**Dry Density / Moisture Content Relationship Light Compaction**			Job Ref	**D10557P**
				Borehole / Pit No	Site
Site Name	**Giga One, Envision**			Sample No	MS2212/3
Soil Description	Brown slightly sandy CLAY			Depth	0.00 m
Specimen Ref.		Specimen Depth	0 m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.3, 2.5kg rammer			Keylab ID	EAT_202207042
				Compaction Test Reference/No.	



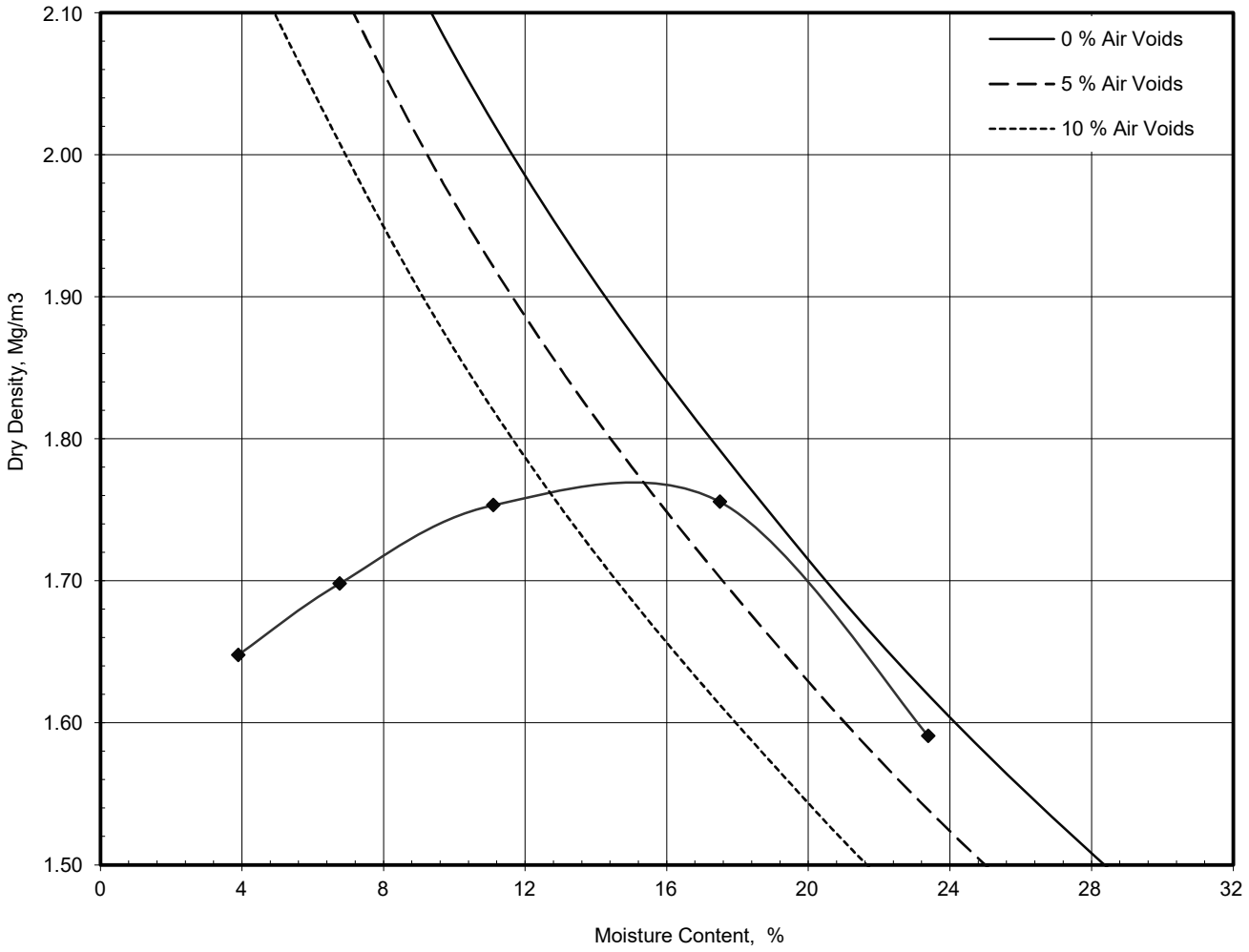
Preparation		Material used was air dried
Mould Type		One Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	0
Particle Density - Measured using gas jar	Mg/m³	2..63

Maximum Dry Density	Mg/m³	**1.73**

Optimum Moisture Content	%	**16**

Comments	Date	Checked By	Approved	
			N. O'Brien	UKAS Accredited Laboratory No. 20632
	04/07/2022 09:32	N. Hodson		

EXPLORATION & TESTING ASSOCIATES	**Dry Density / Moisture Content Relationship Light Compaction**			Job Ref	**D10557P**
				Borehole / Pit No	Site
Site Name	**Giga One, Envision**			Sample No	MS2212/4
Soil Description	Brown slightly sandy CLAY			Depth	0.00 m
Specimen Ref.		Specimen Depth	0 m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.3, 2.5kg rammer			Keylab ID	EAT_202207043
				Compaction Test Reference/No.	



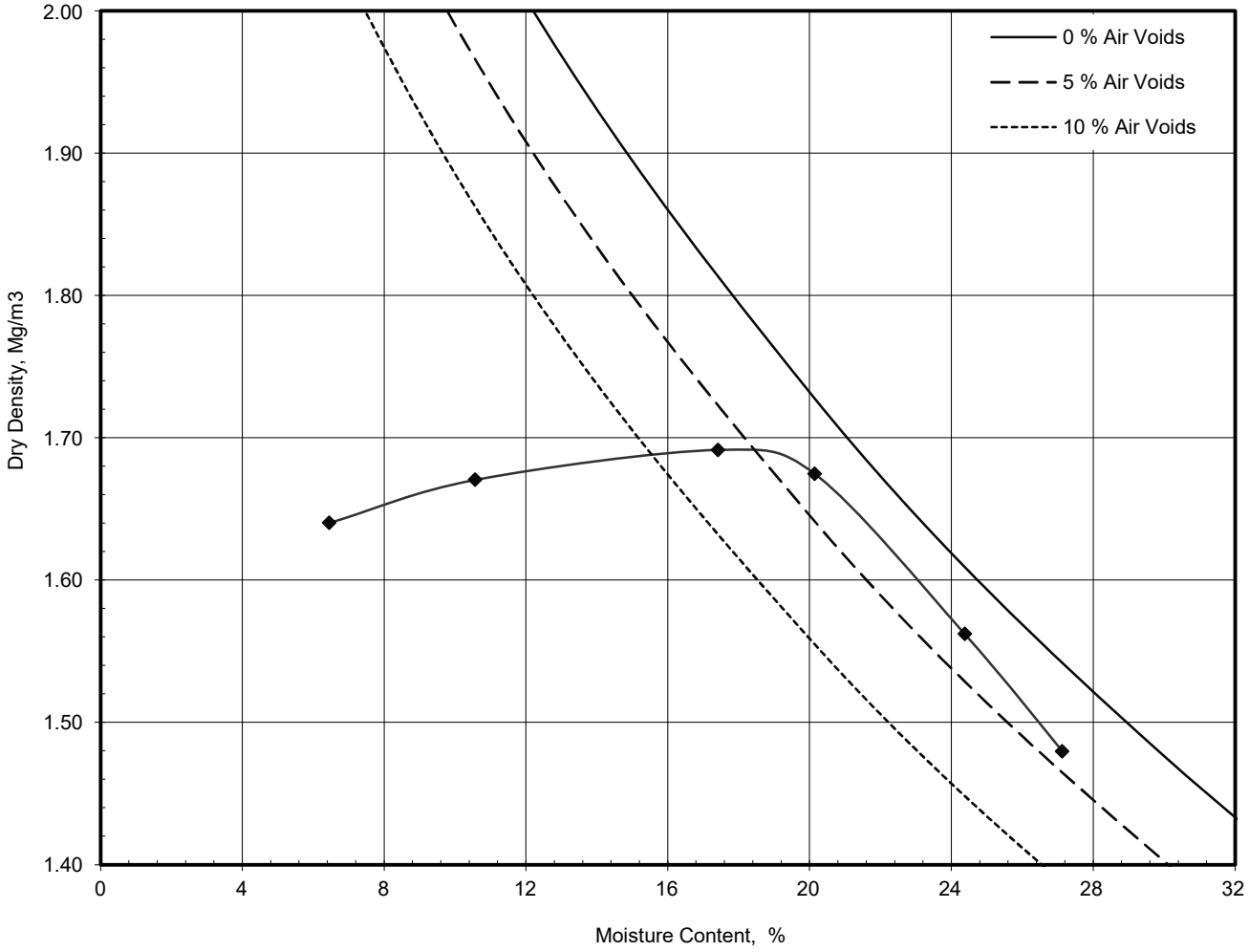
Preparation		Material used was air dried
Mould Type		One Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	0
Particle Density - Measured using gas jar	Mg/m³	2.61

Maximum Dry Density	Mg/m³	**1.76**

Optimum Moisture Content	%	**16**

Comments	Date	Checked By	Approved	UKAS Accredited Laboratory No. 20632
	04/07/2022 09:32	N. Hodson	N. O'Brien	

EXPLORATION & TESTING ASSOCIATES	**Dry Density / Moisture Content Relationship Light Compaction**			Job Ref	**D10557P**
				Borehole / Pit No	Site
Site Name	**Giga One, Envision**			Sample No	MS2212/5
Soil Description	Brown slightly sandy CLAY			Depth	0.00 m
Specimen Ref.		Specimen Depth	0 m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.3, 2.5kg rammer			Keylab ID	EAT_202207044
				Compaction Test Reference/No.	



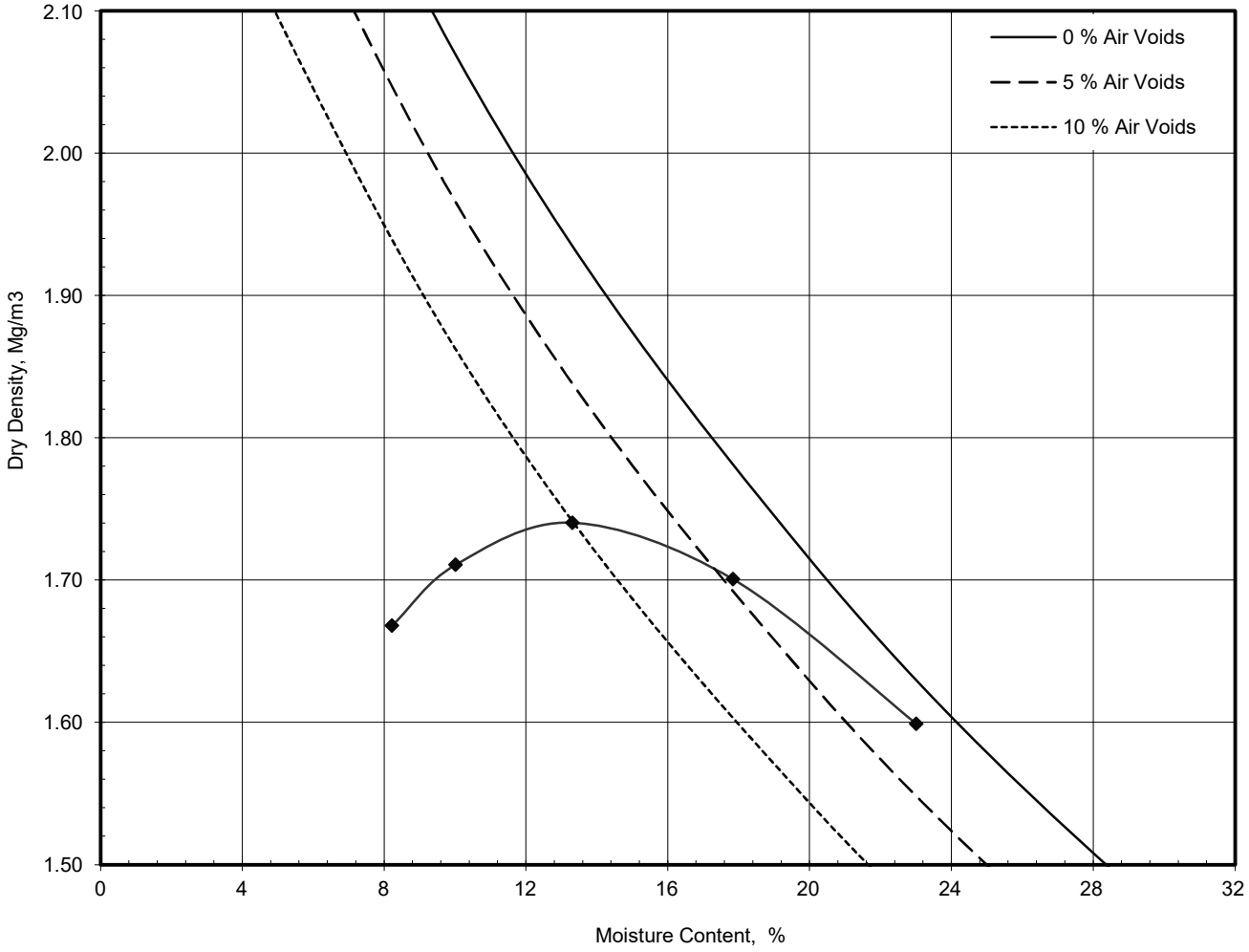
Preparation		Material used was air dried
Mould Type		One Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	0
Particle Density - Measured using gas jar	Mg/m³	2.65

Maximum Dry Density	Mg/m³	**1.69**

Optimum Moisture Content	%	**19**

Comments	Date	Checked By	Approved	UKAS Accredited Laboratory No. 20632
	04/07/2022 09:33	N. Hodson	N. O'Brien	

EXPLORATION & TESTING ASSOCIATES	Dry Density / Moisture Content Relationship Light Compaction			Job Ref	D10557P
				Borehole / Pit No	Site
Site Name	Giga One, Envision			Sample No	MS2212/6
Soil Description	Brown slightly sandy CLAY			Depth	0.00 m
Specimen Ref.		Specimen Depth	0 m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.3, 2.5kg rammer			Keylab ID	EAT_202207045
				Compaction Test Reference/No.	



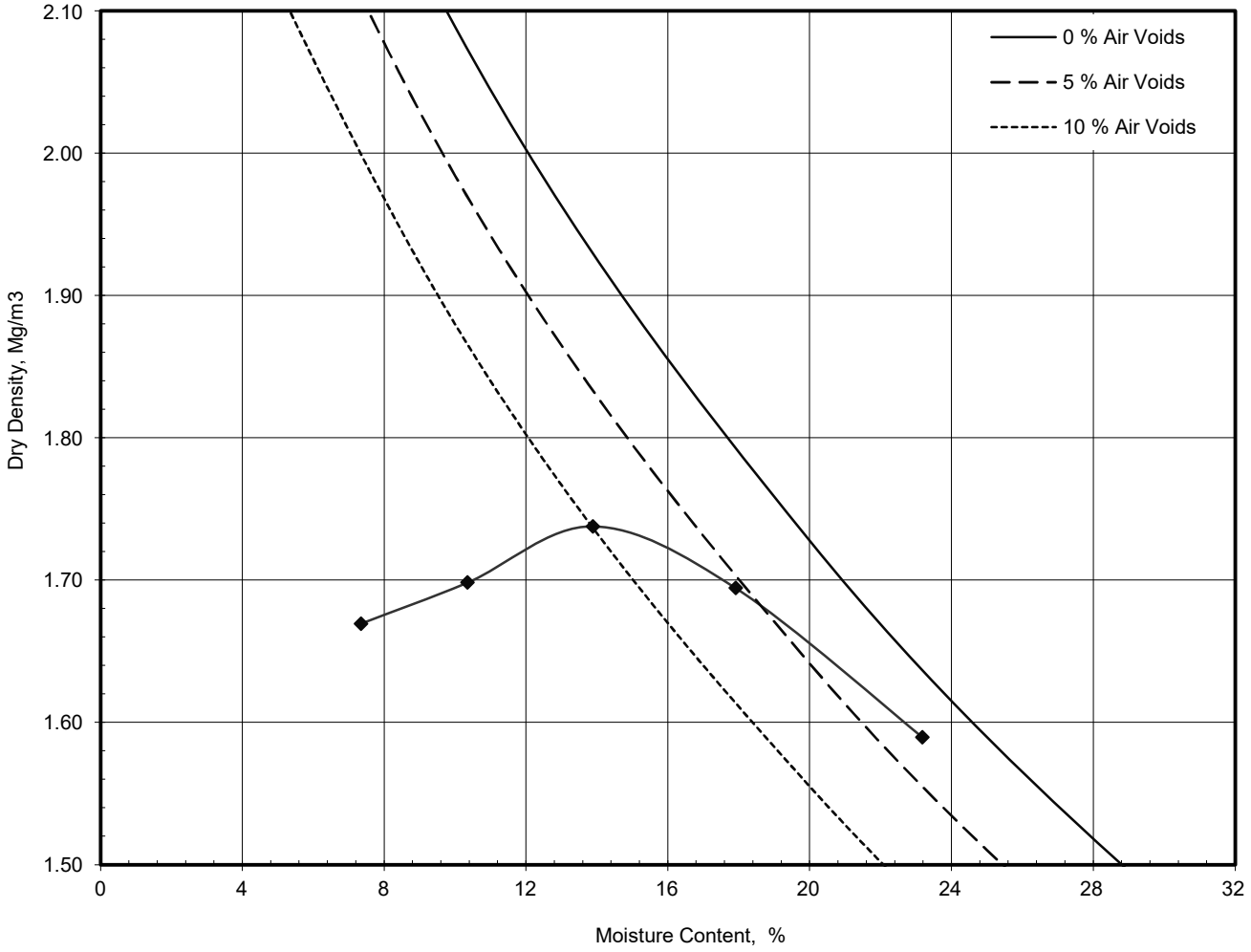
Preparation		Material used was air dried
Mould Type		One Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	0
Particle Density - Measured using gas jar	Mg/m³	2.61

Maximum Dry Density	Mg/m³	**1.74**

Optimum Moisture Content	%	**14**

Comments	Date	Checked By	Approved	UKAS Accredited Laboratory No. 20632
	04/07/2022 09:34	N. Hodson	N. O'Brien	

EXPLORATION & TESTING ASSOCIATES	**Dry Density / Moisture Content Relationship Light Compaction**			Job Ref	**D10557P**
				Borehole / Pit No	Site
Site Name	**Giga One, Envision**			Sample No	MS2212/7
Soil Description	Brown slightly sandy CLAY			Depth	0.00 m
Specimen Ref.		Specimen Depth	0 m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.3, 2.5kg rammer			Keylab ID	EAT_202207046
				Compaction Test Reference/No.	



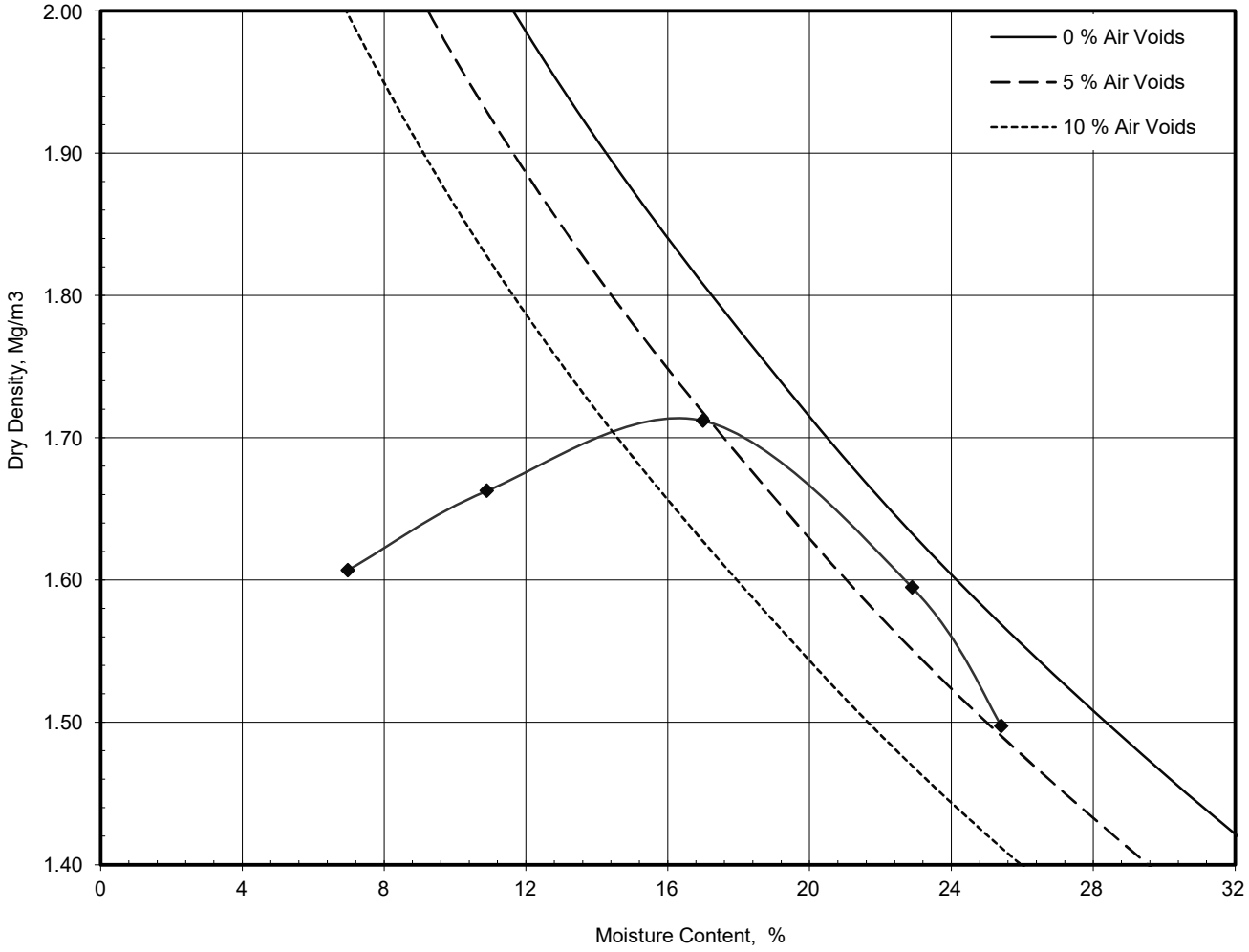
Preparation		Material used was air dried
Mould Type		One Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	0
Particle Density - Measured using gas jar	Mg/m³	2.64

Maximum Dry Density	Mg/m³	**1.74**

Optimum Moisture Content	%	**14**

Comments	Date	Checked By	Approved	UKAS Accredited Laboratory No. 20632
	04/07/2022 09:34	N. Hodson	N. O'Brien	

EXPLORATION & TESTING ASSOCIATES	**Dry Density / Moisture Content Relationship Light Compaction**			Job Ref	**D10557P**
				Borehole / Pit No	Site
Site Name	**Giga One, Envision**			Sample No	MS2212/8
Soil Description	Brown slightly sandy CLAY			Depth	0.00 m
Specimen Ref.		Specimen Depth	0 m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.3, 2.5kg rammer			Keylab ID	EAT_202207047
				Compaction Test Reference/No.	



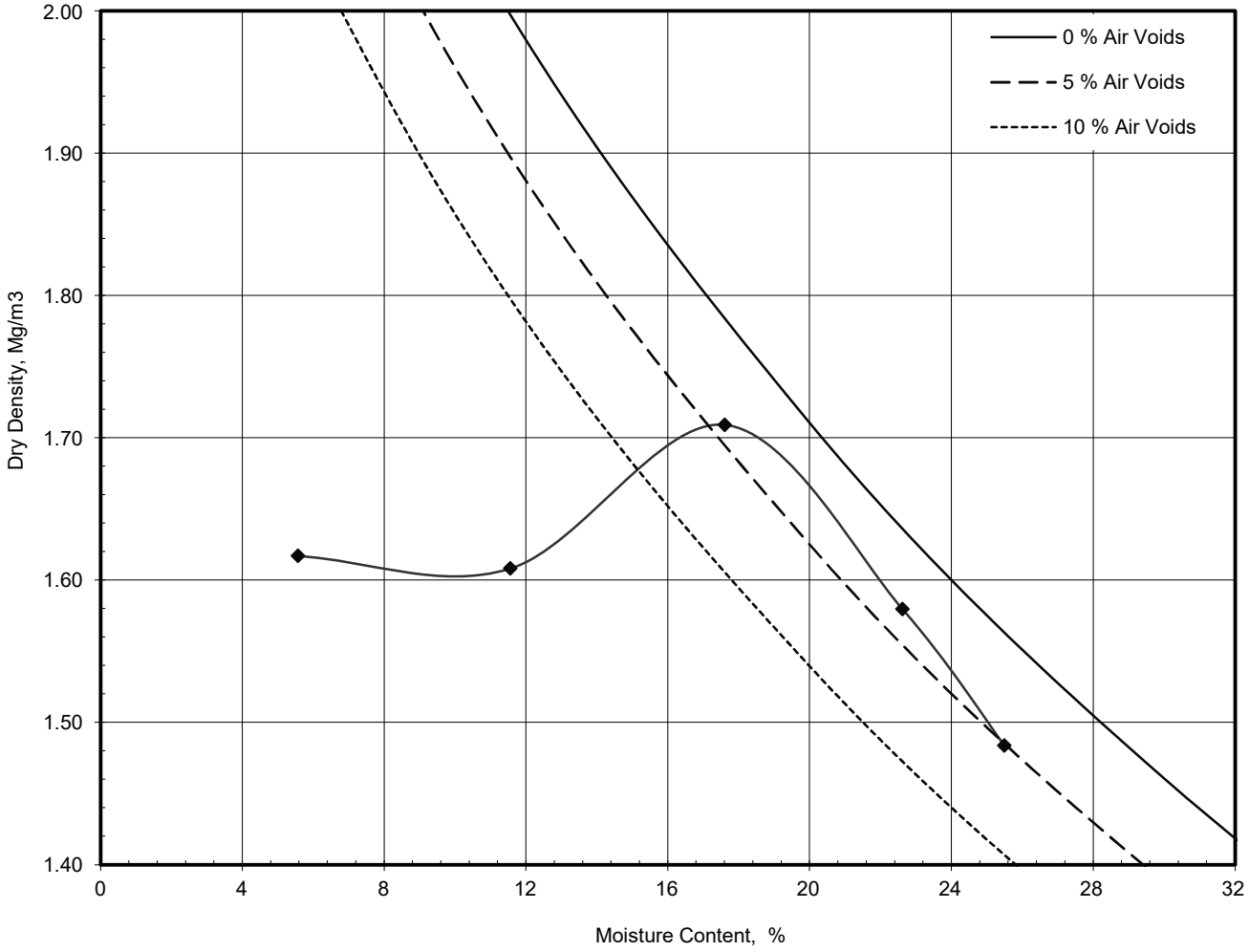
Preparation		Material used was air dried
Mould Type		One Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	0
Particle Density - Measured using gas jar	Mg/m³	2.61

Maximum Dry Density	Mg/m³	**1.71**

Optimum Moisture Content	%	**17**

Comments	Date	Checked By	Approved	UKAS Accredited Laboratory No. 20632
	04/07/2022 09:35	N. Hodson	N. O'Brien	

EXPLORATION & TESTING ASSOCIATES	**Dry Density / Moisture Content Relationship Light Compaction**			Job Ref	**D10557P**
				Borehole / Pit No	Site
Site Name	**Giga One, Envision**			Sample No	MS2212/9
Soil Description	Brown slightly sandy CLAY			Depth	0.00 m
Specimen Ref.		Specimen Depth	0 m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.3, 2.5kg rammer			Keylab ID	EAT_202207048
				Compaction Test Reference/No.	



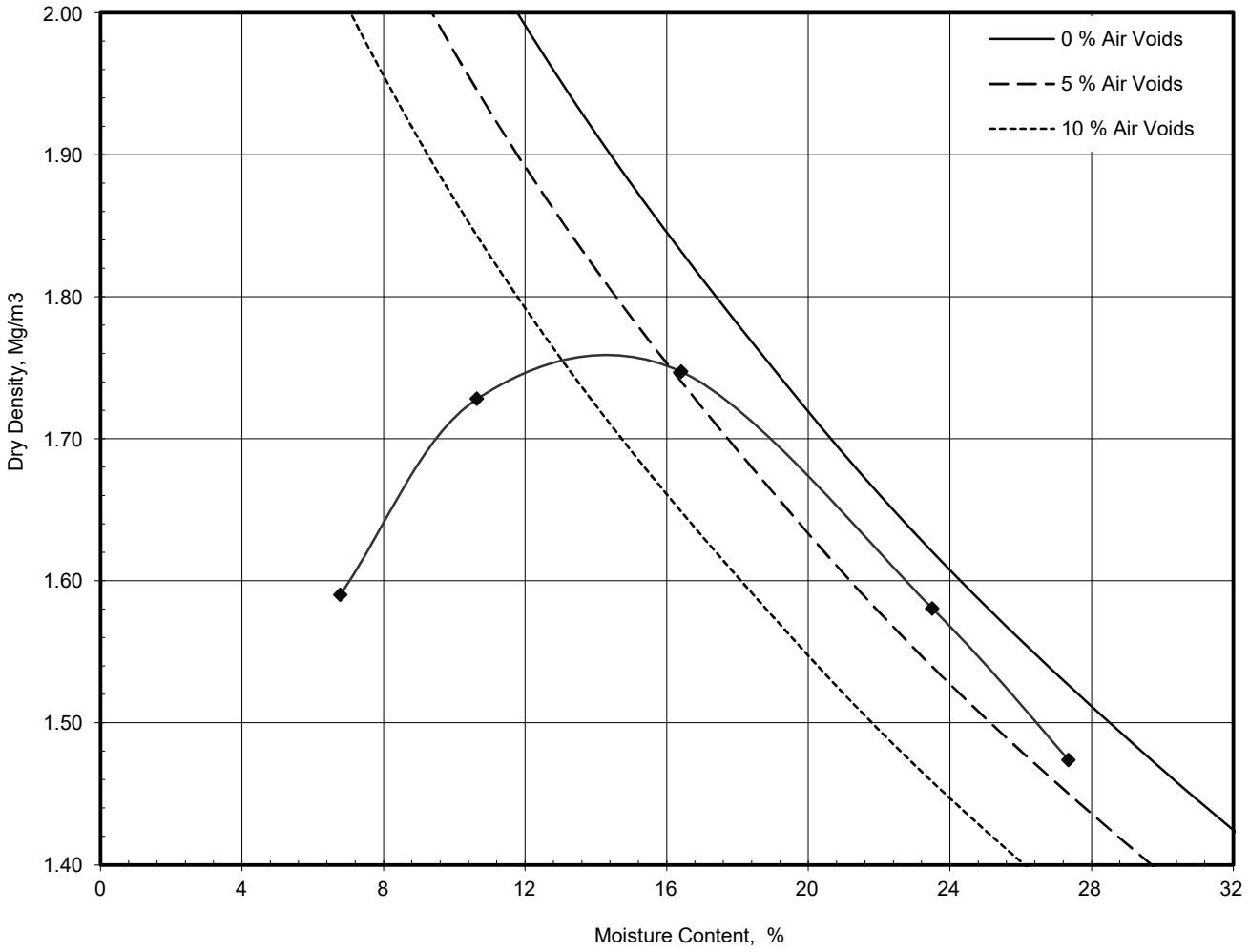
Preparation		Material used was air dried
Mould Type		One Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	0
Particle Density - Measured using gas jar	Mg/m³	2.60

Maximum Dry Density	Mg/m³	**1.71**

Optimum Moisture Content	%	**18**

Comments	Date	Checked By	Approved	UKAS Accredited Laboratory No. 20632
	04/07/2022 09:36	N. Hodson	N. O'Brien	

EXPLORATION & TESTING ASSOCIATES	**Dry Density / Moisture Content Relationship Light Compaction**			Job Ref	**D10557P**
				Borehole / Pit No	Site
Site Name	**Giga One, Envision**			Sample No	MS2212/10
Soil Description	Brown slightly sandy CLAY			Depth	0.00 m
Specimen Ref.		Specimen Depth	0 m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.3, 2.5kg rammer			Keylab ID	EAT_202207049
				Compaction Test Reference/No.	



Preparation		Material used was air dried
Mould Type		One Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	0
Particle Density - Measured using gas jar	Mg/m³	2.62

Maximum Dry Density	Mg/m³	**1.75**

Optimum Moisture Content	%	**14**

Comments	Date	Checked By	Approved	UKAS Accredited Laboratory No. 20632
	04/07/2022 09:29	N. Hodson	N. O'Brien	

EXPLORATION
& TESTING ASSOCIATES

Unit 8B Bowburn South Industrial Estate
Durham, DH6 5AD T: 0191 389 6543

UKAS TESTING

Laboratory Test Report

Client	Groundwork Services (Durham) Limited
Address	Littleburn Industrial Estate Langley Moor Durham DH7 8HJ
F.A.O	Paul Barton
Project:	Giga One, Washington
Project Number:	D10557AB
Report Number:	L22-620
Date Received:	16th July 2022

Testing Required:	Moisture Content - BS:1377-2:1990 Determination of Liquid and Plastic Limits and Plasticity Index - BS:1377-2:1990 (Cone Penetrometer) Particle Size Distribution - BS:1377-2:1990 Sedimentation by Pipette - BS:1377-2:1990 Determination of Maximum Dry Density / Optimum Moisture Content by 2.5kg Rammer - BS:1377-4:1990 Particle Density by Gas Jar - BS:1377-2:1990 Clause 8.2
Date Started:	18th July 2022
Date Finished:	28th July 2022

Report Issue Date:	28th July 2022
Reviewed By:	
	Natalie Hodson - Materials Director
Authorised By:	
	Nik O'Brien - Laboratory Manager
Remarks:	(*) denotes testing is outside of UKAS Scope of Accreditation.
	(+) denotes subcontracted testing.

Samples will be stored for one month after the report has been issue before being disposed of.

The published results appertain only to the specimens tested.

EXPLORATION
& TESTING ASSOCIATES

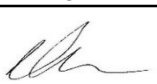
Determination of Water Content, Liquid Limit, Plastic Limit and Derivation of Plasticity Index

Project No.	Project Name
D10557AB	Giga One, Washington

Hole No.	Sample			Soil Description	Water Content %	Passing 425µm %	Liquid Limit %	Plastic Limit %	Plasticity Index %	Remarks
	Type	Ref	Depth							
Clay	B	MS2306/1	0.00	Brown, Slightly Gravelly, Sandy CLAY	17	99	46	21	25	Sample tested in natural state - material passing 425um estimated by hand picking
Clay	B	MS2306/2	0.00	Brown, Slightly Gravelly, Sandy CLAY	18	96	43	19	24	Sample tested in natural state - material passing 425um estimated by hand picking
Clay	B	MS2306/3	0.00	Brown, Slightly Gravelly, Sandy CLAY	17	95	29	15	14	Sample tested in natural state - material passing 425um estimated by hand picking
Clay	B	MS2306/4	0.00	Brown, Slightly Gravelly, Sandy CLAY	18	97	44	17	27	Sample tested in natural state - material passing 425um estimated by hand picking
Clay	B	MS2306/5	0.00	Brown, Slightly Gravelly, Sandy CLAY	17	96	43	26	17	Sample tested in natural state - material passing 425um estimated by hand picking
Clay	B	MS2306/6	0.00	Brown, Slightly Gravelly, Sandy CLAY	17	99	29	16	13	Sample tested in natural state - material passing 425um estimated by hand picking

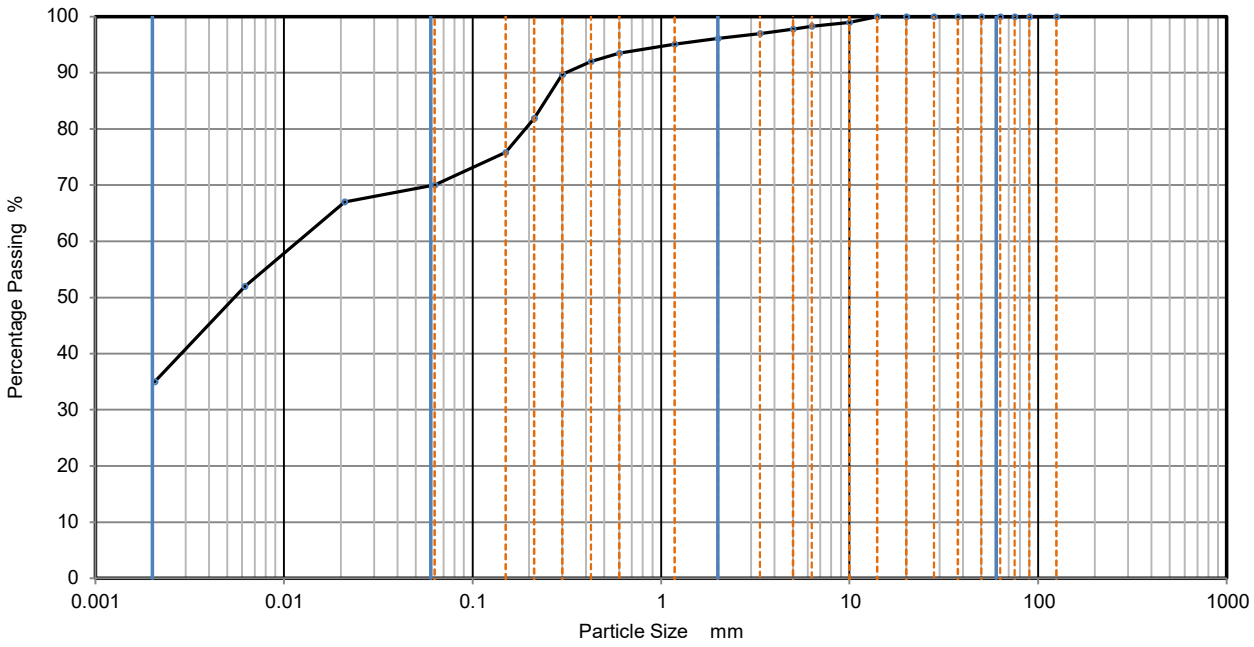
Water Content carried out in accordance with BS EN ISO 17892: Part 1: 2014: Clause 5.1 & 5.2

Liquid Limit, Plastic Limit & Plasticity Index all performed in accordance with BS EN ISO 17892: Part 12: 2018 - Fall cone four point method - Cone 80g/30°

Date	Approved By	
	N O'Brien	UKAS Accredited Laboratory No. 20632
28/07/2022 13:08		

PARTICLE SIZE DISTRIBUTION

				Job Ref	**D10557AB**
				Borehole/Pit No.	Clay
Site Name	Giga One, Washington			Sample No.	MS2306/1
Soil Description	Brown, Slightly Gravelly, Sandy CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990, Washing and Drying, Clauses 9.2 & 9.4			KeyLAB ID	EAT_2022072638



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0210	67
90	100	0.0062	52
75	100	0.0021	35
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	99		
6.3	98		
5	98		
3.35	97		
2	96		
1.18	95		
0.6	94	Particle density (measured)	
0.425	92	2.55	Mg/m3
0.3	90		
0.212	82		
0.15	76		
0.063	70		

Method of Pre-Treatment	Sodium Hexametaphosphate

Sample Proportions	% dry mass
Very coarse	0
Gravel	4
Sand	26
Fines <0.063mm	70

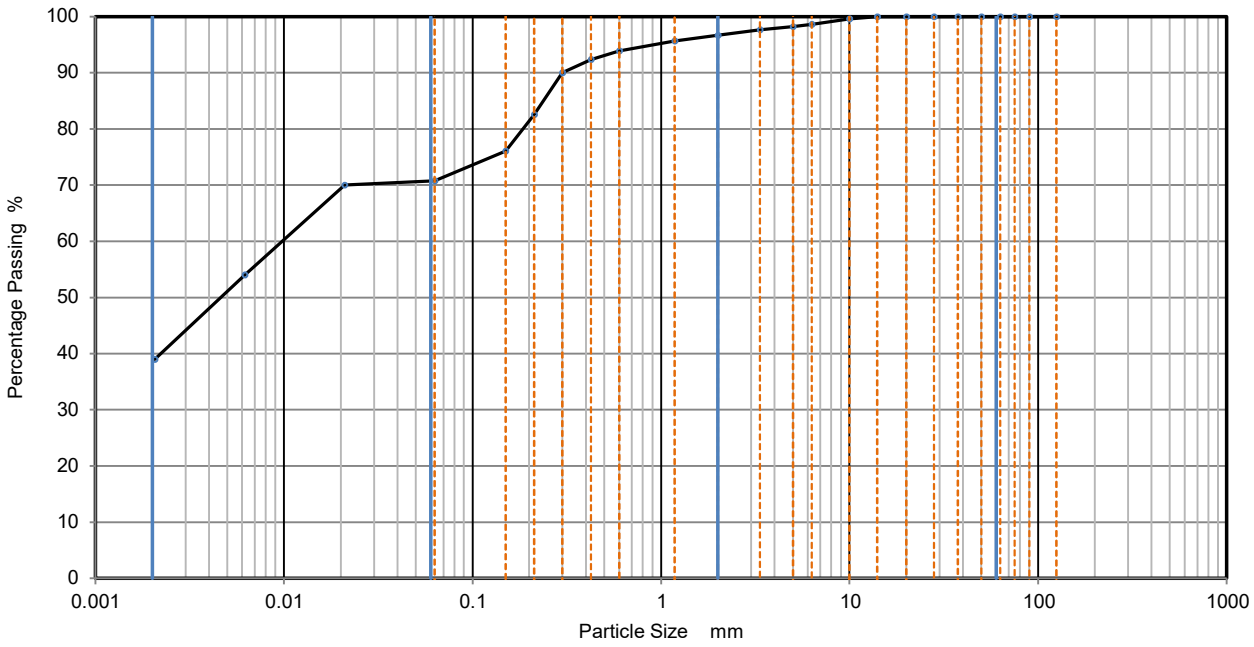
Grading Analysis		
D_{100}	mm	
D_{60}	mm	0.0123
D_{30}	mm	
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		
28/07/2022 13:13	N O'Brien		UKAS Accredited Laboratory No. 20632

EXPLORATION & TESTING ASSOCIATES	PARTICLE SIZE DISTRIBUTION			Job Ref	D10557AB
				Borehole/Pit No.	Clay
Site Name	Giga One, Washington			Sample No.	MS2306/2
Soil Description	Brown, Slightly Gravelly, Sandy CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990, Washing and Drying, Clauses 9.2 & 9.4			KeyLAB ID	EAT_2022072639



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0210	70
90	100	0.0062	54
75	100	0.0021	39
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	99		
5	98		
3.35	98		
2	97		
1.18	96		
0.6	94	Particle density (measured)	
0.425	92	2.55	Mg/m3
0.3	90		
0.212	83		
0.15	76		
0.063	71		

Method of Pre-Treatment	Sodium Hexametaphosphate

Sample Proportions	% dry mass
Very coarse	0
Gravel	3
Sand	26
Fines <0.063mm	71

Grading Analysis		
D_{100}	mm	
D_{60}	mm	0.00973
D_{30}	mm	
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

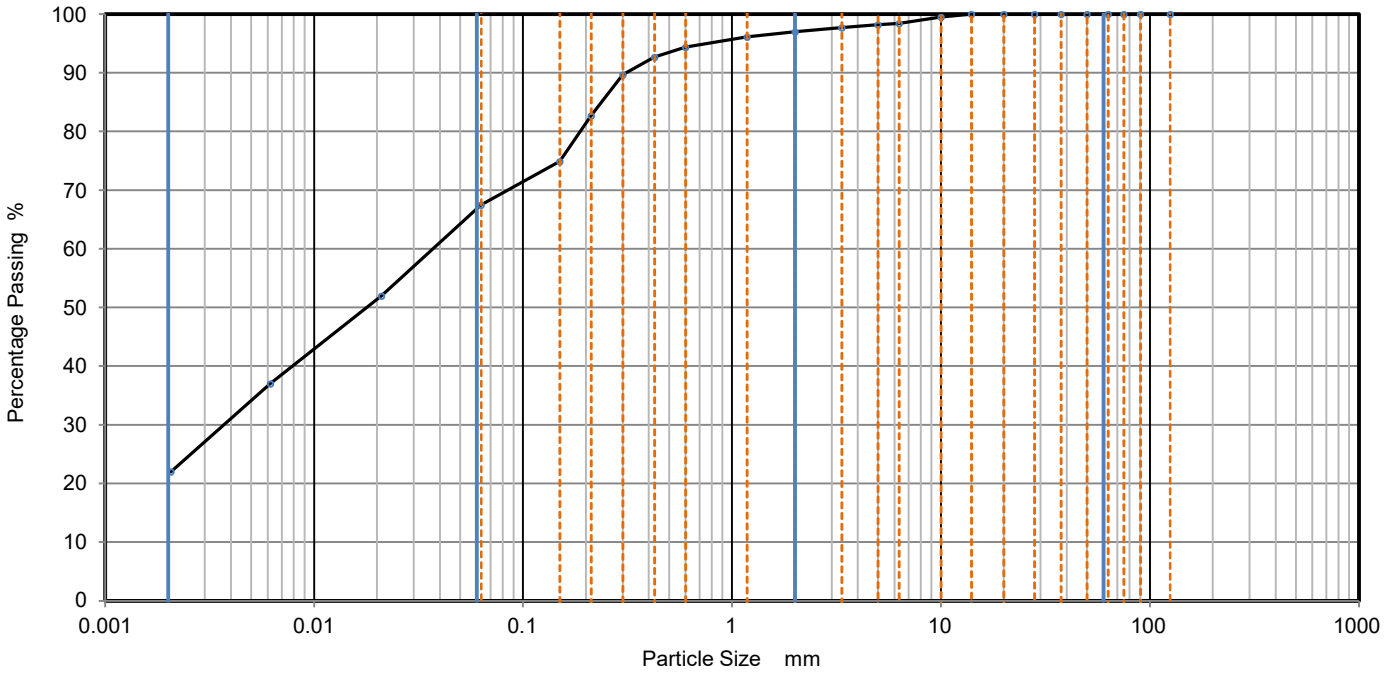
Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		UKAS Accredited Laboratory No. 20632
28/07/2022 13:14	N O'Brien		

EXPLORATION & TESTING ASSOCIATES

PARTICLE SIZE DISTRIBUTION

				Job Ref	**D10557AB**
				Borehole/Pit No.	Clay
Site Name	Giga One, Washington			Sample No.	MS2306/3
Soil Description	Brown, Slightly Gravelly, Sandy CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990, Washing and Drying, Clauses 9.2 & 9.4			KeyLAB ID	EAT_2022072640



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0210	52
90	100	0.0062	37
75	100	0.0021	22
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	98		
5	98		
3.35	98		
2	97		
1.18	96		
0.6	94	Particle density (measured)	
0.425	93	2.55	Mg/m3
0.3	90		
0.212	83		
0.15	75		
0.063	68		

Method of Pre-Treatment	Sodium Hexametaphosphate

Sample Proportions	% dry mass
Very coarse	0
Gravel	3
Sand	29
Fines <0.063mm	68

Grading Analysis		
D_{100}	mm	
D_{60}	mm	0.037
D_{30}	mm	0.0037
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

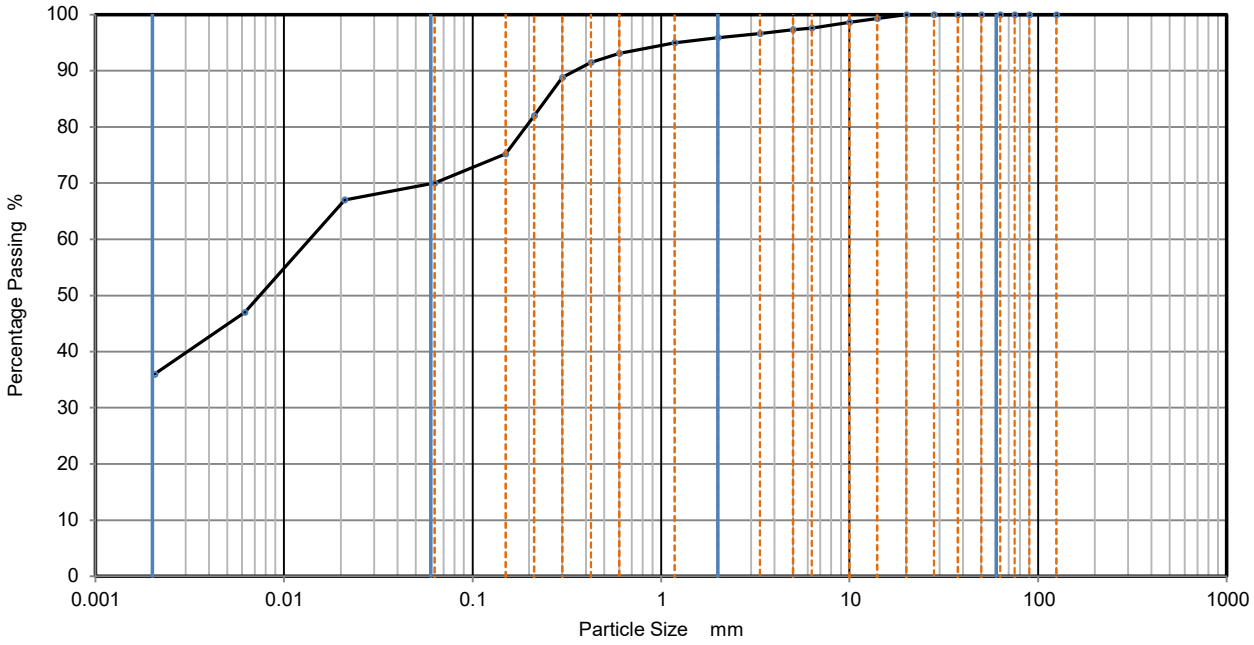
Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		UKAS Accredited Laboratory No. 20632
28/07/2022 15:15	N O'Brien		

EXPLORATION & TESTING ASSOCIATES

PARTICLE SIZE DISTRIBUTION

				Job Ref	**D10557AB**
				Borehole/Pit No.	Clay
Site Name	Giga One, Washington			Sample No.	MS2306/4
Soil Description	Brown, Slightly Gravelly, Sandy CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990, Washing and Drying, Clauses 9.2 & 9.4			KeyLAB ID	EAT_2022072641



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0210	67
90	100	0.0062	47
75	100	0.0021	36
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	99		
10	99		
6.3	98		
5	97		
3.35	97		
2	96		
1.18	95		
0.6	93	Particle density (assumed)	
0.425	92	2.55	Mg/m3
0.3	89		
0.212	82		
0.15	75		
0.063	70		

Method of Pre-Treatment	Sodium Hexametaphosphate

Sample Proportions	% dry mass
Very coarse	0
Gravel	4
Sand	26
Fines <0.063mm	70

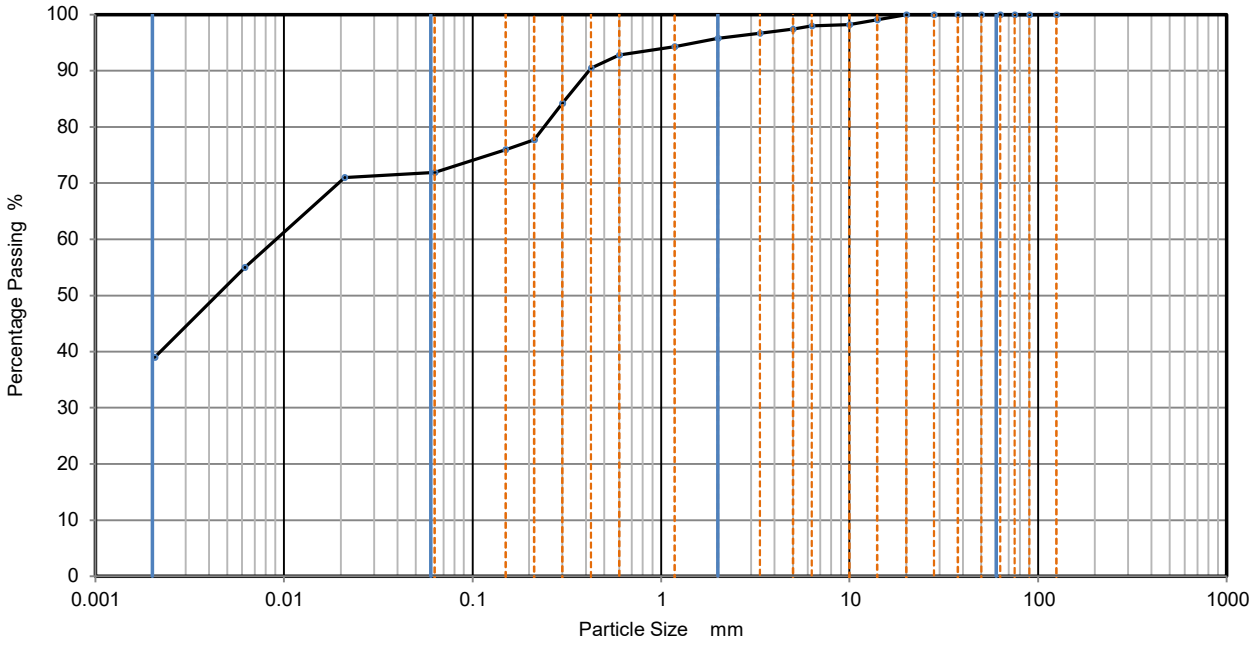
Grading Analysis		
D_{100}	mm	
D_{60}	mm	0.0135
D_{30}	mm	
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		
28/07/2022 13:20	N O'Brien		UKAS Accredited Laboratory No. 20632

EXPLORATION & TESTING ASSOCIATES	PARTICLE SIZE DISTRIBUTION			Job Ref	D10557AB
				Borehole/Pit No.	Clay
Site Name	Giga One, Washington			Sample No.	MS2306/5
Soil Description	Brown, Slightly Gravelly, Sandy CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990, Washing and Drying, Clauses 9.2 & 9.4			KeyLAB ID	EAT_2022072642



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0210	71
90	100	0.0062	55
75	100	0.0021	39
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	99		
10	98		
6.3	98		
5	97		
3.35	97		
2	96		
1.18	94		
0.6	93	Particle density (assumed)	
0.425	91	2.55	Mg/m3
0.3	84		
0.212	78		
0.15	76		
0.063	72		

Method of Pre-Treatment	Sodium Hexametaphosphate

Sample Proportions	% dry mass
Very coarse	0
Gravel	4
Sand	24
Fines <0.063mm	72

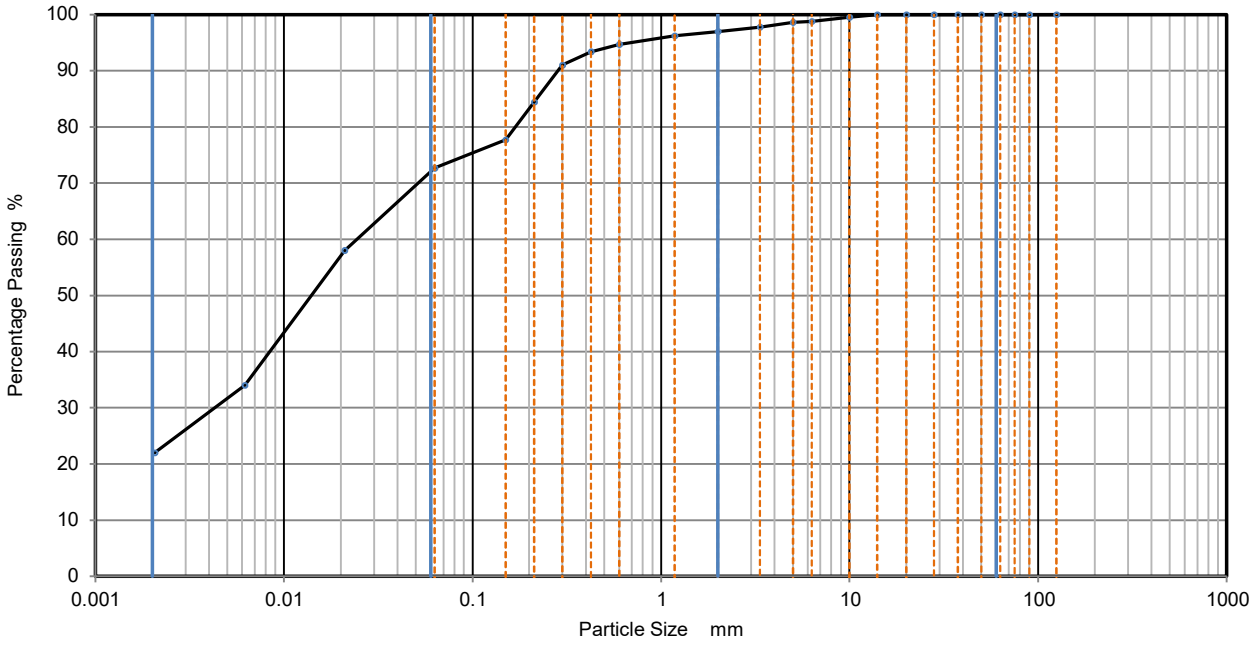
Grading Analysis		
D_{100}	mm	
D_{60}	mm	0.00909
D_{30}	mm	
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		UKAS Accredited Laboratory No. 20632
28/07/2022 13:21	N O'Brien		

EXPLORATION & TESTING ASSOCIATES	PARTICLE SIZE DISTRIBUTION			Job Ref	D10557AB
				Borehole/Pit No.	Clay
Site Name	Giga One, Washington			Sample No.	MS2306/6
Soil Description	Brown, Slightly Gravelly, Sandy CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990, Washing and Drying, Clauses 9.2 & 9.4			KeyLAB ID	EAT_2022072643



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0210	58
90	100	0.0062	34
75	100	0.0021	22
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	99		
5	99		
3.35	98		
2	97		
1.18	96		
0.6	95	Particle density (measured)	
0.425	93	2.55	Mg/m3
0.3	91		
0.212	84		
0.15	78		
0.063	73		

Method of Pre-Treatment	Sodium Hexametaphosphate

Sample Proportions	% dry mass
Very coarse	0
Gravel	3
Sand	24
Fines <0.063mm	73

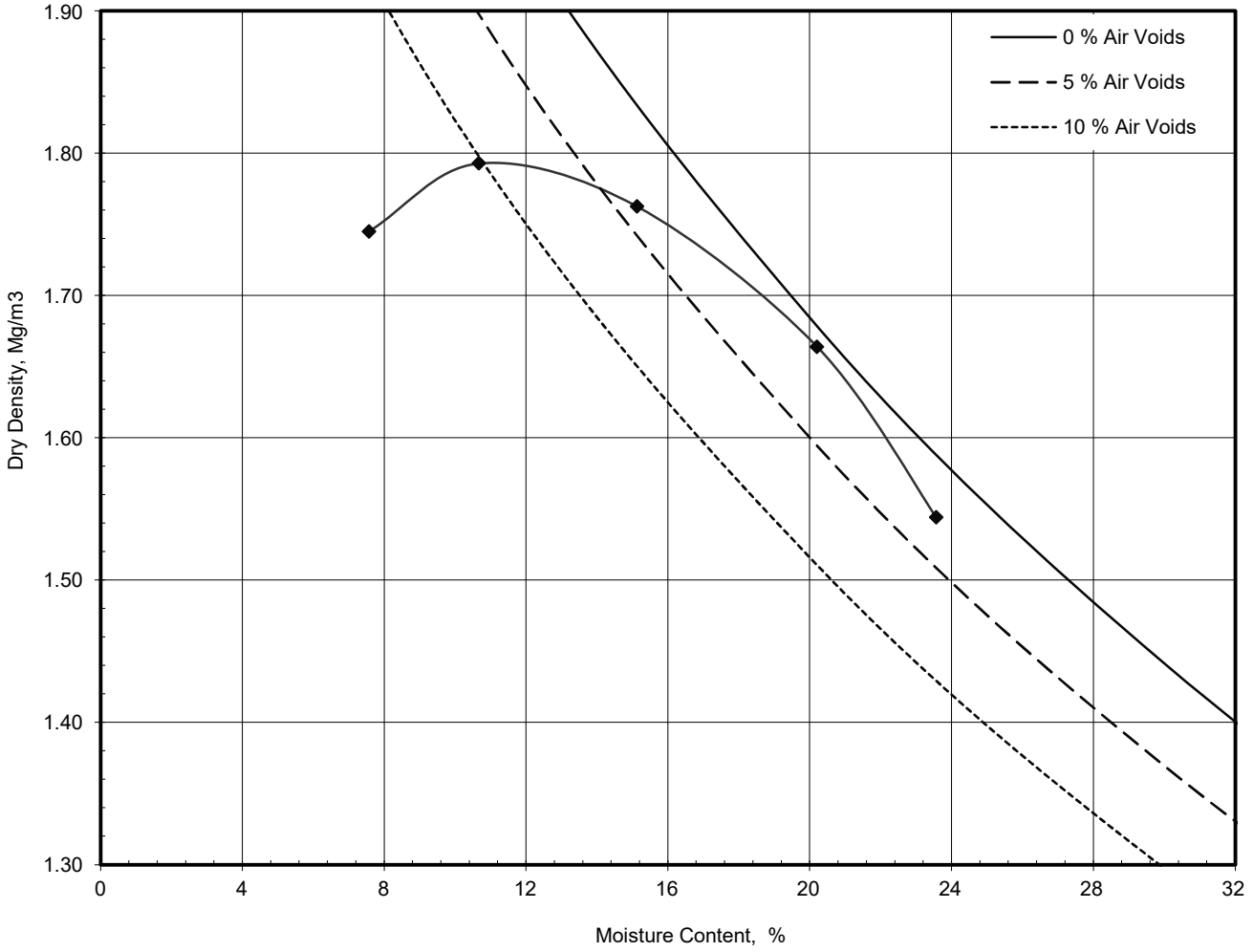
Grading Analysis		
D_{100}	mm	
D_{60}	mm	0.0241
D_{30}	mm	0.00437
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		UKAS Accredited Laboratory No. 20632
28/07/2022 13:21	N O'Brien		

EXPLORATION & TESTING ASSOCIATES	**Dry Density / Moisture Content Relationship Light Compaction**			Job Ref	**D10557AB**
				Borehole / Pit No	Clay
Site Name	**Giga One, Washington**			Sample No	MS2306/1
Soil Description	Brown, Slightly Gravelly, Sandy CLAY			Depth	0.00 m
Specimen Ref.		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.3, 2.5kg rammer			Keylab ID	EAT_2022072638
				Compaction Test Reference/No.	



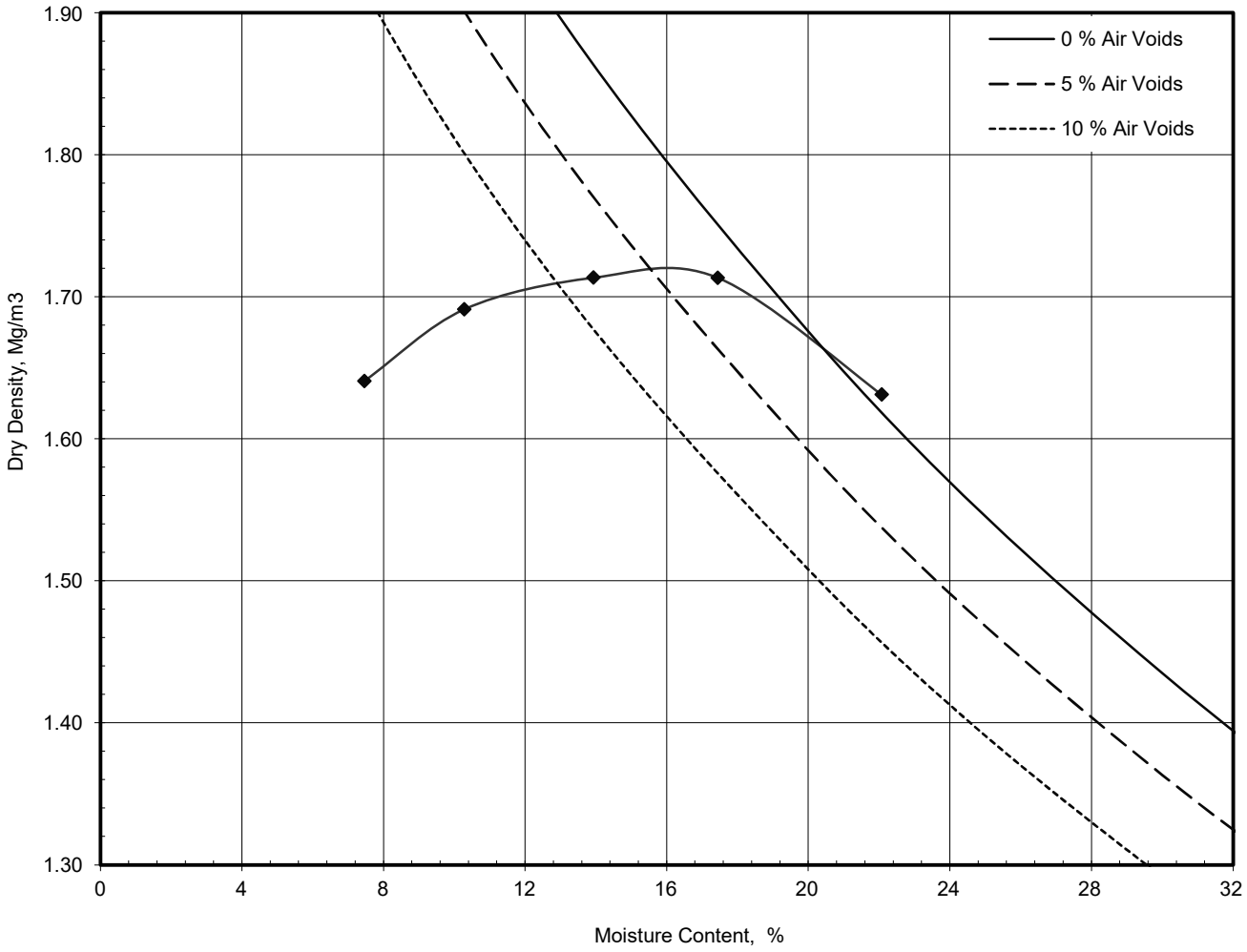
Preparation		Material used was air dried
Mould Type		One Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	0
Particle Density - Measured using gas jar	Mg/m³	2.54

Maximum Dry Density	Mg/m³	**1.79**

Optimum Moisture Content	%	**15**

Comments	Date	Checked By	Approved	UKAS Accredited Laboratory No. 20632
	28/07/2022 15:20	N. Hodson	N. O'Brien	

EXPLORATION & TESTING ASSOCIATES	Dry Density / Moisture Content Relationship Light Compaction			Job Ref	D10557AB
				Borehole / Pit No	Clay
Site Name	Giga One, Washington			Sample No	MS2306/2
Soil Description	Brown, Slightly Gravelly, Sandy CLAY			Depth	0.00 m
Specimen Ref.		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.3, 2.5kg rammer			Keylab ID	EAT_2022072639
				Compaction Test Reference/No.	



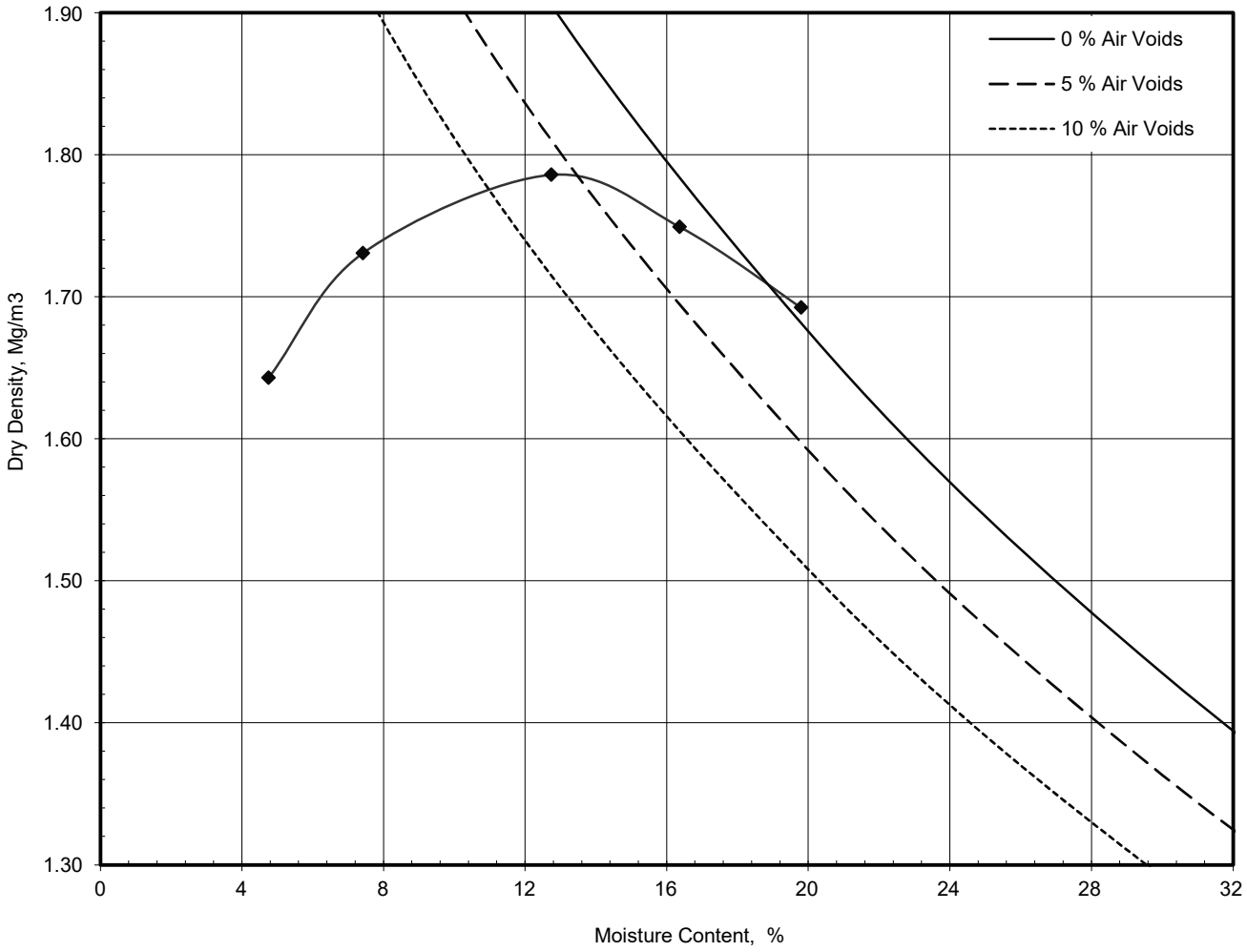
Preparation		Material used was air dried
Mould Type		One Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	0
Particle Density - Measured using gas jar	Mg/m³	2.52

Maximum Dry Density	Mg/m³	**1.71**

Optimum Moisture Content	%	**14**

Comments	Date	Checked By	Approved	UKAS Accredited Laboratory No. 20632
	28/07/2022 15:21	N. Hodson	N. O'Brien	

EXPLORATION & TESTING ASSOCIATES	Dry Density / Moisture Content Relationship Light Compaction			Job Ref	D10557AB
				Borehole / Pit No	Clay
Site Name	Giga One, Washington			Sample No	MS2306/3
Soil Description	Brown, Slightly Gravelly, Sandy CLAY			Depth	0.00 m
Specimen Ref.		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.3, 2.5kg rammer			Keylab ID	EAT_2022072640
				Compaction Test Reference/No.	



Preparation		Material used was air dried
Mould Type		One Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	0
Particle Density - Measured using gas jar	Mg/m³	2.52

Maximum Dry Density	Mg/m³	**1.79**

Optimum Moisture Content	%	**13**

Comments	Date	Checked By	Approved	UKAS Accredited Laboratory No. 20632
	28/07/2022 15:21	N. Hodson	N. O'Brien	

EXPLORATION
& TESTING ASSOCIATES

Unit 8B Bowburn South Industrial Estate
Durham, DH6 5AD T: 0191 389 6543

UKAS TESTING

Test Report

Client	Groundwork Services (Durham) Limited
Address	Littleburn Industrial Estate Langley Moor Durham DH7 8HJ
F.A.O	Paul Barton
Project:	Giga One Factory, Washington
Project Number:	D10557D
Report Number:	L22-443
Date Received:	18th June 2022

Testing Required:	Moisture Content - BS:1377-2:1990
Date Started:	21st June 2022
Date Finished:	22nd June 2022

Report Issue Date:	23rd June 2022
Reviewed By:	
	Natalie Hodson - Materials Director
Authorised By:	
	Nik O'Brien - Laboratory Manager
Remarks:	(*) denotes testing is outside of UKAS Scope of Accreditation.
	(+) denotes subcontracted testing.

Samples will be stored for one month after the report has been issue before being disposed of.

The published results appertain only to the specimens tested.

EXPLORATION & TESTING ASSOCIATES

Determination of Moisture Content

Project No.	Project Name
D10557D	Giga One, Envision

Hole No.	Sample			Soil Description	Moisture Content %	Passing 425µm %	Liquid Limit %	Plastic Limit %	Plasticity Index %	Remarks
	Type	Ref	Depth							
Clay	B	MS2161/1	0.00	Brown, Slightly Sandy CLAY	16					
Clay	B	MS2161/2	0.00	Brown, Slightly Sandy CLAY	16					
Clay	B	MS2161/3	0.00	Brown, Slightly Sandy CLAY	16					

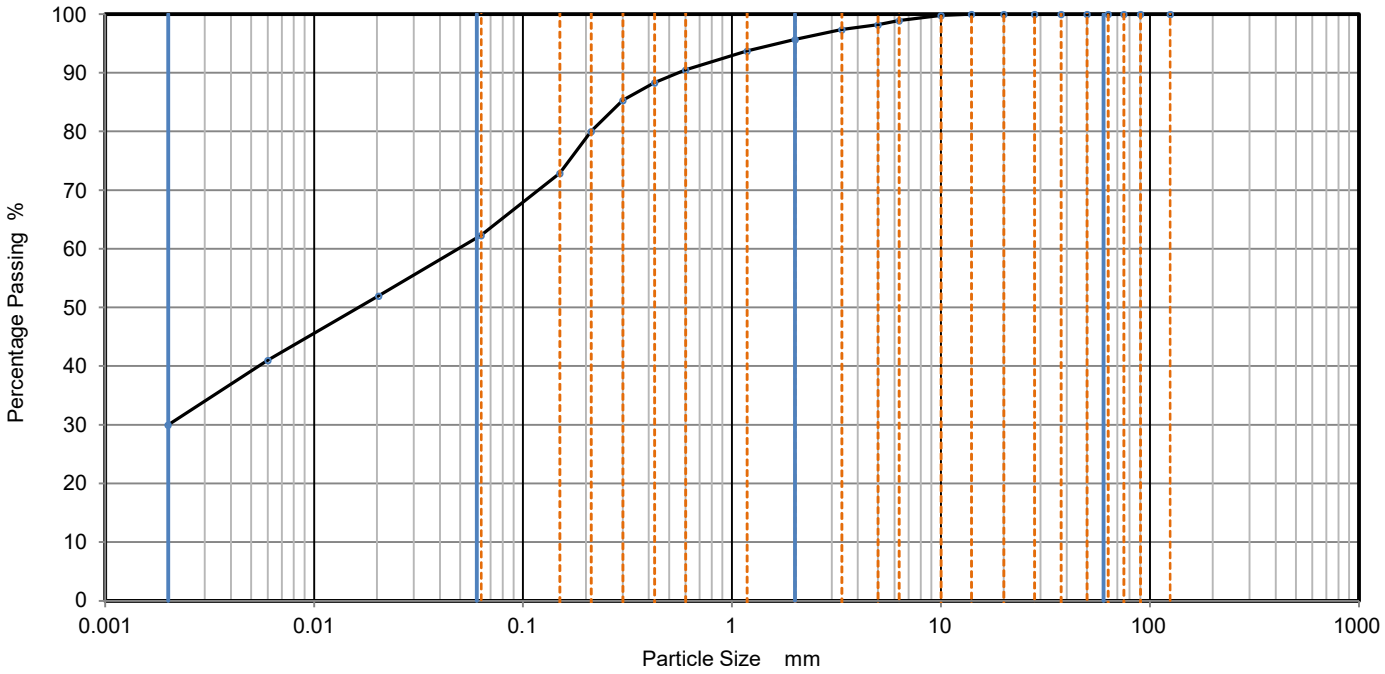
Moisture Content carried out in accordance with BS 1377: Part 2: 1990: Clause 3.2

Date	Approved By	
	N Hodson	UKAS Accredited Laboratory No. 20632
23/06/2022 16:47		

EXPLORATION & TESTING ASSOCIATES

PARTICLE SIZE DISTRIBUTION

				Job Ref	**D10557D**
				Borehole/Pit No.	Clay
Site Name	Giga One, Envision			Sample No.	MS2162/1
Soil Description	Brown, Very Slightly Gravelly, Sandy CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990 - Wet & Dry Sieving			KeyLAB ID	EAT_2022072538



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0203	52
90	100	0.0060	41
75	100	0.0020	30
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	99		
5	98		
3.35	97		
2	96		
1.18	94		
0.6	91	Particle density (assumed)	
0.425	88	2.65	Mg/m3
0.3	85		
0.212	80		
0.15	73		
0.063	62		

Method of Pre-Treatment	Sodium Hexametaphosphate

Sample Proportions	% dry mass
Very coarse	0
Gravel	4
Sand	33
Silt	32
Clay	30

Grading Analysis		
D_{100}	mm	
D_{60}	mm	0.0484
D_{30}	mm	
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

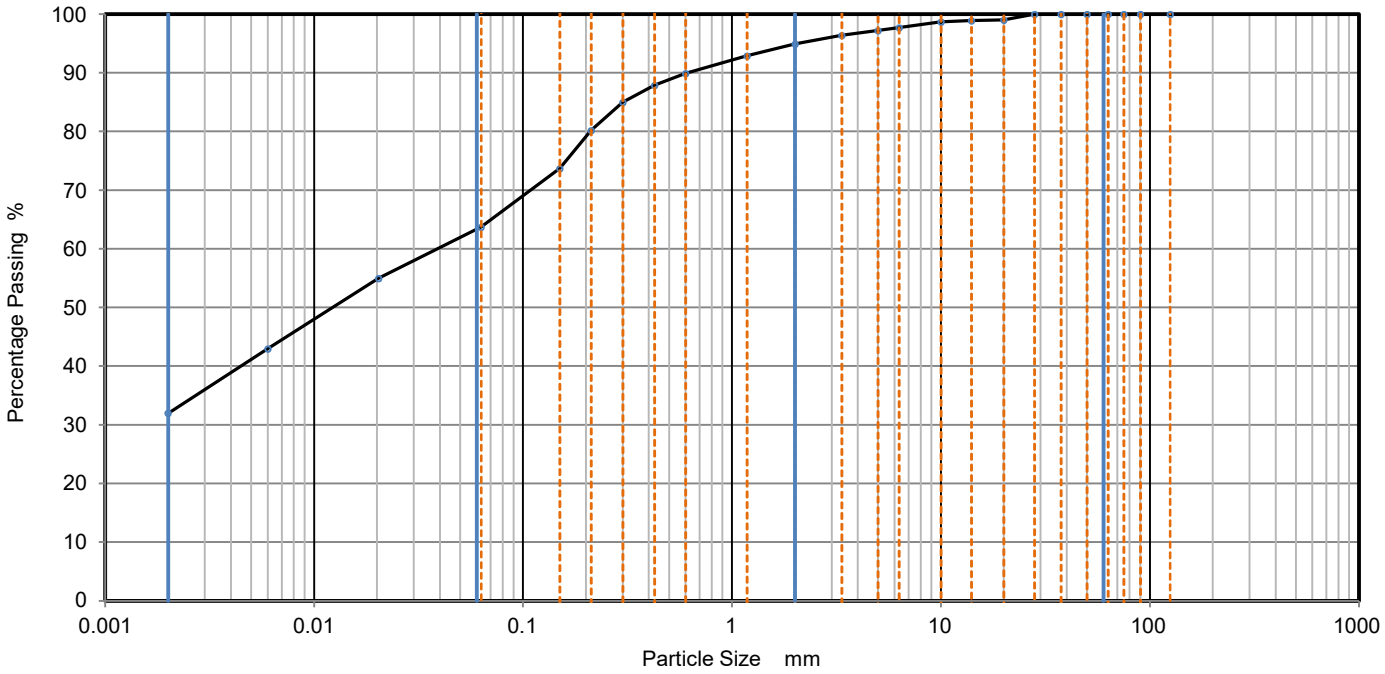
Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		
25/07/2022 18:06	N O'Brien		UKAS Accredited Laboratory No. 20632

EXPLORATION & TESTING ASSOCIATES

PARTICLE SIZE DISTRIBUTION

				Job Ref	**D10557D**
				Borehole/Pit No.	Clay
Site Name	Giga One, Envision			Sample No.	MS2162/2
Soil Description	Brown, Very Slightly Gravelly, Slightly Sandy CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990, Washing and Drying, Clauses 9.2 & 9.4			KeyLAB ID	EAT_2022072539



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0203	55
90	100	0.0060	43
75	100	0.0020	32
63	100		
50	100		
37.5	100		
28	100		
20	99		
14	99		
10	99		
6.3	98		
5	97		
3.35	96		
2	95		
1.18	93		
0.6	90	Particle density (assumed)	
0.425	88	2.65	Mg/m3
0.3	85		
0.212	80		
0.15	74		
0.063	64		

Method of Pre-Treatment	Sodium Hexametaphosphate

Sample Proportions	% dry mass
Very coarse	0
Gravel	5
Sand	31
Silt	32
Clay	32

Grading Analysis		
D_{100}	mm	
D_{60}	mm	0.0379
D_{30}	mm	
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		
25/07/2022 18:07	N O'Brien		UKAS Accredited Laboratory No. 20632

EXPLORATION
& TESTING ASSOCIATES

Unit 8B Bowburn South Industrial Estate
Durham, DH6 5AD T: 0191 389 6543

UKAS TESTING

Laboratory Test Report

Client	Groundwork Services (Durham) Limited
Address	Littleburn Industrial Estate Langley Moor Durham DH7 8HJ
F.A.O	Paul Barton / Ben Johnson
Project:	Giga One Factory, Washington
Project Number:	D10557E
Report Number:	L22-482-1
Date Received:	20th June 2022

Testing Required:	Moisture Content - BS:1377-2:1990 Determination of Liquid and Plastic Limits and Plasticity Index - BS:1377-2:1990 (Cone Penetrometer) Particle Size Distribution - BS:1377-2:1990 Sedimentation by Pipette - BS:1377-2:1990 Particle Density by Gas Jar - BS:1377-2:1990 Clause 8.2 Determination of Maximum Dry Density / Optimum Moisture Content by 2.5kg Rammer - BS:1377-4:1990
Date Started:	21st June 2022
Date Finished:	25th July 2022

Report Issue Date:	25th July 2022
Reviewed By:	N. Hodson - Materials Director
Authorised By:	N O'Brien - Laboratory Manager
Remarks:	(*) denotes testing is outside of UKAS Scope of Accreditation. (+) denotes subcontracted testing.

Samples will be stored for one month after the report has been issue before being disposed of.

The published results appertain only to the specimens tested.

EXPLORATION & TESTING ASSOCIATES

Determination of Moisture Content, Liquid Limit, Plastic Limit and Derivation of Plasticity Index

Project No.	Project Name
D10557E	Giga One, Envision, Washington

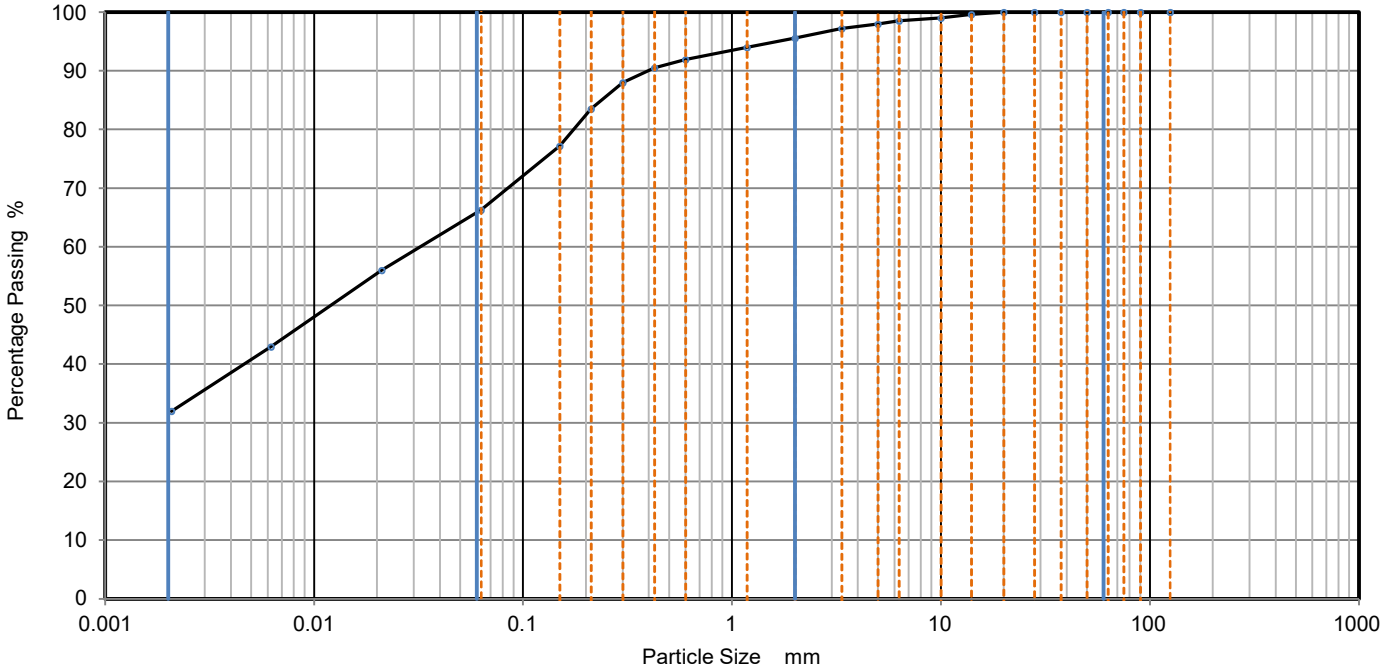
Hole No.	Sample			Soil Description	Moisture Content %	Passing 425µm %	Liquid Limit %	Plastic Limit %	Plasticity Index %	Remarks
	Type	Ref	Depth							
MS2163	B		0.00	Brown, Slightly Sandy, Slightly Gravelly CLAY	17	92	49	22	27	Sample tested in natural state - material passing 425um estimated by hand picking

Moisture Content carried out in accordance with BS 1377: Part 2: 1990: Clause 3.2	Date	Approved By	UKAS Accredited Laboratory No. 20632
		N O'Brien	
Liquid Limit, Plastic Limit & Plasticity Index all performed in accordance with BS 1377: Part 2: 1990 - Cone Penetrometer method - Cone 80g/30°	27/07/2022 19:31		

EXPLORATION & TESTING ASSOCIATES

PARTICLE SIZE DISTRIBUTION

				Job Ref	**D10557E**
				Borehole/Pit No.	MS2163
Site Name	Giga One, Envision, Washington			Sample No.	
Soil Description	Brown, Slightly Sandy, Slightly Gravelly CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990, Washing and Drying, Clauses 9.2 & 9.4			KeyLAB ID	EAT_2022062931



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0211	56
90	100	0.0062	43
75	100	0.0021	32
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	99		
6.3	99		
5	98		
3.35	97		
2	96		
1.18	94		
0.6	92	Particle density (measured)	
0.425	91	2.53	Mg/m3
0.3	88		
0.212	84		
0.15	77		
0.063	66		

Method of Pre-Treatment	Sodium Hexametaphosphate

Sample Proportions	% dry mass
Very coarse	0
Gravel	4
Sand	29
Fines <0.063mm	66

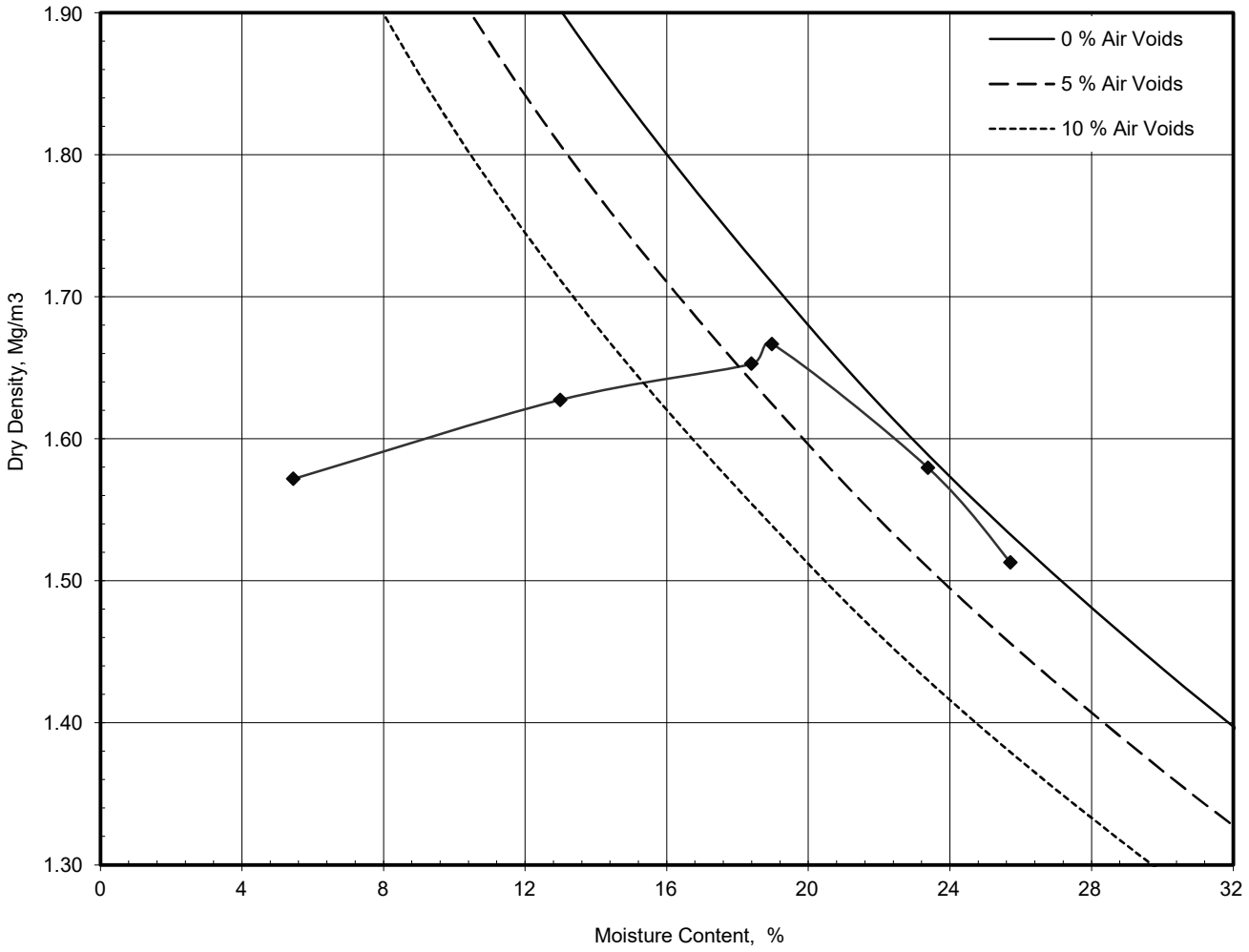
Grading Analysis		
D_{100}	mm	
D_{60}	mm	0.0313
D_{30}	mm	
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		UKAS Accredited Laboratory No. 20632
27/07/2022 19:32	N O'Brien		

EXPLORATION & TESTING ASSOCIATES	**Dry Density / Moisture Content Relationship Light Compaction**			Job Ref	**D10557E**
				Borehole / Pit No	MS2163
Site Name	**Giga One, Washington**			Sample No	Site
Soil Description	Brown, Slightly Sandy, Slightly Gravelly CLAY			Depth	0.00 m
Specimen Ref.		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.3, 2.5kg rammer			Keylab ID	EAT_2022062931
				Compaction Test Reference/No.	



Preparation		Material used was air dried
Mould Type		One Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	5
Particle Density - Assumed	Mg/m³	2.53

Maximum Dry Density	Mg/m³	**1.67**

Optimum Moisture Content	%	**19**

Comments	Date	Checked By	Approved	UKAS Accredited Laboratory No. 20632
	30/06/2022 12:21	N. Hodson	N. O'Brien	

EXPLORATION & TESTING ASSOCIATES

Particle Density by Gas Jar - Summary of Results

Project No.	Project Name
D10557E	Giga One, Envision, Washington

Hole No.	Sample				Soil Description at test horizon	Particle Density Mg/m^3	Remarks
	Ref	Top	Base	Type			
MS2163		0.00		B	Brown, Slightly Sandy, Slightly Gravelly CLAY	2.53	

Notes
Tests performed in accordance with BS 1377 unless annotated otherwise.
Gas Jar tests to BS1377: Part 2 : 1990, clause 8.2

Comments

Date	Approved
30/06/2022 12:23	N O'Brien

UKAS Accredited Laboratory No. 20632

EXPLORATION
& TESTING ASSOCIATES

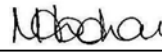
Unit 8B Bowburn South Industrial Estate
Durham, DH6 5AD T: 0191 389 6543

UKAS TESTING

Laboratory Test Report

Client	Groundwork Services (Durham) Limited
Address	Littleburn Industrial Estate Langley Moor Durham DH7 8HJ
F.A.O	Paul Barton
Project:	Giga One, Washington
Project Number:	D10557F
Report Number:	L22-622
Date Received:	22nd June 2022

Testing Required:	Moisture Content - BS:1377-2:1990 Determination of Liquid and Plastic Limits and Plasticity Index - BS:1377-2:1990 (Cone Penetrometer) Particle Size Distribution - BS:1377-2:1990 Sedimentation by Pipette - BS:1377-2:1990 Determination of Maximum Dry Density / Optimum Moisture Content by 2.5kg Rammer - BS:1377-4:1990 Particle Density by Gas Jar - BS:1377-2:1990 Clause 8.2
Date Started:	18th July 2022
Date Finished:	28th July 2022

Report Issue Date:	28th July 2022
Reviewed By:	
	Natalie Hodson - Materials Director
Authorised By:	
	Nik O'Brien - Laboratory Manager
Remarks:	(*) denotes testing is outside of UKAS Scope of Accreditation.
	(+) denotes subcontracted testing.

Samples will be stored for one month after the report has been issue before being disposed of.

The published results appertain only to the specimens tested.

EXPLORATION
& TESTING ASSOCIATES

Determination of Moisture Content, Liquid Limit, Plastic Limit and Derivation of Plasticity Index

Project No.	Project Name
D10557F	Giga One, Envision, Washington

Hole No.	Sample			Soil Description	Moisture Content %	Passing 425µm %	Liquid Limit %	Plastic Limit %	Plasticity Index %	Remarks
	Type	Ref	Depth							
Clay	B	MS2297/1	0.00	Brown, Slightly Sandy, Silty CLAY	18	97	46	20	26	Sample tested in natural state - material passing 425um estimated by hand picking
Clay	B	MS2297/2	0.00	Brown, Slightly Sandy, Silty CLAY	19	90	48	21	27	Sample tested in natural state - material passing 425um estimated by hand picking
Clay	B	MS2297/3	0.00	Brown, Slightly Sandy, Silty CLAY	17	99	47	19	28	Sample tested in natural state - material passing 425um estimated by hand picking
Clay	B	MS2297/4	0.00	Brown, Slightly Sandy, Silty CLAY	18	100	44	20	24	Sample tested in natural state - material passing 425um estimated by hand picking
Clay	B	MS2297/5	0.00	Brown, Slightly Sandy, Silty CLAY	18	99	46	20	26	Sample tested in natural state - material passing 425um estimated by hand picking
Clay	B	MS2297/6	0.00	Brown, Slightly Sandy, Silty CLAY	19	95	52	23	29	Sample tested in natural state - material passing 425um estimated by hand picking

Moisture Content carried out in accordance with BS 1377: Part 2: 1990: Clause 3.2

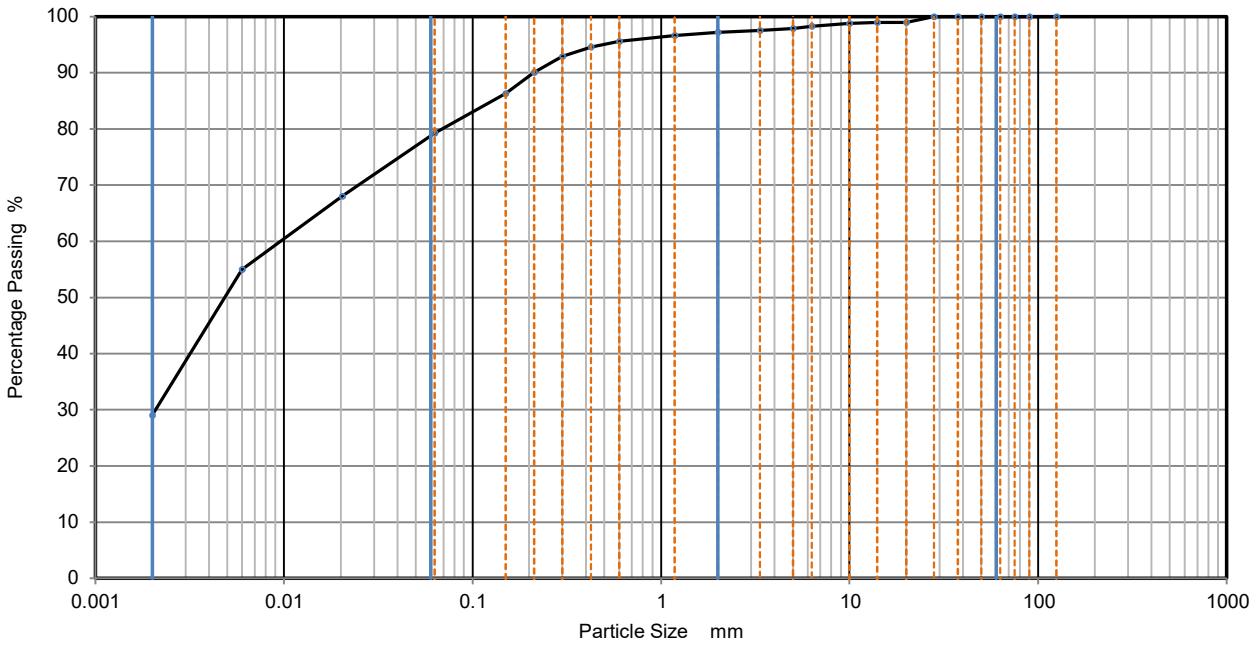
Liquid Limit, Plastic Limit & Plasticity Index all performed in accordance with BS 1377: Part 2: 1990 - Cone Penetrometer method - Cone 80g/30°

Date: 27/07/2022 19:19

Approved By: N O'Brien

UKAS Accredited Laboratory No. 20632

EXPLORATION & TESTING ASSOCIATES	PARTICLE SIZE DISTRIBUTION			Job Ref	D10557F
				Borehole/Pit No.	Clay
Site Name	Giga One, Envision, Washington			Sample No.	MS2297/1
Soil Description	Brown, Slightly Sandy, Silty CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990, Washing and Drying, Clauses 9.2 & 9.4			KeyLAB ID	EAT_2022072540



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0203	68
90	100	0.0060	55
75	100	0.0020	29
63	100		
50	100		
37.5	100		
28	100		
20	99		
14	99		
10	99		
6.3	98		
5	98		
3.35	98		
2	97		
1.18	97		
0.6	96	Particle density (assumed)	
0.425	95	2.65	Mg/m3
0.3	93		
0.212	90		
0.15	86		
0.063	79		

Method of Pre-Treatment	Sodium Hexametaphosphate

Sample Proportions	% dry mass
Very coarse	0
Gravel	3
Sand	18
Silt	51
Clay	29

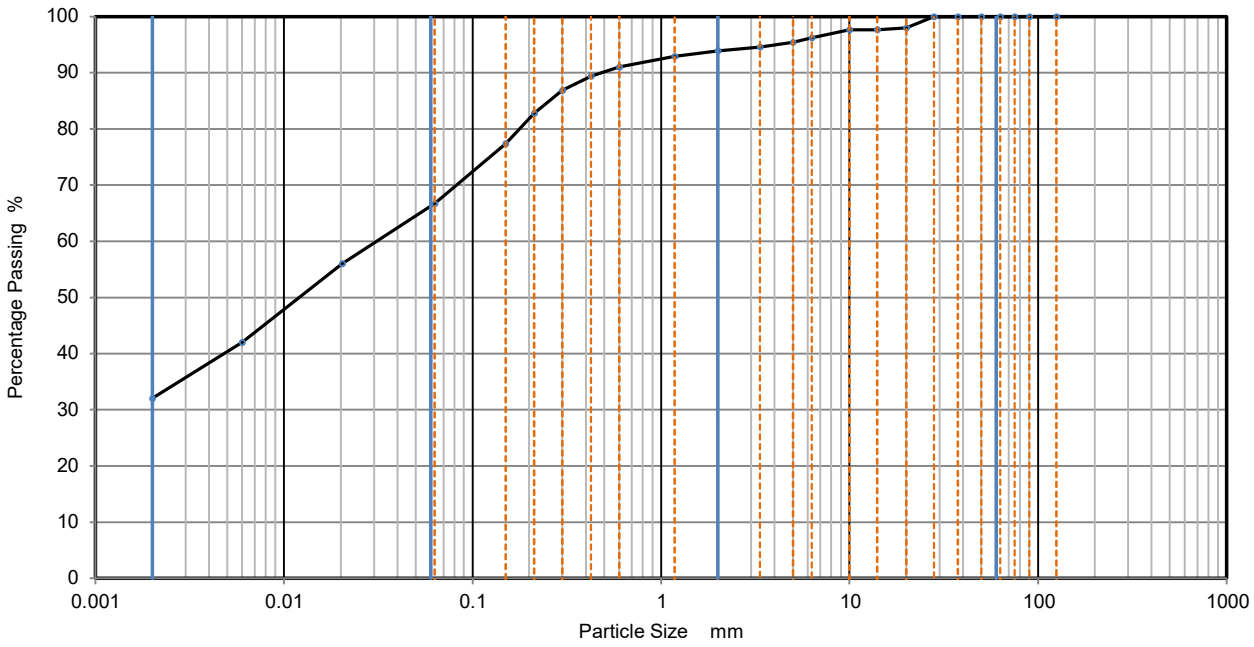
Grading Analysis		
D_{100}	mm	
D_{60}	mm	0.00955
D_{30}	mm	0.00211
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		UKAS Accredited Laboratory No. 20632
28/07/2022 11:30	N O'Brien		

EXPLORATION & TESTING ASSOCIATES	PARTICLE SIZE DISTRIBUTION			Job Ref	D10557F
				Borehole/Pit No.	Clay
Site Name	Giga One, Envision, Washington			Sample No.	MS2297/2
Soil Description	Brown, Slightly Sandy, Silty CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.4			KeyLAB ID	EAT_2022072541



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0203	56
90	100	0.0060	42
75	100	0.0020	32
63	100		
50	100		
37.5	100		
28	100		
20	98		
14	98		
10	98		
6.3	96		
5	95		
3.35	95		
2	94		
1.18	93		
0.6	91	Particle density (assumed)	
0.425	89	2.65	Mg/m3
0.3	87		
0.212	83		
0.15	77		
0.063	67		

Method of Pre-Treatment	Sodium Hexametaphosphate

Sample Proportions	% dry mass
Very coarse	0
Gravel	6
Sand	27
Silt	34
Clay	33

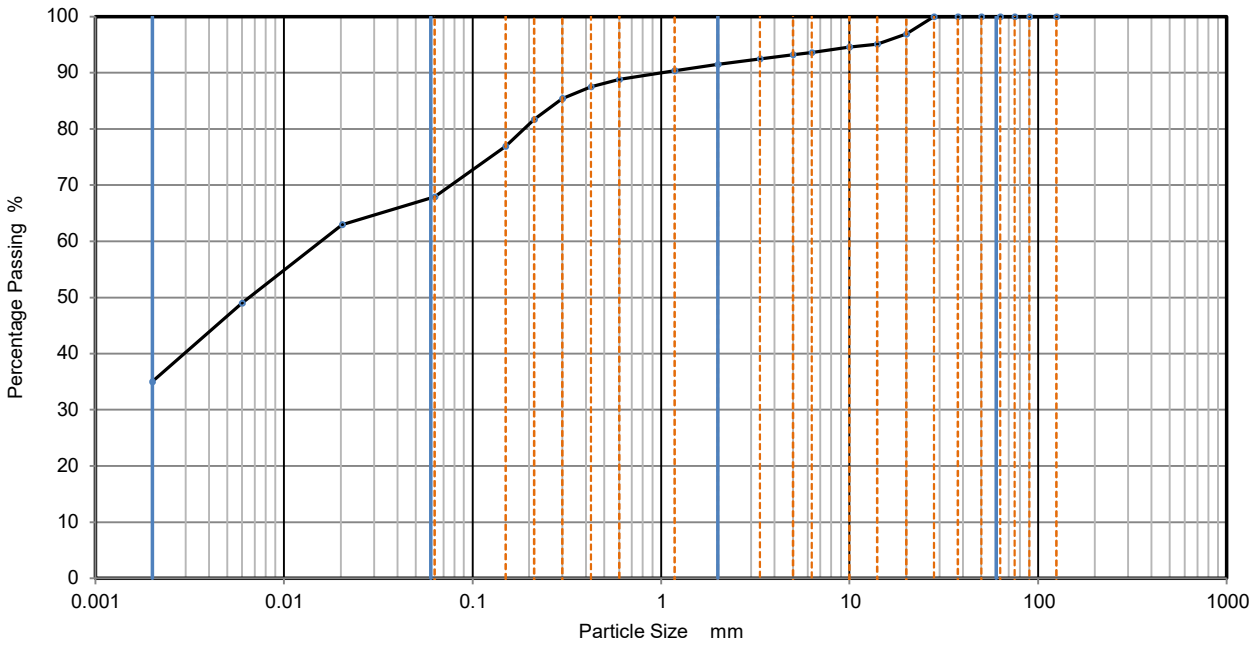
Grading Analysis		
D_{100}	mm	
D_{60}	mm	0.0302
D_{30}	mm	
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		UKAS Accredited Laboratory No. 20632
28/07/2022 11:31	N O'Brien		

EXPLORATION & TESTING ASSOCIATES	PARTICLE SIZE DISTRIBUTION			Job Ref	D10557F
				Borehole/Pit No.	Clay
Site Name	Giga One, Envision, Washington			Sample No.	MS2297/3
Soil Description	Brown, Slightly Sandy, Silty CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.4			KeyLAB ID	EAT_2022072542



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0203	63
90	100	0.0060	49
75	100	0.0020	35
63	100		
50	100		
37.5	100		
28	100		
20	97		
14	95		
10	95		
6.3	94		
5	93		
3.35	93		
2	92		
1.18	90		
0.6	89	Particle density (assumed)	
0.425	88	2.65	Mg/m3
0.3	85		
0.212	82		
0.15	77		
0.063	68		

Method of Pre-Treatment	Sodium Hexametaphosphate

Sample Proportions	% dry mass
Very coarse	0
Gravel	9
Sand	24
Silt	33
Clay	35

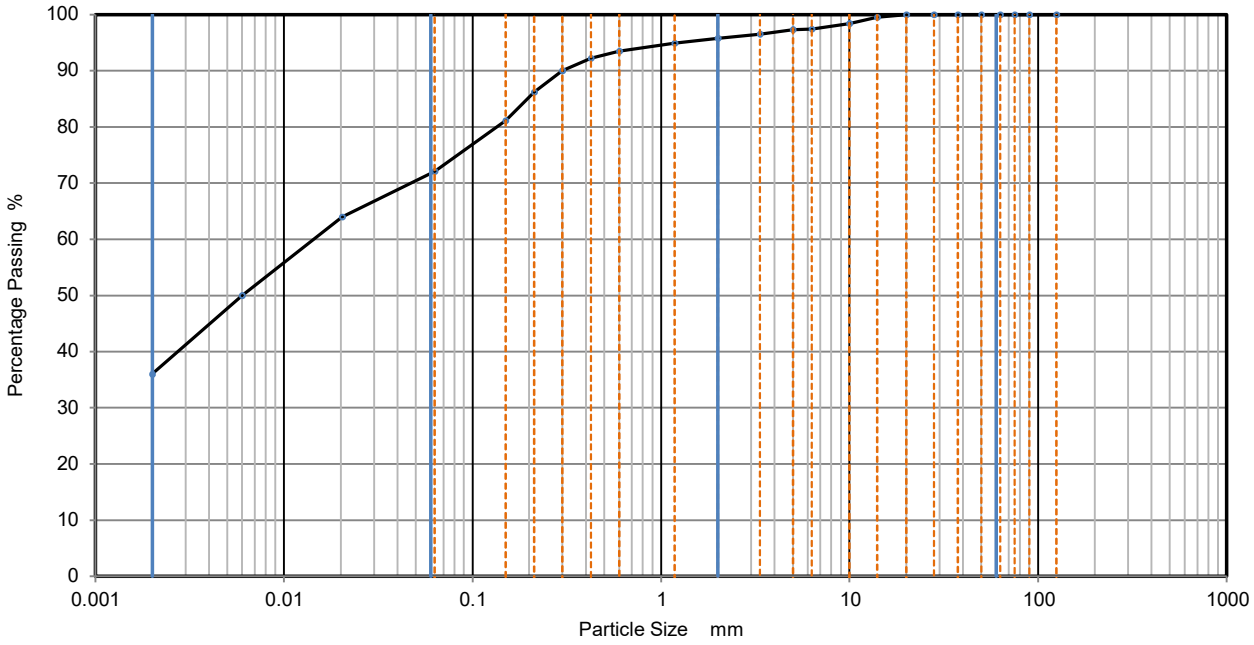
Grading Analysis		
D_{100}	mm	
D_{60}	mm	0.016
D_{30}	mm	
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		UKAS Accredited Laboratory No. 20632
28/07/2022 11:31	N O'Brien		

EXPLORATION & TESTING ASSOCIATES	PARTICLE SIZE DISTRIBUTION			Job Ref	D10557F
				Borehole/Pit No.	Clay
Site Name	Giga One, Envision, Washington			Sample No.	MS2297/4
Soil Description	Brown, Slightly Sandy, Silty CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.4			KeyLAB ID	EAT_2022072543



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0203	64
90	100	0.0060	50
75	100	0.0020	36
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	98		
6.3	97		
5	97		
3.35	97		
2	96		
1.18	95		
0.6	94	Particle density (assumed)	
0.425	92	2.65	Mg/m3
0.3	90		
0.212	86		
0.15	81		
0.063	72		

Method of Pre-Treatment	Sodium Hexametaphosphate

Sample Proportions	% dry mass
Very coarse	0
Gravel	4
Sand	24
Silt	36
Clay	36

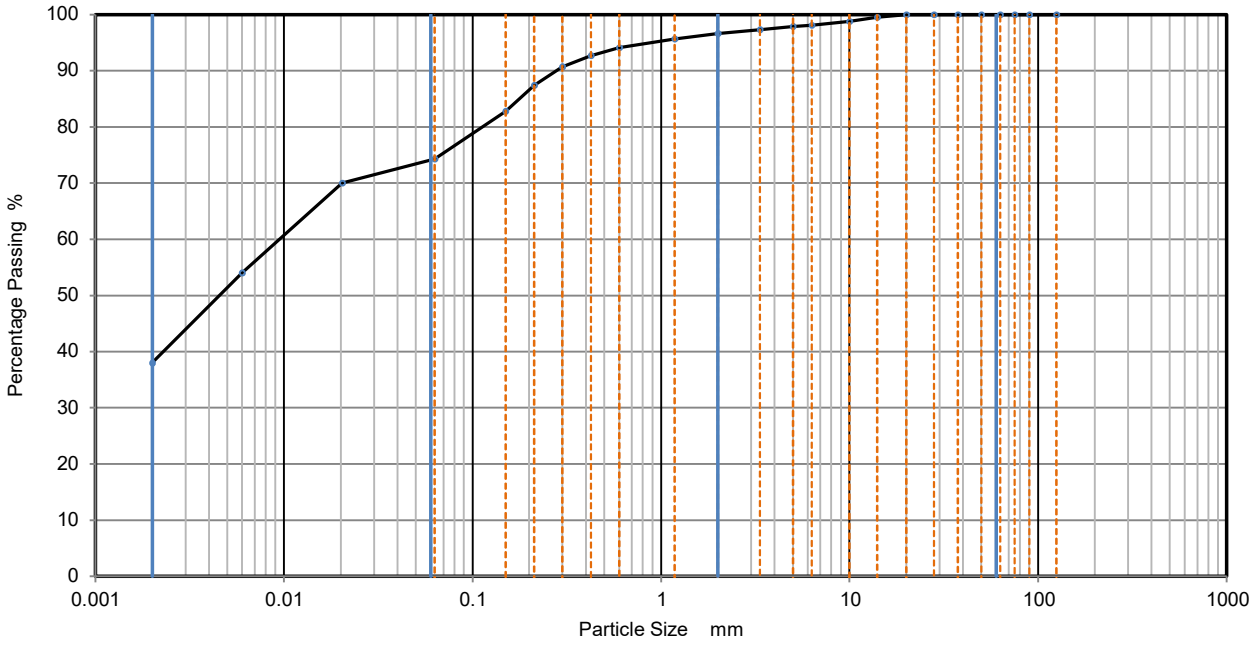
Grading Analysis		
D_{100}	mm	
D_{60}	mm	0.014
D_{30}	mm	
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		UKAS Accredited Laboratory No. 20632
28/07/2022 11:32	N O'Brien		

EXPLORATION & TESTING ASSOCIATES	PARTICLE SIZE DISTRIBUTION			Job Ref	D10557F
				Borehole/Pit No.	Clay
Site Name	Giga One, Envision, Washington			Sample No.	MS2297/5
Soil Description	Brown, Slightly Sandy, Silty CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.4			KeyLAB ID	EAT_2022072544



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0203	70
90	100	0.0060	54
75	100	0.0020	38
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	99		
6.3	98		
5	98		
3.35	97		
2	97		
1.18	96		
0.6	94	Particle density (assumed)	
0.425	93	2.65	Mg/m3
0.3	91		
0.212	87		
0.15	83		
0.063	74		

Method of Pre-Treatment	Sodium Hexametaphosphate

Sample Proportions	% dry mass
Very coarse	0
Gravel	3
Sand	22
Silt	37
Clay	38

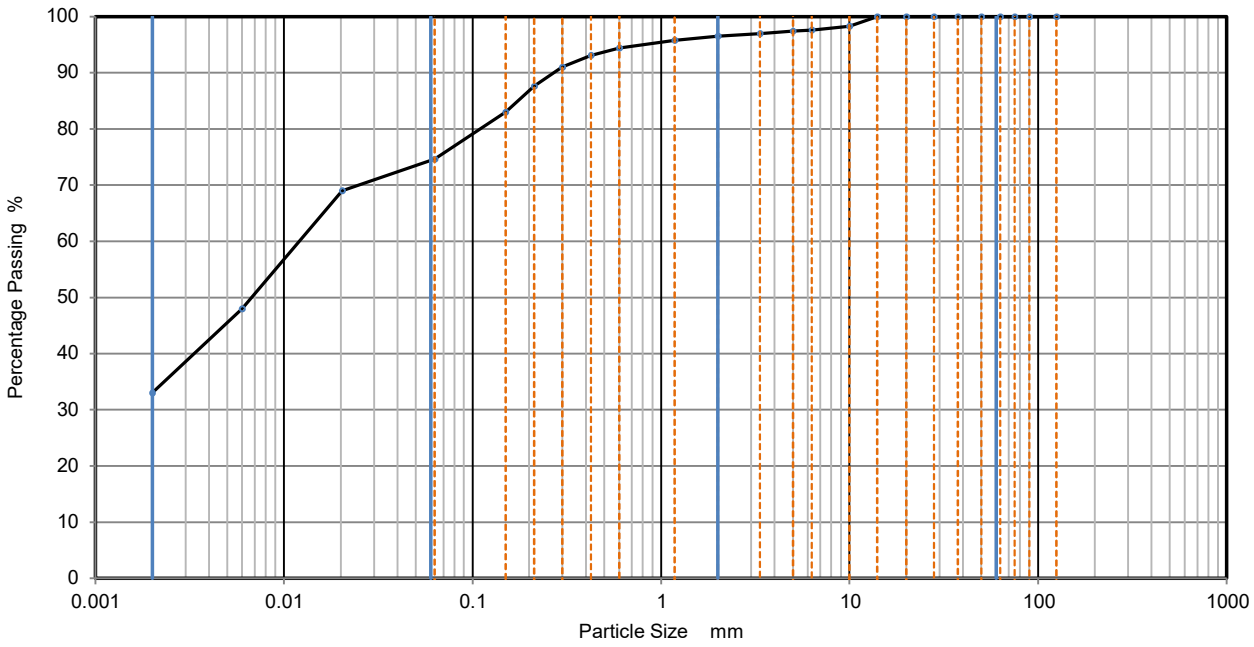
Grading Analysis		
D_{100}	mm	
D_{60}	mm	0.00963
D_{30}	mm	
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		UKAS Accredited Laboratory No. 20632
28/07/2022 11:32	N O'Brien		

EXPLORATION & TESTING ASSOCIATES	PARTICLE SIZE DISTRIBUTION			Job Ref	D10557F
				Borehole/Pit No.	Clay
Site Name	Giga One, Envision, Washington			Sample No.	MS2297/6
Soil Description	Brown, Slightly Sandy, Silty CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.4			KeyLAB ID	EAT_2022072545



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0203	69
90	100	0.0060	48
75	100	0.0020	33
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	98		
6.3	98		
5	97		
3.35	97		
2	97		
1.18	96		
0.6	94	Particle density (assumed)	
0.425	93	2.65	Mg/m3
0.3	91		
0.212	88		
0.15	83		
0.063	75		

Method of Pre-Treatment	Sodium Hexametaphosphate

Sample Proportions	% dry mass
Very coarse	0
Gravel	4
Sand	22
Silt	42
Clay	33

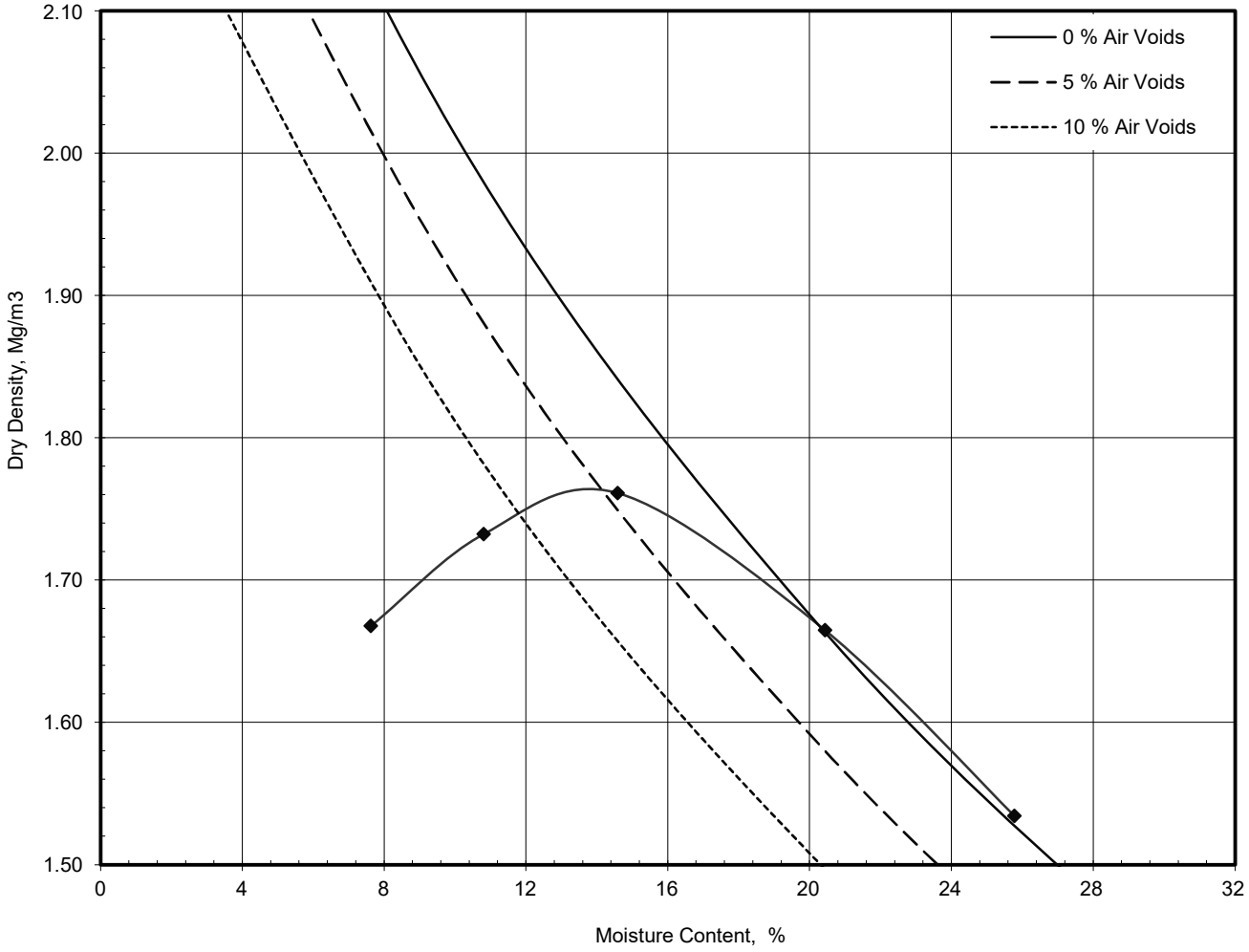
Grading Analysis		
D_{100}	mm	
D_{60}	mm	0.0123
D_{30}	mm	
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		UKAS Accredited Laboratory No. 20632
28/07/2022 11:32	N O'Brien		

EXPLORATION & TESTING ASSOCIATES	Dry Density / Moisture Content Relationship Light Compaction			Job Ref	D10557F
				Borehole / Pit No	Clay
Site Name	Giga One, Washington			Sample No	MS2297/3
Soil Description	Brown, Slightly Sandy, Silty CLAY			Depth	0.00 m
Specimen Ref.		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.3, 2.5kg rammer			Keylab ID	EAT_2022072542
				Compaction Test Reference/No.	



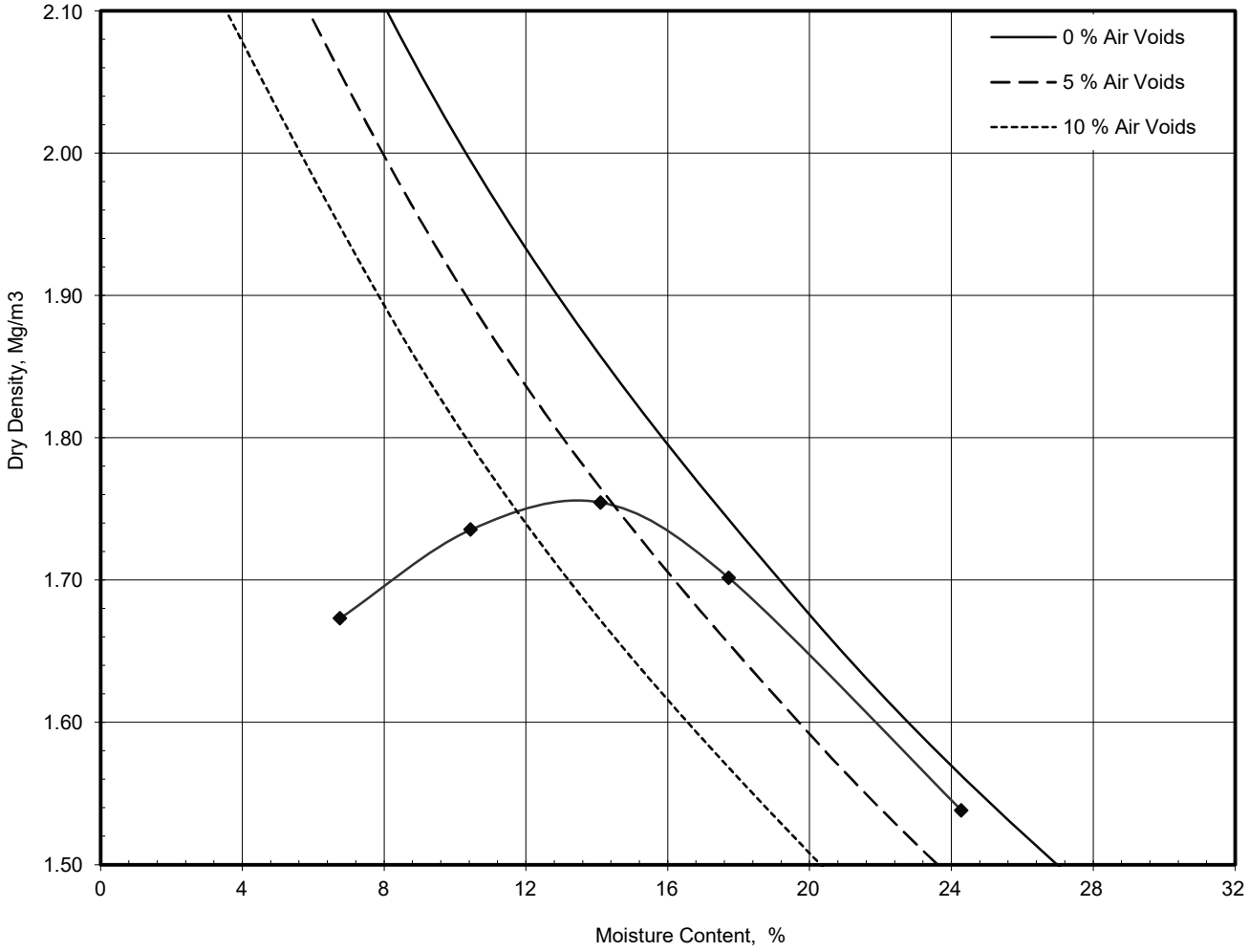
Preparation		Material used was air dried and oven dried at 20degC
Mould Type		One Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	0
Particle Density - Measured using gas jar	Mg/m³	2.52

Maximum Dry Density	Mg/m³	**1.76**

Optimum Moisture Content	%	**15**

Comments	Date	Checked By	Approved	UKAS Accredited Laboratory No. 20632
	27/07/2022 19:18	N. Hodson	N. O'Brien	

EXPLORATION & TESTING ASSOCIATES	Dry Density / Moisture Content Relationship Light Compaction			Job Ref	D10557F
				Borehole / Pit No	Clay
Site Name	Giga One, Washington			Sample No	MS2297/1
Soil Description	Brown, Slightly Sandy, Silty CLAY			Depth	0.00 m
Specimen Ref.		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.4, 2.5kg rammer			Keylab ID	EAT_2022072540
				Compaction Test Reference/No.	



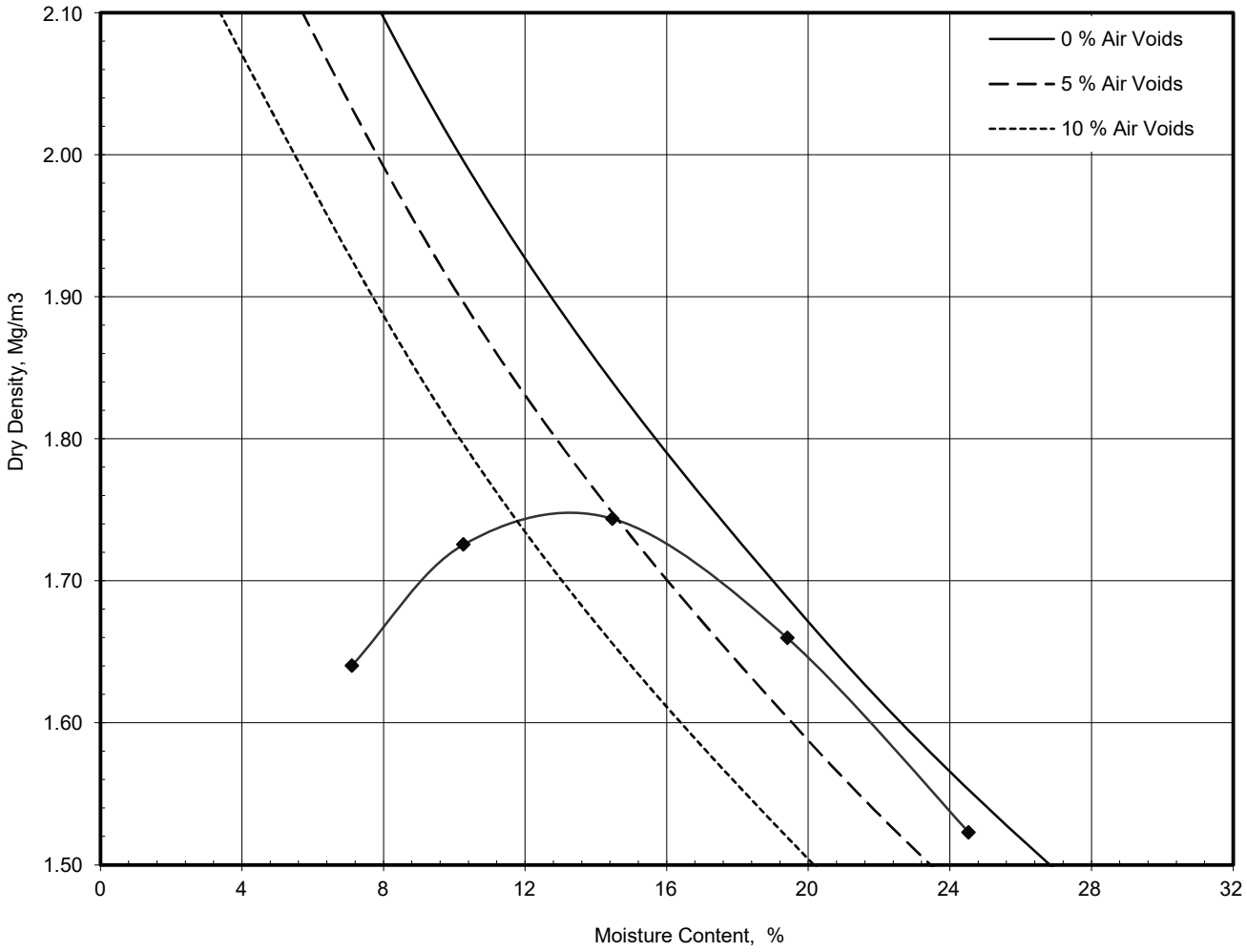
Preparation		Material used was air dried
Mould Type		One Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	0
Particle Density - Measured using gas jar	Mg/m³	2.52

Maximum Dry Density	Mg/m³	**1.75**

Optimum Moisture Content	%	**14**

Comments	Date	Checked By	Approved	UKAS Accredited Laboratory No. 20632
	27/07/2022 19:17	N. Hodson	N. O'Brien	

EXPLORATION & TESTING ASSOCIATES	**Dry Density / Moisture Content Relationship Light Compaction**			Job Ref	**D10557F**
				Borehole / Pit No	Clay
Site Name	**Giga One, Washington**			Sample No	MS2297/2
Soil Description	Brown, Slightly Sandy, Silty CLAY			Depth	0.00 m
Specimen Ref.		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.4, 2.5kg rammer			Keylab ID	EAT_2022072541
				Compaction Test Reference/No.	



Preparation		Material used was air dried
Mould Type		One Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	0
Particle Density - Measured using gas jar	Mg/m³	2.51

Maximum Dry Density	Mg/m³	**1.74**

Optimum Moisture Content	%	**14**

Comments	Date	Checked By	Approved	UKAS Accredited Laboratory No. 20632
	27/07/2022 19:18	N. Hodson	N. O'Brien	

EXPLORATION & TESTING ASSOCIATES

Particle Density by Gas Jar - Summary of Results

Project No.	Project Name
D10557F	Giga One, Envision, Washington

Hole No.	Sample				Soil Description at test horizon	Particle Density Mg/m^3	Remarks
	Ref	Top	Base	Type			
Clay	MS2297/1	0.00		B	Brown, Slighly Sandy, Silty CLAY	2.53	
Clay	MS2297/2	0.00		B	Brown, Slighly Sandy, Silty CLAY	2.51	
Clay	MS2297/3	0.00		B	Brown, Slighly Sandy, Silty CLAY	2.53	

Notes
Tests performed in accordance with BS 1377
unless annotated otherwise.
Gas Jar tests to BS1377: Part 2 : 1990, clause 8.2

Comments

Date
27/07/2022 19:21

Approved
N O'Brien

UKAS Accredited
Laboratory No. 20632

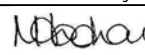
EXPLORATION
& TESTING ASSOCIATES
Unit 8B Bowburn South Industrial Estate
Durham, DH6 5AD T: 0191 389 6543

UKAS TESTING

Laboratory Test Report

Client	Groundwork Services (Durham) Limited
Address	Littleburn Industrial Estate Langley Moor Durham DH7 8HJ
F.A.O	Paul Barton / Ben Johnson
Project:	Giga One Factory, Washington
Project Number:	D10557G
Report Number:	L22-607
Date Received:	23rd June 2022

Testing Required:	Moisture Content - BS:1377-2:1990 Determination of Liquid and Plastic Limits and Plasticity Index - BS:1377-2:1990 (Cone Penetrometer) Particle Size Distribution - BS:1377-2:1990 Sedimentation by Pipette - BS:1377-2:1990 Particle Density by Gas Jar - BS:1377-2:1990 Clause 8.2 Determination of Maximum Dry Density / Optimum Moisture Content by 2.5kg Rammer - BS:1377-4:1990
Date Started:	30th June 2022
Date Finished:	27th July 2022

Report Issue Date:	27th July 2022
Reviewed By:	
	N. Hodson - Materials Director
Authorised By:	
	N O'Brien - Laboratory Manager
Remarks:	(*) denotes testing is outside of UKAS Scope of Accreditation.
	(+) denotes subcontracted testing.

Samples will be stored for one month after the report has been issue before being disposed of.

The published results appertain only to the specimens tested.

EXPLORATION & TESTING ASSOCIATES

Determination of Moisture Content, Liquid Limit, Plastic Limit and Derivation of Plasticity Index

Project No.	Project Name
D10557G	Giga One, Envision, Washington

Hole No.	Sample			Soil Description	Moisture Content %	Passing 425µm %	Liquid Limit %	Plastic Limit %	Plasticity Index %	Remarks
	Type	Ref	Depth							
Clay	B	MS2298/1	0.00	Brown, Slightly Sandy, Silty CLAY	18	98	49	22	27	Sample tested in natural state - material passing 425um estimated by hand picking
Clay	B	MS2298/2	0.00	Brown, Slightly Sandy, Silty CLAY	19	90	50	23	27	Sample tested in natural state - material passing 425um estimated by hand picking
Clay	B	MS2298/3	0.00	Brown, Slightly Sandy, Silty CLAY	18	99	52	21	31	Sample tested in natural state - material passing 425um estimated by hand picking
Clay	B	MS2298/4	0.00	Brown, Slightly Sandy, Silty CLAY	19	98	52	22	30	Sample tested in natural state - material passing 425um estimated by hand picking
Clay	B	MS2298/5	0.00	Brown, Slightly Sandy, Silty CLAY	18	98	49	20	29	Sample tested in natural state - material passing 425um estimated by hand picking
Clay	B	MS2298/6	0.00	Brown, Slightly Sandy, Silty CLAY	18	99	51	23	28	Sample tested in natural state - material passing 425um estimated by hand picking

Moisture Content carried out in accordance with BS 1377: Part 2: 1990: Clause 3.2

Liquid Limit, Plastic Limit & Plasticity Index all performed in accordance with BS 1377: Part 2: 1990 - Cone Penetrometer method - Cone 80g/30°

Date: 27/07/2022 19:46

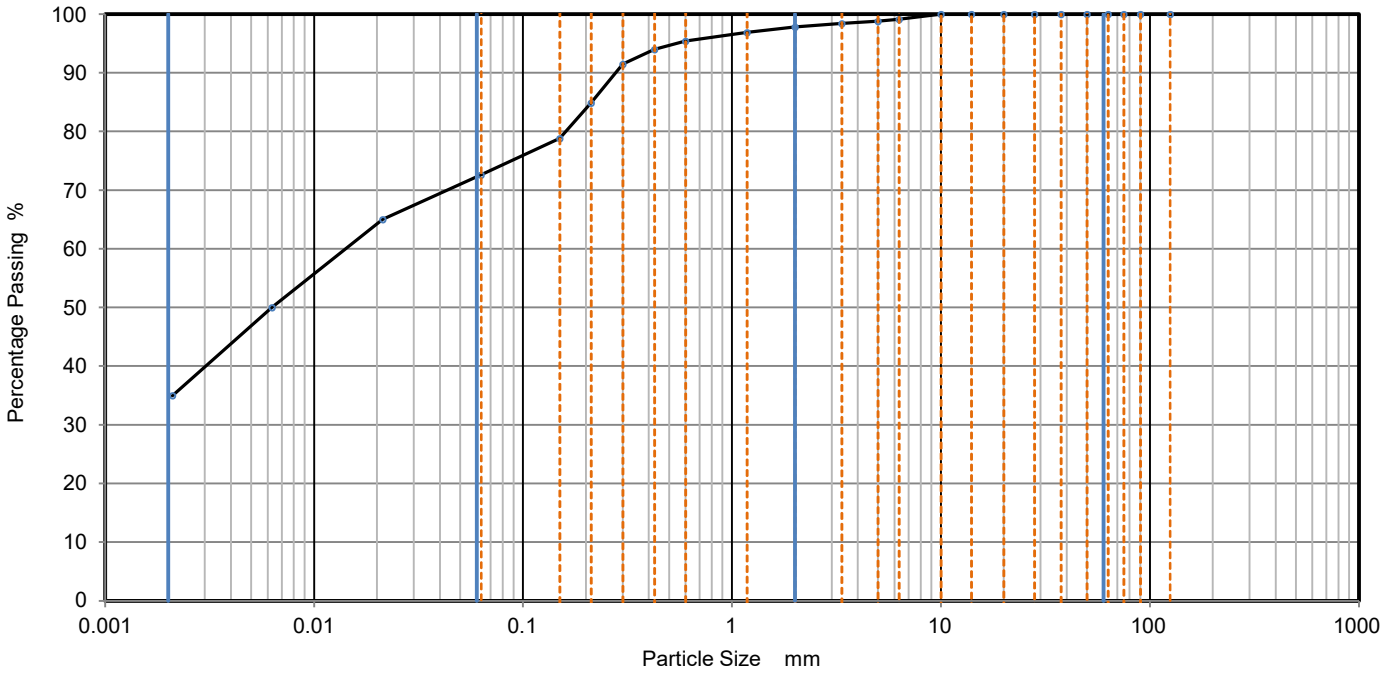
Approved By: N O'Brien

UKAS Accredited Laboratory No. 20632

EXPLORATION & TESTING ASSOCIATES

PARTICLE SIZE DISTRIBUTION

				Job Ref	**D10557G**
				Borehole/Pit No.	Clay
Site Name	Giga One, Envision, Washington			Sample No.	MS2298/1
Soil Description	Brown, Slightly Sandy, Silty CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990, Washing and Drying, Clauses 9.2 & 9.4			KeyLAB ID	EAT_2022072546



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0213	65
90	100	0.0063	50
75	100	0.0021	35
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	99		
5	99		
3.35	98		
2	98		
1.18	97		
0.6	95	Particle density (measured)	
0.425	94	2.50	Mg/m3
0.3	92		
0.212	85		
0.15	79		
0.063	73		

Method of Pre-Treatment	Sodium Hexametaphosphate

Sample Proportions	% dry mass
Very coarse	0
Gravel	2
Sand	25
Fines <0.063mm	73

Grading Analysis		
D_{100}	mm	
D_{60}	mm	0.0147
D_{30}	mm	
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

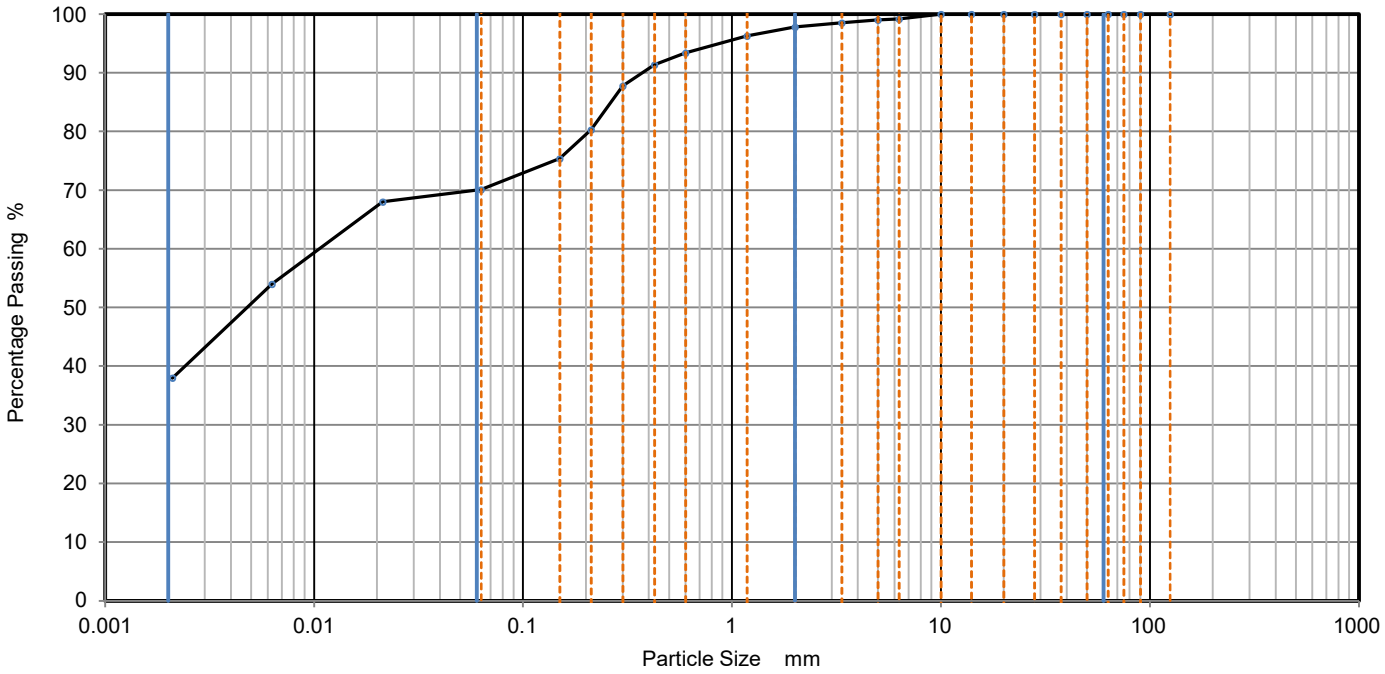
Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		UKAS Accredited Laboratory No. 20632
27/07/2022 19:47	N O'Brien		

EXPLORATION & TESTING ASSOCIATES

PARTICLE SIZE DISTRIBUTION

				Job Ref	**D10557G**
				Borehole/Pit No.	Clay
Site Name	Giga One, Envision, Washington			Sample No.	MS2298/2
Soil Description	Brown, Slightly Sandy, Silty CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990, Washing and Drying, Clauses 9.2 & 9.4			KeyLAB ID	EAT_2022072547



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0213	68
90	100	0.0063	54
75	100	0.0021	38
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	99		
5	99		
3.35	99		
2	98		
1.18	96		
0.6	93	Particle density (measured)	
0.425	91	2.50	Mg/m3
0.3	88		
0.212	80		
0.15	75		
0.063	70		

Method of Pre-Treatment	Sodium Hexametaphosphate

Sample Proportions	% dry mass
Very coarse	0
Gravel	2
Sand	28
Fines <0.063mm	70

Grading Analysis		
D_{100}	mm	
D_{60}	mm	0.0106
D_{30}	mm	
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

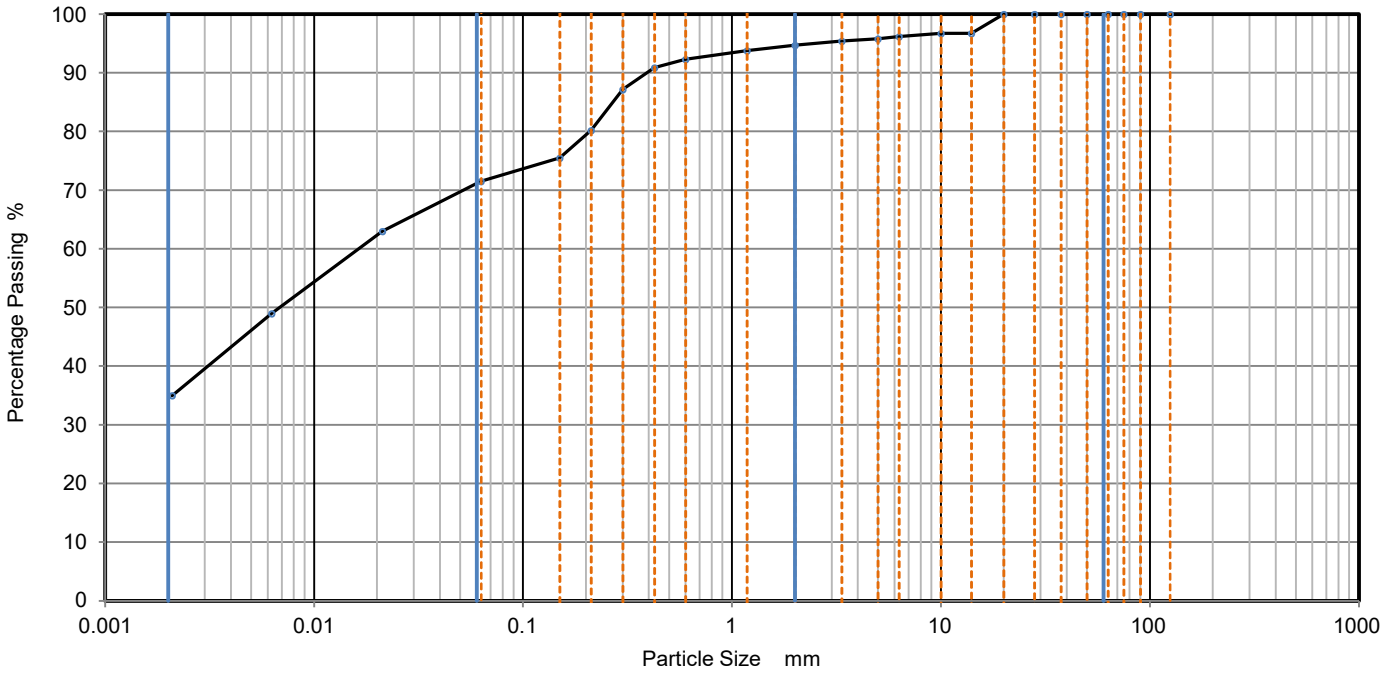
Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		UKAS Accredited Laboratory No. 20632
27/07/2022 19:47	N O'Brien		

EXPLORATION & TESTING ASSOCIATES

PARTICLE SIZE DISTRIBUTION

				Job Ref	**D10557G**
				Borehole/Pit No.	Clay
Site Name	Giga One, Envision, Washington			Sample No.	MS2298/3
Soil Description	Brown, Slightly Sandy, Silty CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990, Washing and Drying, Clauses 9.2 & 9.4			KeyLAB ID	EAT_2022072548



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0212	63
90	100	0.0063	49
75	100	0.0021	35
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	97		
10	97		
6.3	96		
5	96		
3.35	95		
2	95		
1.18	94		
0.6	92	Particle density (measured)	
0.425	91	2.51	Mg/m3
0.3	87		
0.212	80		
0.15	76		
0.063	72		

Method of Pre-Treatment	Sodium Hexametaphosphate

Sample Proportions	% dry mass
Very coarse	0
Gravel	5
Sand	23
Fines <0.063mm	71

Grading Analysis		
D_{100}	mm	
D_{60}	mm	0.0159
D_{30}	mm	
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

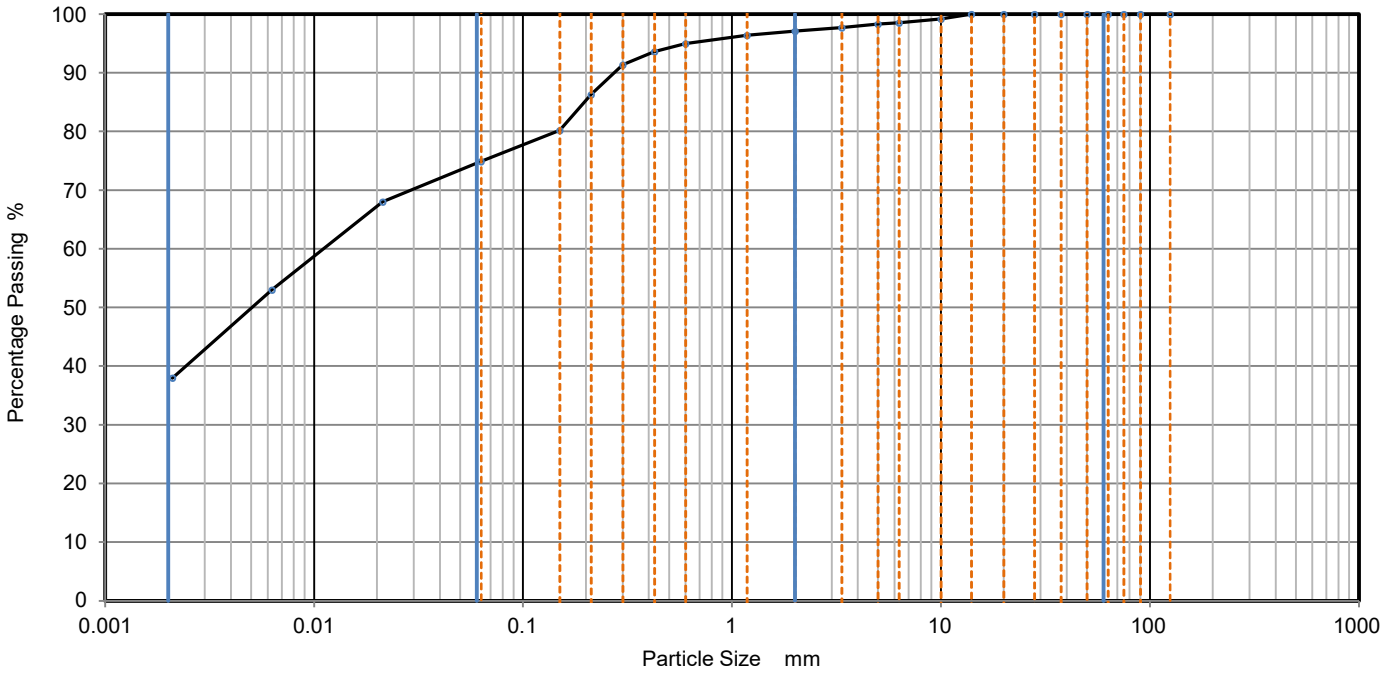
Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		UKAS Accredited Laboratory No. 20632
27/07/2022 19:48	N O'Brien		

EXPLORATION & TESTING ASSOCIATES

PARTICLE SIZE DISTRIBUTION

				Job Ref	**D10557G**
				Borehole/Pit No.	Clay
Site Name	Giga One, Envision, Washington			Sample No.	MS2298/4
Soil Description	Brown, Slightly Sandy, Silty CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990, Washing and Drying, Clauses 9.2 & 9.4			KeyLAB ID	EAT_2022072549



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0213	68
90	100	0.0063	53
75	100	0.0021	38
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	99		
6.3	99		
5	98		
3.35	98		
2	97		
1.18	96		
0.6	95	Particle density (measured)	
0.425	94	2.50	Mg/m3
0.3	91		
0.212	86		
0.15	80		
0.063	75		

Method of Pre-Treatment	Sodium Hexametaphosphate

Sample Proportions	% dry mass
Very coarse	0
Gravel	3
Sand	22
Fines <0.063mm	75

Grading Analysis		
D_{100}	mm	
D_{60}	mm	0.0109
D_{30}	mm	
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

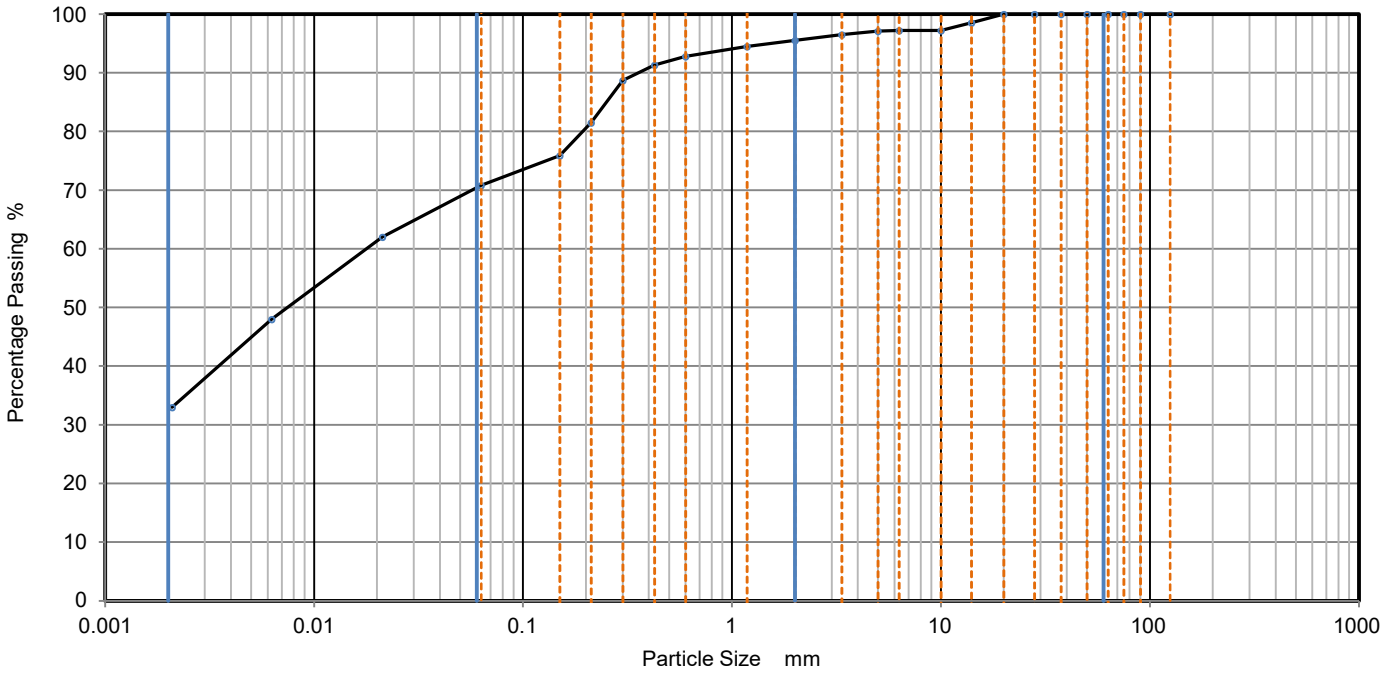
Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		UKAS Accredited Laboratory No. 20632
27/07/2022 19:48	N O'Brien		

EXPLORATION & TESTING ASSOCIATES

PARTICLE SIZE DISTRIBUTION

				Job Ref	**D10557G**
				Borehole/Pit No.	Clay
Site Name	Giga One, Envision, Washington			Sample No.	MS2298/5
Soil Description	Brown, Slightly Sandy, Silty CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990, Washing and Drying, Clauses 9.2 & 9.4			KeyLAB ID	EAT_2022072550



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0212	62
90	100	0.0063	48
75	100	0.0021	33
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	99		
10	97		
6.3	97		
5	97		
3.35	97		
2	96		
1.18	95		
0.6	93	Particle density (assumed)	
0.425	91	2.51	Mg/m3
0.3	89		
0.212	82		
0.15	76		
0.063	71		

Method of Pre-Treatment	Sodium Hexametaphosphate

Sample Proportions	% dry mass
Very coarse	0
Gravel	5
Sand	25
Fines <0.063mm	71

Grading Analysis		
D_{100}	mm	
D_{60}	mm	0.0174
D_{30}	mm	
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

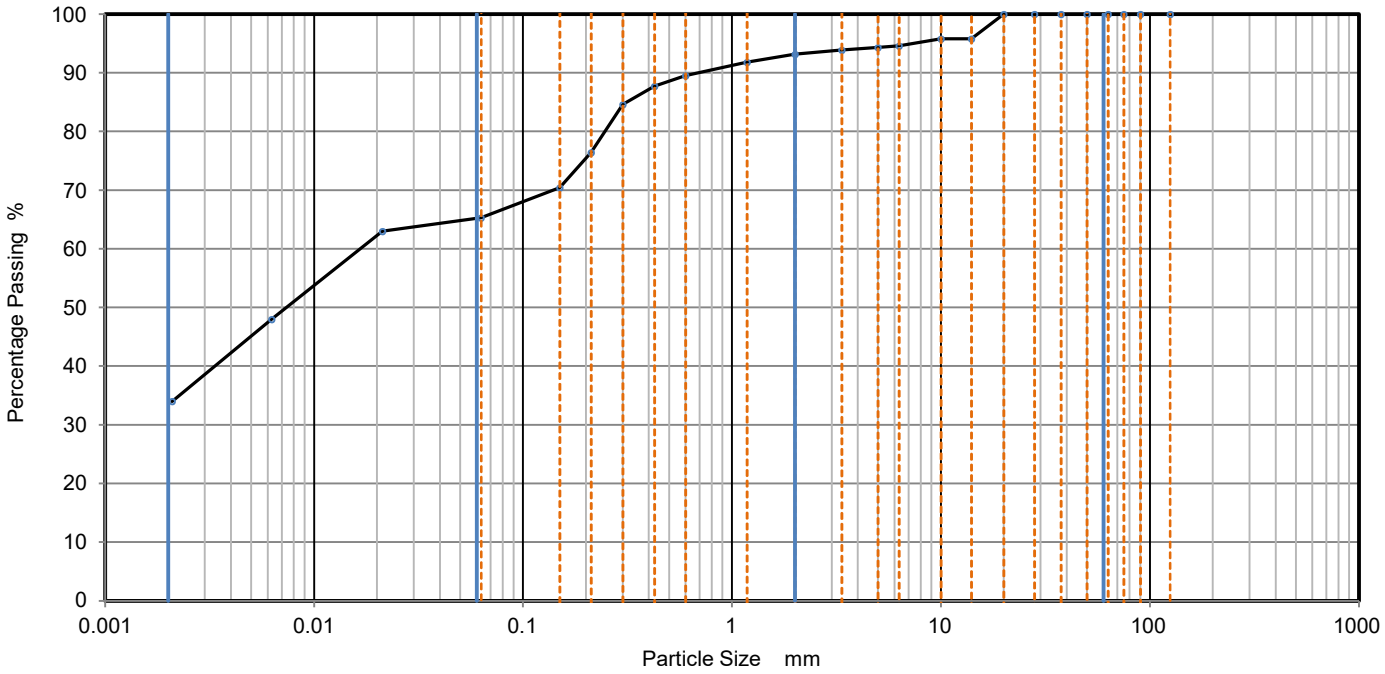
Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		UKAS Accredited Laboratory No. 20632
27/07/2022 19:48	N O'Brien		

EXPLORATION & TESTING ASSOCIATES

PARTICLE SIZE DISTRIBUTION

				Job Ref	**D10557G**
				Borehole/Pit No.	Clay
Site Name	Giga One, Envision, Washington			Sample No.	MS2298/6
Soil Description	Brown, Slightly Sandy, Silty CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990, Washing and Drying, Clauses 9.2 & 9.4			KeyLAB ID	EAT_2022072551



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0212	63
90	100	0.0063	48
75	100	0.0021	34
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	96		
10	96		
6.3	95		
5	94		
3.35	94		
2	93		
1.18	92		
0.6	90	Particle density (measured)	
0.425	88	2.51	Mg/m3
0.3	85		
0.212	76		
0.15	70		
0.063	65		

Method of Pre-Treatment	Sodium Hexametaphosphate

Sample Proportions	% dry mass
Very coarse	0
Gravel	7
Sand	28
Fines <0.063mm	65

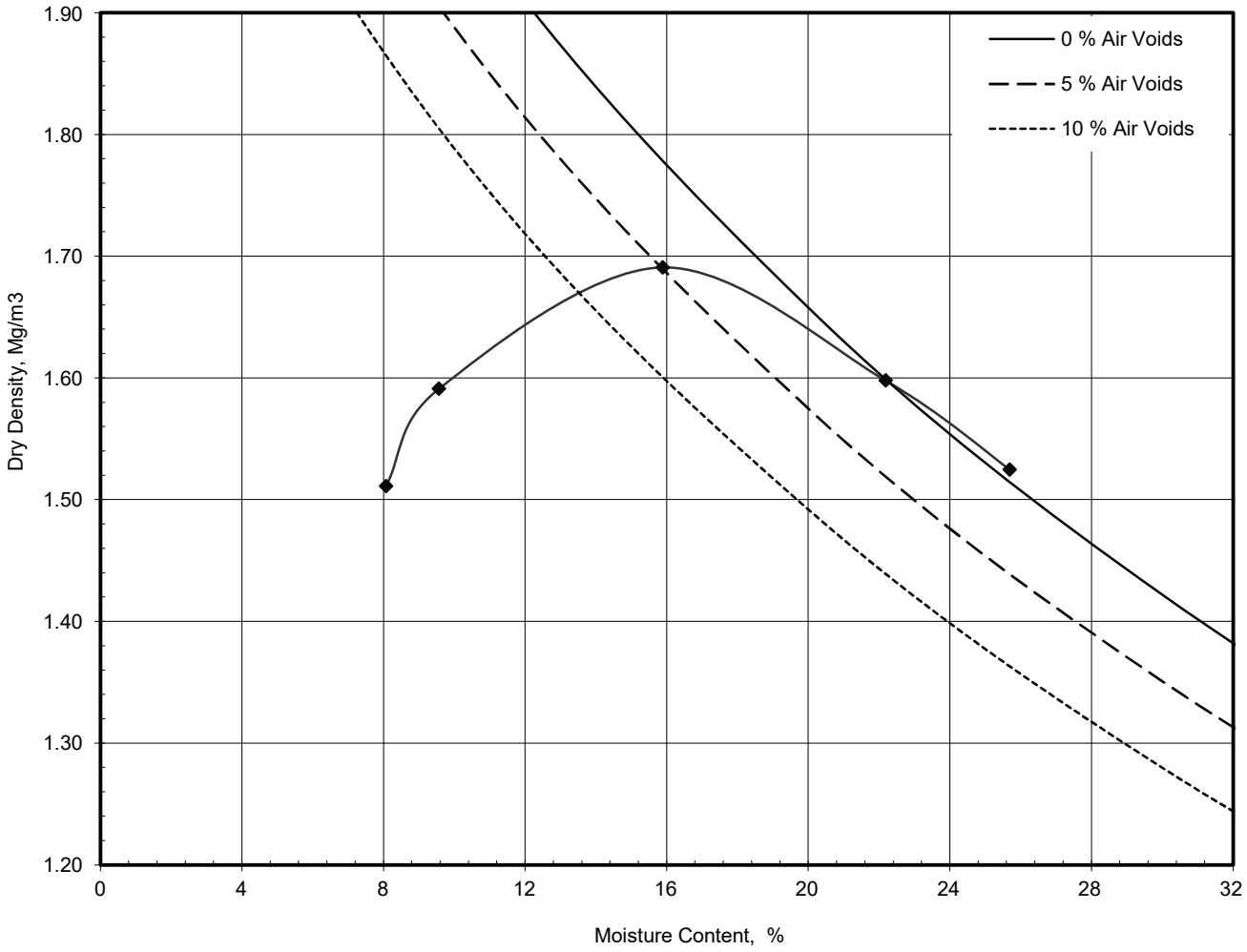
Grading Analysis		
D_{100}	mm	
D_{60}	mm	0.0168
D_{30}	mm	
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		UKAS Accredited Laboratory No. 20632
27/07/2022 19:48	N O'Brien		

EXPLORATION & TESTING ASSOCIATES	**Dry Density / Moisture Content Relationship Light Compaction**			Job Ref	**D10557G**
				Borehole / Pit No	Clay
Site Name	**Giga One, Washington**			Sample No	MS2298/1
Soil Description	Brown, Slightly Sandy, Silty CLAY			Depth	0.00 m
Specimen Ref.		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.3, 2.5kg rammer			Keylab ID	EAT_2022072546
				Compaction Test Reference/No.	



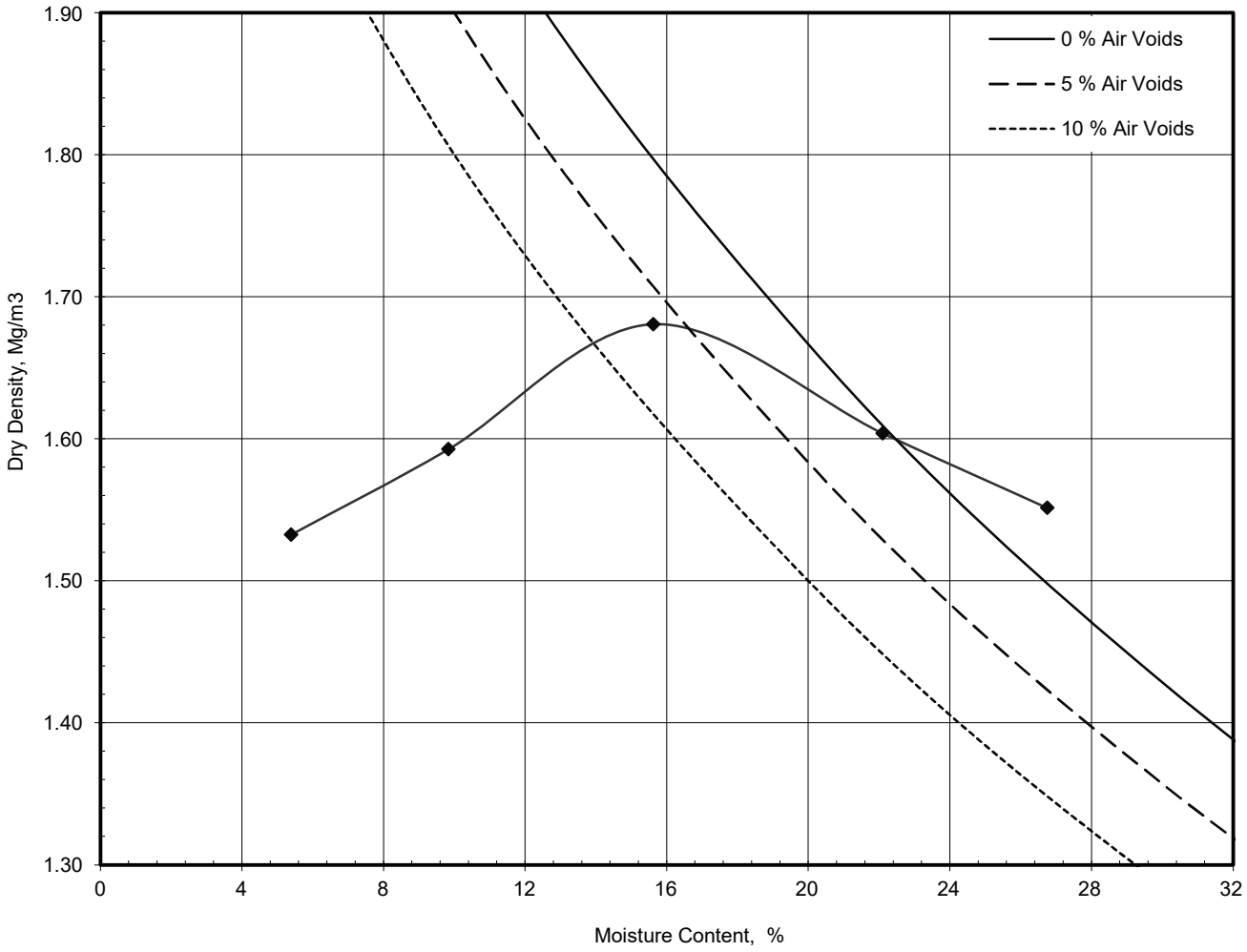
Preparation		Material used was air dried
Mould Type		One Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	0
Particle Density - Assumed	Mg/m³	2.48

Maximum Dry Density	Mg/m³	**1.69**

Optimum Moisture Content	%	**16**

Comments	Date	Checked By	Approved	UKAS Accredited Laboratory No. 20632
	27/07/2022 19:43	N. Hodson	N. O'Brien	

EXPLORATION & TESTING ASSOCIATES	Dry Density / Moisture Content Relationship Light Compaction			Job Ref	D10557G
				Borehole / Pit No	Clay
Site Name	Giga One, Washington			Sample No	MS2298/2
Soil Description	Brown, Slightly Sandy, Silty CLAY			Depth	0.00 m
Specimen Ref.		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.3, 2.5kg rammer			Keylab ID	EAT_2022072547
				Compaction Test Reference/No.	



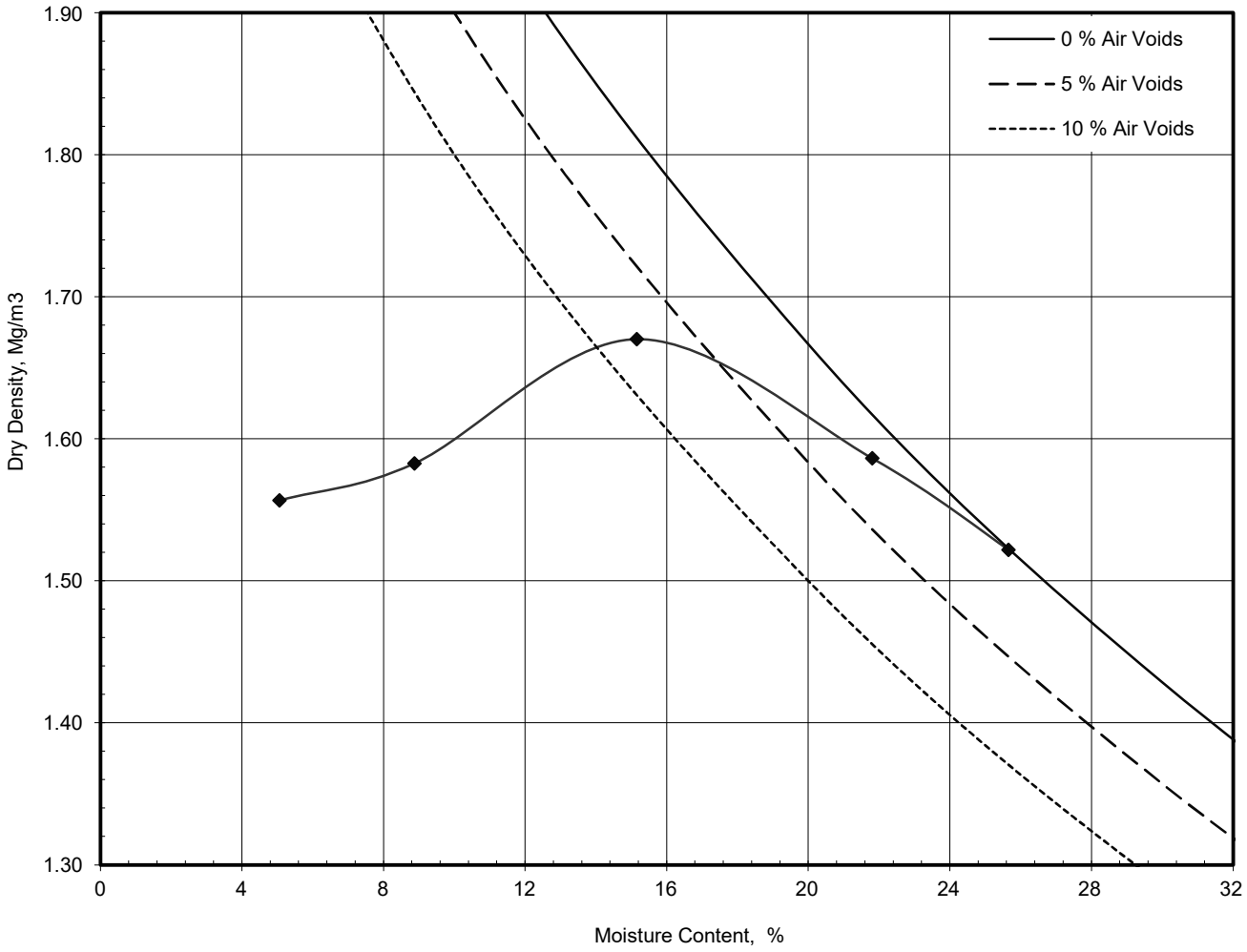
Preparation		Material used was air dried
Mould Type		One Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	0
Particle Density - Assumed	Mg/m³	2.50

Maximum Dry Density	Mg/m³	**1.68**

Optimum Moisture Content	%	**16**

Comments	Date	Checked By	Approved	UKAS Accredited Laboratory No. 20632
	27/07/2022 19:44	N. Hodson	N. O'Brien	

EXPLORATION & TESTING ASSOCIATES	Dry Density / Moisture Content Relationship Light Compaction			Job Ref	D10557G
				Borehole / Pit No	Clay
Site Name	Giga One, Washington			Sample No	MS2298/3
Soil Description	Brown, Slightly Sandy, Silty CLAY			Depth	0.00 m
Specimen Ref.		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.4, 2.5kg rammer			Keylab ID	EAT_2022072548
				Compaction Test Reference/No.	



Preparation		Material used was air dried
Mould Type		CBR
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	0
Particle Density - Assumed	Mg/m³	2.50

Maximum Dry Density	Mg/m³	**1.67**

Optimum Moisture Content	%	**15**

Comments	Date	Checked By	Approved	UKAS Accredited Laboratory No. 20632
	27/07/2022 19:45	N. Hodson	N. O'Brien	

EXPLORATION & TESTING ASSOCIATES

Particle Density by Gas Jar - Summary of Results

Project No.	Project Name
D10557G	Giga One, Envision, Washington

Hole No.	Sample Ref	Top	Base	Type	Soil Description at test horizon	Particle Density Mg/m^3	Remarks
Clay	MS2298/1	0.00		B	Brown, Slightly Sandy, Silty CLAY	2.48	
Clay	MS2298/2	0.00		B	Brown, Slightly Sandy, Silty CLAY	2.51	
Clay	MS2298/3	0.00		B	Brown, Slightly Sandy, Silty CLAY	2.50	

Notes
Tests performed in accordance with BS 1377 unless annotated otherwise.
Gas Jar tests to BS1377: Part 2 : 1990, clause 8.2

Comments

Date: 27/07/2022 19:49

Approved: N O'Brien

UKAS Accredited Laboratory No. 20632

EXPLORATION
& TESTING ASSOCIATES

Unit 8B Bowburn South Industrial Estate
Durham, DH6 5AD T: 0191 389 6543

UKAS TESTING

Laboratory Test Report

Client	Groundwork Services (Durham) Limited
Address	Littleburn Industrial Estate Langley Moor Durham DH7 8HJ
F.A.O	Paul Barton / Ben Johnson
Project:	Giga One Factory, Washington
Project Number:	D10557M
Report Number:	L22-608
Date Received:	29th June 2022

Testing Required:	Moisture Content - BS:1377-2:1990 Determination of Liquid and Plastic Limits and Plasticity Index - BS:1377-2:1990 (Cone Penetrometer) Particle Size Distribution - BS:1377-2:1990 Sedimentation by Pipette - BS:1377-2:1990 Particle Density by Gas Jar - BS:1377-2:1990 Clause 8.2 Determination of Maximum Dry Density / Optimum Moisture Content by 2.5kg Rammer - BS:1377-4:1990
Date Started:	30th June 2022
Date Finished:	27th July 2022

Report Issue Date:	27th July 2022
Reviewed By:	N. Hodson - Materials Director
Authorised By:	N O'Brien - Laboratory Manager
Remarks:	(*) denotes testing is outside of UKAS Scope of Accreditation. (+) denotes subcontracted testing.

Samples will be stored for one month after the report has been issue before being disposed of.

The published results appertain only to the specimens tested.

EXPLORATION & TESTING ASSOCIATES

Determination of Moisture Content, Liquid Limit, Plastic Limit and Derivation of Plasticity Index

Project No.	Project Name
D10557M	Giga One, Envision, Washington

Hole No.	Sample			Soil Description	Moisture Content %	Passing 425µm %	Liquid Limit %	Plastic Limit %	Plasticity Index %	Remarks
	Type	Ref	Depth							
Clay	B	MS2299/1	0.00	Brown, Slightly Sandy, Slightly Silty CLAY	16	97	47	19	28	Sample tested in natural state - material passing 425um estimated by hand picking
Clay	B	MS2299/2	0.00	Brown, Slightly Sandy, Slightly Silty CLAY	17	98	49	21	28	Sample tested in natural state - material passing 425um estimated by hand picking
Clay	B	MS2299/3	0.00	Brown, Slightly Sandy, Slightly Silty CLAY	18	99	45	21	24	Sample tested in natural state - material passing 425um estimated by hand picking
Clay	B	MS2299/4	0.00	Brown, Slightly Sandy, Slightly Silty CLAY	18	96	49	19	30	Sample tested in natural state - material passing 425um estimated by hand picking

Moisture Content carried out in accordance with BS 1377: Part 2: 1990: Clause 3.2

Liquid Limit, Plastic Limit & Plasticity Index all performed in accordance with BS 1377: Part 2: 1990 - Cone Penetrometer method - Cone 80g/30°

Date: 27/07/2022 20:06

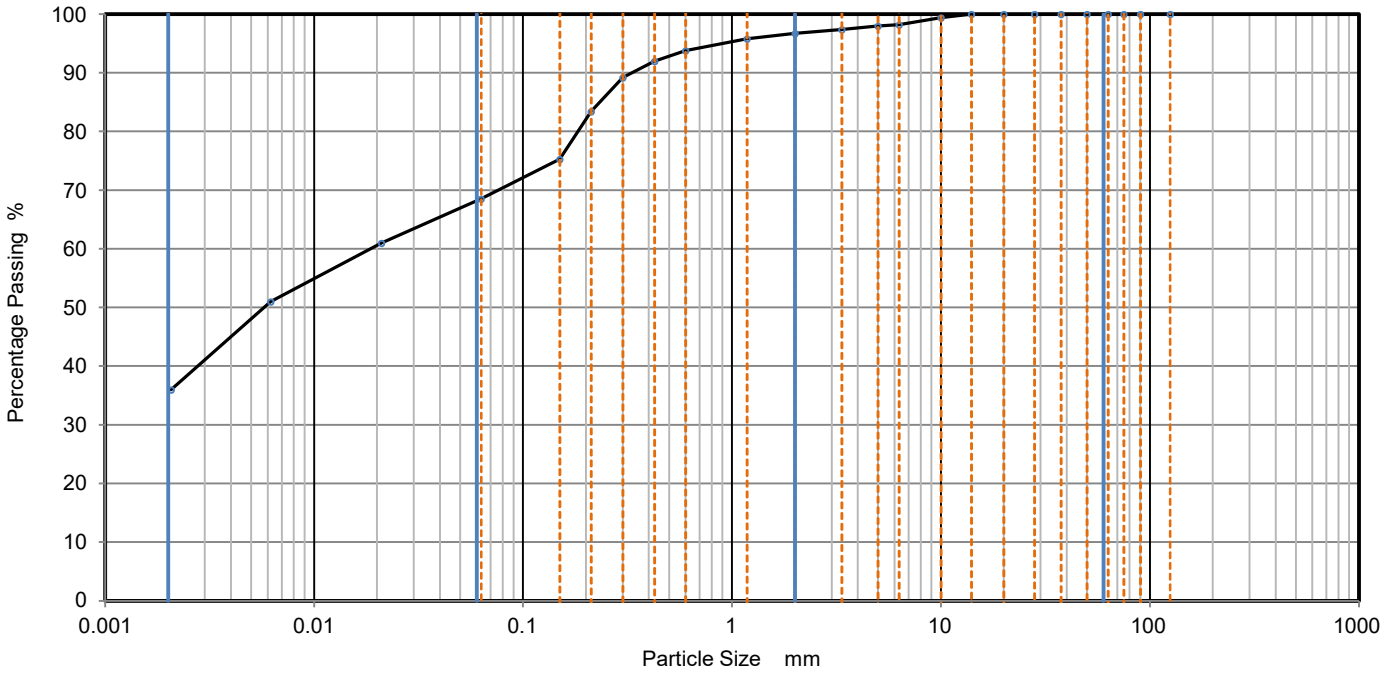
Approved By: N O'Brien

UKAS Accredited Laboratory No. 20632

EXPLORATION & TESTING ASSOCIATES

PARTICLE SIZE DISTRIBUTION

				Job Ref	**D10557M**
				Borehole/Pit No.	Clay
Site Name	Giga One, Envision, Washington			Sample No.	MS2299/1
Soil Description	Brown, Slightly Sandy, Slightly Silty CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990, Washing and Drying, Clauses 9.2 & 9.4			KeyLAB ID	EAT_2022072552



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0210	61
90	100	0.0062	51
75	100	0.0021	36
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	99		
6.3	98		
5	98		
3.35	97		
2	97		
1.18	96		
0.6	94	Particle density (measured)	
0.425	92	2.54	Mg/m3
0.3	89		
0.212	83		
0.15	75		
0.063	69		

Method of Pre-Treatment	Sodium Hexametaphosphate

Sample Proportions	% dry mass
Very coarse	0
Gravel	3
Sand	28
Fines <0.063mm	68

Grading Analysis		
D_{100}	mm	
D_{60}	mm	0.0191
D_{30}	mm	
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

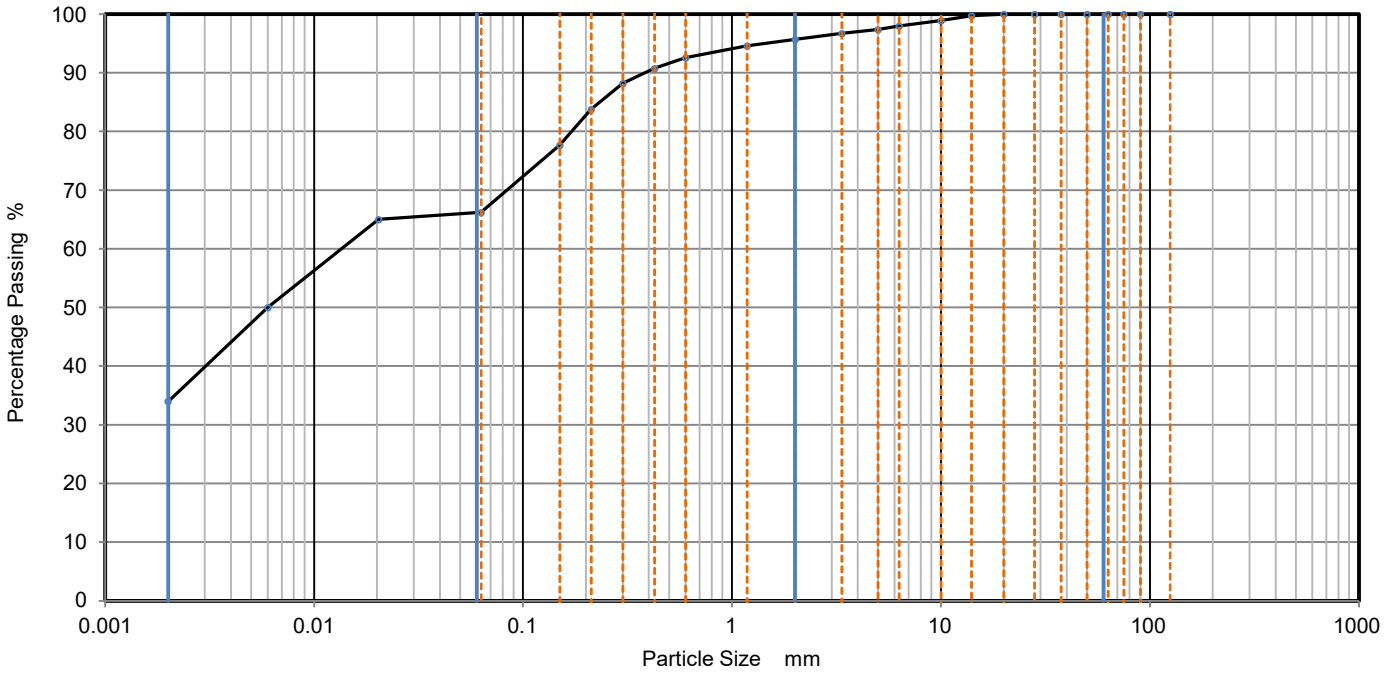
Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		UKAS Accredited Laboratory No. 20632
27/07/2022 20:06	N O'Brien		

EXPLORATION & TESTING ASSOCIATES

PARTICLE SIZE DISTRIBUTION

				Job Ref	**D10557M**
				Borehole/Pit No.	Clay
Site Name	Giga One, Envision, Washington			Sample No.	MS2299/2
Soil Description	Brown, Slightly Sandy, Slightly Silty CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990 - Wet & Dry Sieving			KeyLAB ID	EAT_2022072553



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0203	65
90	100	0.0060	50
75	100	0.0020	34
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	99		
6.3	98		
5	97		
3.35	97		
2	96		
1.18	95		
0.6	93	Particle density (assumed)	
0.425	91	2.65	Mg/m3
0.3	88		
0.212	84		
0.15	78		
0.063	66		

Method of Pre-Treatment	Sodium Hexametaphosphate

Sample Proportions	% dry mass
Very coarse	0
Gravel	4
Sand	30
Silt	32
Clay	34

Grading Analysis		
D_{100}	mm	
D_{60}	mm	0.0134
D_{30}	mm	
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

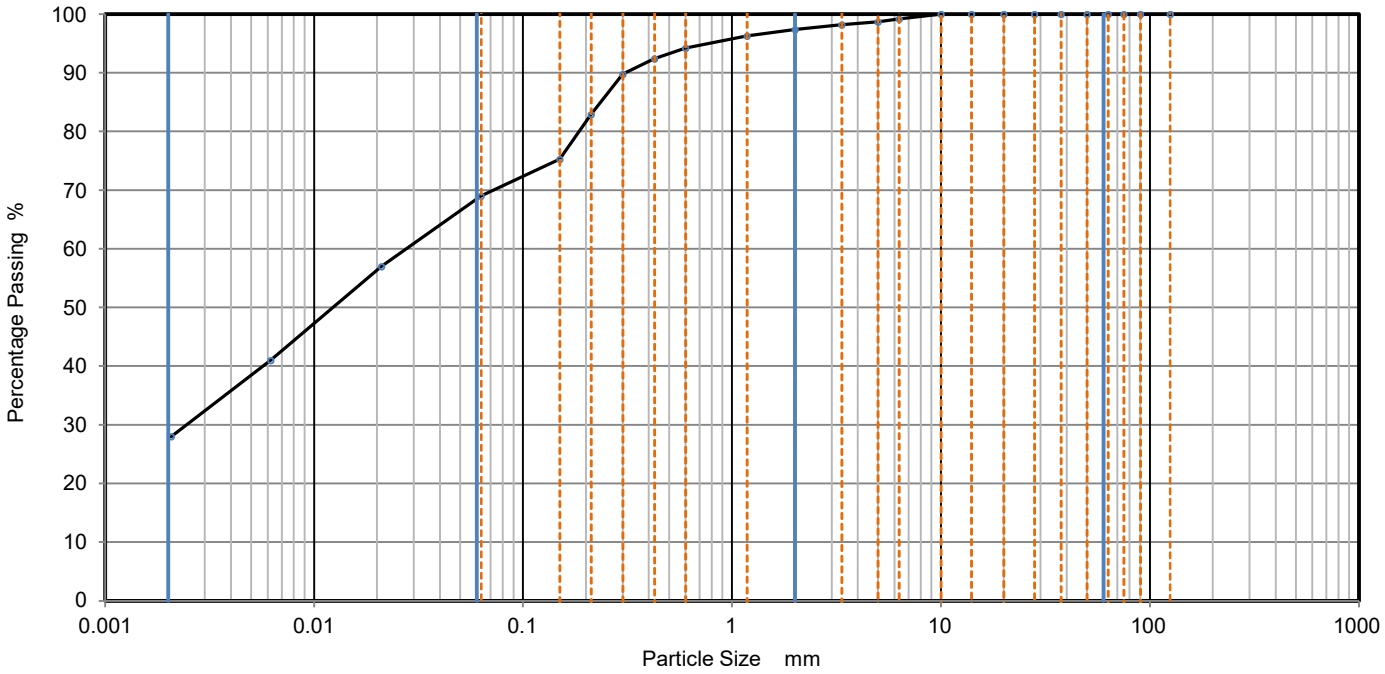
Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		UKAS Accredited Laboratory No. 20632
27/07/2022 20:07	N O'Brien		

EXPLORATION & TESTING ASSOCIATES

PARTICLE SIZE DISTRIBUTION

				Job Ref	**D10557M**
				Borehole/Pit No.	Clay
Site Name	Giga One, Envision, Washington			Sample No.	MS2299/3
Soil Description	Brown, Slightly Sandy, Slightly Silty CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990, Washing and Drying, Clauses 9.2 & 9.4			KeyLAB ID	EAT_2022072554



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0210	57
90	100	0.0062	41
75	100	0.0021	28
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	99		
5	99		
3.35	98		
2	97		
1.18	96		
0.6	94	Particle density (measured)	
0.425	92	2.54	Mg/m3
0.3	90		
0.212	83		
0.15	75		
0.063	69		

Method of Pre-Treatment	Sodium Hexametaphosphate

Sample Proportions	% dry mass
Very coarse	0
Gravel	3
Sand	28
Fines <0.063mm	69

Grading Analysis		
D_{100}	mm	
D_{60}	mm	0.0279
D_{30}	mm	0.00247
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

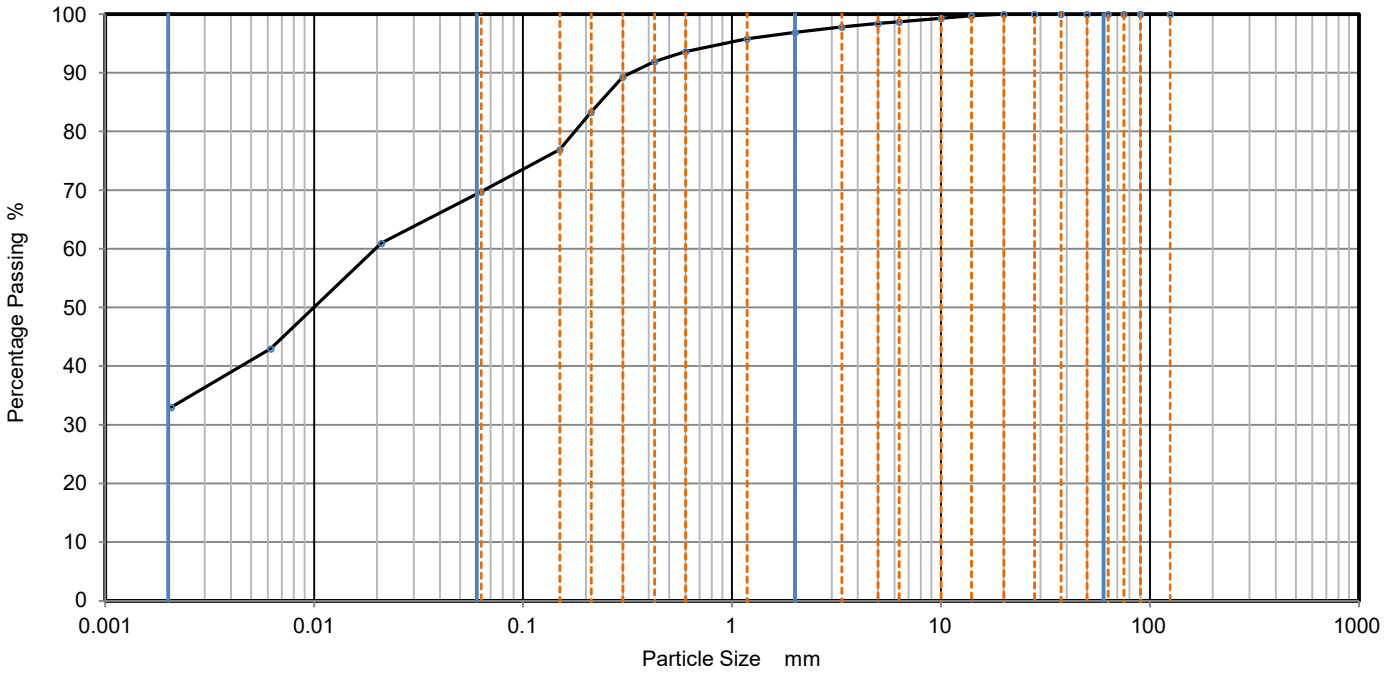
Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		UKAS Accredited Laboratory No. 20632
27/07/2022 20:07	N O'Brien		

EXPLORATION & TESTING ASSOCIATES

PARTICLE SIZE DISTRIBUTION

				Job Ref	**D10557M**
				Borehole/Pit No.	Clay
Site Name	Giga One, Envision, Washington			Sample No.	MS2299/4
Soil Description	Brown, Slightly Sandy, Slightly Silty CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990, Washing and Drying, Clauses 9.2 & 9.4			KeyLAB ID	EAT_2022072555



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0210	61
90	100	0.0062	43
75	100	0.0021	33
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	99		
6.3	99		
5	98		
3.35	98		
2	97		
1.18	96		
0.6	94	Particle density (measured)	
0.425	92	2.54	Mg/m3
0.3	89		
0.212	83		
0.15	77		
0.063	70		

Method of Pre-Treatment	Sodium Hexametaphosphate

Sample Proportions	% dry mass
Very coarse	0
Gravel	3
Sand	27
Fines <0.063mm	70

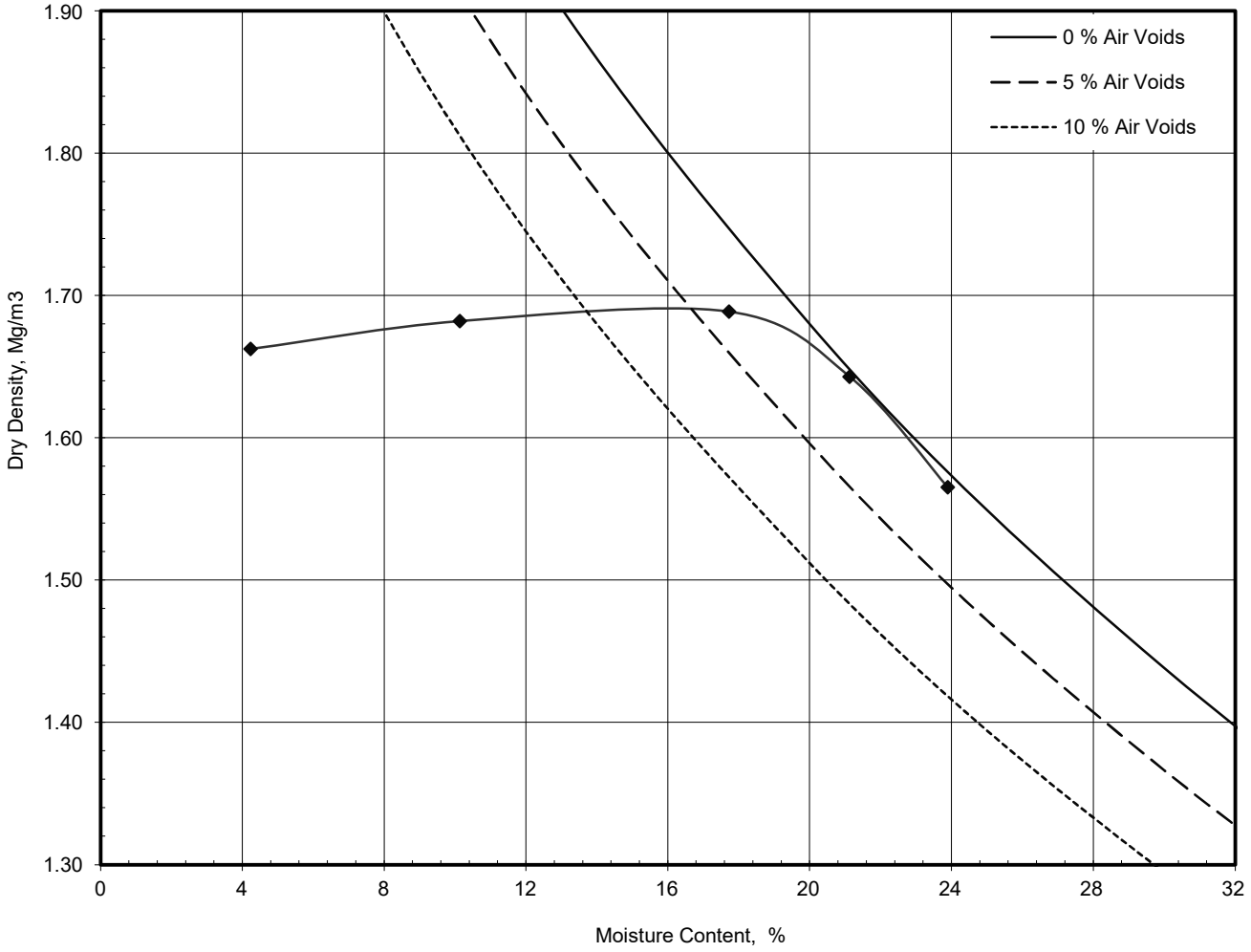
Grading Analysis		
D_{100}	mm	
D_{60}	mm	0.0195
D_{30}	mm	
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		UKAS Accredited Laboratory No. 20632
27/07/2022 20:07	N O'Brien		

EXPLORATION & TESTING ASSOCIATES	**Dry Density / Moisture Content Relationship Light Compaction**			Job Ref	**D10557M**
				Borehole / Pit No	Clay
Site Name	**Giga One, Washington**			Sample No	MS2299/1
Soil Description	Brown, Slightly Sandy, Slightly Silty CLAY			Depth	0.00 m
Specimen Ref.		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.3, 2.5kg rammer			Keylab ID	EAT_2022072552
				Compaction Test Reference/No.	



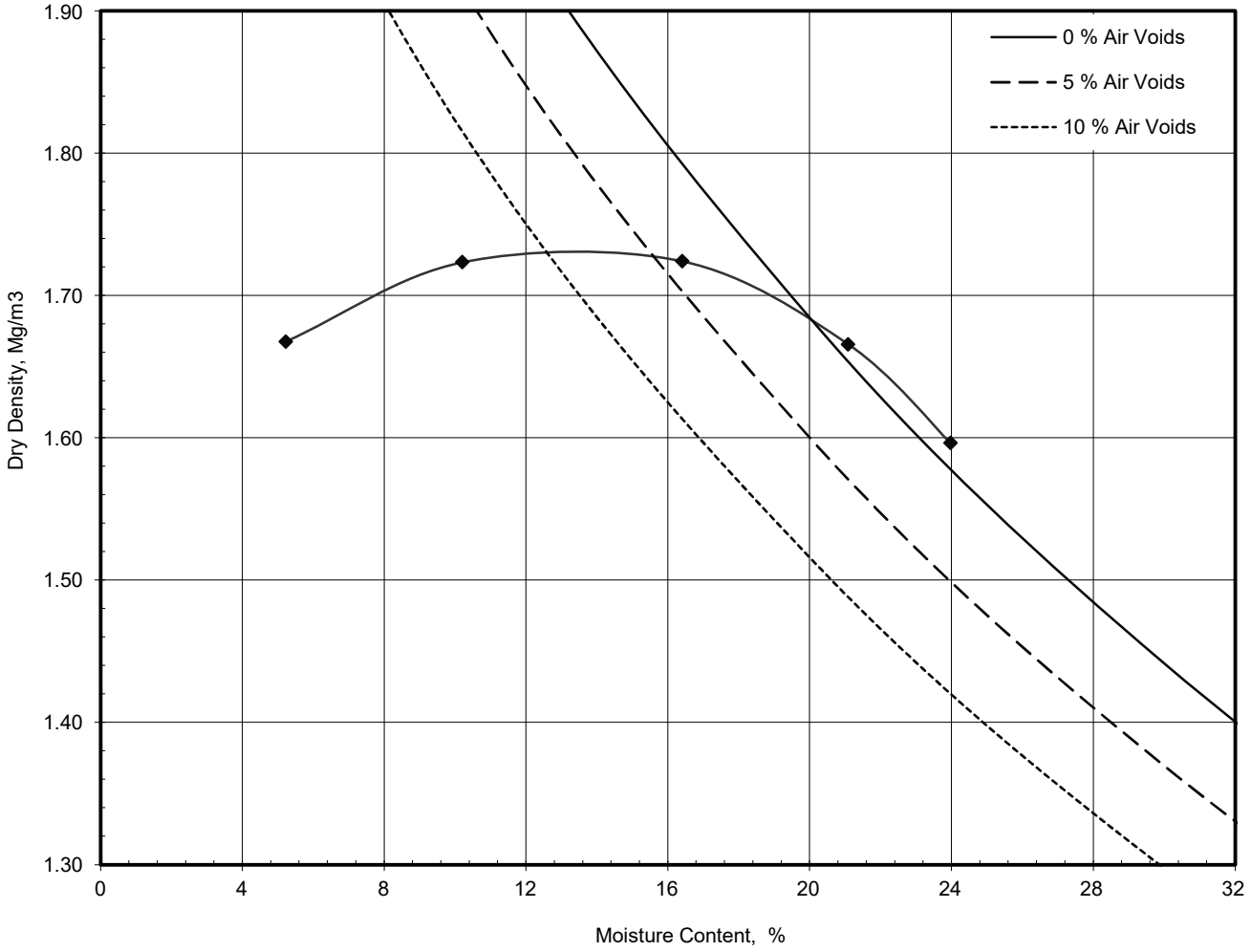
Preparation		Material used was air dried
Mould Type		One Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	0
Particle Density - Measured using gas jar	Mg/m³	2.53

Maximum Dry Density	Mg/m³	**1.69**

Optimum Moisture Content	%	**18**

Comments	Date	Checked By	Approved	UKAS Accredited Laboratory No. 20632
	27/07/2022 20:04	N. Hodson	N. O'Brien	

EXPLORATION & TESTING ASSOCIATES	Dry Density / Moisture Content Relationship Light Compaction			Job Ref	D10557M
				Borehole / Pit No	Clay
Site Name	Giga One, Washington			Sample No	MS2299/2
Soil Description	Brown, Slightly Sandy, Slightly Silty CLAY			Depth	0.00 m
Specimen Ref.		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.3, 2.5kg rammer			Keylab ID	EAT_2022072553
				Compaction Test Reference/No.	



Preparation		Material used was air dried
Mould Type		One Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	0
Particle Density - Measured using gas jar	Mg/m³	2.54

Maximum Dry Density	Mg/m³	**1.72**

Optimum Moisture Content	%	**16**

Comments	Date	Checked By	Approved	UKAS Accredited Laboratory No. 20632
	27/07/2022 20:04	N. Hodson	N. O'Brien	

EXPLORATION & TESTING ASSOCIATES

Particle Density by Gas Jar - Summary of Results

Project No.	Project Name
D10557M	Giga One, Envision, Washington

Hole No.	Sample				Soil Description at test horizon	Particle Density Mg/m^3	Remarks
	Ref	Top	Base	Type			
Clay	MS2299/1	0.00		B	Brown, Slightly Sandy, Slightly Silty CLAY	2.54	
Clay	MS2299/2	0.00		B	Brown, Slightly Sandy, Slightly Silty CLAY	2.53	

Notes
Tests performed in accordance with BS 1377
unless annotated otherwise.
Gas Jar tests to BS1377: Part 2 : 1990, clause 8.2

Comments

Date: 27/07/2022 20:08

Approved: N O'Brien

UKAS Accredited
Laboratory No. 20632

EXPLORATION
& TESTING ASSOCIATES

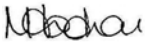
Unit 8B Bowburn South Industrial Estate
Durham, DH6 5AD T: 0191 389 6543

UKAS TESTING

Laboratory Test Report

Client	Groundwork Services (Durham) Limited
Address	Littleburn Industrial Estate Langley Moor Durham DH7 8HJ
F.A.O	Paul Barton / Ben Johnson
Project:	Giga One Factory, Washington
Project Number:	D10557N
Report Number:	L22-609
Date Received:	30th June 2022

Testing Required:	Moisture Content - BS:1377-2:1990 Determination of Liquid and Plastic Limits and Plasticity Index - BS:1377-2:1990 (Cone Penetrometer) Particle Size Distribution - BS:1377-2:1990 Sedimentation by Pipette - BS:1377-2:1990 Particle Density by Gas Jar - BS:1377-2:1990 Clause 8.2 Determination of Maximum Dry Density / Optimum Moisture Content by 2.5kg Rammer - BS:1377-4:1990
Date Started:	04th July 2022
Date Finished:	25th July 2022

Report Issue Date:	25th July 2022
Reviewed By:	
	N. Hodson - Materials Director
Authorised By:	
	N O'Brien - Laboratory Manager
Remarks:	(*) denotes testing is outside of UKAS Scope of Accreditation.
	(+) denotes subcontracted testing.

Samples will be stored for one month after the report has been issue before being disposed of.

The published results appertain only to the specimens tested.

EXPLORATION & TESTING ASSOCIATES

Determination of Moisture Content, Liquid Limit, Plastic Limit and Derivation of Plasticity Index

Project No.	Project Name
D10557N	Giga One, Washington

Hole No.	Sample			Soil Description	Moisture Content %	Passing 425µm %	Liquid Limit %	Plastic Limit %	Plasticity Index %	Remarks
	Type	Ref	Depth							
Clay	B	MS2222/1	0.00	Brown, Slightly Sandy, Silty CLAY	20	92	49	22	27	Sample tested in natural state - material passing 425um estimated by hand picking
Clay	B	MS2222/2	0.00	Brown, Slightly Sandy, Silty CLAY	18	85	56	22	34	Sample tested in natural state - material passing 425um estimated by hand picking
Clay	B	MS2222/3	0.00	Brown, Slightly Sandy, Silty CLAY	20	99	49	19	30	Sample tested in natural state - material passing 425um estimated by hand picking
Clay	B	MS2222/4	0.00	Brown, Slightly Sandy, Silty CLAY	15					
Clay	B	MS2222/5	0.00	Brown, Slightly Sandy, Silty CLAY	19					
Clay	B	MS2222/6	0.00	Brown, Slightly Sandy, Silty CLAY	19					

Moisture Content carried out in accordance with BS 1377: Part 2: 1990: Clause 3.2

Liquid Limit, Plastic Limit & Plasticity Index all performed in accordance with BS 1377: Part 2: 1990 - Cone Penetrometer method - Cone 80g/30°

Date: 27/07/2022 20:22

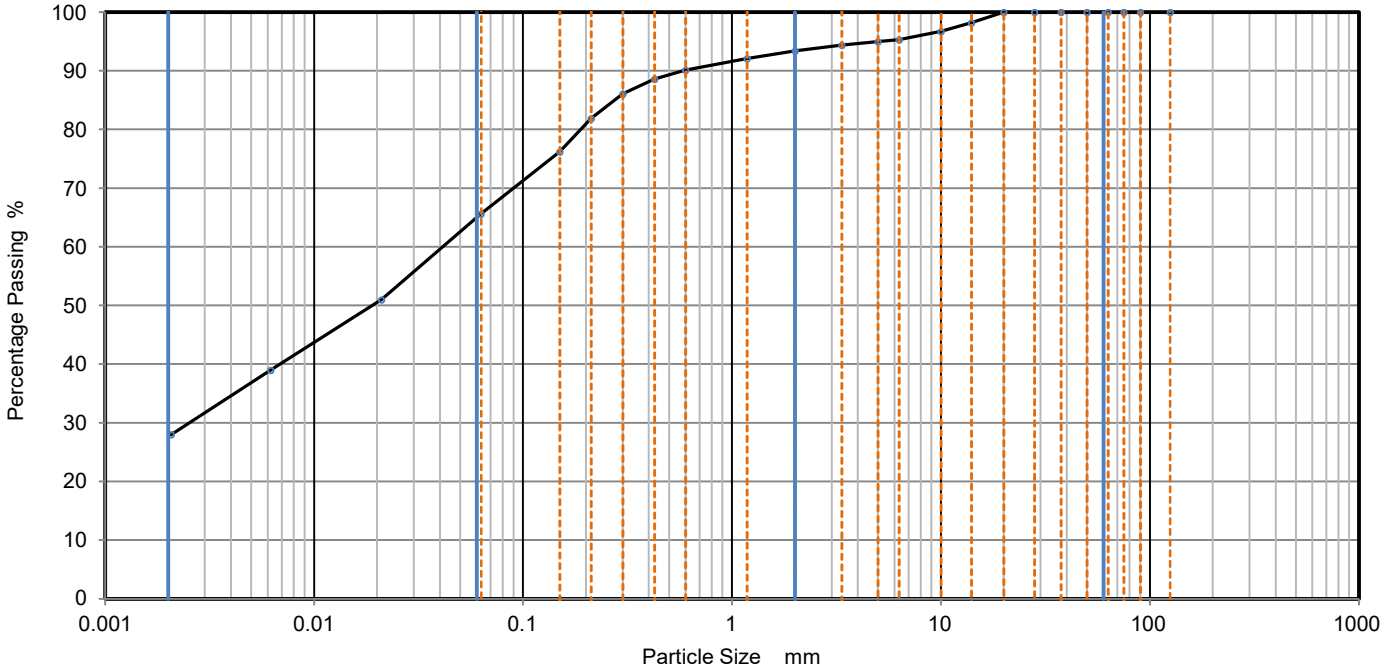
Approved By: N O'Brien

UKAS Accredited Laboratory No. 20632

EXPLORATION & TESTING ASSOCIATES

PARTICLE SIZE DISTRIBUTION

				Job Ref	**D10557N**
				Borehole/Pit No.	Clay
Site Name	Giga One, Washington			Sample No.	MS2222/2
Soil Description	Brown, Slightly Sandy, Silty CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990, Washing and Drying, Clauses 9.2 & 9.4			KeyLAB ID	EAT_2022070747



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0210	51
90	100	0.0062	39
75	100	0.0021	28
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	98		
10	97		
6.3	95		
5	95		
3.35	94		
2	93		
1.18	92		
0.6	90	Particle density (measured)	
0.425	89	2.54	Mg/m3
0.3	86		
0.212	82		
0.15	76		
0.063	66		

Method of Pre-Treatment	Sodium Hexametaphosphate

Sample Proportions	% dry mass
Very coarse	0
Gravel	7
Sand	28
Fines <0.063mm	66

Grading Analysis		
D_{100}	mm	
D_{60}	mm	0.0409
D_{30}	mm	0.00256
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

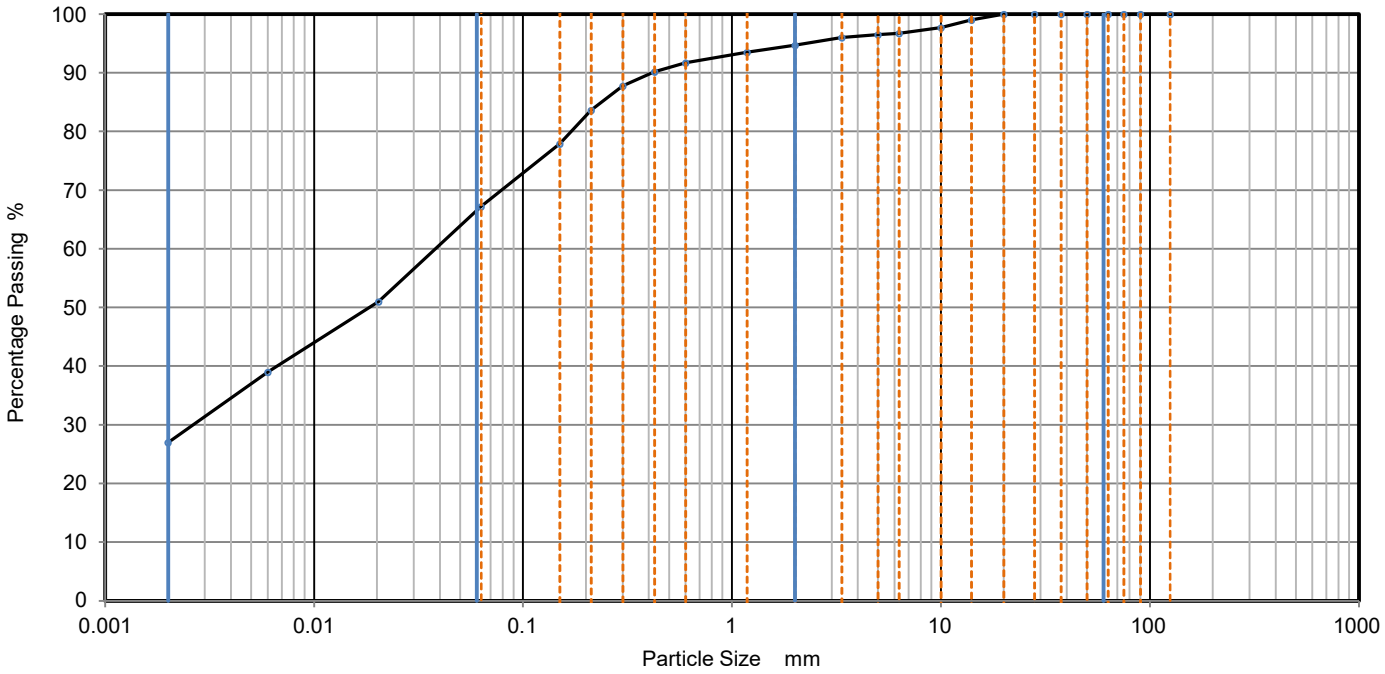
Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		UKAS Accredited Laboratory No. 20632
27/07/2022 20:22	N O'Brien		

EXPLORATION & TESTING ASSOCIATES

PARTICLE SIZE DISTRIBUTION

				Job Ref	**D10557N**
				Borehole/Pit No.	Clay
Site Name	Giga One, Washington			Sample No.	MS2222/4
Soil Description	Brown, Slightly Sandy, Silty CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990, Washing and Drying, Clauses 9.2 & 9.4			KeyLAB ID	EAT_2022070749



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0203	51
90	100	0.0060	39
75	100	0.0020	27
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	99		
10	98		
6.3	97		
5	97		
3.35	96		
2	95		
1.18	94		
0.6	92	Particle density (assumed)	
0.425	90	2.65	Mg/m3
0.3	88		
0.212	84		
0.15	78		
0.063	67		

Method of Pre-Treatment	Sodium Hexametaphosphate

Sample Proportions	% dry mass
Very coarse	0
Gravel	5
Sand	28
Silt	40
Clay	27

Grading Analysis		
D_{100}	mm	
D_{60}	mm	0.0376
D_{30}	mm	0.00258
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

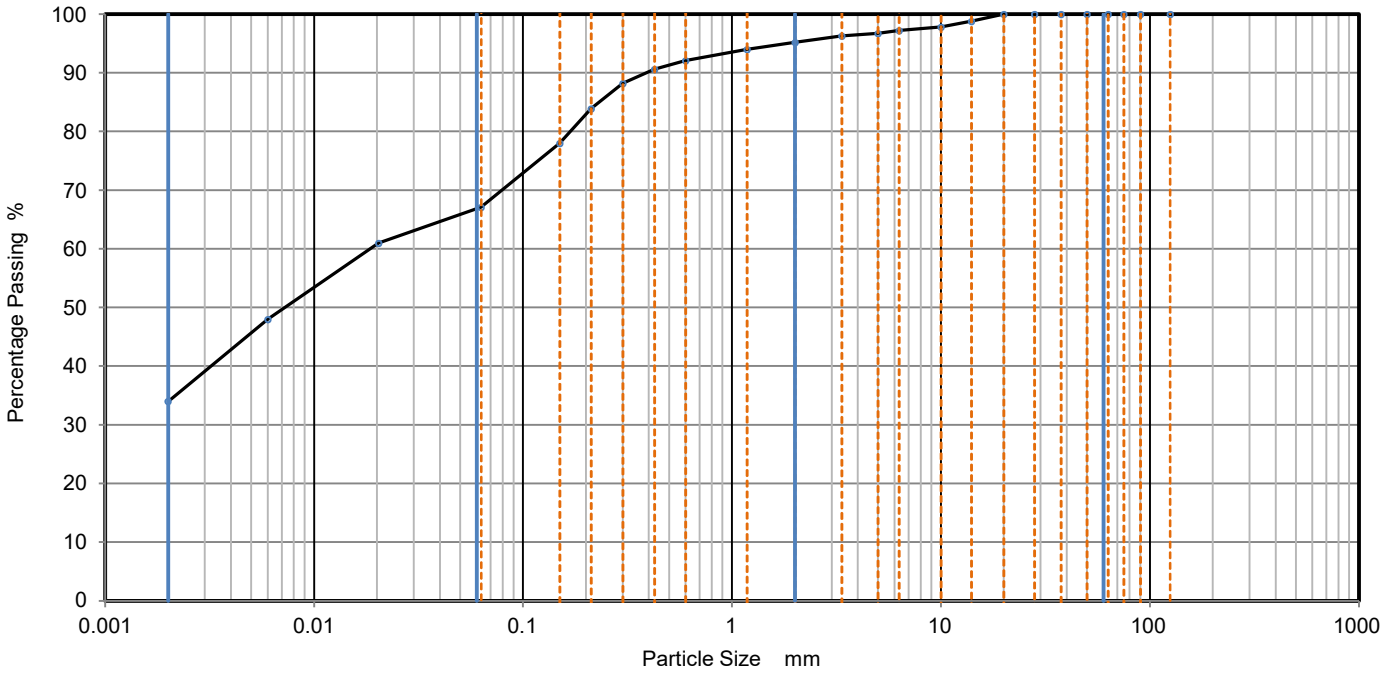
Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		UKAS Accredited Laboratory No. 20632
27/07/2022 20:22	N O'Brien		

EXPLORATION & TESTING ASSOCIATES

PARTICLE SIZE DISTRIBUTION

				Job Ref	**D10557N**
				Borehole/Pit No.	Clay
Site Name	Giga One, Washington			Sample No.	MS2222/6
Soil Description	Brown, Slightly Sandy, Silty CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990, Washing and Drying, Clauses 9.2 & 9.4			KeyLAB ID	EAT_2022070751



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0203	61
90	100	0.0060	48
75	100	0.0020	34
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	99		
10	98		
6.3	97		
5	97		
3.35	96		
2	95		
1.18	94		
0.6	92	Particle density (assumed)	
0.425	91	2.65	Mg/m3
0.3	88		
0.212	84		
0.15	78		
0.063	67		

Method of Pre-Treatment	Sodium Hexametaphosphate

Sample Proportions	% dry mass
Very coarse	0
Gravel	5
Sand	28
Silt	33
Clay	34

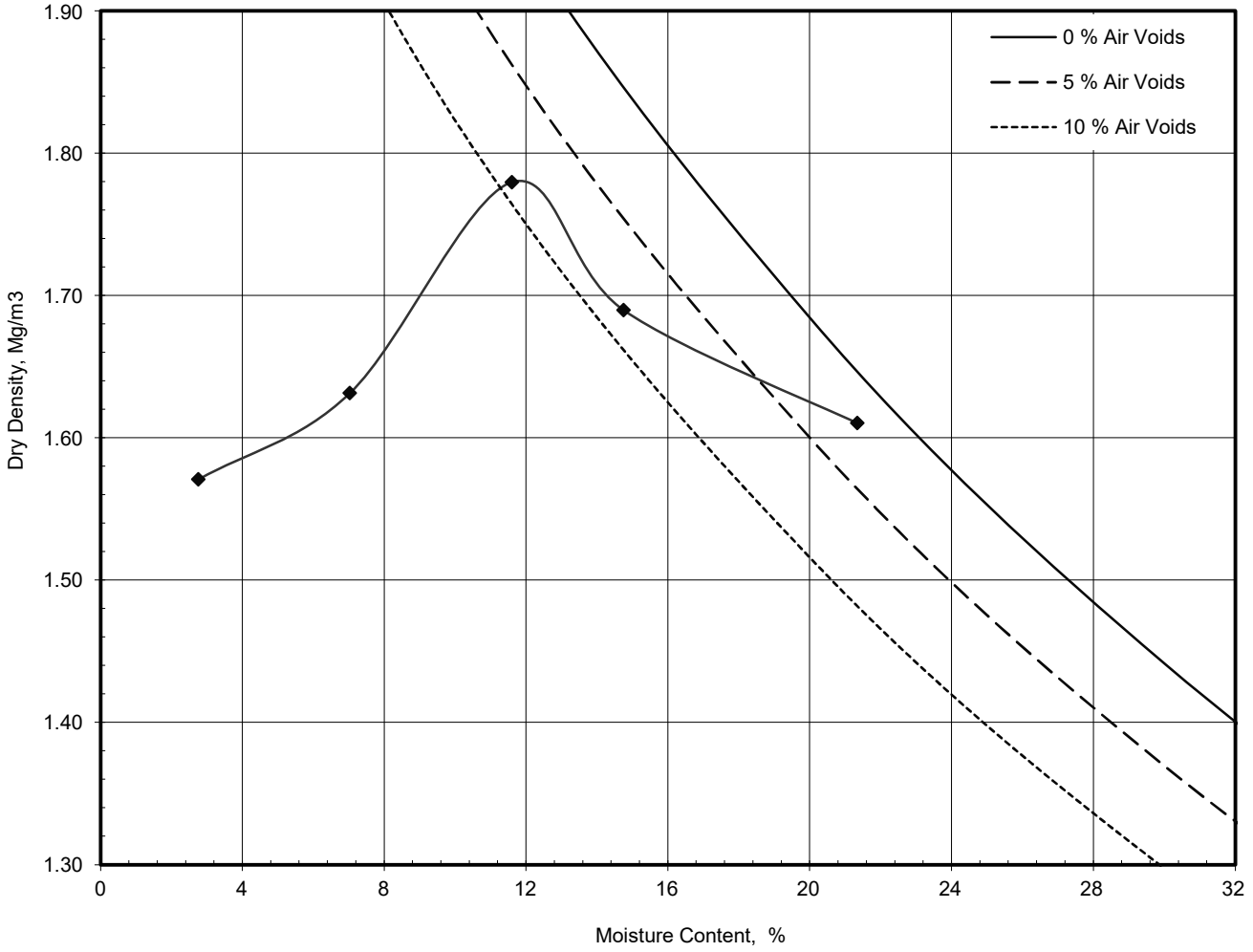
Grading Analysis		
D_{100}	mm	
D_{60}	mm	0.019
D_{30}	mm	
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		
27/07/2022 20:23	N O'Brien		UKAS Accredited Laboratory No. 20632

EXPLORATION & TESTING ASSOCIATES	**Dry Density / Moisture Content Relationship Light Compaction**			Job Ref	**D10557N**
				Borehole / Pit No	Clay
Site Name	**Giga One, Washington**			Sample No	MS2222/1
Soil Description	Brown, Slightly Sandy, Silty CLAY			Depth	0.00 m
Specimen Ref.		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.3, 2.5kg rammer			Keylab ID	EAT_2022070746
				Compaction Test Reference/No.	



Preparation		Material used was air dried
Mould Type		One Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	0
Particle Density - Measured using gas jar	Mg/m³	2.54

Maximum Dry Density	Mg/m³	**1.78**

Optimum Moisture Content	%	**12**

Comments	Date	Checked By	Approved	UKAS Accredited Laboratory No. 20632
	27/07/2022 20:20	N. Hodson	N. O'Brien	

EXPLORATION

Particle Density by Gas Jar - Summary of Results

Project No.	Project Name
D10557N	Giga One, Washington

Hole No.	Sample				Soil Description at test horizon	Particle Density Mg/m^3	Remarks
	Ref	Top	Base	Type			
Clay	MS2222/1	0.00		B	Brown, Slightly Sandy, Slightly Silty CLAY	2.54	

Notes
Tests performed in accordance with BS 1377
unless annotated otherwise.
Gas Jar tests to BS1377: Part 2 : 1990, clause 8.2

Comments

Date
27/07/2022 20:24

Approved
N O'Brien

UKAS Accredited
Laboratory No. 20632

EXPLORATION
& TESTING ASSOCIATES

Unit 8B Bowburn South Industrial Estate
Durham, DH6 5AD T: 0191 389 6543

UKAS TESTING

Laboratory Test Report

Client	Groundwork Services (Durham) Limited
Address	Littleburn Industrial Estate Langley Moor Durham DH7 8HJ
F.A.O	Paul Barton / Ben Johnson
Project:	Giga One Factory, Washington
Project Number:	D10557Q
Report Number:	L22-610
Date Received:	2nd July 2022

Testing Required:	Moisture Content - BS:1377-2:1990 Determination of Liquid and Plastic Limits and Plasticity Index - BS:1377-2:1990 (Cone Penetrometer) Particle Size Distribution - BS:1377-2:1990 Sedimentation by Pipette - BS:1377-2:1990
Date Started:	18th July 2022
Date Finished:	26th July 2022

Report Issue Date:	27th July 2022
Reviewed By:	N Hodson . N. Hodson - Materials Director
Authorised By:	 N O'Brien - Laboratory Manager
Remarks:	(*) denotes testing is outside of UKAS Scope of Accreditation. (+) denotes subcontracted testing.

Samples will be stored for one month after the report has been issue before being disposed of.

The published results appertain only to the specimens tested.

Exploration and Testing Associates Limited, registered in England and Wales #11803869 at 8B, Bowburn South Industrial Estate, Bowburn, Durham, DH6 5AD

EXPLORATION & TESTING ASSOCIATES

Determination of Moisture Content, Liquid Limit, Plastic Limit and Derivation of Plasticity Index

Project No.	Project Name
D10557Q	Giga One, Envision, Washington

Hole No.	Sample			Soil Description	Moisture Content %	Passing 425µm %	Liquid Limit %	Plastic Limit %	Plasticity Index %	Remarks
	Type	Ref	Depth							
Clay	B	MS2300/1	0.00	Brown, Slightly Sandy, Very Slightly Gravelly CLAY	16	97	45	19	26	Sample tested in natural state - material passing 425um estimated by hand picking

Moisture Content carried out in accordance with BS 1377: Part 2: 1990: Clause 3.2

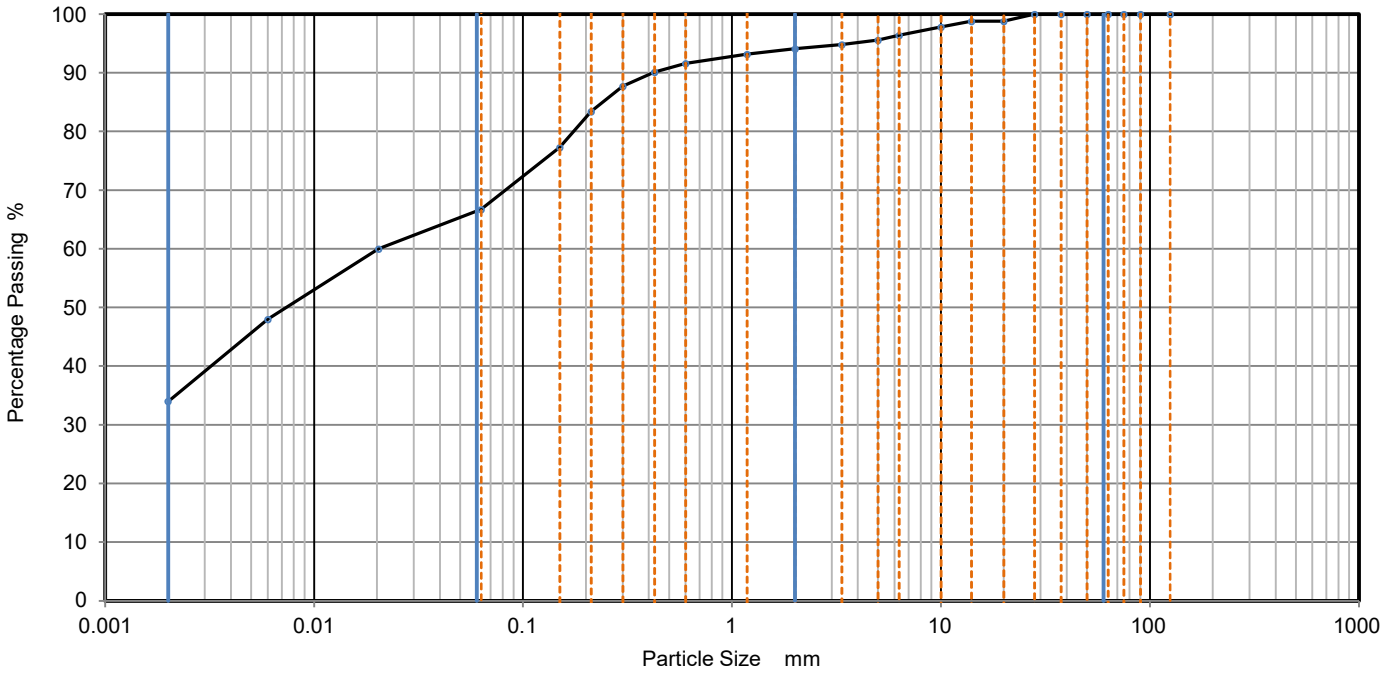
Liquid Limit, Plastic Limit & Plasticity Index all performed in accordance with BS 1377: Part 2: 1990 - Cone Penetrometer method - Cone 80g/30°

Date	Approved By	UKAS Accredited Laboratory No. 20632
27/07/2022 20:32	N O'Brien	

EXPLORATION & TESTING ASSOCIATES

PARTICLE SIZE DISTRIBUTION

				Job Ref	**D10557Q**
				Borehole/Pit No.	Clay
Site Name	Giga One, Envision, Washington			Sample No.	MS2300/1
Soil Description	Brown, Slightly Sandy, Very Slightly Gravelly CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990, Washing and Drying, Clauses 9.2 & 9.4			KeyLAB ID	EAT_2022072556



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0203	60
90	100	0.0060	48
75	100	0.0020	34
63	100		
50	100		
37.5	100		
28	100		
20	99		
14	99		
10	98		
6.3	96		
5	96		
3.35	95		
2	94		
1.18	93		
0.6	92	Particle density (assumed)	
0.425	90	2.65	Mg/m3
0.3	88		
0.212	83		
0.15	77		
0.063	67		

Method of Pre-Treatment	Sodium Hexametaphosphate

Sample Proportions	% dry mass
Very coarse	0
Gravel	6
Sand	27
Silt	33
Clay	34

Grading Analysis		
D_{100}	mm	
D_{60}	mm	0.0196
D_{30}	mm	
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		UKAS Accredited Laboratory No. 20632
27/07/2022 20:31	N O'Brien		

EXPLORATION
& TESTING ASSOCIATES

Unit 8B Bowburn South Industrial Estate
Durham, DH6 5AD T: 0191 389 6543

UKAS TESTING

Laboratory Test Report

Client	Groundwork Services (Durham) Limited
Address	Littleburn Industrial Estate Langley Moor Durham DH7 8HJ
F.A.O	Paul Barton
Project:	Giga One Factory, Washington
Project Number:	D10557V
Report Number:	L22-615
Date Received:	8th July 2022

Testing Required:	Moisture Content - BS:1377-2:1990 Determination of Liquid and Plastic Limits and Plasticity Index - BS:1377-2:1990 (Cone Penetrometer) Particle Size Distribution - BS:1377-2:1990 Sedimentation by Pipette - BS:1377-2:1990 Determination of Maximum Dry Density / Optimum Moisture Content by 2.5kg Rammer - BS:1377-4:1990 Particle Density by Gas Jar - BS:1377-2:1990 Clause 8.2
Date Started:	13th July 2022
Date Finished:	27th July 2022

Report Issue Date:	28th July 2022
Reviewed By:	
	Natalie Hodson - Materials Director
Authorised By:	
	Nik O'Brien - Laboratory Manager
Remarks:	(*) denotes testing is outside of UKAS Scope of Accreditation.
	(+) denotes subcontracted testing.

Samples will be stored for one month after the report has been issue before being disposed of.

The published results appertain only to the specimens tested.

EXPLORATION & TESTING ASSOCIATES

Determination of Moisture Content, Liquid Limit, Plastic Limit and Derivation of Plasticity Index

Project No.	Project Name
D10557V	Giga One, Envision, Washington

Hole No.	Sample			Soil Description	Moisture Content %	Passing 425µm %	Liquid Limit %	Plastic Limit %	Plasticity Index %	Remarks
	Type	Ref	Depth							
MS2289/1	B	MS2289/1	0.00	Brown, Sandy, Silty CLAY	17	99	50	24	26	Sample tested in natural state - material passing 425um estimated by hand picking
MS2289/2	B	MS2289/2	0.00	Brown, Sandy, Silty CLAY	17	94	50	21	29	Sample tested in natural state - material passing 425um estimated by hand picking

Moisture Content carried out in accordance with BS 1377: Part 2: 1990: Clause 3.2

Liquid Limit, Plastic Limit & Plasticity Index all performed in accordance with BS 1377: Part 2: 1990 - Cone Penetrometer method - Cone 80g/30°

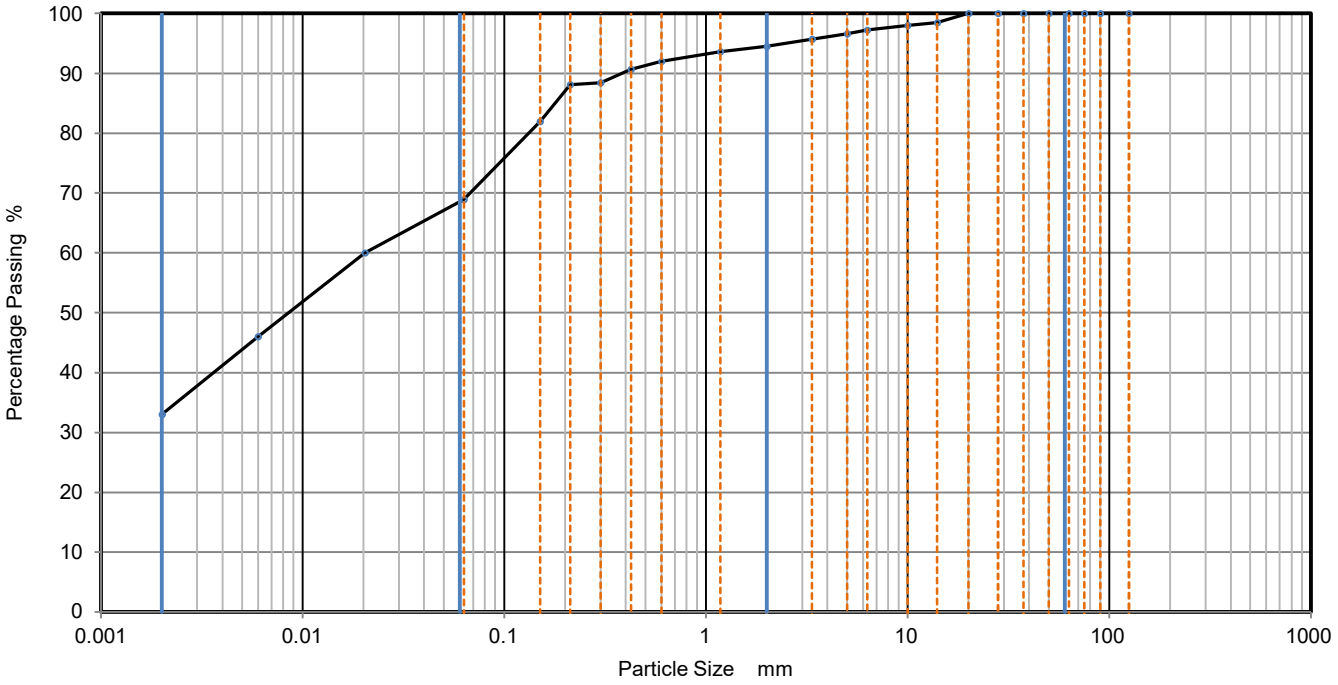
Date: 28/07/2022 09:24

Approved By: N O'Brien

UKAS Accredited Laboratory No. 20632

PARTICLE SIZE DISTRIBUTION

				Job Ref	**D10557V**
				Borehole/Pit No.	MS2289/1
Site Name	Giga One, Envision, Washington			Sample No.	MS2289/1
Soil Description	Brown, Sandy, Silty CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990, Washing and Drying, Clauses 9.2 & 9.4			KeyLAB ID	EAT_202207260



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0204	60
90	100	0.0060	46
75	100	0.0020	33
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	99		
10	98		
6.3	97		
5	97		
3.35	96		
2	95		
1.18	94		
0.6	92	Particle density (measured)	
0.425	91	2.64	Mg/m3
0.3	88		
0.212	88		
0.15	82		
0.063	69		

Method of pre-treatment	Sodium Hexametaphosphate

Sample Proportions	% dry mass
Very coarse	0
Gravel	6
Sand	26
Fines <0.063mm	69

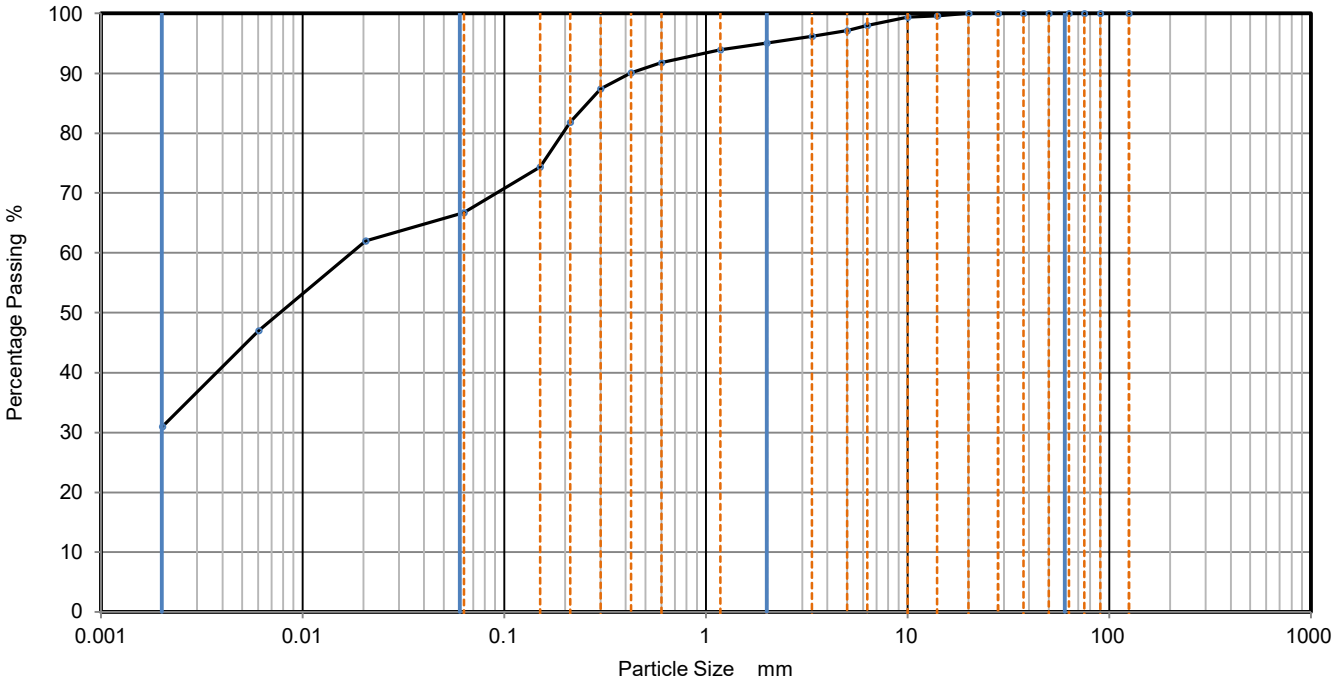
Grading Analysis		
D_{100}	mm	
D_{60}	mm	0.0202
D_{30}	mm	
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		UKAS Accredited Laboratory No. 20632
28/07/2022 09:27	N O'Brien		

EXPLORATION & TESTING ASSOCIATES	PARTICLE SIZE DISTRIBUTION			Job Ref	D10557V
				Borehole/Pit No.	MS2289/2
Site Name	Giga One, Envision, Washington			Sample No.	MS2289/2
Soil Description	Brown, Sandy, Silty CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990, Washing and Drying, Clauses 9.2 & 9.4			KeyLAB ID	EAT_202207261



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0205	62
90	100	0.0060	47
75	100	0.0020	31
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	99		
6.3	98		
5	97		
3.35	96		
2	95		
1.18	94		
0.6	92	Particle density (measured)	
0.425	90	2.62	Mg/m3
0.3	87		
0.212	82		
0.15	74		
0.063	67		

Method of pre-treatment	Sodium Hexametaphosphate

Sample Proportions	% dry mass
Very coarse	0
Gravel	5
Sand	28
Fines <0.063mm	67

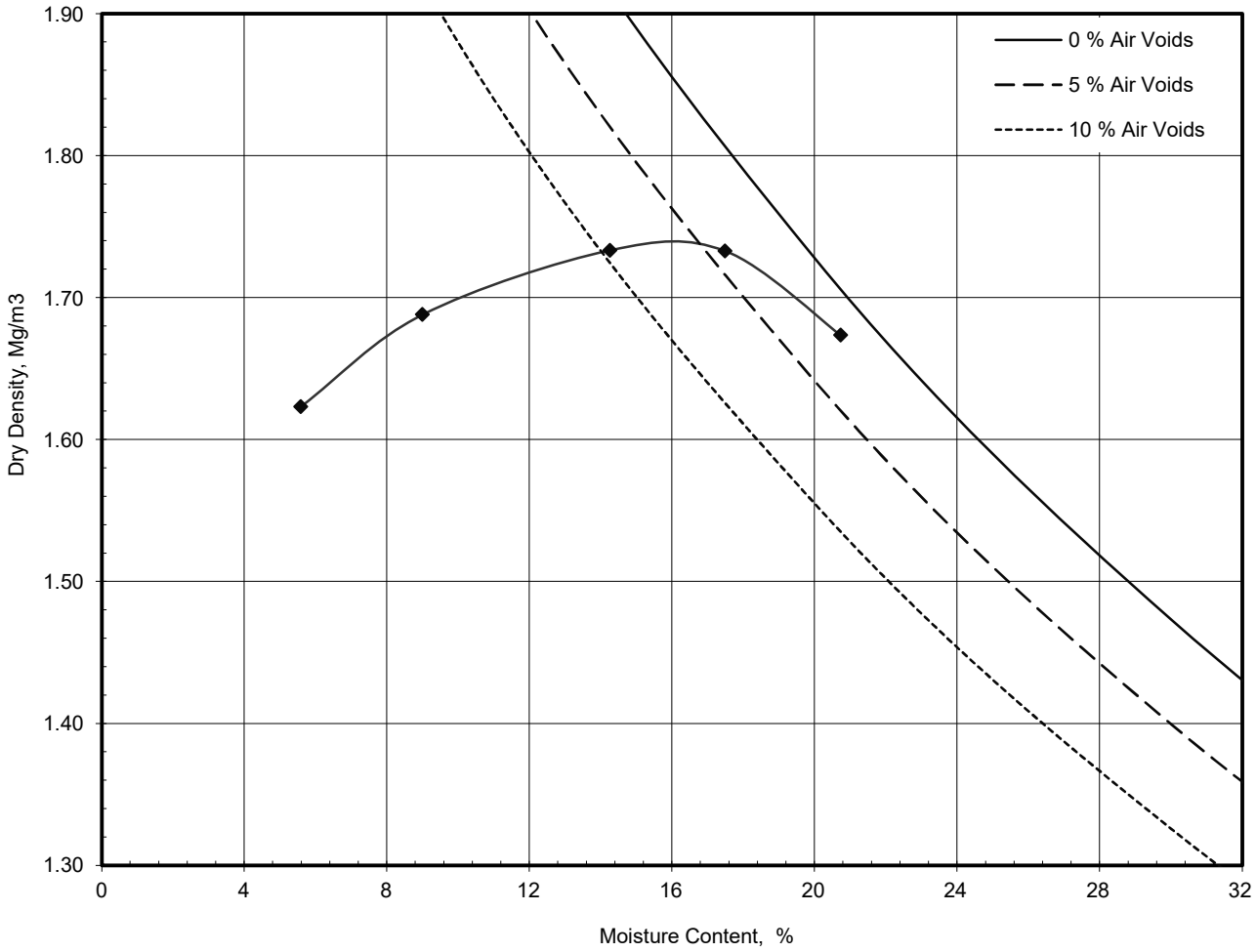
Grading Analysis		
D_{100}	mm	
D_{60}	mm	0.0178
D_{30}	mm	
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		UKAS Accredited Laboratory No. 20632
28/07/2022 09:27	N O'Brien		

EXPLORATION & TESTING ASSOCIATES	**Dry Density / Moisture Content Relationship Light Compaction**			Job Ref	**D10557V**
				Borehole / Pit No	MS2289/1
Site Name	**Giga One, Washington**			Sample No	MS2289/1
Soil Description	Brown, Sandy, Silty CLAY			Depth	0.00 m
Specimen Ref.		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.3, 2.5kg rammer			Keylab ID	EAT_202207260
				Compaction Test Reference/No.	



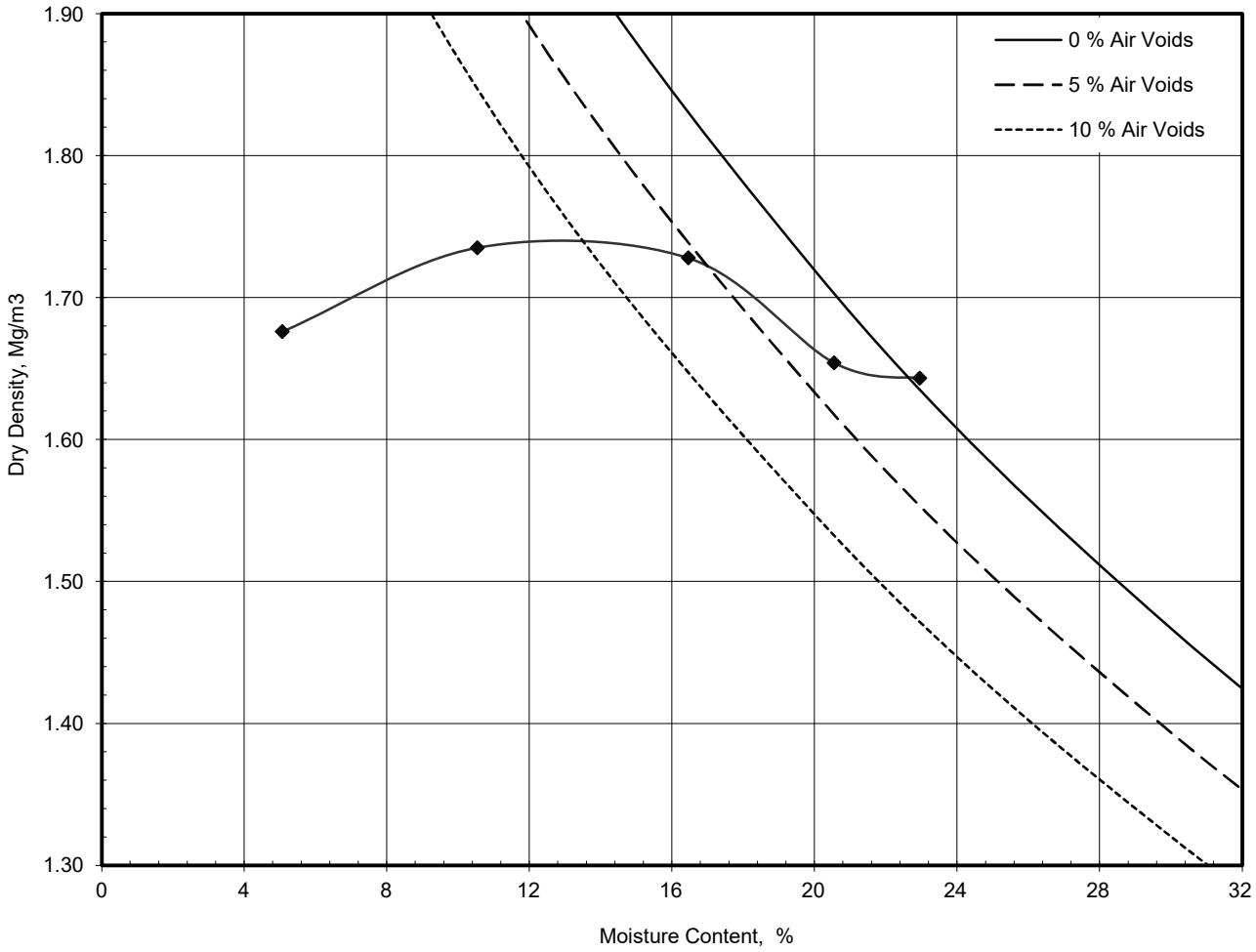
Preparation		Material used was air dried
Mould Type		One Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	0
Particle Density - Measured using gas jar	Mg/m³	2.64

Maximum Dry Density	Mg/m³	**1.73**

Optimum Moisture Content	%	**14**

Comments	Date	Checked By	Approved	UKAS Accredited Laboratory No. 20632
	28/07/2022 09:21	N. Hodson	N. O'Brien	

EXPLORATION & TESTING ASSOCIATES	Dry Density / Moisture Content Relationship Light Compaction			Job Ref	D10557V
				Borehole / Pit No	MS2289/2
Site Name	Giga One, Washington			Sample No	MS2289/2
Soil Description	Brown, Sandy, Silty CLAY			Depth	0.00 m
Specimen Ref.		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.3, 2.5kg rammer			Keylab ID	EAT_202207261
				Compaction Test Reference/No.	



Preparation		Material used was air dried
Mould Type		One Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	0
Particle Density - Measured using gas jar	Mg/m³	2.62

Maximum Dry Density	Mg/m³	**1.74**

Optimum Moisture Content	%	**16**

Comments	Date	Checked By	Approved	UKAS Accredited Laboratory No. 20632
	28/07/2022 09:23	N. Hodson	N. O'Brien	

EXPLORATION & TESTING ASSOCIATES

Particle Density by Gas Jar - Summary of Results

Project No.	Project Name
D10557V	Giga One, Envision, Washington

Hole No.	Sample				Soil Description at test horizon	Particle Density Mg/m^3	Remarks
	Ref	Top	Base	Type			
MS2289/1	MS2289/1	0.00		B	Brown, Sandy, Silty CLAY	2.64	
MS2289/2	MS2289/2	0.00		B	Brown, Sandy, Silty CLAY	2.62	

Notes
Tests performed in accordance with BS 1377
unless annotated otherwise.
Gas Jar tests to BS1377: Part 2 : 1990, clause 8.2

Comments

Date: 28/07/2022 09:26

Approved: N O'Brien

UKAS Accredited Laboratory No. 20632

EXPLORATION
& TESTING ASSOCIATES

Unit 8B Bowburn South Industrial Estate
Durham, DH6 5AD T: 0191 389 6543

UKAS TESTING

Laboratory Test Report

Client	Groundwork Services (Durham) Limited
Address	Littleburn Industrial Estate Langley Moor Durham DH7 8HJ
F.A.O	Paul Barton / Ben Johnson
Project:	Giga One Factory, Washington
Project Number:	D10557R
Report Number:	L22-611
Date Received:	4th July 2022

Testing Required:	Moisture Content - BS:1377-2:1990 Determination of Liquid and Plastic Limits and Plasticity Index - BS:1377-2:1990 (Cone Penetrometer) Particle Size Distribution - BS:1377-2:1990 Sedimentation by Pipette - BS:1377-2:1990
Date Started:	6th July 2022
Date Finished:	24th July 2022

Report Issue Date:	27th July 2022
Reviewed By:	N Hodson.
	N. Hodson - Materials Director
Authorised By:	
	N O'Brien - Laboratory Manager
Remarks:	(*) denotes testing is outside of UKAS Scope of Accreditation.
	(+) denotes subcontracted testing.

Samples will be stored for one month after the report has been issue before being disposed of.

The published results appertain only to the specimens tested.

EXPLORATION
& TESTING ASSOCIATES

Determination of Moisture Content, Liquid Limit, Plastic Limit and Derivation of Plasticity Index

Project No.	Project Name
D10557R	Giga One, Washington

Hole No.	Sample			Soil Description	Moisture Content %	Passing 425µm %	Liquid Limit %	Plastic Limit %	Plasticity Index %	Remarks
	Type	Ref	Depth							
Clay	B	MS2221/1	0.00	Brown, Slightly Sandy, Slightly Silty CLAY	18					
Clay	B	MS2221/2	0.00	Brown, Slightly Sandy, Slightly Silty CLAY	17	99	51	22	29	Sample tested in natural state - material passing 425um estimated by hand picking
Clay	B	MS2221/3	0.00	Brown, Slightly Sandy, Slightly Silty CLAY	18					
Clay	B	MS2221/4	0.00	Brown, Slightly Sandy, Slightly Silty CLAY	18	99	50	20	30	Sample tested in natural state - material passing 425um estimated by hand picking
Clay	B	MS2221/5	0.00	Brown, Slightly Sandy, Slightly Silty CLAY	15					
Clay	B	MS2221/6	0.00	Brown, Slightly Sandy, Slightly Silty CLAY	18	98	50	22	28	Sample tested in natural state - material passing 425um estimated by hand picking

Moisture Content carried out in accordance with BS 1377: Part 2: 1990: Clause 3.2

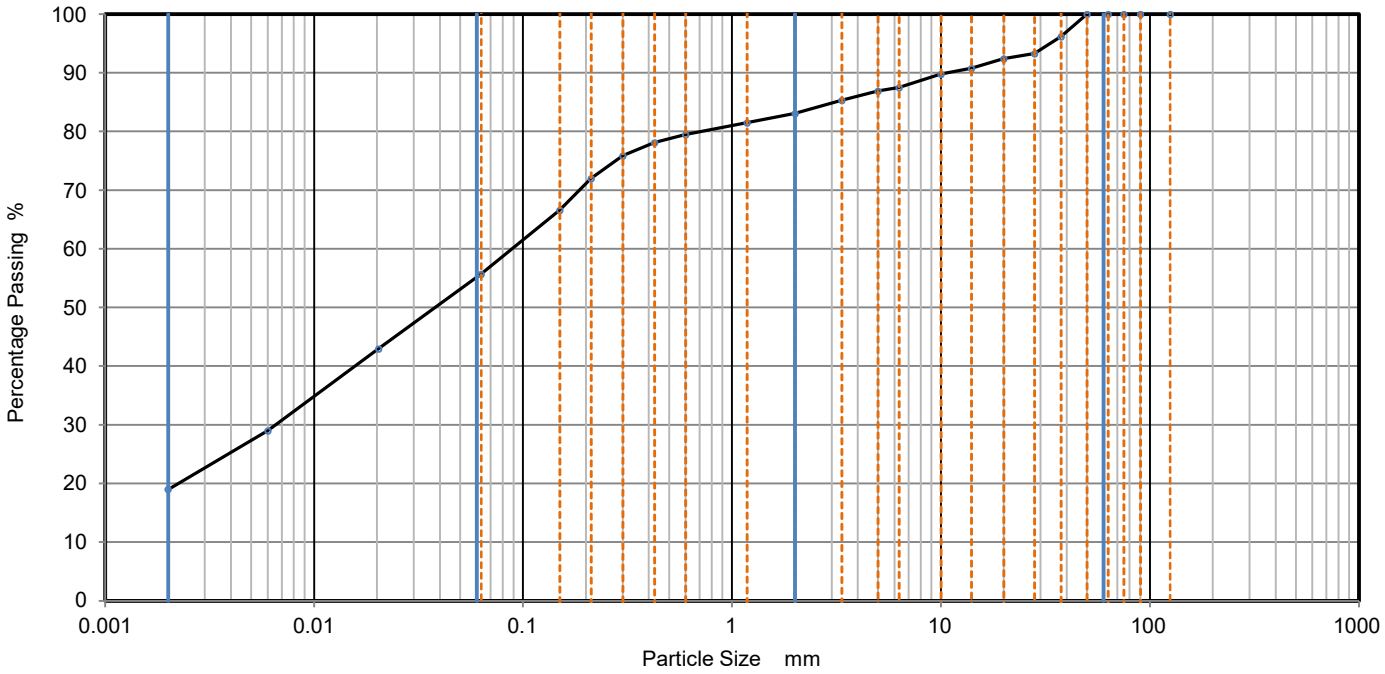
Liquid Limit, Plastic Limit & Plasticity Index all performed in accordance with BS 1377: Part 2: 1990 - Cone Penetrometer method - Cone 80g/30°

Date	Approved By	UKAS Accredited Laboratory No. 20632
27/07/2022 20:43	N O'Brien	

EXPLORATION & TESTING ASSOCIATES

PARTICLE SIZE DISTRIBUTION

				Job Ref	**D10557R**
				Borehole/Pit No.	Clay
Site Name	Giga One, Washington			Sample No.	MS2221/2
Soil Description	Brown, Slightly Sandy, Slightly Silty CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990, Washing and Drying, Clauses 9.2 & 9.4			KeyLAB ID	EAT_2022070753



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0203	43
90	100	0.0060	29
75	100	0.0020	19
63	100		
50	100		
37.5	96		
28	93		
20	92		
14	91		
10	90		
6.3	88		
5	87		
3.35	85		
2	83		
1.18	82		
0.6	80	Particle density (assumed)	
0.425	78	2.65	Mg/m3
0.3	76		
0.212	72		
0.15	67		
0.063	56		

Method of Pre-Treatment	Sodium Hexametaphosphate

Sample Proportions	% dry mass
Very coarse	0
Gravel	17
Sand	27
Silt	36
Clay	19

Grading Analysis		
D_{100}	mm	
D_{60}	mm	0.0894
D_{30}	mm	0.00643
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

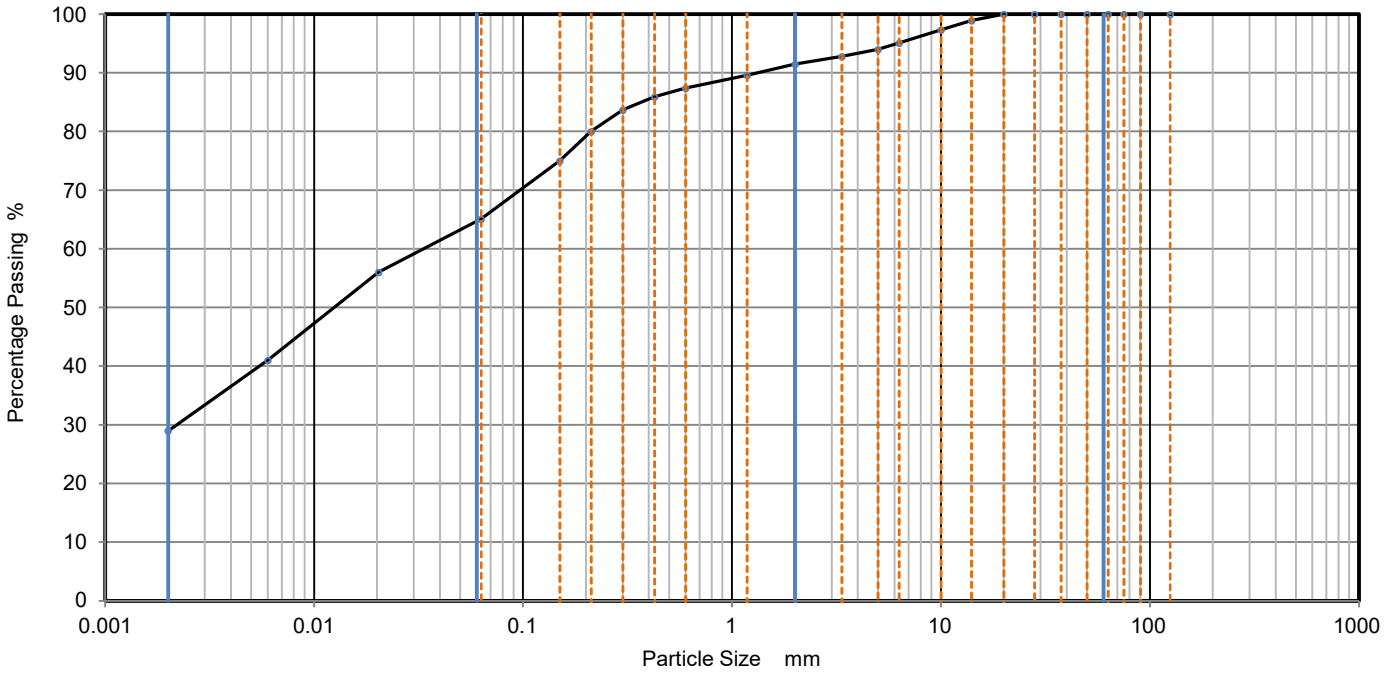
Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		UKAS Accredited Laboratory No. 20632
27/07/2022 20:44	N O'Brien		

EXPLORATION & TESTING ASSOCIATES

PARTICLE SIZE DISTRIBUTION

				Job Ref	**D10557R**
				Borehole/Pit No.	Clay
Site Name	Giga One, Washington			Sample No.	MS2221/4
Soil Description	Brown, Slightly Sandy, Slightly Silty CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990, Washing and Drying, Clauses 9.2 & 9.4			KeyLAB ID	EAT_2022070755



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0203	56
90	100	0.0060	41
75	100	0.0020	29
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	99		
10	97		
6.3	95		
5	94		
3.35	93		
2	92		
1.18	90		
0.6	87	Particle density (assumed)	
0.425	86	2.65	Mg/m3
0.3	84		
0.212	80		
0.15	75		
0.063	65		

Method of Pre-Treatment	Sodium Hexametaphosphate

Sample Proportions	% dry mass
Very coarse	0
Gravel	9
Sand	26
Silt	37
Clay	29

Grading Analysis		
D_{100}	mm	
D_{60}	mm	0.0338
D_{30}	mm	0.00226
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

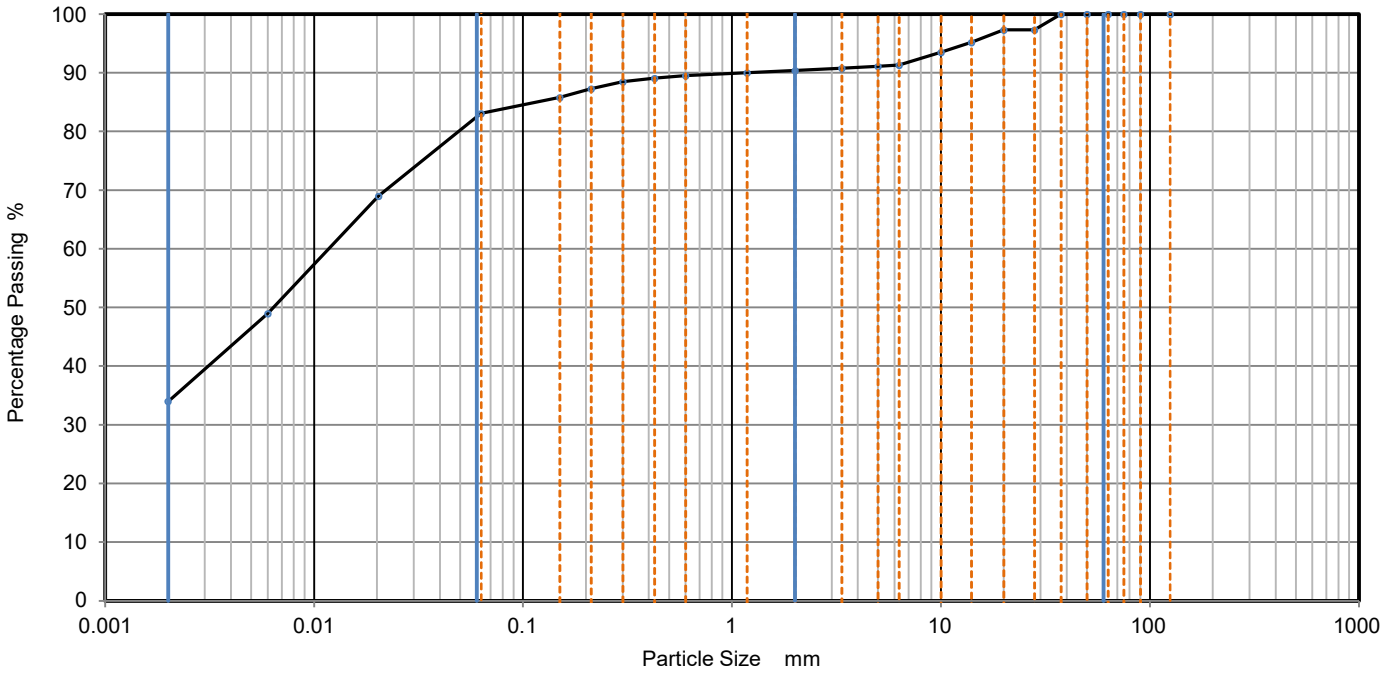
Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		UKAS Accredited Laboratory No. 20632
27/07/2022 20:45	N O'Brien		

EXPLORATION & TESTING ASSOCIATES

PARTICLE SIZE DISTRIBUTION

				Job Ref	**D10557R**
				Borehole/Pit No.	Clay
Site Name	Giga One, Washington			Sample No.	MS2221/6
Soil Description	Brown, Slightly Sandy, Slightly Silty CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990, Washing and Drying, Clauses 9.2 & 9.4			KeyLAB ID	EAT_2022070757



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0203	69
90	100	0.0060	49
75	100	0.0020	34
63	100		
50	100		
37.5	100		
28	97		
20	97		
14	95		
10	94		
6.3	91		
5	91		
3.35	91		
2	90		
1.18	90		
0.6	90	Particle density (assumed)	
0.425	89	2.65	Mg/m3
0.3	89		
0.212	87		
0.15	86		
0.063	83		

Method of Pre-Treatment	Sodium Hexametaphosphate

Sample Proportions	% dry mass
Very coarse	0
Gravel	10
Sand	7
Silt	49
Clay	34

Grading Analysis		
D_{100}	mm	
D_{60}	mm	0.0116
D_{30}	mm	
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		UKAS Accredited Laboratory No. 20632
27/07/2022 20:45	N O'Brien		

EXPLORATION
& TESTING ASSOCIATES

Unit 8B Bowburn South Industrial Estate
Durham, DH6 5AD T: 0191 389 6543

UKAS TESTING

Laboratory Test Report

Client	Groundwork Services (Durham) Limited
Address	Littleburn Industrial Estate Langley Moor Durham DH7 8HJ
F.A.O	Paul Barton
Project:	Giga One Factory, Washington
Project Number:	D10557S
Report Number:	L22-612
Date Received:	5th July 2022

Testing Required:	Moisture Content - BS:1377-2:1990 Determination of Liquid and Plastic Limits and Plasticity Index - BS:1377-2:1990 (Cone Penetrometer) Particle Size Distribution - BS:1377-2:1990 Sedimentation by Pipette - BS:1377-2:1990
Date Started:	6th July 2022
Date Finished:	20th July 2022

Report Issue Date:	22nd July 2022
Reviewed By:	
	Natalie Hodson - Materials Director
Authorised By:	
	Nik O'Brien - Laboratory Manager
Remarks:	(*) denotes testing is outside of UKAS Scope of Accreditation.
	(+) denotes subcontracted testing.

Samples will be stored for one month after the report has been issue before being disposed of.

The published results appertain only to the specimens tested.

EXPLORATION & TESTING ASSOCIATES

Determination of Moisture Content, Liquid Limit, Plastic Limit and Derivation of Plasticity Index

Project No.	Project Name
D10557S	Giga One, Envision, Washington

Hole No.	Sample			Soil Description	Moisture Content %	Passing 425µm %	Liquid Limit %	Plastic Limit %	Plasticity Index %	Remarks
	Type	Ref	Depth							
Clay	B	MS2249/1	0.00	Brown, Slightly Sandy, Slightly Silty CLAY	17					
Clay	B	MS2249/2	0.00	Brown, Slightly Sandy, Slightly Silty CLAY	17	100	53	30	23	Sample tested in natural state - material passing 425um estimated by hand picking
Clay	B	MS2249/3	0.00	Brown, Slightly Sandy, Slightly Silty CLAY	17					
Clay	B	MS2249/4	0.00	Brown, Slightly Sandy, Slightly Silty CLAY	19	98	43	17	26	Sample tested in natural state - material passing 425um estimated by hand picking
Clay	B	MS2249/5	0.00	Brown, Slightly Sandy, Slightly Silty CLAY	17					
Clay	B	MS2249/6	0.00	Brown, Slightly Sandy, Slightly Silty CLAY	19	99	45	17	28	Sample tested in natural state - material passing 425um estimated by hand picking

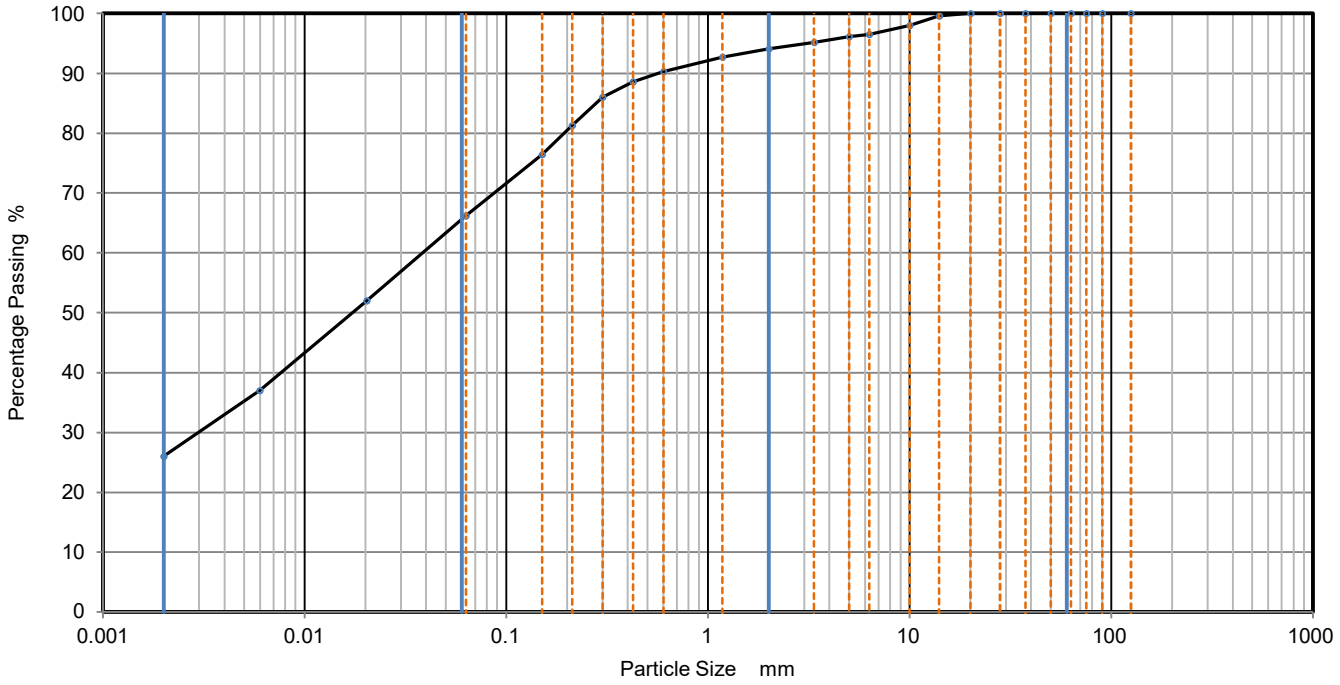
Moisture Content carried out in accordance with BS 1377: Part 2: 1990: Clause 3.2

Liquid Limit, Plastic Limit & Plasticity Index all performed in accordance with BS 1377: Part 2: 1990 - Cone Penetrometer method - Cone 80g/30°

Date	Approved By	
	N O'Brien	UKAS Accredited Laboratory No. 20632
28/07/2022 09:05		

PARTICLE SIZE DISTRIBUTION

				Job Ref	**D10557S**
				Borehole/Pit No.	Clay
Site Name	Giga One, Envision, Washington			Sample No.	MS2249/2
Soil Description	Brown, Slightly Sandy, Slightly Silty CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990, Washing and Drying, Clauses 9.2 & 9.4			KeyLAB ID	EAT_2022070759



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0203	52
90	100	0.0060	37
75	100	0.0020	26
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	98		
6.3	97		
5	96		
3.35	95		
2	94		
1.18	93		
0.6	90	Particle density (assumed)	
0.425	89	2.65	Mg/m3
0.3	86		
0.212	81		
0.15	76		
0.063	66		

Method of pre-treatment	Sodium Hexametaphosphate

Sample Proportions	% dry mass
Very coarse	0
Gravel	6
Sand	28
Silt	40
Clay	26

Grading Analysis		
D_{100}	mm	
D_{60}	mm	0.0389
D_{30}	mm	0.00295
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

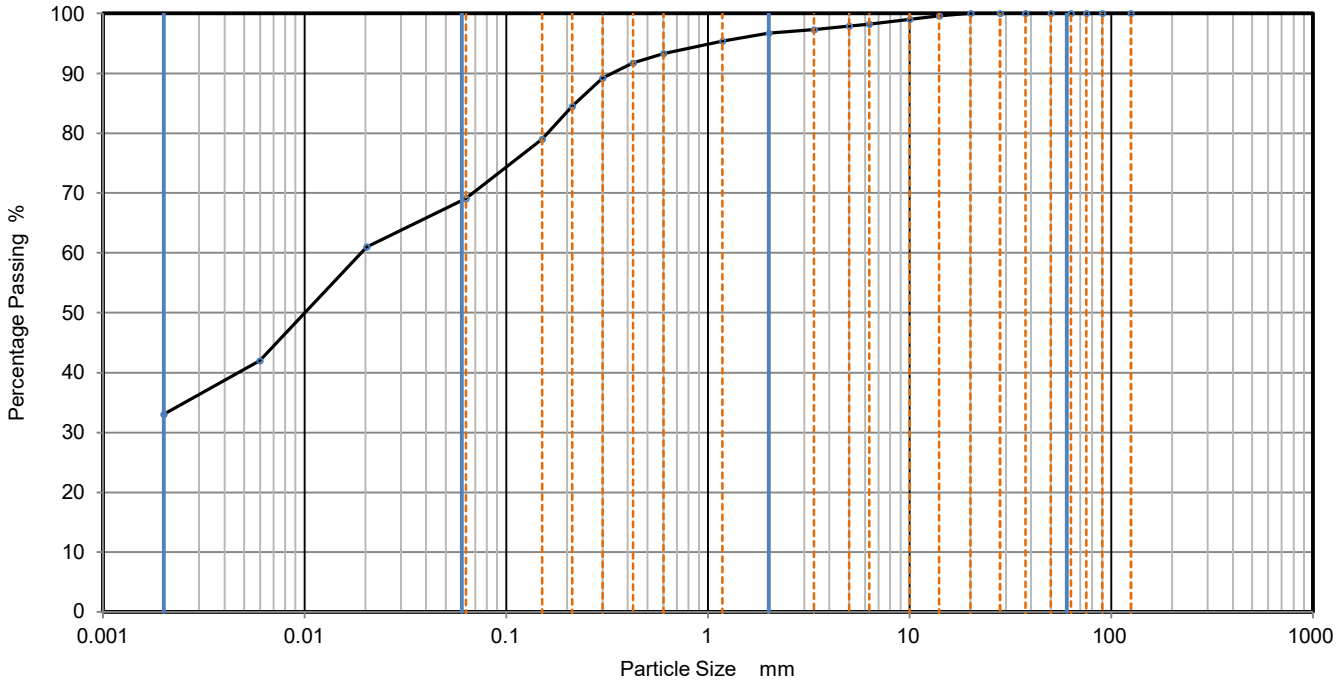
Remarks

Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		UKAS Accredited Laboratory No. 20632
28/07/2022 09:07	N O'Brien		

PARTICLE SIZE DISTRIBUTION

				Job Ref	**D10557S**
				Borehole/Pit No.	Clay
Site Name	Giga One, Envision, Washington			Sample No.	MS2249/4
Soil Description	Brown, Slightly Sandy, Slightly Silty CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990, Washing and Drying, Clauses 9.2 & 9.4			KeyLAB ID	EAT_2022070761



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0203	61
90	100	0.0060	42
75	100	0.0020	33
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	99		
6.3	98		
5	98		
3.35	97		
2	97		
1.18	95		
0.6	93	Particle density (assumed)	
0.425	92	2.65	Mg/m3
0.3	89		
0.212	85		
0.15	79		
0.063	69		

Method of pre-treatment	Sodium Hexametaphosphate

Sample Proportions	% dry mass
Very coarse	0
Gravel	3
Sand	28
Silt	37
Clay	33

Grading Analysis		
D_{100}	mm	
D_{60}	mm	0.0195
D_{30}	mm	
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

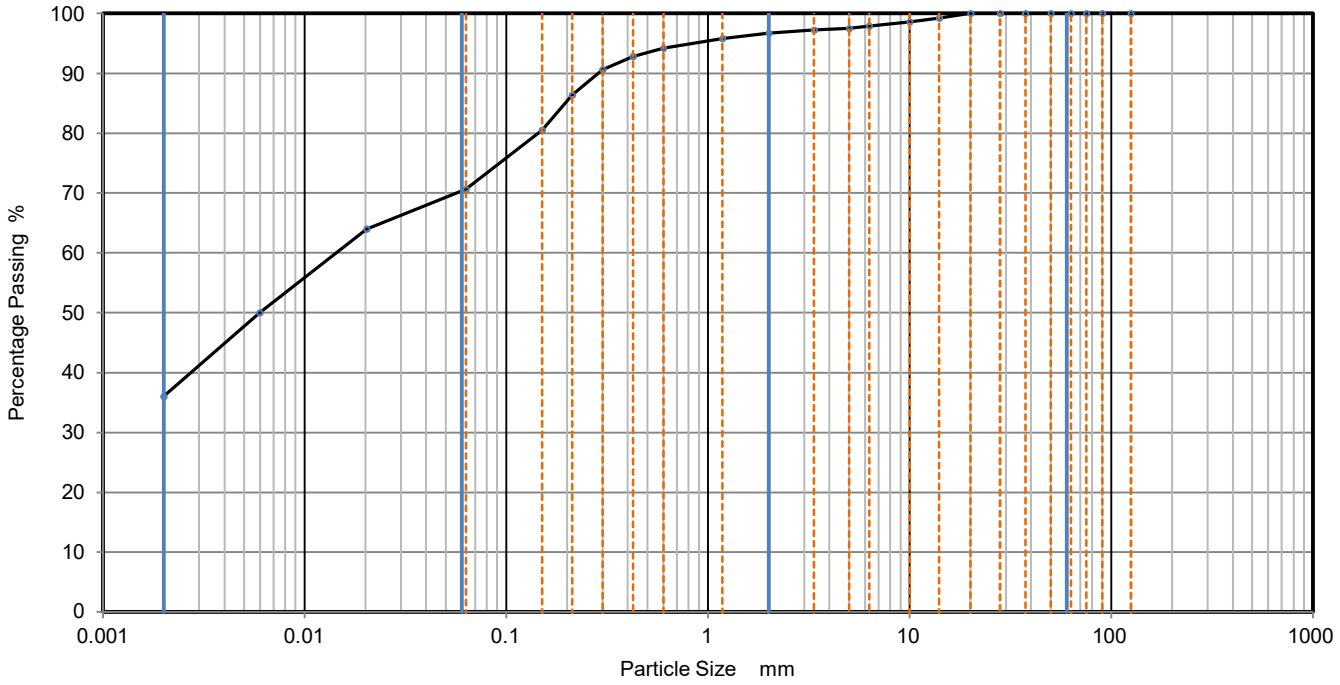
Remarks

Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		UKAS Accredited Laboratory No. 20632
28/07/2022 09:08	N O'Brien		

PARTICLE SIZE DISTRIBUTION

				Job Ref	**D10557S**
				Borehole/Pit No.	Clay
Site Name	Giga One, Envision, Washington			Sample No.	MS2249/6
Soil Description	Brown, Slightly Sandy, Slightly Silty CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990, Washing and Drying, Clauses 9.2 & 9.4			KeyLAB ID	EAT_2022070763



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0203	64
90	100	0.0060	50
75	100	0.0020	36
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	99		
10	99		
6.3	98		
5	98		
3.35	97		
2	97		
1.18	96		
0.6	94	Particle density (assumed)	
0.425	93	2.65	Mg/m3
0.3	91		
0.212	86		
0.15	81		
0.063	71		

Method of pre-treatment	Sodium Hexametaphosphate

Sample Proportions	% dry mass
Very coarse	0
Gravel	3
Sand	26
Silt	35
Clay	36

Grading Analysis		
D_{100}	mm	
D_{60}	mm	0.0141
D_{30}	mm	
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		UKAS Accredited Laboratory No. 20632
28/07/2022 09:08	N O'Brien		

EXPLORATION
& TESTING ASSOCIATES

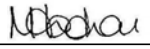
Unit 8B Bowburn South Industrial Estate
Durham, DH6 5AD T: 0191 389 6543

UKAS TESTING

Test Report

Client	Groundwork Services (Durham) Limited
Address	Littleburn Industrial Estate Langley Moor Durham DH7 8HJ
F.A.O	Paul Barton
Project:	Giga One Factory, Washington
Project Number:	D10557T
Report Number:	L22-594
Date Received:	6th July 2022

Testing Required:	PSD - BS EN 933-1:2012
Date Started:	6th July 2022
Date Finished:	15th July 2022

Report Issue Date:	25th July 2022
Reviewed By:	
	Natalie Hodson - Materials Director
Authorised By:	
	Nik O'Brien - Laboratory Manager
Remarks:	(*) denotes testing is outside of UKAS Scope of Accreditation.
	(+) denotes subcontracted testing.

Samples will be stored for one month after the report has been issue before being disposed of.

The published results appertain only to the specimens tested.

EXPLORATION & TESTING ASSOCIATES

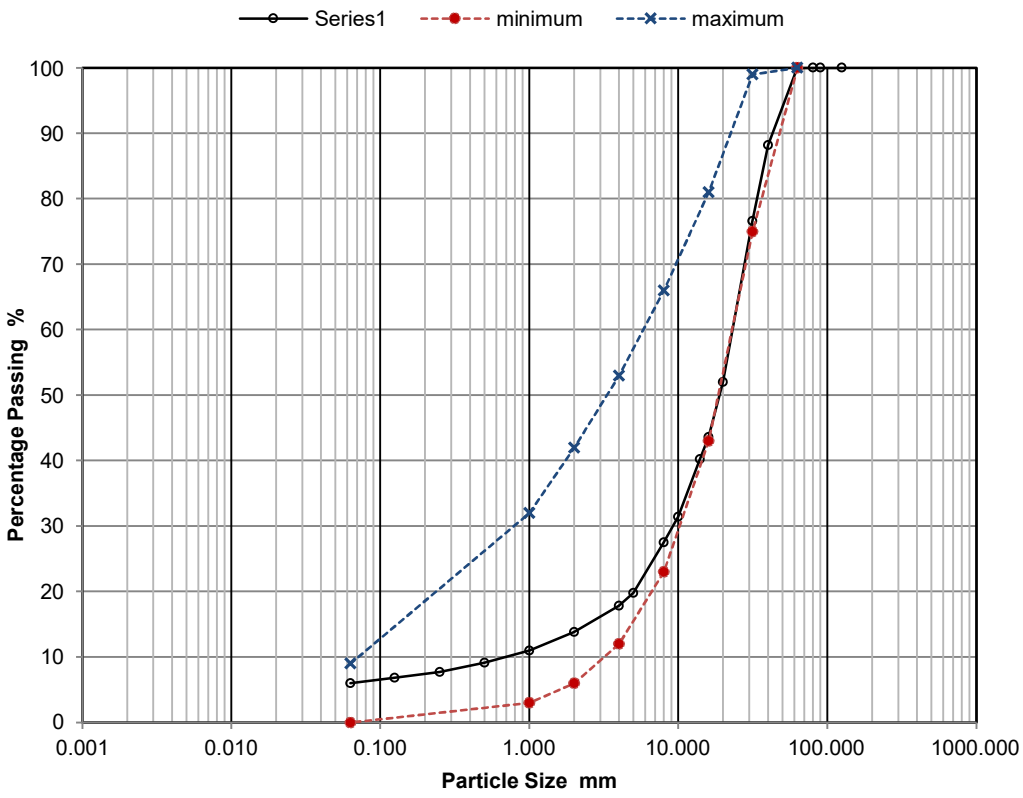
Aggregate Particle Size Distribution

				Job Ref	D10557T
				Borehole/Pit No.	Type1
Site Name	Giga One, Envision, Washington			Sample No.	MS2259/1
Soil Description	Type 1			Depth m	0
Specimen Reference		Specimen Depth	0 m	Sample Type	B
Specimen Description	Type 1			KeyLAB ID	EAT_2022071850
Test Method	BS EN 933-1:2012 - Wet & Dry Sieving			Date of test	15.07.2022

Material Type **Type1**

6D and 6I only Crushed rock

PSD test result	
Size mm	Passing %
125	100
90	100
80	100
63	100
40	88
31.5	77
20	52
16	44
14	40
10	31
8	28
5	20
4	18
2	14
1	11
0.5	9
0.25	8
0.125	7
0.063	6.0



Comparison based on each grading size

No.	size mm	%passing Type1 min	%passing Type1 max	sieve result %passing
1	63	100	100	100
2	31.5	75	99	77
3	16	43	81	44
4	8	23	66	28
5	4	12	53	18
6	2	6	42	14
7	1	3	32	11
8	0.063	0	9	6.0

Notes

Specification for Highway Works, MCHW volume 1, series 0800.
Assessment based on specified sieve sizes. Envelopes drawn using straight line connections for information only.

Approved Date 25/07/2022 15:33

N O'Brien - Laboratory Manager

UKAS Accredited Laboratory No. 20632

EXPLORATION & TESTING ASSOCIATES

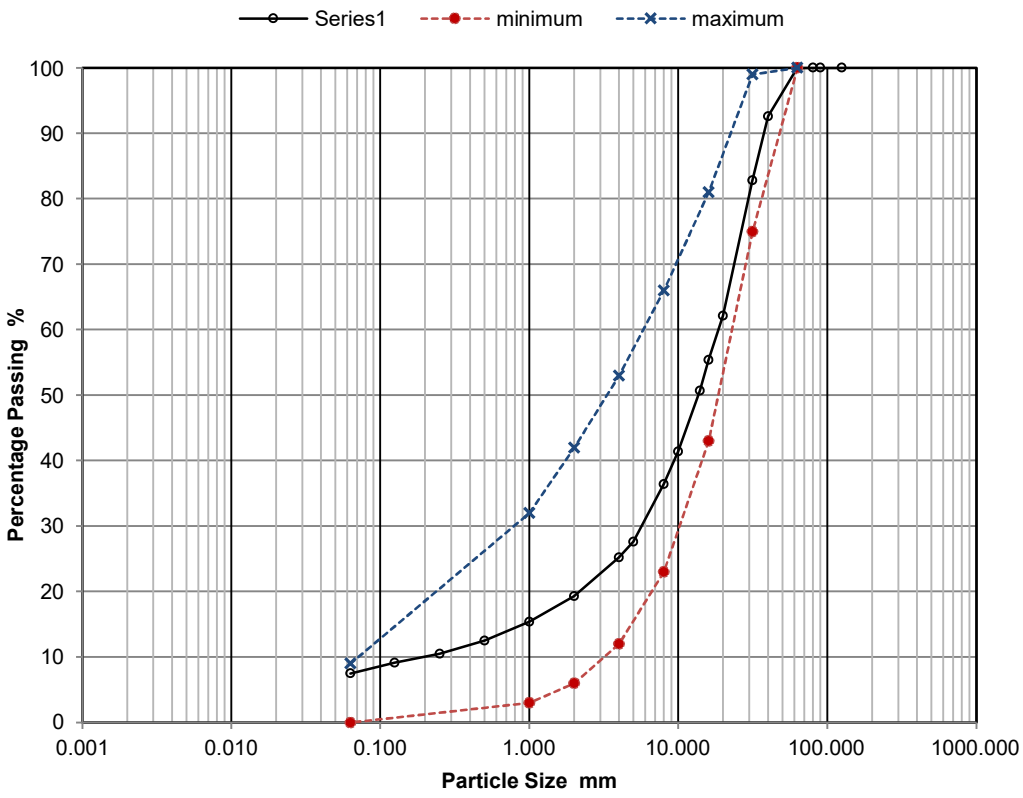
Aggregate Particle Size Distribution

				Job Ref	D10557T
				Borehole/Pit No.	Type1
Site Name	Giga One, Envision, Washington			Sample No.	MS2259/2
Soil Description	Type 1			Depth m	0
Specimen Reference		Specimen Depth	0 m	Sample Type	B
Specimen Description	Type 1			KeyLAB ID	EAT_2022071851
Test Method	BS EN 933-1:2012 - Wet & Dry Sieving			Date of test	15.07.2022

Material Type **Type1**

6D and 6I only Crushed rock

PSD test result	
Size mm	Passing %
125	100
90	100
80	100
63	100
40	93
31.5	83
20	62
16	55
14	51
10	41
8	36
5	28
4	25
2	19
1	15
0.5	13
0.25	11
0.125	9
0.063	7.5



Comparison based on each grading size

No.	size mm	%passing Type1 min	%passing Type1 max	sieve result %passing
1	63	100	100	100
2	31.5	75	99	83
3	16	43	81	55
4	8	23	66	36
5	4	12	53	25
6	2	6	42	19
7	1	3	32	15
8	0.063	0	9	7.5

Notes

Specification for Highway Works, MCHW volume 1, series 0800. Assessment based on specified sieve sizes. Envelopes drawn using straight line connections for information only.

Approved Date 25/07/2022 15:34

N O'Brien - Laboratory Manager

UKAS Accredited Laboratory No. 20632

EXPLORATION & TESTING ASSOCIATES

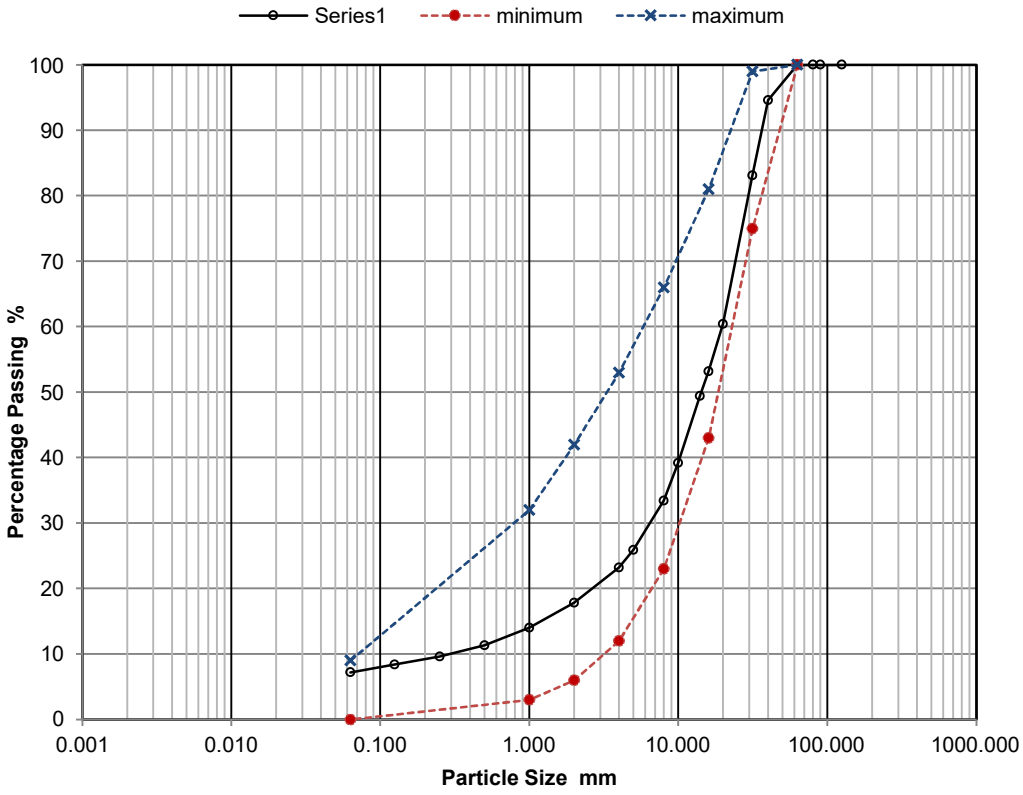
Aggregate Particle Size Distribution

				Job Ref	D10557T
				Borehole/Pit No.	Type1
Site Name	Giga One, Envision, Washington			Sample No.	MS2259/3
Soil Description	Type 1			Depth m	0
Specimen Reference		Specimen Depth	0 m	Sample Type	B
Specimen Description	Type 1			KeyLAB ID	EAT_2022071852
Test Method	BS EN 933-1:2012 - Wet & Dry Sieving			Date of test	15.07.2022

Material Type **Type1**

6D and 6I only Crushed rock

PSD test result	
Size mm	Passing %
125	100
90	100
80	100
63	100
40	95
31.5	83
20	60
16	53
14	49
10	39
8	33
5	26
4	23
2	18
1	14
0.5	11
0.25	10
0.125	8
0.063	7.2



Comparison based on each grading size

No.	size mm	%passing Type1 min	%passing Type1 max
1	63	100	100
2	31.5	75	99
3	16	43	81
4	8	23	66
5	4	12	53
6	2	6	42
7	1	3	32
8	0.063	0	9

sieve result %passing
100
83
53
33
23
18
14
7.2

Notes	Approved Date		
Specification for Highway Works, MCHW volume 1, series 0800. Assessment based on specified sieve sizes. Envelopes drawn using straight line connections for information only.	25/07/2022 15:35	N O'Brien - Laboratory Manager	UKAS Accredited Laboratory No. 20632

EXPLORATION & TESTING ASSOCIATES

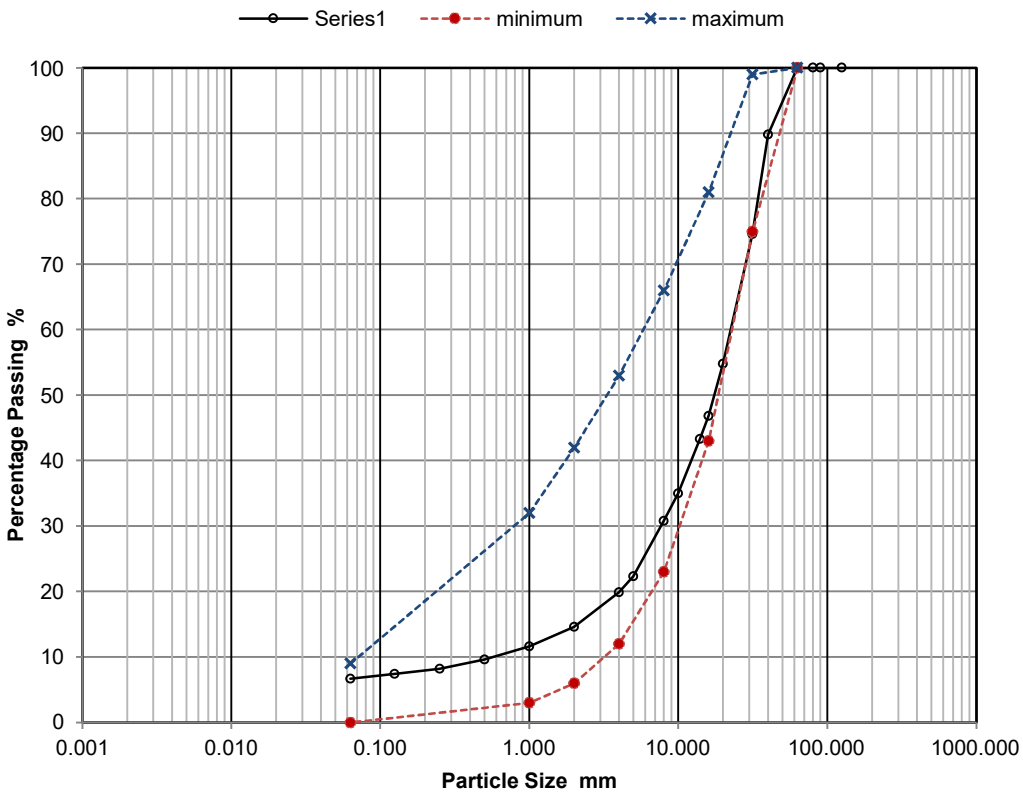
Aggregate Particle Size Distribution

				Job Ref	D10557T
				Borehole/Pit No.	Type1
Site Name	Giga One, Envision, Washington			Sample No.	MS2259/4
Soil Description	Type 1			Depth m	0
Specimen Reference		Specimen Depth	0 m	Sample Type	B
Specimen Description	Type 1			KeyLAB ID	EAT_2022071853
Test Method	BS EN 933-1:2012 - Wet & Dry Sieving			Date of test	15.07.2022

Material Type **Type1**

6D and 6I only Crushed rock

PSD test result	
Size mm	Passing %
125	100
90	100
80	100
63	100
40	90
31.5	75
20	55
16	47
14	43
10	35
8	31
5	22
4	20
2	15
1	12
0.5	10
0.25	8
0.125	7
0.063	6.7



Comparison based on each grading size

No.	size mm	%passing Type1 min	%passing Type1 max
1	63	100	100
2	31.5	75	99
3	16	43	81
4	8	23	66
5	4	12	53
6	2	6	42
7	1	3	32
8	0.063	0	9

sieve result %passing
100
75
47
31
20
15
12
6.7

Notes

Specification for Highway Works, MCHW volume 1, series 0800. Assessment based on specified sieve sizes. Envelopes drawn using straight line connections for information only.

Approved Date 25/07/2022 15:36

N O'Brien - Laboratory Manager

UKAS Accredited Laboratory No. 20632

EXPLORATION & TESTING ASSOCIATES

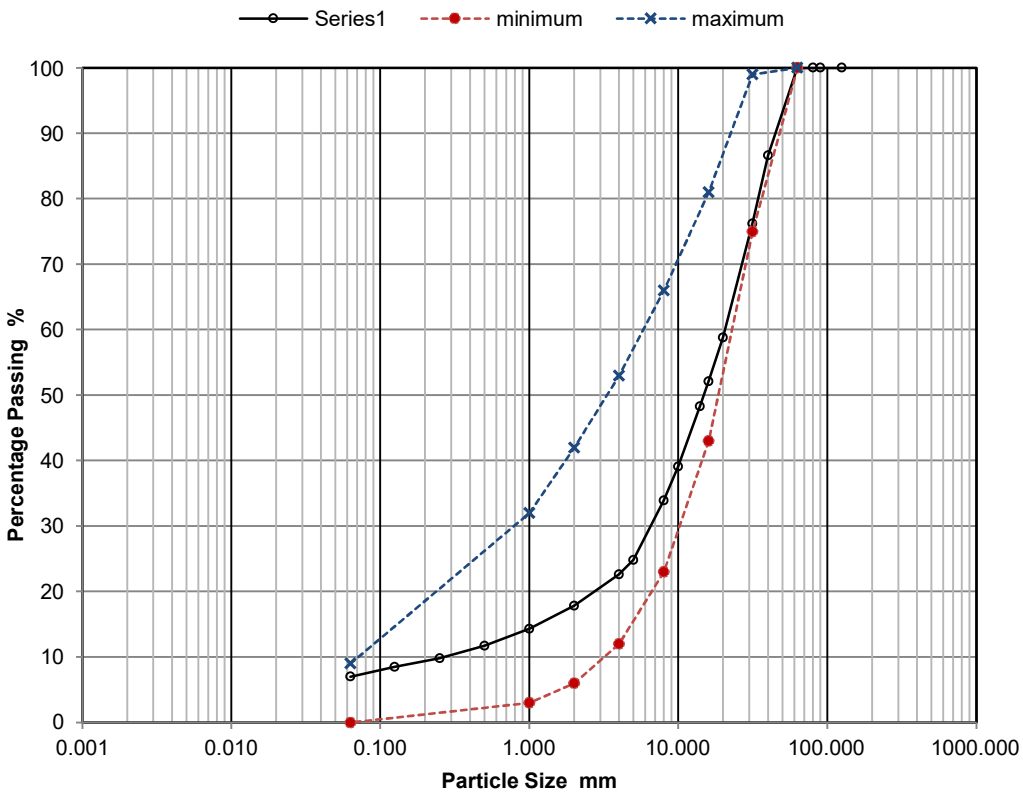
Aggregate Particle Size Distribution

				Job Ref	D10557T
				Borehole/Pit No.	Type1
Site Name	Giga One, Envision, Washington			Sample No.	MS2259/5
Soil Description	Type 1			Depth m	0
Specimen Reference		Specimen Depth	0 m	Sample Type	B
Specimen Description	Type 1			KeyLAB ID	EAT_2022071854
Test Method	BS EN 933-1:2012 - Wet & Dry Sieving			Date of test	15.07.2022

Material Type **Type1**

6D and 6I only Crushed rock

PSD test result	
Size mm	Passing %
125	100
90	100
80	100
63	100
40	87
31.5	76
20	59
16	52
14	48
10	39
8	34
5	25
4	23
2	18
1	14
0.5	12
0.25	10
0.125	9
0.063	7.0



Comparison based on each grading size

No.	size mm	%passing Type1 min	%passing Type1 max
1	63	100	100
2	31.5	75	99
3	16	43	81
4	8	23	66
5	4	12	53
6	2	6	42
7	1	3	32
8	0.063	0	9

sieve result %passing
100
76
52
34
23
18
14
7.0

Notes	Approved Date		
Specification for Highway Works, MCHW volume 1, series 0800. Assessment based on specified sieve sizes. Envelopes drawn using straight line connections for information only.	25/07/2022 15:43	N O'Brien - Laboratory Manager	UKAS Accredited Laboratory No. 20632

EXPLORATION
& TESTING ASSOCIATES

Unit 8B Bowburn South Industrial Estate
Durham, DH6 5AD T: 0191 389 6543

UKAS TESTING

Laboratory Test Report

Client	Groundwork Services (Durham) Limited
Address	Littleburn Industrial Estate Langley Moor Durham DH7 8HJ
F.A.O	Paul Barton
Project:	Giga One Factory, Washington
Project Number:	D10557T
Report Number:	L22-613
Date Received:	6th July 2022

Testing Required:	Moisture Content - BS:1377-2:1990 Determination of Liquid and Plastic Limits and Plasticity Index - BS:1377-2:1990 (Cone Penetrometer) Particle Size Distribution - BS:1377-2:1990 Sedimentation by Pipette - BS:1377-2:1990
Date Started:	8th July 2022
Date Finished:	22nd July 2022

Report Issue Date:	22nd July 2022
Reviewed By:	
	Natalie Hodson - Materials Director
Authorised By:	
	Nik O'Brien - Laboratory Manager
Remarks:	(*) denotes testing is outside of UKAS Scope of Accreditation.
	(+) denotes subcontracted testing.

Samples will be stored for one month after the report has been issue before being disposed of.

The published results appertain only to the specimens tested.

EXPLORATION & TESTING ASSOCIATES

Determination of Moisture Content, Liquid Limit, Plastic Limit and Derivation of Plasticity Index

Project No.	Project Name
D10557T	Giga One, Envision, Washington

Hole No.	Sample			Soil Description	Moisture Content %	Passing 425µm %	Liquid Limit %	Plastic Limit %	Plasticity Index %	Remarks
	Type	Ref	Depth							
Fill	B	MS2258/1	0.00	Brown, Slightly Sandy, Slightly Silty CLAY	17	98	52	21	31	Sample tested in natural state - material passing 425um estimated by hand picking
Fill	B	MS2258/2	0.00	Brown, Slightly Sandy, Slightly Silty CLAY	17	98	49	19	30	Sample tested in natural state - material passing 425um estimated by hand picking
Fill	B	MS2258/3	0.00	Brown, Slightly Sandy, Slightly Silty CLAY	17					
Fill	B	MS2258/4	0.00	Brown, Slightly Sandy, Slightly Silty CLAY	19					
Fill	B	MS2258/5	0.00	Brown, Slightly Sandy, Slightly Silty CLAY	18	98	52	22	30	Sample tested in natural state - material passing 425um estimated by hand picking
Fill	B	MS2258/6	0.00	Brown, Slightly Sandy, Slightly Silty CLAY	19					

Moisture Content carried out in accordance with BS 1377: Part 2: 1990: Clause 3.2

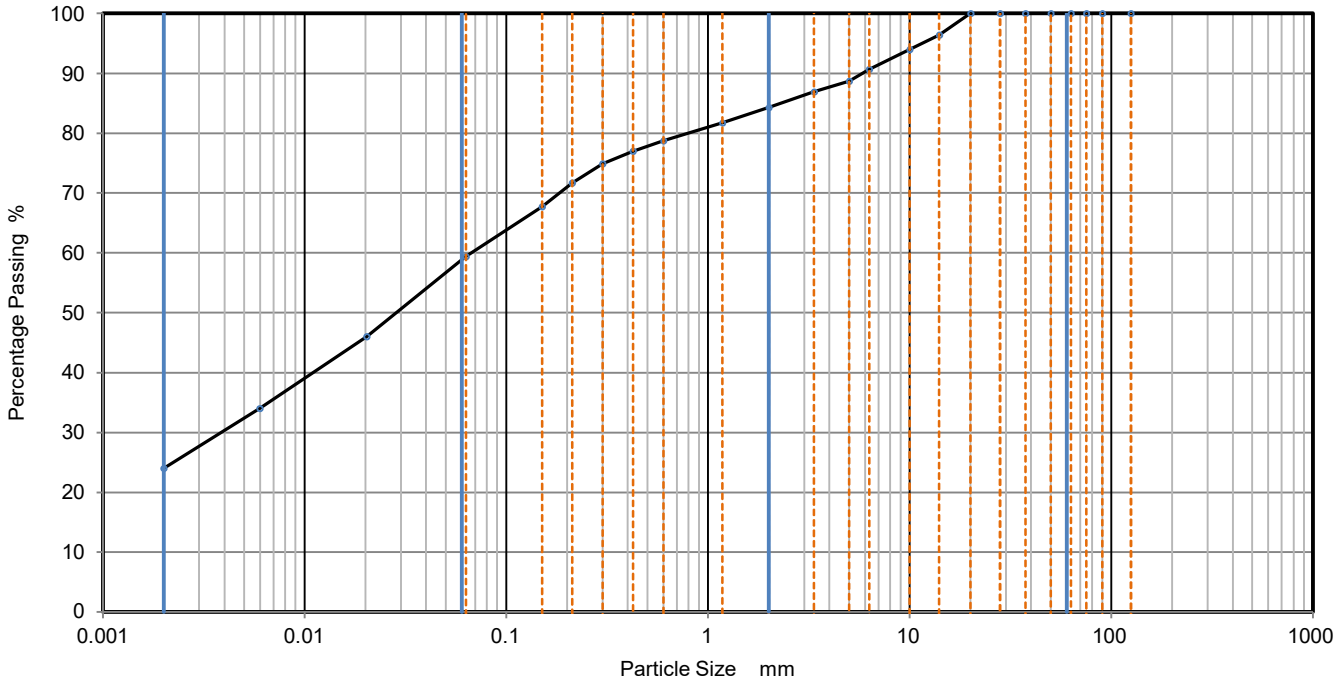
Liquid Limit, Plastic Limit & Plasticity Index all performed in accordance with BS 1377: Part 2: 1990 - Cone Penetrometer method - Cone 80g/30°

Date	Approved By
28/07/2022 09:11	N O'Brien

UKAS Accredited Laboratory No. 20632

PARTICLE SIZE DISTRIBUTION

				Job Ref	**D10557S**
				Borehole/Pit No.	Fill
Site Name	Giga One, Envision, Washington			Sample No.	MS2258/1
Soil Description	Brown, Slightly Sandy, Slightly Silty CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990, Washing and Drying, Clauses 9.2 & 9.4			KeyLAB ID	EAT_2022072041



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0203	46
90	100	0.0060	34
75	100	0.0020	24
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	96		
10	94		
6.3	91		
5	89		
3.35	87		
2	84		
1.18	82		
0.6	79	Particle density (assumed)	
0.425	77	2.65	Mg/m3
0.3	75		
0.212	72		
0.15	68		
0.063	59		

Method of pre-treatment	Sodium Hexametaphosphate

Sample Proportions	% dry mass
Very coarse	0
Gravel	16
Sand	25
Silt	36
Clay	24

Grading Analysis		
D_{100}	mm	
D_{60}	mm	0.0677
D_{30}	mm	0.00382
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

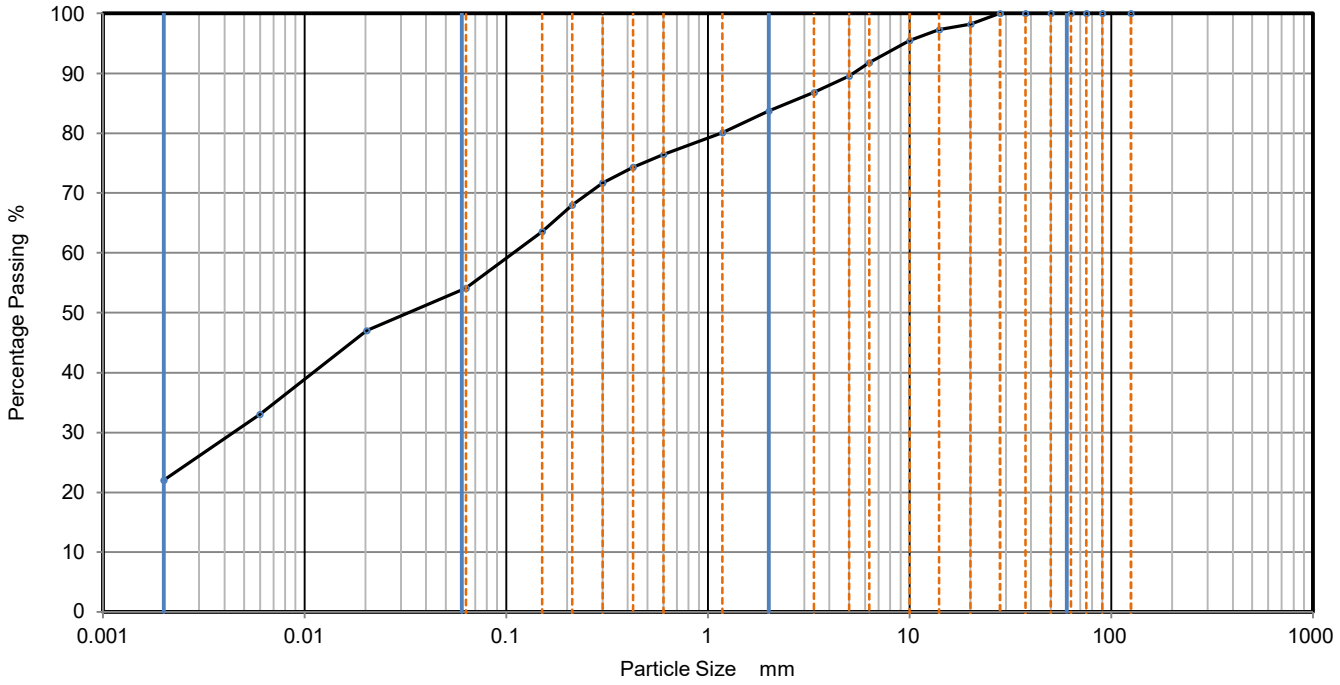
Remarks

Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		UKAS Accredited Laboratory No. 20632
28/07/2022 09:13	N O'Brien		

PARTICLE SIZE DISTRIBUTION

				Job Ref	**D10557S**
				Borehole/Pit No.	Fill
Site Name	Giga One, Envision, Washington			Sample No.	MS2258/2
Soil Description	Brown, Slightly Sandy, Slightly Silty CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990, Washing and Drying, Clauses 9.2 & 9.4			KeyLAB ID	EAT_2022072042



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0203	47
90	100	0.0060	33
75	100	0.0020	22
63	100		
50	100		
37.5	100		
28	100		
20	98		
14	97		
10	96		
6.3	92		
5	90		
3.35	87		
2	84		
1.18	80		
0.6	76	Particle density (assumed)	
0.425	74	2.65	Mg/m3
0.3	72		
0.212	68		
0.15	64		
0.063	54		

Method of pre-treatment	Sodium Hexametaphosphate

Sample Proportions	% dry mass
Very coarse	0
Gravel	16
Sand	30
Silt	32
Clay	22

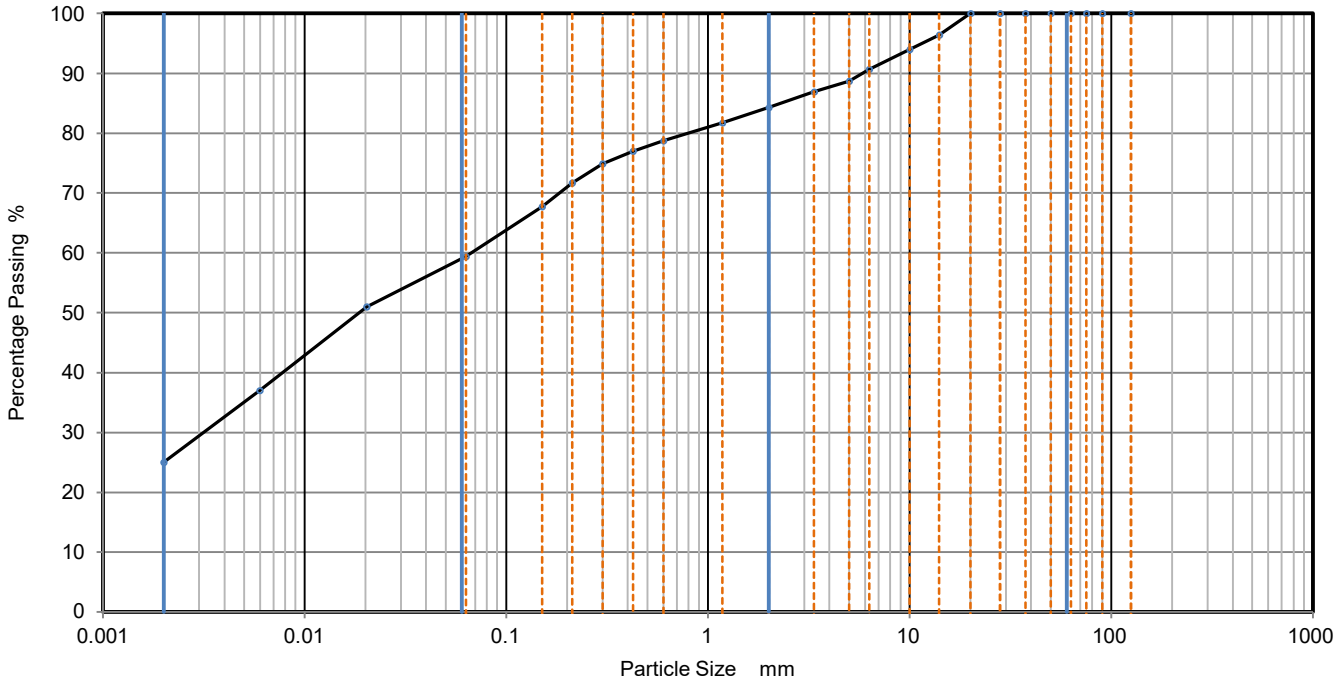
Grading Analysis		
D_{100}	mm	
D_{60}	mm	0.11
D_{30}	mm	0.00431
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		UKAS Accredited Laboratory No. 20632
28/07/2022 09:13	N O'Brien		

EXPLORATION & TESTING ASSOCIATES	PARTICLE SIZE DISTRIBUTION			Job Ref	D10557S
				Borehole/Pit No.	Fill
Site Name	Giga One, Envision, Washington			Sample No.	MS2258/5
Soil Description	Brown, Slightly Sandy, Slightly Silty CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990, Washing and Drying, Clauses 9.2 & 9.4			KeyLAB ID	EAT_2022072045



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0203	51
90	100	0.0060	37
75	100	0.0020	25
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	96		
10	94		
6.3	91		
5	89		
3.35	87		
2	84		
1.18	82		
0.6	79	Particle density (assumed)	
0.425	77	2.65	Mg/m3
0.3	75		
0.212	72		
0.15	68		
0.063	59		

Method of pre-treatment	Sodium Hexametaphosphate

Sample Proportions	% dry mass
Very coarse	0
Gravel	16
Sand	25
Silt	34
Clay	25

Grading Analysis		
D_{100}	mm	
D_{60}	mm	0.0677
D_{30}	mm	0.00316
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		UKAS Accredited Laboratory No. 20632
28/07/2022 09:14	N O'Brien		

EXPLORATION
& TESTING ASSOCIATES

Unit 8B Bowburn South Industrial Estate
Durham, DH6 5AD T: 0191 389 6543

UKAS TESTING

Laboratory Test Report

Client	Groundwork Services (Durham) Limited
Address	Littleburn Industrial Estate Langley Moor Durham DH7 8HJ
F.A.O	Paul Barton
Project:	Giga One Factory, Washington
Project Number:	D10557U
Report Number:	L22-614
Date Received:	7th July 2022

Testing Required:	Moisture Content - BS:1377-2:1990 Determination of Liquid and Plastic Limits and Plasticity Index - BS:1377-2:1990 (Cone Penetrometer) Particle Size Distribution - BS:1377-2:1990 Sedimentation by Pipette - BS:1377-2:1990 Determination of Maximum Dry Density / Optimum Moisture Content by 2.5kg Rammer - BS:1377-4:1990 Particle Density by Gas Jar - BS:1377-2:1990 Clause 8.2
Date Started:	11th July 2022
Date Finished:	26th July 2022

Report Issue Date:	26th July 2022
Reviewed By:	
	Natalie Hodson - Materials Director
Authorised By:	
	Nik O'Brien - Laboratory Manager
Remarks:	(*) denotes testing is outside of UKAS Scope of Accreditation.
	(+) denotes subcontracted testing.

Samples will be stored for one month after the report has been issue before being disposed of.

The published results appertain only to the specimens tested.

EXPLORATION & TESTING ASSOCIATES

Determination of Moisture Content, Liquid Limit, Plastic Limit and Derivation of Plasticity Index

Project No.	Project Name
D10557U	Giga One Envision, Washington

Hole No.	Sample			Soil Description	Moisture Content %	Passing 425µm %	Liquid Limit %	Plastic Limit %	Plasticity Index %	Remarks
	Type	Ref	Depth							
Clay	B	MS2301/1	0.00	Brown, Slightly Sandy, Slightly Silty CLAY	19	98	56	22	34	Sample tested in natural state - material passing 425um estimated by hand picking
Clay	B	MS2301/2	0.00	Brown, Slightly Sandy, Slightly Silty CLAY	18	98	52	21	31	Sample tested in natural state - material passing 425um estimated by hand picking
Clay	B	MS2301/3	0.00	Brown, Slightly Sandy, Slightly Silty CLAY	19	99	49	22	27	Sample tested in natural state - material passing 425um estimated by hand picking
Clay	B	MS2301/4	0.00	Brown, Slightly Sandy, Slightly Silty CLAY	16	100	53	30	23	Sample tested in natural state - material passing 425um estimated by hand picking
Clay	B	MS2301/5	0.00	Brown, Slightly Sandy, Slightly Silty CLAY	20	98	51	21	30	Sample tested in natural state - material passing 425um estimated by hand picking
Clay	B	MS2301/6	0.00	Brown, Slightly Sandy, Slightly Silty CLAY	17	98	53	22	31	Sample tested in natural state - material passing 425um estimated by hand picking

Moisture Content carried out in accordance with BS 1377: Part 2: 1990: Clause 3.2

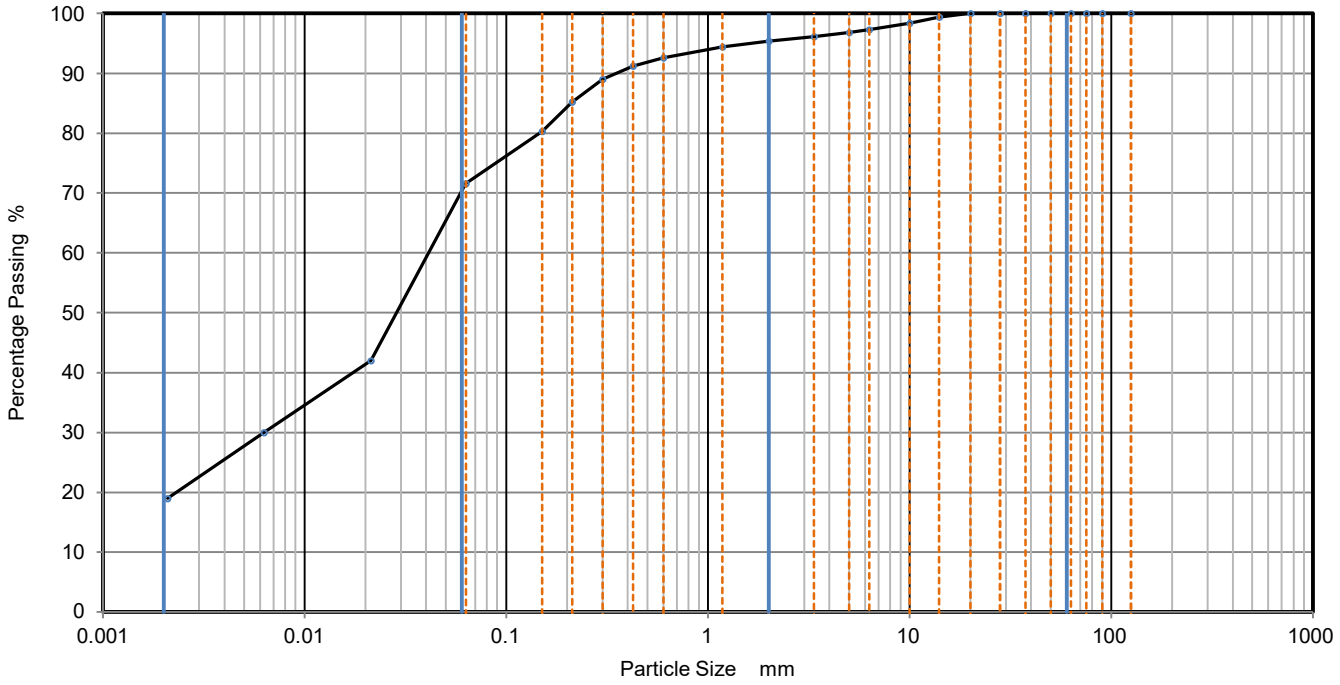
Liquid Limit, Plastic Limit & Plasticity Index all performed in accordance with BS 1377: Part 2: 1990 - Cone Penetrometer method - Cone 80g/30°

Date	Approved By
28/07/2022 09:17	N O'Brien

UKAS Accredited Laboratory No. 20632

PARTICLE SIZE DISTRIBUTION

				Job Ref	**D10557U**
				Borehole/Pit No.	Clay
Site Name	Giga One Envision, Washington			Sample No.	MS2301/1
Soil Description	Brown, Slightly Sandy, Slightly Silty CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990, Washing and Drying, Clauses 9.2 & 9.4			KeyLAB ID	EAT_2022072624



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0212	42
90	100	0.0063	30
75	100	0.0021	19
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	99		
10	98		
6.3	97		
5	97		
3.35	96		
2	95		
1.18	94		
0.6	93	Particle density (measured)	
0.425	91	2.51	Mg/m3
0.3	89		
0.212	85		
0.15	80		
0.063	72		

Method of pre-treatment	Sodium Hexametaphosphate

Sample Proportions	% dry mass
Very coarse	0
Gravel	5
Sand	24
Fines <0.063mm	72

Grading Analysis		
D_{100}	mm	
D_{60}	mm	0.0409
D_{30}	mm	0.00621
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

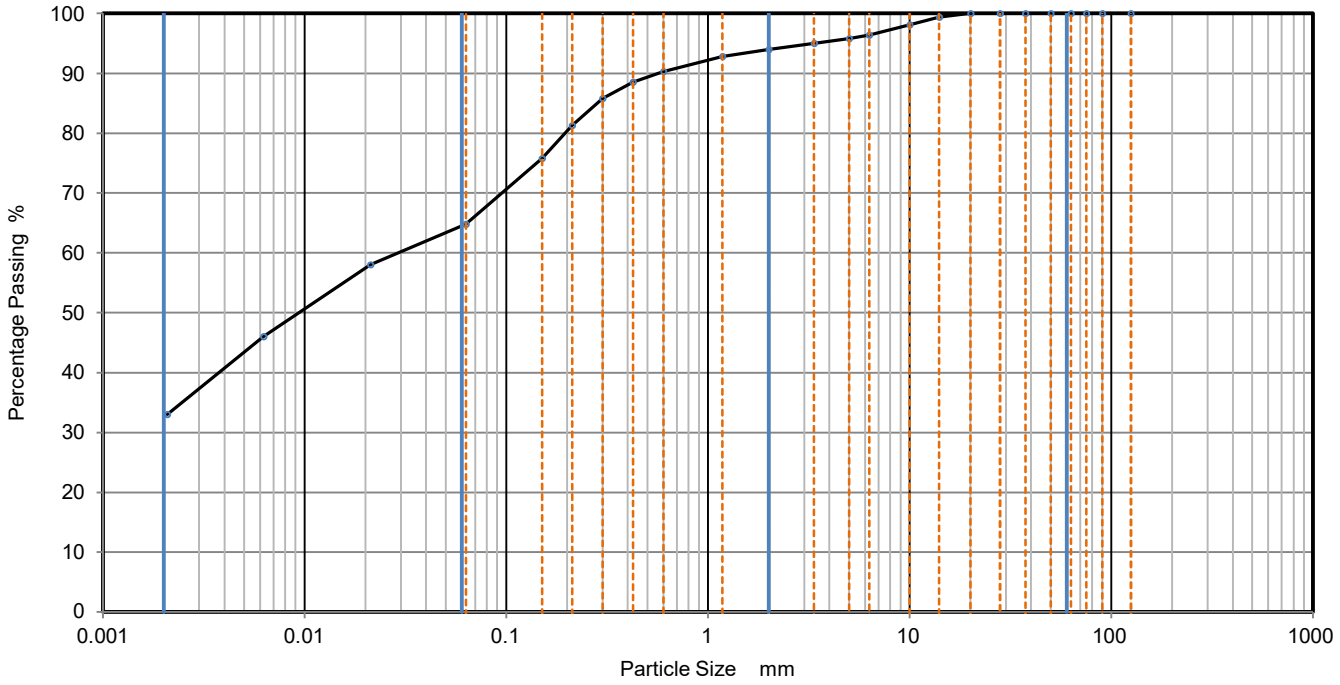
Remarks

Preparation and testing in accordance with BS 1377-2:1990 unless noted below

Date	Approved By		UKAS Accredited Laboratory No. 20632
28/07/2022 09:18	N O'Brien		

PARTICLE SIZE DISTRIBUTION

				Job Ref	**D10557U**
				Borehole/Pit No.	Clay
Site Name	Giga One Envision, Washington			Sample No.	MS2301/2
Soil Description	Brown, Slightly Sandy, Slightly Silty CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990, Washing and Drying, Clauses 9.2 & 9.4			KeyLAB ID	EAT_2022072625



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0212	58
90	100	0.0062	46
75	100	0.0021	33
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	99		
10	98		
6.3	96		
5	96		
3.35	95		
2	94		
1.18	93		
0.6	90	Particle density (measured)	
0.425	89	2.52	Mg/m3
0.3	86		
0.212	81		
0.15	76		
0.063	65		

Method of pre-treatment	Sodium Hexametaphosphate

Sample Proportions	% dry mass
Very coarse	0
Gravel	6
Sand	29
Fines <0.063mm	65

Grading Analysis		
D_{100}	mm	
D_{60}	mm	0.03
D_{30}	mm	
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

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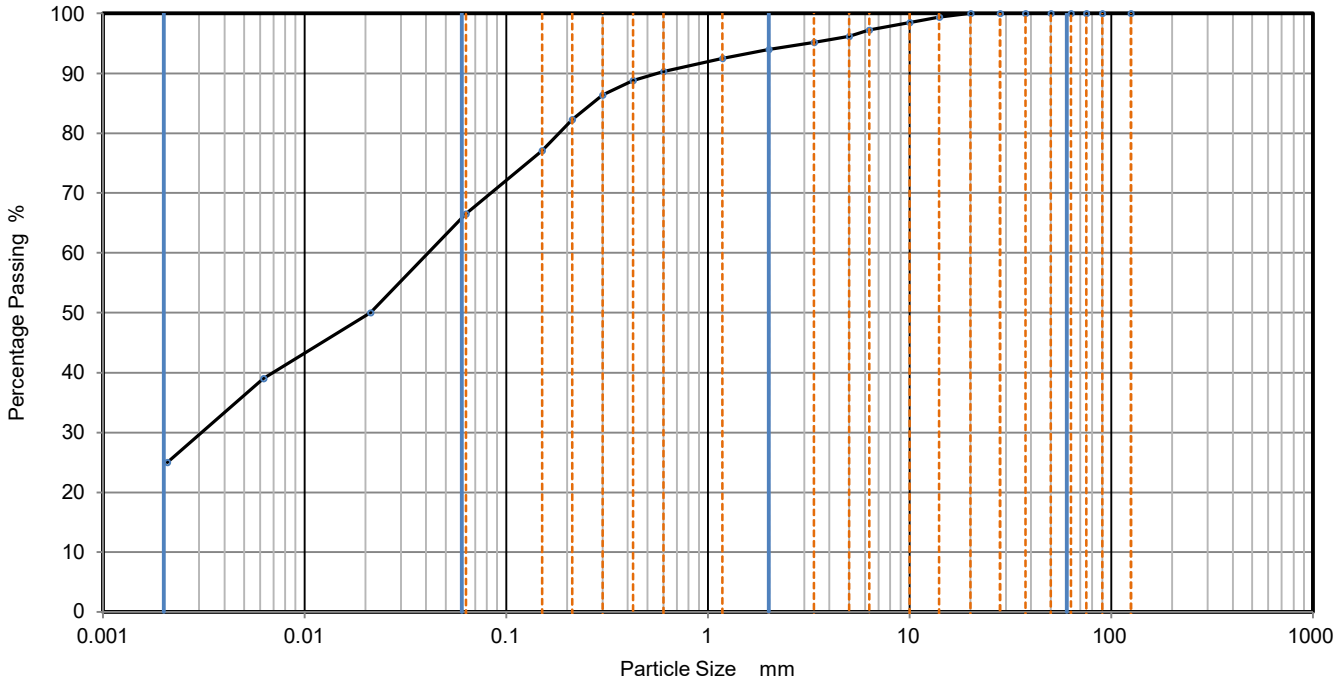
28/07/2022 09:18	N O'Brien		

PARTICLE SIZE DISTRIBUTION

				Job Ref	**D10557U**
				Borehole/Pit No.	Clay
Site Name	Giga One Envision, Washington			Sample No.	MS2301/3
Soil Description	Brown, Slightly Sandy, Slightly Silty CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990, Washing and Drying, Clauses 9.2 & 9.4			KeyLAB ID	EAT_2022072626



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0212	50
90	100	0.0062	39
75	100	0.0021	25
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	99		
10	99		
6.3	97		
5	96		
3.35	95		
2	94		
1.18	93		
0.6	90	Particle density (measured)	
0.425	89	2.52	Mg/m3
0.3	86		
0.212	82		
0.15	77		
0.063	67		

Method of pre-treatment	Sodium Hexametaphosphate

Sample Proportions	% dry mass
Very coarse	0
Gravel	6
Sand	28
Fines <0.063mm	66

Grading Analysis		
D_{100}	mm	
D_{60}	mm	0.0413
D_{30}	mm	0.00313
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

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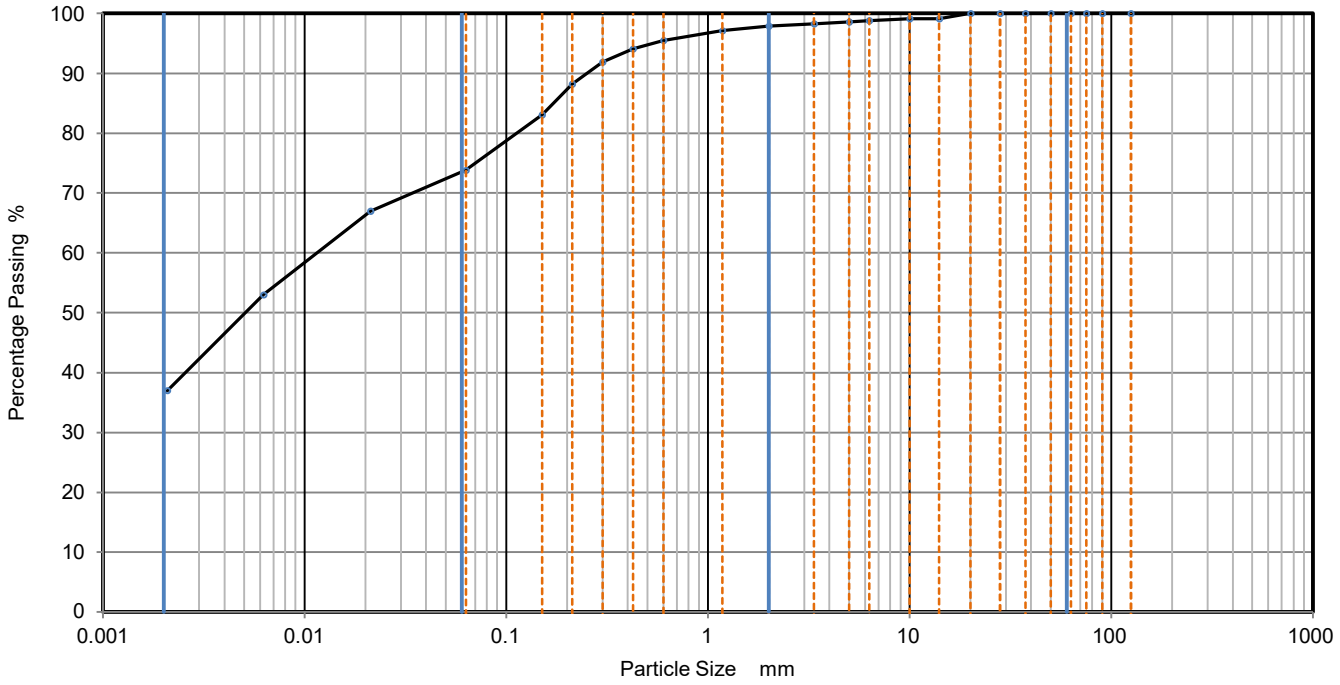
28/07/2022 09:19	N O'Brien		

PARTICLE SIZE DISTRIBUTION

				Job Ref	**D10557U**
				Borehole/Pit No.	Clay
Site Name	Giga One Envision, Washington			Sample No.	MS2301/4
Soil Description	Brown, Slightly Sandy, Slightly Silty CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990, Washing and Drying, Clauses 9.2 & 9.4			KeyLAB ID	EAT_2022072627



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0212	67
90	100	0.0062	53
75	100	0.0021	37
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	99		
10	99		
6.3	99		
5	99		
3.35	98		
2	98		
1.18	97		
0.6	96	Particle density (measured)	
0.425	94	2.52	Mg/m3
0.3	92		
0.212	88		
0.15	83		
0.063	74		

Method of pre-treatment	Sodium Hexametaphosphate

Sample Proportions	% dry mass
Very coarse	0
Gravel	2
Sand	24
Fines <0.063mm	74

Grading Analysis		
D_{100}	mm	
D_{60}	mm	0.0117
D_{30}	mm	
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

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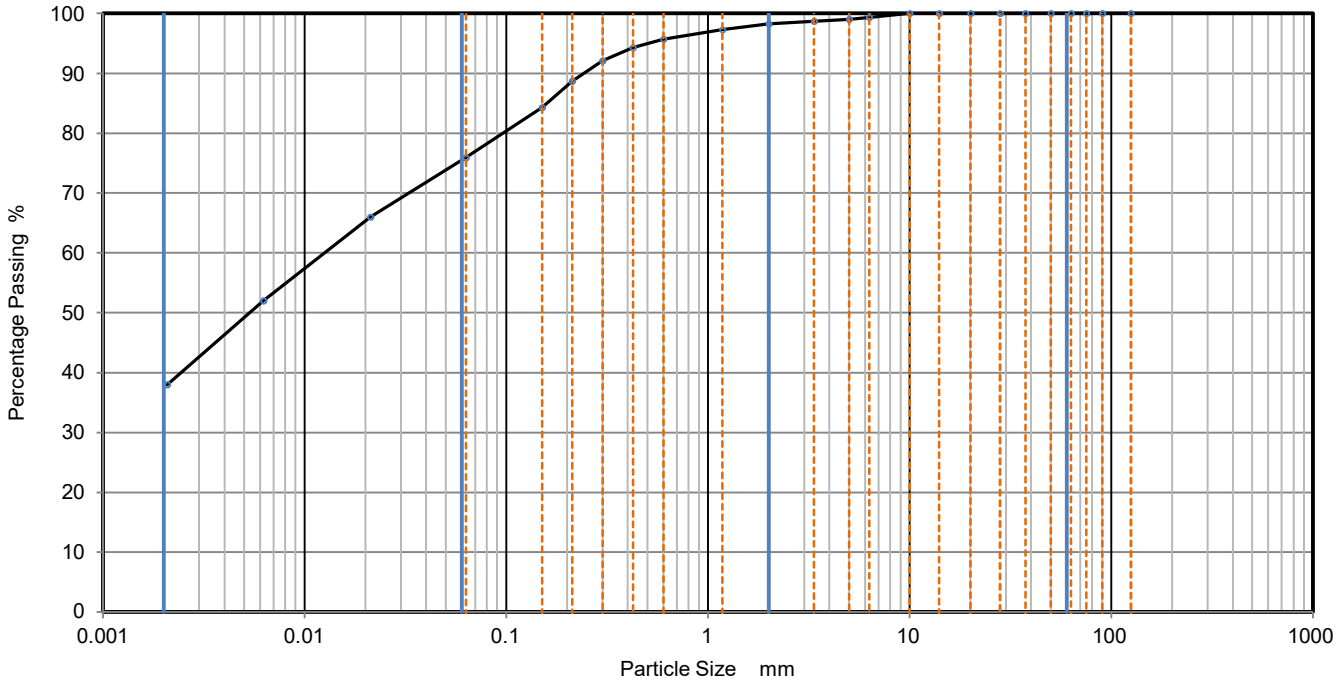
28/07/2022 09:19	N O'Brien		

PARTICLE SIZE DISTRIBUTION

				Job Ref	**D10557U**
				Borehole/Pit No.	Clay
Site Name	Giga One Envision, Washington			Sample No.	MS2301/5
Soil Description	Brown, Slightly Sandy, Slightly Silty CLAY			Depth, m	0.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS 1377-2:1990, Washing and Drying, Clauses 9.2 & 9.4			KeyLAB ID	EAT_2022072628



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0212	66
90	100	0.0062	52
75	100	0.0021	38
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	99		
5	99		
3.35	99		
2	98		
1.18	97		
0.6	96	Particle density (measured)	
0.425	94	2.52	Mg/m3
0.3	92		
0.212	89		
0.15	84		
0.063	76		

Method of pre-treatment	Sodium Hexametaphosphate

Sample Proportions	% dry mass
Very coarse	0
Gravel	2
Sand	22
Fines <0.063mm	76

Grading Analysis		
D_{100}	mm	
D_{60}	mm	0.0127
D_{30}	mm	
D_{10}	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

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28/07/2022 09:19	N O'Brien		