



Appendix 9.3 AECOM Ground Investigations Factual Report



SHETLAND SPACE CENTRE

Preliminary Ground Investigation
Report

Shetland Space Centre

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1. Introduction

1.1 Scope and objective of the report

AECOM Infrastructure and Environment UK & Ireland Limited (AECOM) was appointed by Shetland Space Centre (SSC) to undertake a preliminary ground investigation to determine the depth of peat, where present, and the nature of the underlying deposits and depth to bedrock, to assist with the initial understanding of the former RAF Skaw site at Lamba Ness ('site').

The ground conditions encountered at the site are presented herein as factual information within this Ground Investigation Report (GIR). This report has been written in general accordance with the Eurocodes, specifically Eurocode 7 documents BS EN 1997-1: 2004 and BS EN 1997-2: 2007 and their National Annexes. This report summarises the ground conditions and material parameters obtained from laboratory testing and will assist in the design of the infrastructure associated with the proposed Space Centre development.

1.2 Description of Project

Shetland Space Centre propose to develop the site as a launch station for satellites. The site is located at Lamba Ness, near Skaw on the island of Unst, which is part of the archipelago of the Shetland Isles in Scotland.

The development will comprise launch pads and associated infrastructure including Assembly and Administrative buildings.

1.3 Geotechnical category of Project

It is considered that the works associated with the development of the site will be classified within Geotechnical Category 2 in accordance with BS EN 1997-1: 2014 (+A1:2013). This is defined in clause 2.1 of the British Standard as "conventional types of structure and foundation, earthworks and activities, with no exceptional or difficult ground or loading conditions".

2. Description of the Site

2.1 General Description

The area being considered for the Launch Site extends over an area extending to 185 hectares on Lamba Ness which was an active RAF Radar Station (RAF Skaw) during World War 2 (WW2). Large coastal cliffs form the perimeter of the peninsula, some extending to a height of approximately 50m above sea level.

The ground levels across the site fall from west to east, with the ground levels at the access to the site starting at approximately 65m above ordnance datum (m AOD) and falling to approximately 10m AOD at its lowest point before rising again to approximately 30m AOD at the eastern tip

To the west of the site, the land rises steeply to the Ward of Norwick at approximately 186m AOD and then on again to the present RAF Radar Station at Saxa Vord which is at a level of approximately 285m AOD.

The drift and solid geology across the site comprise the following:

- Drift geology – the superficial deposits comprise topsoil/peat overlying a glacial till which is described as a poorly sorted sandy, silty clay with possible laminated sand layers and coarse granular material.
- Solid geology – bedrock comprises a medium-grained intrusive igneous rock (Porphyritic Microgranite – Skaw Intrusion) with several dyke intrusions.

The site location is shown on drawing 60617516-ACM-XX-00-DR-CE-0097 contained within Appendix A.

2.2 Site Designation

The former RAF base on Lamba Ness is a Scheduled Monument (**Scheduled Monument Skaw, radar station Ref - SM13097**) which comprises the remains of a Second World War Chain Home radar station. The station is spread over two sites, a main and a reserve site, with over 50 buildings and structures reflecting its core early warning function and with supporting infrastructure and domestic blocks. The radar complex is the furthest north of its type in the United Kingdom.

As the site is a Scheduled Monument consent was required from Historic Environment Scotland (HES) prior to undertaking any intrusive ground investigation works. During the site works, there was an archaeological watching brief during the excavation for each of the trial pits and all pits and probe locations were restricted so they did not encroach on sensitive areas of potential archaeological interest.

2.3 Unexploded Ordnance

As the site was an active RAF Radar Station during WW2 it was the target for bombing raids from the German Luftwaffe. Records exist of the site being attacked and bombs being dropped and craters have been identified across the site. Prior to the intrusive investigation, a Detailed Desk Study was undertaken by Zetica, a specialist UXO company.

Whilst the site was known to have been bombed the records obtained during the Desk Study indicated that the risk level across the site was low and the intrusive works were able to progress with staff undergoing a "UXO Awareness Briefing" prior to commencing the works.

3. Ground Investigation

3.1 Summary of Site Work

The preliminary ground investigation comprised 42 machine excavated trial pits and 304 peat probes. The site works were conducted during the period between Tuesday 27th October and Wednesday 4th November 2020. A team of AECOM Engineering Geologists were accompanied on site by an Archaeologist from AOC Archaeology who undertook a watching brief on the site works.

The identification of peat across the site has been based on the “Guidance on Developments on Peatland – Site Surveys” produced by the Scottish Government, SEPA, SNH and the James Hutton Institute (2014) which defines organic soils as follows;

- **Peaty** (or organo-mineral soils) : a soil with a surface organic layer less than 0.5m deep;
- **Peat** : a soil with a surface organic layer greater than 0.5m deep which has an organic matter content of more than 60%;
- **Deep Peat** : a peat soil with a surface organic layer greater than 1.0m deep

The locations of individual exploratory holes and probes are shown on drawings 60617516-ACM-XX-00-DR-CE-0093 to 0096 which are contained within Appendix A.

3.2 Trial Pitting

Trial pits were excavated using a tracked excavator provided and operated by a local contractor. The following table provides details of the depths achieved and the position of each pit. Some of the pits were not completed during the site works to prevent disturbance of archaeological features or due to poor ground conditions, as indicated.

Trial pit logs for each of the excavated pits are included in Appendix B. Photographs from each of the pits are included within Appendix C.

Table 1 : Summary of Trial Pits

Trial Pit ID	Depth of Peaty Topsoil / Peat (m bgl)	Final Depth of Pit (m bgl)	National Grid Coordinates		Comments
			Eastings	Northings	
TP01	NA	NA	465703.8	1215510.2	Cancelled due to archaeology
TP02	0.4	0.4	465776.6	1215464.4	
TP03	0.5	0.5	465776.8	1215505.6	
TP04	0.25	0.25	465794.3	1215574.5	
TP05	0.5	0.5	465844.1	1215451.4	
TP06	0.33	0.33	465862.8	1215517.7	
TP07	0.38	0.38	465900.1	1215505.8	
TP08	0.44	0.44	465912.1	1215551.9	
TP09	0.2	0.6	465987.3	1215513.9	
TP10	0.7	0.83	466133.8	1215491.8	
TP11	0.68	0.68	466197.8	1215439.8	
TP12	1.03	1.66	466273.6	1215361.8	
TP13	0.4	2.03	466362.9	1215327.8	
TP14	0.3	1.4	466352.4	1215389.9	
TP15	0.33	2.2	466340.7	1215437.2	
TP16	0.5	1.4	466401.5	1215373.7	

Trial Pit ID	Depth of Peaty Topsoil / Peat (m bgl)	Final Depth of Pit (m bgl)	National Grid Coordinates		Comments
			Eastings	Northings	
TP17	0.6	1.87	466385.6	1215428.9	
TP18	0.4	1.36	466538.1	1215372.7	
TP19	NA	NA	466739.1	1215438.0	Cancelled due to soft/wet ground
TP20	1.63	1.82	466737.9	1215459.4	
TP21	1.16	2.0	466709.6	1215543.3	
TP22	1.2	2.2	466732.1	1215618.2	
TP23	1.1	1.15	466696.1	1215663.1	
TP24	0.6	1.0	466751.6	1215663.9	
TP25	0.8	1.2	466692.3	1215714.8	
TP26	0.8	1.3	466739.3	1215697.2	
TP27	0.6	0.6	466724.7	1215734.3	
TP28	1.38	1.38	466850.1	1215469.6	
TP29	1.4	1.9	466903.2	1215508.9	Terminated due to field drain
TP30	1.7	2.2	466890.1	1215546.5	
TP31	2.1	2.1	466995.3	1215592.6	
TP32	0.9	1.2	467022.2	1215628.5	
TP33	NA	NA	466950.3	1215662.3	Cancelled due to archaeology
TP34	1.8	1.8	466986.1	1215713.1	
TP35	NA	NA	467020.3	1215706.4	Combined
TP36	0.5	0.5	467048.9	1215672.4	
TP37	NA	NA	466950.2	1215517.3	Cancelled due to archaeology
TP38	0.5	1.17	466996.3	1215509.1	
TP39	NA	NA	467018.2	1215487.7	Cancelled due to archaeology
TP40	0.5	1.06	467121.5	1215460.1	
TP41	0.35	1.05	467229.7	1215453.3	
TP42	0.37	1.17	467292.0	1215480.5	Terminated on exposed archaeology
TP43	0.3	0.45	467337.5	1215552.3	
TP44	0.2	0.92	467416.2	1215586.7	
TP45	0.1	0.88	467417.1	1215615.6	
TP46	0.3	0.9	467494.7	1215562.9	
TP47	0.4	1.04	467416.2	1215586.7	
TP48	0.4	1.2	467467.4	1215623.9	

3.3 Peat Probes

Peat probing was undertaken across selected areas of the site on a 25m grid. The probe was pushed through the peat to refusal or where there was a recognisable change in stiffness in the ground or granular material could be felt scraping against the probe.

Details of the location of each probe and the estimated depth of peat encountered is contained within Table 4 contained within Appendix D.

3.4 Laboratory Testing

The geotechnical and chemical laboratory testing was undertaken on samples of peat and underlying soil (substrate) obtained from the trial pits and comprised the following:

- 32 No. Moisture Content;
- 18 No. Particle Size Distribution;
- 18 No. Particle Size Distribution with sedimentation;
- 18 No. Atterberg Limits;
- 14 No. Bulk Density;
- 14 No. pH;
- 14 No. Organic Matter (Loss on Ignition);
- 9 No. Suite A Chemical (pH, Sulphate).

Results from the laboratory testing are summarised below with the full set presented in Appendix E.

Table 2 : Summary of Lab Test results for Peat

Exploratory Hole	Sample Depth (m bgl)	Moisture Content (%)	Bulk Density (Mg/m ³)	Dry Density (Mg/m ³)	pH	Loss on Ignition (%)
TP02	0.4	197	1.06	0.36	4.5	42.7
TP06	0.3	355	1.05	0.23	5.5	49.7
TP20	1.0	667	1.07	0.14	5.0	87.4
TP21	0.5	920	1.07	0.11	5.6	60.3
TP23	0.9	449	1.07	0.19	5.3	33.0
TP24	0.3	138	1.1	0.46	4.8	72.8
TP27	0.3	188	1.2	0.42	4.9	27.3
TP29	1.2	823	1.14	0.12	5.1	91.4
TP30	0.4	748	1.06	0.13	5.0	91.7
TP31	0.4	742	1.05	0.12	5.0	88.3
TP32	0.3	321	1.15	0.25	5.0	75.6
TP34	0.3	769	1.06	0.12	4.8	91.9
TP42	0.2	195	1.03	0.35	5.4	36.4
TP48	0.3	206	1.05	0.34	5.6	35.1

Table 3 : Summary of Lab Test results for Substrate

Exploratory Hole	Sample Depth (m bgl)	Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index	pH	Sulphate (SO ₄)
TP13	2.0	22				-	-
TP14	0.6	30				6.1	0.06
TP15	0.5	54				-	-
	1.1	29				4.4	0.49
TP16	1.05	31					
TP17	1.1	17				3.7	0.96
	1.8	20				-	-
TP21	1.3	39				4.2	1.03
TP22	2.0	28				-	-
TP25	1.0	29				-	-
TP26	1.0	21				5.2	0.1
TP30	2.0	46				-	-
TP32	1.0	38				5.7	0.03
TP38	0.8	26				5.8	0.1
TP42	0.6	40				-	-
TP44	0.5	37				6.3	0.05
TP46	0.8	29				-	-
TP47	0.7					6.0	0.07
TP48	0.7	29				-	-

The results from the Atterberg Limits testing which includes Liquid & Plastic Limit and Plasticity Index values have still to be received. Once these are obtained, soil descriptions for the substrate may need to be revised.

4. Ground Conditions

4.1 General Summary

At the western extent of the site towards the entrance, a peaty topsoil was encountered which extended to depths of between 0.2 and 0.5m bgl and directly overlies bedrock. This extends to include the area for the proposed Assembly and Storage areas.

Towards the middle of site, around the proposed Satellite Tracking Areas and Launch Pads 2 and 3 in the lower areas, the peat increases in depth and is underlain by a (wind blown) sand with a further thin layer of peat beneath it. This peat layer is intermittent and may have been missed in a couple of pits as it may have appeared as a smear from the surface peat on the bucket. Beneath this peat lens is generally a very clayey sand and gravel which in turn overlies bedrock. The peaty topsoil/peat at the proposed Satellite Tracking Area is generally extends to a depth of approximately 0.5m and deepens to the east at the location of Launch Pads 1 and 2 where deep peat is located to a maximum depth of 2.2m, as identified in the trial pits and to an estimated depth of 2.75m in the peat probes.

Further east, towards the end of the peninsula and up onto higher ground, it changes back to a peaty topsoil extending to depths between 0.1 and 0.4m bgl over a substrate comprising a weathered residual soil of the granite bedrock.

4.2 Peaty Topsoil / Peat / Deep Peat

The peaty topsoil encountered in both the western and eastern sections of the site generally comprised a sandy gravelly peaty topsoil with rootlets in the upper surface and cobbles and boulders at its base on weathered bedrock. The acrotelmic peat can be considered to be within the peaty topsoil generally extending to a depth of approximately 0.3m bgl.

The peat and deep peat encountered within the trial pits was generally described as being a very soft to soft dark brown amorphous PEAT and can be considered as being catotelmic. With reference to the Von Post Scale of Humification, peat was assessed to range from H6 to H8 with field moisture contents of B2 to B3. This is indicative of a moderately/highly decomposed to very highly decomposed peat with a low to moderate field moisture content.

The extent of Peat and Deep Peat identified within the central area of the site, around proposed Launch Sites 1 and 2, has been shown on drawing 60617516-ACM-XX-00-DR-CE-0098 which is contained within Appendix A.

4.3 Substrate

In the vicinity of the proposed Assembly Building, the substrate underlying the peat generally comprised a soft very sandy very gravelly CLAY/SILT with cobbles and boulders or a gravelly SAND with cobbles and boulders. Several trial pits encountered both the clay/silt deposits and the sand deposits. Typically, clay would sit beneath the peat with typical thickness of 0.6m from 0.3-1mbgl. Sand was encountered directly beneath the peat or beneath the clay/silt and was of varying thicknesses of 0.3-1.3m and encountered at depths of 0.3-0.9m, the sand contained occasional peat lenses and typically overlay suspected bedrock but in some instances was founded upon another layer of the clay/silt.

The substrate in the area of Launch Pad 1 varies, with some pits recording deposits of soft sandy gravelly CLAY from depths of 1.16-2m bgl and others recording gravelly clayey fine to coarse sand or sands and gravels from 0.6-1.3m bgl. In one instance, these coarser deposits grade with depth to a soft very sandy very gravelly SILT with a small peat lens before terminating on bedrock at 2mbgl.

Substrate in the area of Launch Pad 2 is similar to that encountered at Launch Pad 1 with peat found to be sat on sandy gravelly clay from depths of 0.5-1.6m bgl or sandy silty gravel from depths of 1.7-2.2m bgl.

The underlying material beneath Launch Pad 3 typically comprises of a soft gravelly sandy clay ranging in depth from 0.1-0.47m bgl, which occasionally overlies a small granular layer typically described as sandy clayey GRAVEL or gravelly clayey SAND encountered between depths of 0.3-0.6m bgl. In all trial pits, in this area, the base material before termination on weathered bedrock is believed to be a residual soil of weathered granite typically described as very soft very sandy very gravelly CLAY or SILT and encountered between depths of 0.3-1.2m bgl.

4.4 Bedrock

Each of the trial pits were terminated on bedrock, likely a weathered Microgranite of the Skaw Granite Formation that forms the peninsula. Depth encountered ranges from 0.2-2.2m bgl.

Appendix A - Drawings

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Checked: NS
Approved: DR
Date: 07/12/2020











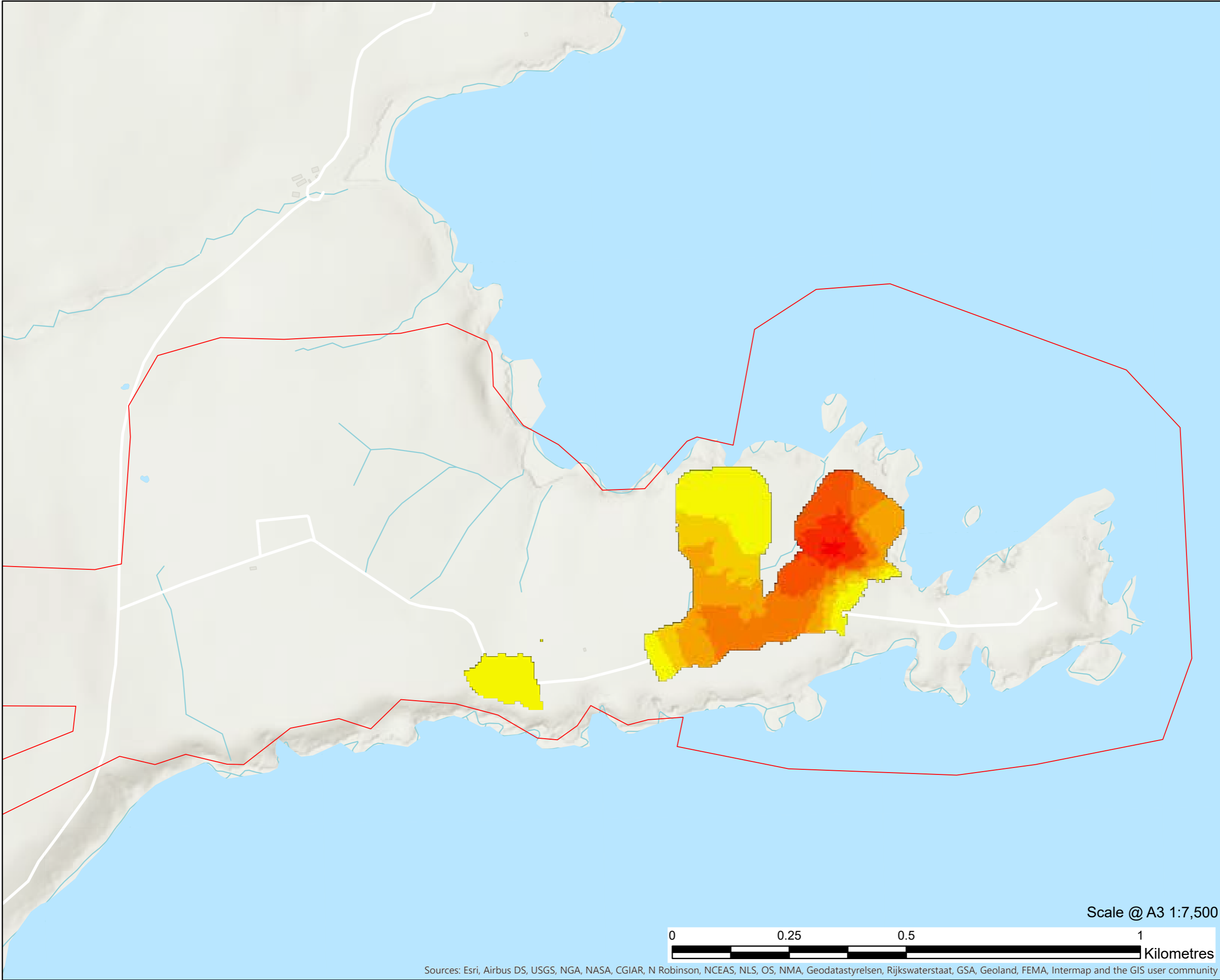
PROJECT
Shetland Space
Centre

CLIENT
Shetland Space
Centre

CONSULTANT
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LEGEND

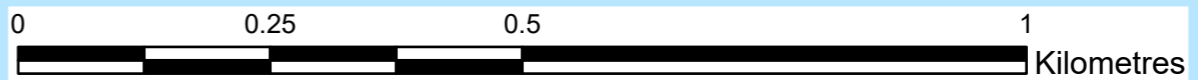
-  Redline Application Boundary
- Peat Depth (m)**
-  0.51 - 0.75 Peat
-  0.76 - 1.00
-  1.01 - 1.25 Deep Peat
-  1.26 - 1.50
-  1.51 - 1.75
-  1.76 - 2.00
-  2.01 - 2.25



NOTES

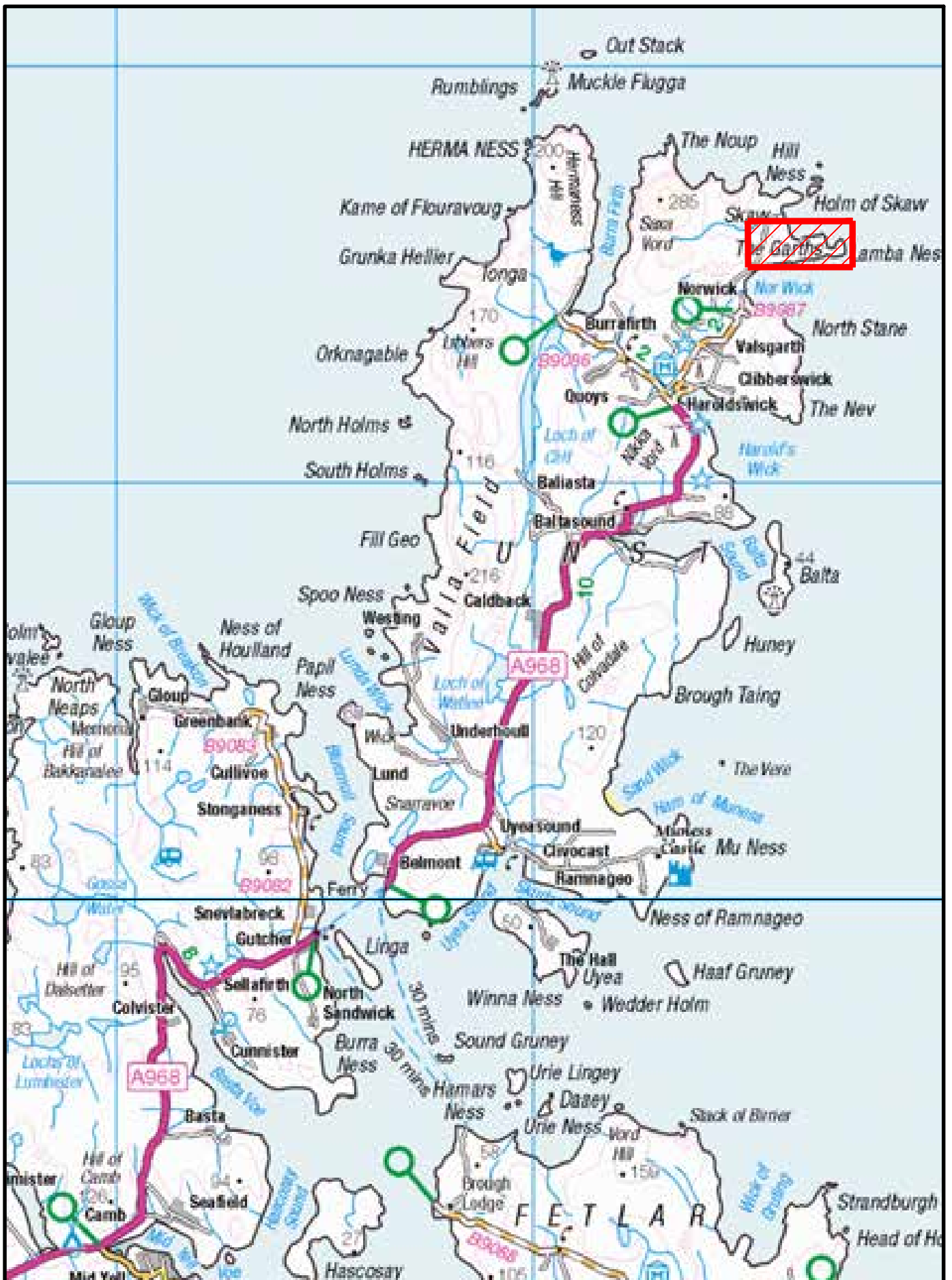
ISSUE PURPOSE
FOR PLANNING
PROJECT NUMBER
60617516
SHEET TITLE
Peat Depth Plan

Scale @ A3 1:7,500



Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community

SHEET NUMBER
60617516-ACM-XX-00-DR-CE-0098

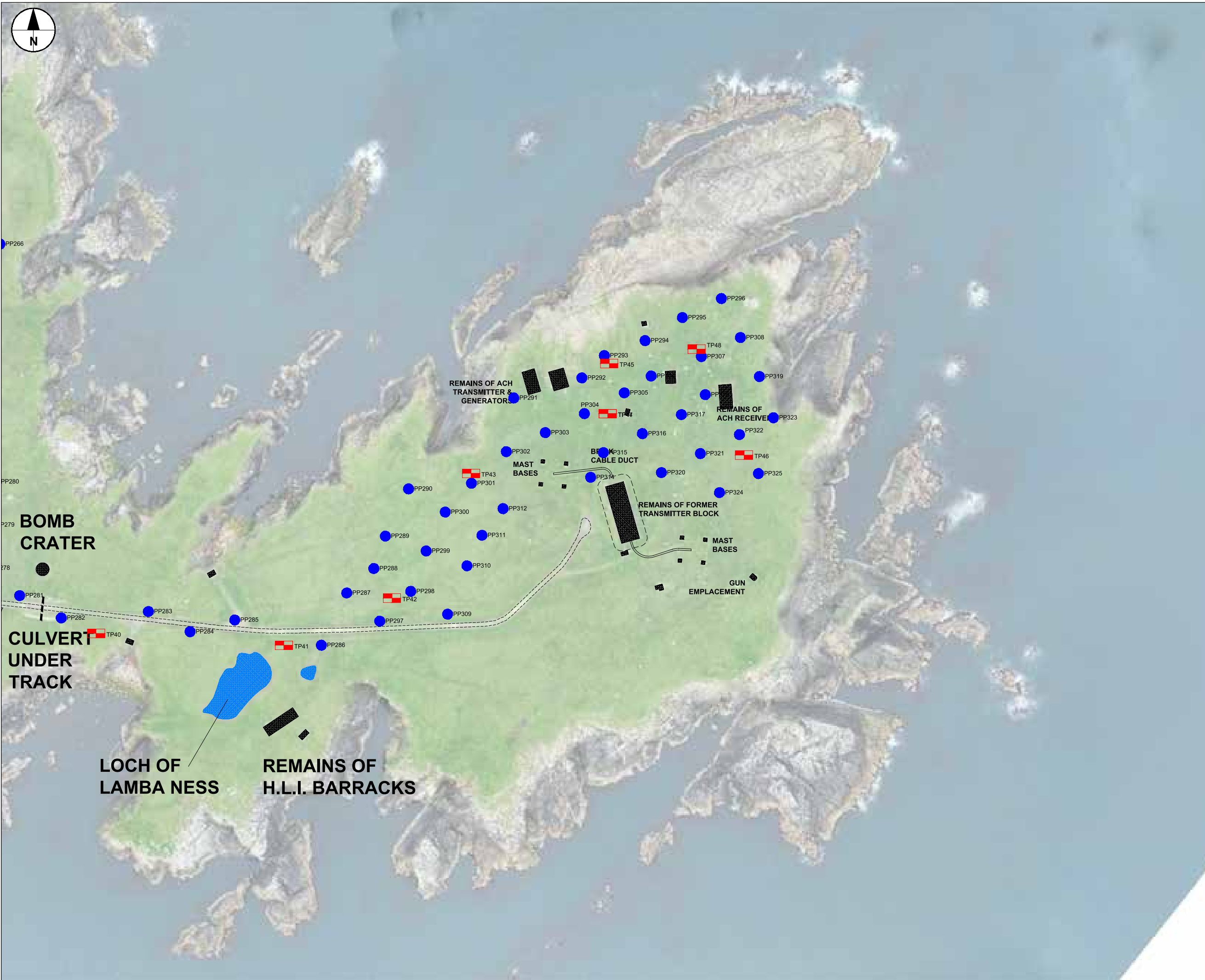


 SITE LOCATION

Issue Status: FOR PLANNING

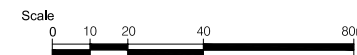
SHETLAND SPACE CENTRE
 SITE LOCATION PLAN
 SKAW, UNST
 DRAWING NUMBER: 60617516-ACM-XX-00-DR-CE-0097





Notes

- LEGEND**
- PEAT PROBE
 - TRIAL PIT
 - 5m BOUNDARY AROUND HISTORIC STRUCTURES



Original Size (A1) 1:1000 @ A1 1:2000 @ A3

ISSUE/REVISION

Rev	Date	Description	Drn/Chk/Appr
B	10/12/20	UPDATED TO ALL OUR LOGS	BS/DR/DR
A	15/10/20	FIRST ISSUE	BS/DR/DR

Key Plan

Purpose Of Issue

FOR PLANNING

Project Number

60617516

Sheet Title

PRELIMINARY GROUND INVESTIGATION FINAL LAYOUT SHEET 4 OF 4

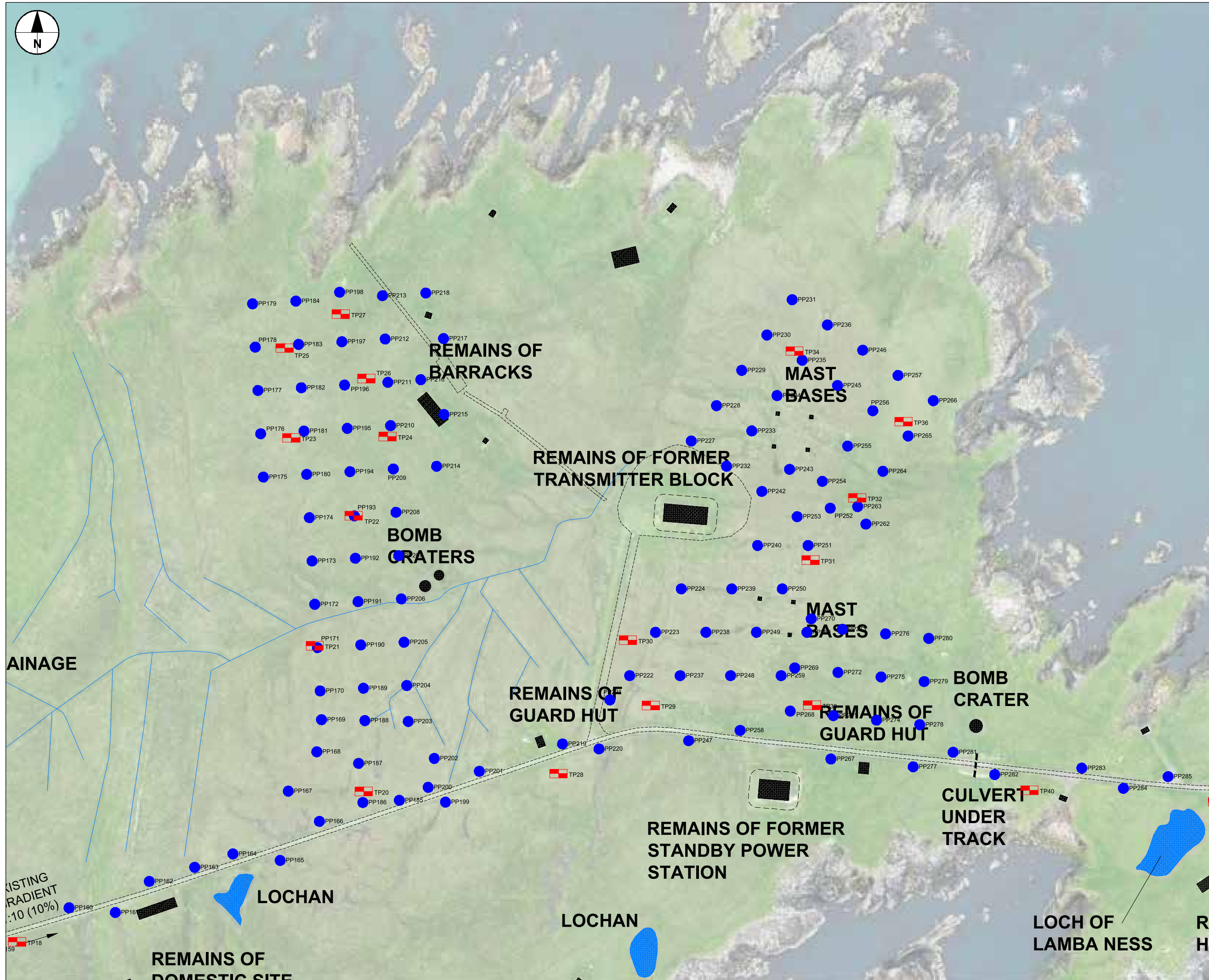
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60617516-ACM-XX-00-DR-CE-0096

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Rev: B

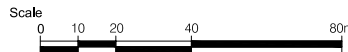
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Notes

LEGEND

- PEAT PROBE
- TRIAL PIT
- 5m BOUNDARY AROUND HISTORIC STRUCTURES



Original Size (A1) 1:1000 @ A1 1:2000 @ A3

ISSUE/REVISION

Rev	Date	Description	Drn/Chk/Appr
B	10/12/20	UPDATED TO ALL OUTGOING WORK	BS/DR/DR
A	15/10/20	FINAL ISSUE	BS/DR/DR

Key Plan

Purpose Of Issue

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Project Number

60617516

Sheet Title

PRELIMINARY GROUND INVESTIGATION FINAL LAYOUT SHEET 3 OF 4

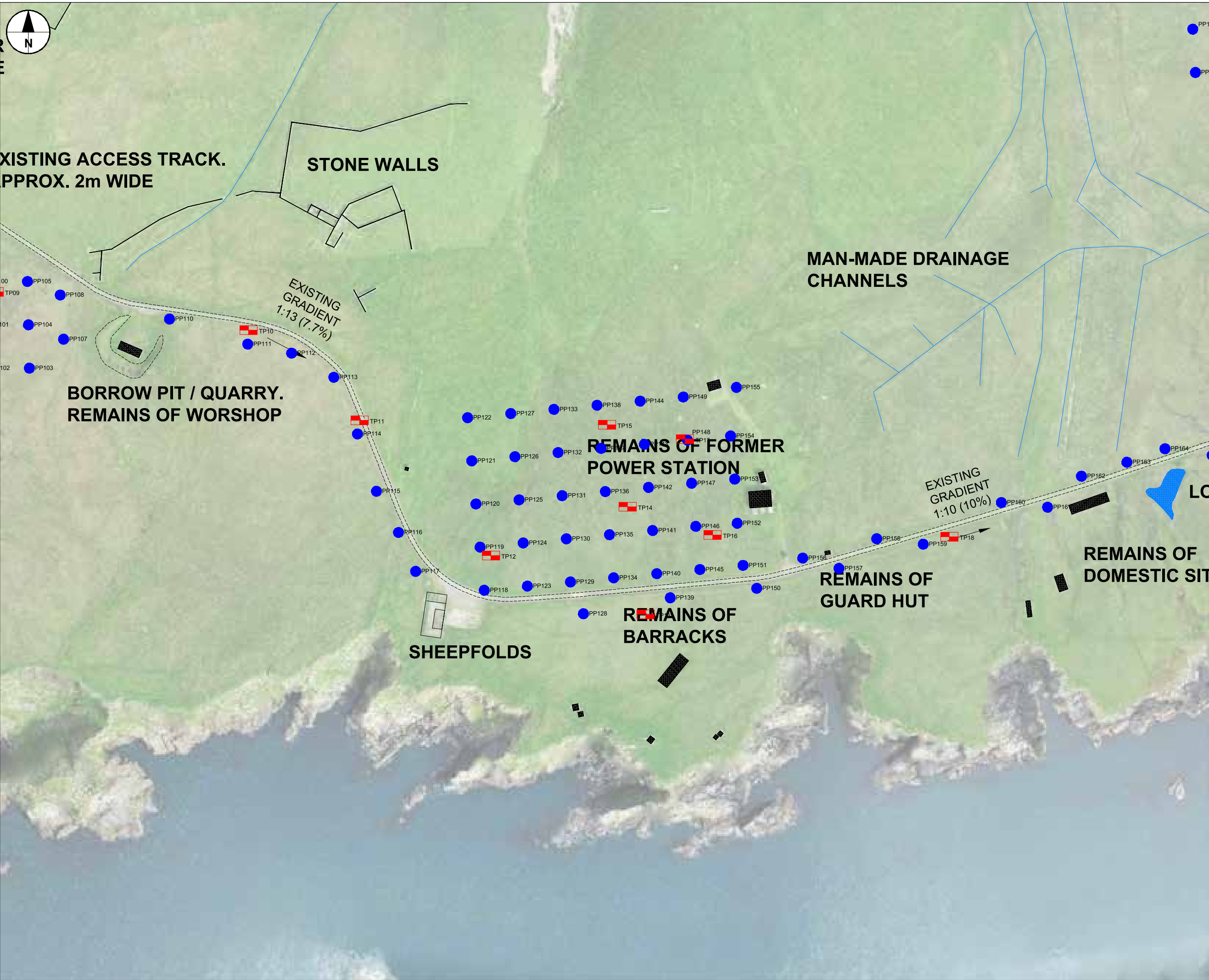
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Rev: B

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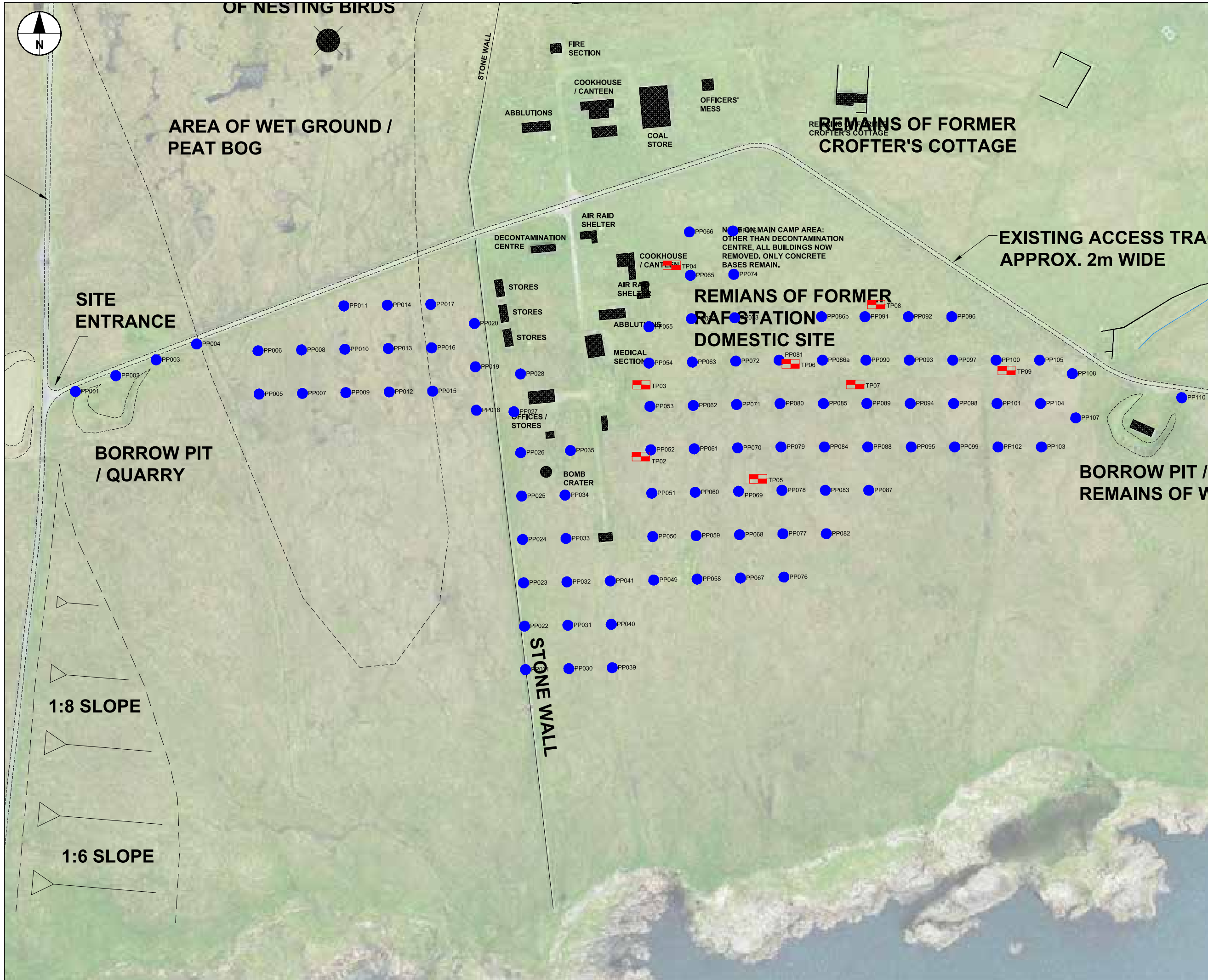


ISSUE/REVISION			
Rev	Date	Description	Drn/Chk/Appr
B	10/12/20	UPDATED TO ALL OUTSTANDING	BS/DR/DR
A	15/10/20	FIRST DRAFT	BS/DR/DR

Key Plan

Purpose Of Issue	FOR PLANNING
Project Number	60617516
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A	15/10/20	FIRST DRAFT	BS/DR/DR

Key Plan

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Appendix B - Trial Pits Logs

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Client: **Shetland Space Centre**

Project: **Shetland Space Centre, Preliminary Ground Investigation, Unst, Shetland.**

Contract No: **60617516**



Record of Trial Pit

TP02

Samples & in situ Tests			Strata					
Depth	Type/No.	Test Results	Water Level	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Visual/Olfactory Observations
0.4	D/D1					(0.40)	Very soft dark brown sandy gravelly peaty TOPSOIL with cobbles and boulders of microgranite, up to 0.15m in size. Von Post H6 B2	
						0.40	Weathered bedrock Trial pit terminated at 0.40m	

GENERAL REMARKS

Logged by: David Evans
 Checked by: David Raeside
 Equipment: Tracked excavator

Termination due to suspected weathered bedrock




Exploratory hole logs should be read in conjunction with corresponding Key Sheets.

Logged by:	Equipment:	Coordinates (OS NGR):	Ground Level:	Date:	
Checked by:	Contractor:	Easting: 465776.60m	Not surveyed	Start: 27/10/2020	
Status:	AECOM	Northing: 1215464.40m		End: 27/10/2020	

Style: AGS4_AECOM_LEN_VP File: \\S:\WUK\ADMIN\GLASGOW\ADMIN\IEL SCOTLAND AND N IRELAND\RUSSELL.OLD11...JOBS\GE GINT\GE GINT.GPJ Printed: 10/12/2020 17:13:56

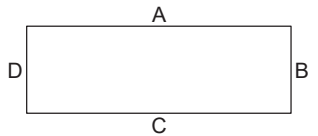
Client: **Shetland Space Centre**
 Project: **Shetland Space Centre, Preliminary Ground Investigation, Unst, Shetland.**
 Contract No: **60617516**


 Record of Trial Pit
TP03


Samples & in situ Tests			Strata					
Depth	Type/No.	Test Results	Water Level	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Visual/Olfactory Observations
						(0.50)	Very soft peaty TOPSOIL with some gravel. Angular cobbles and boulders up to 0.4m in size. Von Post H6 B2	
						0.50	Weathered bedrock Trial pit terminated at 0.50m	

GENERAL REMARKS

Logged by: David Evans
 Checked by: David Raeside
 Equipment: Tracked excavator



Exploratory hole logs should be read in conjunction with corresponding Key Sheets.

Logged by:	Equipment:	Coordinates (OS NGR):	Ground Level:	Date:	
Checked by:	Contractor:	Easting: 465776.80m	Not surveyed	Start: 27/10/2020	 Sheet 1 of 1
Status:	AECOM	Northing: 1215505.60m		End: 27/10/2020	

Style: AGS4_AECOM_LEN_VP File: \\S\WUK\ADMIN\G\ASGOW\ADMIN\IEL SCOTLAND AND N IRELAND\RUSSELL.OLD11..JOB\GSE GINT\GNT.GPJ Printed: 10/12/2020 17:13:57

Client: **Shetland Space Centre**
 Project: **Shetland Space Centre, Preliminary Ground Investigation, Unst, Shetland.**
 Contract No: **60617516**

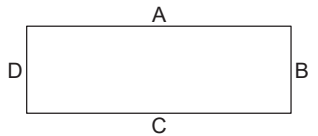


Record of Trial Pit
TP04

Samples & in situ Tests			Strata					
Depth	Type/No.	Test Results	Water Level	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Visual/Olfactory Observations
						0.25	Very soft dark brown peaty TOPSOIL with distinct rootlets and angular cobbles and boulders up to 0.35m. Von Post H6 B2	
							Weathered bedrock Trial pit terminated at 0.25m	

GENERAL REMARKS

Logged by: David Evans
 Checked by: David Raeside
 Equipment: Tracked excavator



Exploratory hole logs should be read in conjunction with corresponding Key Sheets.

Logged by: Checked by: Status:	Equipment: Contractor: AECOM	Coordinates (OS NGR): Easting: 465794.30m Northing: 1215574.50m	Ground Level: Not surveyed	Date: Start: 27/10/2020 End: 27/10/2020	
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Style: AGS4_AECOM_LEV_TP File: \\S:\WUK\ADMIN\GLASGOW\ADMIN\IELS SCOTLAND AND N IRELAND\RUSSELL.OLD\1..._JOBS\GE GINT\GE GINT.GPJ Printed: 10/12/2020 17:13:57


Client: **Shetland Space Centre**

Project: **Shetland Space Centre, Preliminary Ground Investigation, Unst, Shetland.**

Contract No: **60617516**

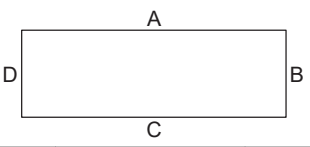


Record of Trial Pit
TP05


Samples & in situ Tests			Strata					
Depth	Type/No.	Test Results	Water Level	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Visual/Olfactory Observations
						(0.50)	Very soft dark brown sandy, gravelly amorphous PEAT with some rootlets, cobbles and boulders of microgranite up to 0.3m. Von Post H7 B2	
						0.50	Weathered bedrock Trial pit terminated at 0.50m	

GENERAL REMARKS

Logged by: David Evans
 Checked by: David Raeside
 Equipment: Tracked excavator




Exploratory hole logs should be read in conjunction with corresponding Key Sheets.

Logged by:	Equipment:	Coordinates (OS NGR):	Ground Level:	Date:	 Sheet 1 of 1
Checked by:	Contractor:	Easting: 465844.10m	Not surveyed	Start: 27/10/2020	
Status:	AECOM	Northing: 1215451.40m		End: 27/10/2020	

Style: AGS4_AECOM_LEN_VP File: \\S:\WUK\ADMIN\GLASGOW\ADMIN\IELD11_JOBS\GE GINT\GE GINT.GPJ Printed: 10/12/2020 17:13:58

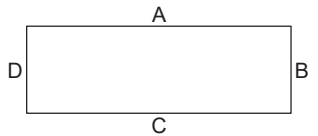
Client: **Shetland Space Centre**
 Project: **Shetland Space Centre, Preliminary Ground Investigation, Unst, Shetland.**
 Contract No: **60617516**


 Record of Trial Pit
TP06


Samples & in situ Tests			Strata					
Depth	Type/No.	Test Results	Water Level	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Visual/Olfactory Observations
0.3	D/D1					(0.33) 0.33	Very soft dark brown clayey peaty TOPSOIL with cobbles and boulders of microgranite up to 0.5m. Von post H7 B2 Weathered bedrock Trial pit terminated at 0.33m	

GENERAL REMARKS

Logged by: David Evans
 Checked by: David Raeside
 Equipment: Tracked excavator



Exploratory hole logs should be read in conjunction with corresponding Key Sheets.

Logged by:	Equipment:	Coordinates (OS NGR):	Ground Level:	Date:	
Checked by:	Contractor:	Easting: 465862.80m	Not surveyed	Start: 27/10/2020	 Sheet 1 of 1
Status:	AECOM	Northing: 1215517.70m		End: 27/10/2020	

Style: AGS4_AECOM_LEV_TP File: \\S:\WUK\ADMIN\GLASGOW\ADMIN\IEL SCOTLAND AND N IRELAND\RUSSELL.OLD\1...JOBS\GE GINT\GE GINT.GPJ Printed: 10/12/2020 17:13:58

Client: **Shetland Space Centre**


Project: **Shetland Space Centre, Preliminary Ground Investigation, Unst, Shetland.**

Contract No: **60617516**

AECOM

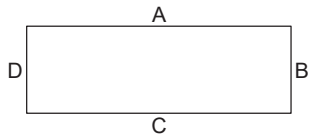
Record of Trial Pit

TP07


Samples & in situ Tests			Strata					
Depth	Type/No.	Test Results	Water Level	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Visual/Olfactory Observations
						(0.38) 0.38	Very soft dark brown peaty TOPSOIL with abundant roots. Some cobbles and boulders of microgranite up to 0.4m. Von Post H7 B2	
							Weathered bedrock Trial pit terminated at 0.38m	

GENERAL REMARKS

Logged by: David Evans
 Checked by: David Raeside
 Equipment: Tracked excavator



Exploratory hole logs should be read in conjunction with corresponding Key Sheets.

Logged by:	Equipment:	Coordinates (OS NGR):	Ground Level:	Date:	
Checked by:	Contractor:	Easting: 465900.10m	Not surveyed	Start: 27/10/2020	
Status:	AECOM	Northing: 1215505.80m		End: 27/10/2020	

Style: AGS4_AECOM_LEN_V_TP File: \\S:\WUK\ADMIN\GLASGOW\ADMIN\IELD\1...JOBS\GE GINT\GE GINT.GPJ Printed: 10/12/2020 17:13:59

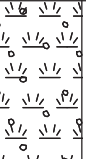
Client: **Shetland Space Centre**

Project: **Shetland Space Centre, Preliminary Ground Investigation, Unst, Shetland.**

Contract No: **60617516**

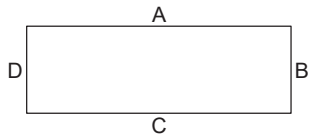


Record of Trial Pit
TP08


Samples & in situ Tests			Strata					
Depth	Type/No.	Test Results	Water Level	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Visual/Olfactory Observations
						(0.44)	Very soft dark brown slightly gravelly amorphous PEAT with cobbles and boulders up to 0.3m. Von post H7 B2	
						0.44	Weathered bedrock Trial pit terminated at 0.44m	

GENERAL REMARKS

Logged by: David Evans
 Checked by: David Raeside
 Equipment: Tracked excavator



Exploratory hole logs should be read in conjunction with corresponding Key Sheets.

Logged by:	Equipment:	Coordinates (OS NGR):	Ground Level:	Date:	
Checked by:	Contractor:	Easting: 465912.10m	Not surveyed	Start: 27/10/2020	
Status:	AECOM	Northing: 1215551.90m		End: 27/10/2020	

Style: AGS4_AECOM_LEN_V_TP File: \\S:\WUK\ADMIN\GLASGOW\ADMIN\IELD\1..._JOBS\GE GINT\GE GINT.GPJ Printed: 10/12/2020 17:13:59

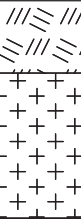
Client: **Shetland Space Centre**

Project: **Shetland Space Centre, Preliminary Ground Investigation, Unst, Shetland.**

Contract No: **60617516**

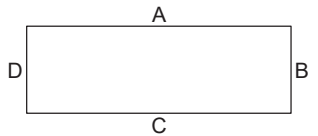


Record of Trial Pit
TP09


Samples & in situ Tests			Strata					
Depth	Type/No.	Test Results	Water Level	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Visual/Olfactory Observations
0.2	D/D1					0.20	Very soft dark brown sandy gravelly peaty TOPSOIL with cobbles and boulders of microgranite up to 0.4m. Von post H7 B2	
						(0.40)	Weathered microgranite with amorphous peat filling cavities	
						0.60	Weathered bedrock	
Trial pit terminated at 0.60m								

GENERAL REMARKS

Logged by: David Evans
 Checked by: David Raeside
 Equipment: Tracked excavator



Exploratory hole logs should be read in conjunction with corresponding Key Sheets.

Logged by:	Equipment:	Coordinates (OS NGR):	Ground Level:	Date:	
Checked by:	Contractor:	Easting: 465987.30m	Not surveyed	Start: 27/10/2020	
Status:	AECOM	Northing: 1215513.90m		End: 27/10/2020	

Style: AGS4_AECOM_LEV_TP File: \\S:\WUK\ADMIN\GLASGOW\ADMIN\IEL SCOTLAND AND N IRELAND\RUSSELL.OLD1 - JOBS\GE GINT\GE GINT.GPJ Printed: 10/12/2020 17:14:00


Client: **Shetland Space Centre**

Project: **Shetland Space Centre, Preliminary Ground Investigation, Unst, Shetland.**

Contract No: **60617516**

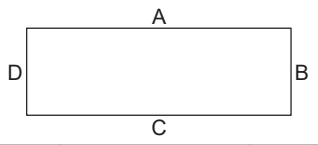


Record of Trial Pit
TP10


Samples & in situ Tests			Strata					
Depth	Type/No.	Test Results	Water Level	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Visual/Olfactory Observations
0.5	D/D1					(0.30)	Very soft dark brown sandy gravelly amorphous PEAT with cobbles and boulders of microgranite up to 0.5m. Minor rootlets. Von post H7 B2	
						0.30	No rootlets	
						(0.40)		
						0.70		
						0.83	Fine to coarse SAND and fine to coarse GRAVEL of microgranite (weathered bedrock)	
							Weathered bedrock	
							Trial pit terminated at 0.83m	

GENERAL REMARKS

Logged by: David Evans
 Checked by: David Raeside
 Equipment: Tracked excavator



Exploratory hole logs should be read in conjunction with corresponding Key Sheets.

Logged by:	Equipment:	Coordinates (OS NGR):	Ground Level:	Date:	
Checked by:	Contractor:	Easting: 466133.80m	Not surveyed	Start: 27/10/2020	
Status:	AECOM	Northing: 1215491.80m		End: 27/10/2020	

Style: AGS4_AECOM_LEN_V_TP File: \\S:\WUK\ADMIN\Glasgow\Admin\NELS SCOTLAND AND N IRELAND\RUSSELL.OLD11 - JOBS\GE GINT\GE GINT.GPJ Printed: 10/12/2020 17:14:01

Client: **Shetland Space Centre**



Project: **Shetland Space Centre, Preliminary Ground Investigation, Unst, Shetland.**

Record of Trial Pit

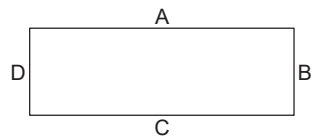
Contract No: **60617516**

TP11

Samples & in situ Tests			Strata					
Depth	Type/No.	Test Results	Water Level	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Visual/Olfactory Observations
						(0.68)	Very soft dark brown sandy gravelly amorphous PEAT with rootlets and cobbles and boulders of microgranite up to 0.5m. Von post H7 B2	
						0.68	Weathered bedrock Trial pit terminated at 0.68m	

GENERAL REMARKS

Logged by: David Evans
 Checked by: David Raeside
 Equipment: Tracked excavator



Exploratory hole logs should be read in conjunction with corresponding Key Sheets.

Logged by:	Equipment:	Coordinates (OS NGR):	Ground Level:	Date:	
Checked by:	Contractor:	Easting: 466197.80m	Not surveyed	Start: 27/10/2020	
Status:	AECOM	Northing: 1215439.80m		End: 27/10/2020	

Style: AGS4_AECOM_LEN_TP File: NSWUK\ADMIN\GLASGOW\ADMIN\IELD\1..JOBS\GE GINT\GE GINT.GPJ Printed: 10/12/2020 17:14:01

Client: **Shetland Space Centre**



Project: **Shetland Space Centre, Preliminary Ground Investigation, Unst, Shetland.**

Record of Trial Pit

Contract No: **60617516**

TP12

Samples & in situ Tests			Strata					
Depth	Type/No.	Test Results	Water Level	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Visual/Olfactory Observations
1	B/B1					(1.03)	Very soft dark brown amorphous PEAT with rootlets throughout and a very strong odour. Von Post H7 B2	
						1.03	Soft grey very sandy very gravelly CLAY with occasional rootlets and cobbles and boulders up to 1.1m	
2						1.66	Suspected boulders/weathered bedrock Trial pit terminated at 1.66m	

GENERAL REMARKS

Logged by: David Evans
 Checked by: David Raeside
 Equipment: Tracked excavator
 Terminated on suspected boulders/weathered bedrock



Exploratory hole logs should be read in conjunction with corresponding Key Sheets.

Logged by:	Equipment:	Coordinates (OS NGR):	Ground Level:	Date:	
Checked by:	Contractor:	Easting: 466273.60m	Not surveyed	Start: 28/10/2020	
Status:	AECOM	Northing: 1215361.80m		End: 28/10/2020	

Style: AGS4_AECOM_LEV_TP File: \\SIVUK\ADMIN\GLASGOW\ADMIN\IEL SCOTLAND AND N IRELAND\RUSSELL.OLD11_JOBS\GE GINT\GE GINT.GPJ Printed: 10/12/2020 17:14:02

Client: **Shetland Space Centre**





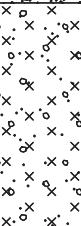
Project: **Shetland Space Centre, Preliminary Ground Investigation, Unst, Shetland.**

Contract No: **60617516**

AECOM

Record of Trial Pit

TP13

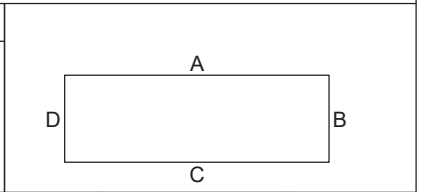
Samples & in situ Tests			Strata					
Depth	Type/No.	Test Results	Water Level	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Visual/Olfactory Observations
1 2	2.0	B/B1				0.40	Very soft dark brown peaty TOPSOIL with abundant rootlets. Von Post H6 B2	
						0.40 1.00	Light grey very slightly gravelly fine to coarse SAND with rare rootlets	
						1.00 1.16	Soft dark grey very sandy very gravelly CLAY. Sand and Gravel are both fine to coarse	
						1.16 1.40	Fine to coarse SAND and GRAVEL within a BOULDER layer, boulders up to 0.3m	
						1.40 2.03	Brown gravelly very sandy SILT with cobbles, gravel is fine to coarse	
							Suspected weathered bedrock Trial pit terminated at 2.03m	


GENERAL REMARKS

Logged by: David Evans
 Checked by: David Raeside
 Equipment: Tracked excavator

Trial pit terminated due to heavy digging, 10 minutes for 3cm

Exploratory hole logs should be read in conjunction with corresponding Key Sheets.



Logged by:	Equipment:	Coordinates (OS NGR):	Ground Level:	Date:	
Checked by:	Contractor:	Easting: 466362.90m	Not surveyed	Start: 28/10/2020	
Status:	AECOM	Northing: 1215327.80m		End: 28/10/2020	

Style: AGS4_AECOM_LEV_TP File: \\S:\WUK\ADMIN\GLASGOW\ADMIN\IEL SCOTLAND AND N IRELAND\RUSSELL.OLD\1 - JOBS\GE GINT\GE GINT.GPJ Printed: 10/12/2020 17:14:03

Client: **Shetland Space Centre**

Project: **Shetland Space Centre, Preliminary Ground Investigation, Unst, Shetland.**

Contract No: **60617516**



Record of Trial Pit

TP14

Samples & in situ Tests			Strata					
Depth	Type/No.	Test Results	Water Level	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Visual/Olfactory Observations
0.6	B/B1					0.30	Very soft dark brown peaty TOPSOIL with abundant rootlets. Von Post H7 B2	
						1.10	Light brown slightly gravelly silty fine to coarse SAND with rare rootlets. Gravel is fine	
						1.40	Suspected weathered bedrock/boulders	
Trial pit terminated at 1.40m								

GENERAL REMARKS

Logged by: David Evans
 Checked by: David Raeside
 Equipment: Tracked excavator



Exploratory hole logs should be read in conjunction with corresponding Key Sheets.

Logged by:	Equipment:	Coordinates (OS NGR):	Ground Level:	Date:	
Checked by:	Contractor:	Easting: 466352.40m	Not surveyed	Start: 28/10/2020	
Status:	AECOM	Northing: 1215389.90m		End: 28/10/2020	

Style: AGS4_AECOM_LEN_VP File: \\S:\WORK\ADMIN\GLASGOW\ADMIN\IEL SCOTLAND AND N IRELAND\RUSSELL.OLD11 - JOBS\GE GINT\GE GINT.GPJ Printed: 10/12/2020 17:14:03

Client: **Shetland Space Centre**

Project: **Shetland Space Centre, Preliminary Ground Investigation, Unst, Shetland.**

Contract No: **60617516**



Record of Trial Pit
TP15

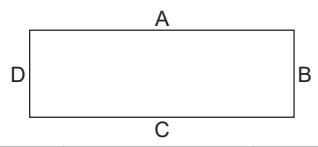
Samples & in situ Tests			Strata					
Depth	Type/No.	Test Results	Water Level	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Visual/Olfactory Observations
0.5	B/B1					0.33	Very soft dark brown peaty TOPSOIL with rootlets. Von Post H7 B2	
						0.90	Slightly gravelly silty SAND. Gravel is fine	
1.1	B/B2					1.30	Light grey slightly gravelly silty SAND with rare rootlets. Gravel is fine. Becoming more gravelly with depth	
2						2.20	Suspected weathered bedrock/boulders	
Trial pit terminated at 2.20m								

GENERAL REMARKS

Logged by: David Evans
 Checked by: David Raeside
 Equipment: Tracked excavator

Trial pit moved 10m as buried service encountered

Exploratory hole logs should be read in conjunction with corresponding Key Sheets.



Logged by:	Equipment:	Coordinates (OS NGR):	Ground Level:	Date:	
Checked by:	Contractor:	Easting: 466340.70m	Not surveyed	Start: 28/10/2020	
Status:	AECOM	Northing: 1215437.20m		End: 28/10/2020	

Style: AGS4_AECOM_LEV_TP File: \\S:\WUK\ADMIN\GLASGOW\ADMIN\IEL SCOTLAND AND N IRELAND\RUSSELL.OLD\1 - JOBS\GE GINT\GE GINT.GPJ Printed: 10/12/2020 17:14:04

Client: **Shetland Space Centre**

Project: **Shetland Space Centre, Preliminary Ground Investigation, Unst, Shetland.**

Contract No: **60617516**



Record of Trial Pit

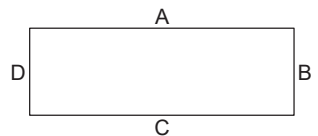
TP16

Samples & in situ Tests			Strata					
Depth	Type/No.	Test Results	Water Level	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Visual/Olfactory Observations
1.1	B/B1					(0.50)	Very soft dark brown peaty TOPSOIL with rootlets. Von post H7 B2	
						0.50		
						(0.29)	Light grey slightly gravelly fine to coarse SAND, gravel is fine	
						0.79		
0.84	PEAT lens							
						(0.56)	Silty Sand and GRAVEL	
						1.40	Terminated due to weathered bedrock/boulders	
Trial pit terminated at 1.40m								

GENERAL REMARKS

Logged by: David Evans
 Checked by: David Raeside
 Equipment: Tracked excavator

Terminated due to weathered bedrock/boulders



Exploratory hole logs should be read in conjunction with corresponding Key Sheets.

Logged by:	Equipment:	Coordinates (OS NGR):	Ground Level:	Date:	
Checked by:	Contractor:	Easting: 466401.50m	Not surveyed	Start: 28/10/2020	
Status:	AECOM	Northing: 1215373.70m		End: 28/10/2020	

Style: AGS4_AECOM_LEN_V_TP File: \\S\WUK\ADMIN\GLASGOW\ADMIN\IEL SCOTLAND AND N IRELAND\RUSSELL.OLD11...JOBS\GE GINT\GE GINT.GPJ Printed: 10/12/2020 17:14:05

Client: **Shetland Space Centre**
 Project: **Shetland Space Centre, Preliminary Ground Investigation, Unst, Shetland.**
 Contract No: **60617516**

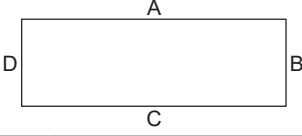


Record of Trial Pit
TP17

Samples & in situ Tests			Strata					
Depth	Type/No.	Test Results	Water Level	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Visual/Olfactory Observations
1.1	B/B1					0.60	Very soft dark brown amorphous PEAT with rootlets. Von Post H7 B2	
						0.76	Dark grey slightly gravelly fine to coarse SAND with occasional rootlets. Gravel is fine to coarse	
						0.86	Peat lens	
						1.20	Gravelly very silty SAND as above. Gravel is fine to medium.	
						1.30	Peat lens	
						1.87	Silty fine to coarse SAND and fine to coarse GRAVEL. Some cobbles and boulders up to 0.2m	
1.8	B/B2					1.87	Suspected weathered bedrock/ boulders	
2							Trial pit terminated at 1.87m	

GENERAL REMARKS

Logged by: David Evans
 Checked by: David Raeside
 Equipment: Tracked excavator



Exploratory hole logs should be read in conjunction with corresponding Key Sheets.

Logged by:	Equipment:	Coordinates (OS NGR):	Ground Level:	Date:	
Checked by:	Contractor:	Easting: 466385.60m	Not surveyed	Start: 28/10/2020	
Status:	AECOM	Northing: 1215428.90m		End: 28/10/2020	

Client: **Shetland Space Centre**
 Project: **Shetland Space Centre, Preliminary Ground Investigation, Unst, Shetland.**
 Contract No: **60617516**

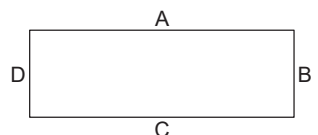


Record of Trial Pit
TP18

Samples & in situ Tests			Strata					
Depth	Type/ No.	Test Results	Water Level	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Visual/Olfactory Observations
						0.40 0.40	Very soft dark brown peaty TOPSOIL with rare rootlets. Von Post H6 B2	
						0.96 1.36	Light grey slightly gravelly fine to coarse SAND with rare rootlets. Gravel is fine	
							Weathered bedrock Trial pit terminated at 1.36m	

GENERAL REMARKS

Logged by: David Evans
 Checked by: David Raeside
 Equipment: Tracked excavator
 Terminated on weathered bedrock



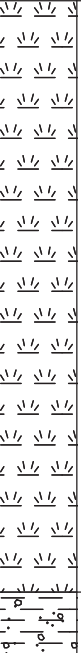

Exploratory hole logs should be read in conjunction with corresponding Key Sheets.

Logged by:	Equipment:	Coordinates (OS NGR):	Ground Level:	Date:	
Checked by:	Contractor:	Easting: 466538.10m	Not surveyed	Start: 28/10/2020	
Status:	AECOM	Northing: 1215372.70m		End: 28/10/2020	

File: \\S:\WUK\ADMIN\GLASGOW\ADMIN\IELS SCOTLAND AND N IRELAND\RUSSELL.OLD11..JOB\GINT\GINT.GPJ Printed: 10/12/2020 17:14:07
 Site: AGS4_AECOM_LEV_TP

Client: **Shetland Space Centre**
 Project: **Shetland Space Centre, Preliminary Ground Investigation, Unst, Shetland.**
 Contract No: **60617516**

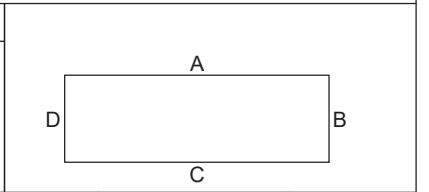

 Record of Trial Pit
TP20


Samples & in situ Tests			Strata					
Depth	Type/No.	Test Results	Water Level	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Visual/Olfactory Observations
1.0	D/D1					(1.63)	Very soft dark brown amorphous PEAT, rootlets common to 0.2m. Von Post H9 B3	Very strong organic odour
						1.63	Soft grey sandy gravelly CLAY. Sand and gravel are both fine to coarse. Some cobbles and boulders present up to 0.5m, boulder @ 1.6m depth measuring 1.2m	
2						1.82	Terminated on suspected bedrock Trial pit terminated at 1.82m	

GENERAL REMARKS

Logged by: David Evans
 Checked by: David Raeside
 Equipment: Tracked excavator
 Terminated due to heavy digging, 5 minutes for 5cm

Exploratory hole logs should be read in conjunction with corresponding Key Sheets.



Logged by:	Equipment:	Coordinates (OS NGR):	Ground Level:	Date:	
Checked by:	Contractor:	Easting: 466737.90m	Not surveyed	Start: 28/10/2020	 Sheet 1 of 1
Status:	AECOM	Northing: 1215459.40m		End: 28/10/2020	

Style: AGS4_AECOM_LEN_V_TP File: \\S\WUK\ADMIN\GLASGOW\ADMIN\IEL SCOTLAND AND N IRELAND\RUSSELL.OLD11...JOBS\GE GINT\GE GINT.GPJ Printed: 10/12/2020 17:14:07

Client: **Shetland Space Centre**



Project: **Shetland Space Centre, Preliminary Ground Investigation, Unst, Shetland.**

Record of Trial Pit

Contract No: **60617516**

TP21

Samples & in situ Tests			Strata					
Depth	Type/No.	Test Results	Water Level	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Visual/Olfactory Observations
0.5	D/D1					(1.16)	Very soft dark brown amorphous PEAT with rootlets to 0.2. Von Post H7 B3	Very strong organic odour
1.3	B/B1					(0.84)	Silty very gravelly fine to coarse SAND. Gravel fine to medium	
2						2.00	Suspected weathered bedrock/boulders Trial pit terminated at 2.00m	

GENERAL REMARKS

Logged by: David Evans
 Checked by: David Raeside
 Equipment: Tracked excavator
 Terminated on suspected weathered bedrock/boulders



Exploratory hole logs should be read in conjunction with corresponding Key Sheets.

Logged by:	Equipment:	Coordinates (OS NGR):	Ground Level:	Date:	
Checked by:	Contractor:	Easting: 466709.60m	Not surveyed	Start: 30/10/2020	
Status:	AECOM	Northing: 1215543.30m		End: 30/10/2020	

Style: AGS4_AECOM_LEN_VP File: NSWUKADMIN\GLASGOW\ADMIN\IEL SCOTLAND AND N IRELAND\RUSSELL_OLD11_JOBS\GE GINT\GE GINT.GPJ Printed: 10/12/2020 17:14:08

Client: **Shetland Space Centre**
 Project: **Shetland Space Centre, Preliminary Ground Investigation, Unst, Shetland.**
 Contract No: **60617516**



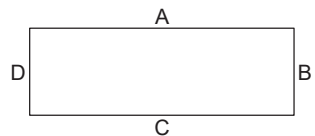
Record of Trial Pit

TP22

Samples & in situ Tests			Strata					
Depth	Type/No.	Test Results	Water Level	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Visual/Olfactory Observations
0.4	D/D1					(1.20)	Very soft dark brown amorphous PEAT with rootlets to 30cm. Von Post H6 B3	
1.20						(0.30)	Dark grey slightly gravelly clayey fine to coarse SAND with cobbles and boulders up to 0.6m. Gravel is fine to coarse	
1.50						1.55	Peat lens	
2.0	B/B1					(0.65)	Dark grey SAND as above, increasing in clay content, to become a very sandy very gravelly CLAY. Silt, sand and gravel is fine to coarse.	
2.20						2.20	Terminated on suspected bedrock	
Trial pit terminated at 2.20m								

GENERAL REMARKS

Logged by: David Evans
 Checked by: David Raeside
 Equipment: Tracked excavator
 Terminated due to very heavy digging and lack of progress





Exploratory hole logs should be read in conjunction with corresponding Key Sheets.

Logged by:	Equipment:	Coordinates (OS NGR):	Ground Level:	Date:	
Checked by:	Contractor:	Easting: 466732.10m	Not surveyed	Start: 30/10/2020	
Status:	AECOM	Northing: 1215618.20m		End: 30/10/2020	

File: \\S:\UK\ADMIN\GLASGOW\ADMIN\IELAND\RUSSELL.OLD\1...JOBS\GE GINT\GE GINT.GPJ Printed: 10/12/2020 17:14:09
 Style: AGS4_AECOM_LEV_TP

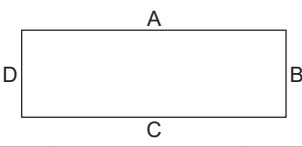
Client: **Shetland Space Centre**
 Project: **Shetland Space Centre, Preliminary Ground Investigation, Unst, Shetland.**
 Contract No: **60617516**


 Record of Trial Pit
TP23


Samples & in situ Tests			Strata					
Depth	Type/No.	Test Results	Water Level	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Visual/Olfactory Observations
0.9	D/D1					(1.10)	Very soft dark brown amorphous PEAT with rootlets to 0.1m. Von Post H7 B2	
1						1.10 1.15	Dark grey slightly clayey fine to coarse SAND and fine to coarse GRAVEL of microgranite Weathered bedrock/boulders Trial pit terminated at 1.15m	
2								

GENERAL REMARKS

Logged by: David Evans
 Checked by: David Raeside
 Equipment: Tracked excavator



Exploratory hole logs should be read in conjunction with corresponding Key Sheets.

Logged by:	Equipment:	Coordinates (OS NGR):	Ground Level:	Date:	
Checked by:		Easting: 466696.10m	Not surveyed	Start: 30/10/2020	 Sheet 1 of 1
Status:	Contractor: AECOM	Northing: 1215663.10m		End: 30/10/2020	

2019 AECOM www.AECOM.com
 File: NSWUKADMIN\GLASGOW-ADMIN\NELS SCOTLAND AND N IRELAND\RUSSELL.OLD11...JOBS\GE GINT\GPJ...
 Printed: 10/12/2020 17:14:10
 Style: AGS4_AECOM_LEN_V_TP

Client: **Shetland Space Centre**



Project: **Shetland Space Centre, Preliminary Ground Investigation, Unst, Shetland.**

Record of Trial Pit

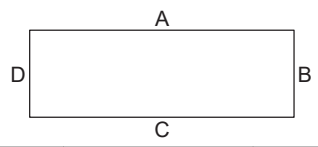
Contract No: **60617516**

TP24

Samples & in situ Tests			Strata					
Depth	Type/No.	Test Results	Water Level	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Visual/Olfactory Observations
0.3	D/D1					(0.60)	Very soft dark brown amorphous PEAT with rootlets to 0.2m. Von Post H7 B2	
						0.60		
1						(0.40)	Light grey gravelly fine to coarse SAND. Gravel is fine	
						1.00		
2							Suspected weathered bedrock/boulders Trial pit terminated at 1.00m	

GENERAL REMARKS

Logged by: David Evans
 Checked by: David Raeside
 Equipment: Tracked excavator



Exploratory hole logs should be read in conjunction with corresponding Key Sheets.

Logged by: Checked by: Status:	Equipment: Contractor: AECOM	Coordinates (OS NGR): Easting: 466751.60m Northing: 1215663.90m	Ground Level: Not surveyed	Date: Start: 30/10/2020 End: 30/10/2020	
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Style: AGS4_AECOM_LEN_V_TP File: \\S\WUK\ADMIN\GLASGOW\ADMIN\IELS SCOTLAND AND N IRELAND\RUSSELL.LOJD1.1_JOBS\GE GINT\GE GINT.GPJ Printed: 10/12/2020 17:14:10

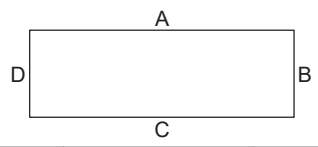
Client: **Shetland Space Centre**
 Project: **Shetland Space Centre, Preliminary Ground Investigation, Unst, Shetland.**
 Contract No: **60617516**

AECOM
 Record of Trial Pit
TP25

Samples & in situ Tests			Strata					
Depth	Type/No.	Test Results	Water Level	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Visual/Olfactory Observations
1.0	B/B1					0.80	Very soft dark brown amorphous PEAT with rootlets up to 0.2m. Von Post H7 B2	
						0.80		
						0.40	Silty fine to coarse SAND and fine to coarse GRAVEL	
1.20						Weathered bedrock/boulders Trial pit terminated at 1.20m		

GENERAL REMARKS

Logged by: David Evans
 Checked by: David Raeside
 Equipment: Tracked excavator



Exploratory hole logs should be read in conjunction with corresponding Key Sheets.

Logged by:	Equipment:	Coordinates (OS NGR):	Ground Level:	Date:	
Checked by:	Contractor:	Easting: 466692.30m	Not surveyed	Start: 30/10/2020	
Status:	AECOM	Northing: 1215714.80m		End: 30/10/2020	

Style: AGS4_AECOM_LEV_TP File: \\S:\WUK\ADMIN\GLASGOW\ADMIN\IEL SCOTLAND AND N IRELAND\RUSSELL.OLD11 - JOBS\GE GINT\GE GINT.GPJ Printed: 10/12/2020 17:14:11

Client: **Shetland Space Centre**

Project: **Shetland Space Centre, Preliminary Ground Investigation, Unst, Shetland.**

Contract No: **60617516**



Record of Trial Pit

TP26

Samples & in situ Tests			Strata					
Depth	Type/No.	Test Results	Water Level	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Visual/Olfactory Observations
0.3	D/D1					0.80	Very soft dark brown amorphous PEAT, rootlets to 0.2m. Von Post H7 B2	
1.1	B/B1					0.50	Dark brown very sandy silty fine to coarse GRAVEL with cobbles and boulders up to 0.3m. Sand is fine to coarse	
						1.30	Terminated on suspected weathered bedrock/boulders Trial pit terminated at 1.30m	

GENERAL REMARKS

Logged by: David Evans
 Checked by: David Raeside
 Equipment: Tracked excavator

Terminated on suspected weathered bedrock/boulders



Exploratory hole logs should be read in conjunction with corresponding Key Sheets.

Logged by:	Equipment:	Coordinates (OS NGR):	Ground Level:	Date:	
Checked by:	Contractor:	Easting: 466739.30m	Not surveyed	Start: 30/10/2020	
Status:	AECOM	Northing: 1215697.20m		End: 30/10/2020	

File: \\S:\WUK\ADMIN\GLASGOW\ADMIN\IELD\11_JOBS\GE GINT\GNT.GPJ Printed: 10/12/2020 17:14:11
 Style: AGS4_AECOM_LEV_TP

Client: **Shetland Space Centre**



Project: **Shetland Space Centre, Preliminary Ground Investigation, Unst, Shetland.**

Record of Trial Pit

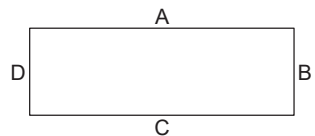
Contract No: **60617516**

TP27

Samples & in situ Tests			Strata					
Depth	Type/No.	Test Results	Water Level	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Visual/Olfactory Observations
0.3	D/D1					(0.60)	Very soft dark brown amorphous PEAT with rootlets. Von post H6 B2	
						0.60	Weathered bedrock Trial pit terminated at 0.60m	

GENERAL REMARKS

Logged by: David Evans
 Checked by: David Raeside`vator`



Exploratory hole logs should be read in conjunction with corresponding Key Sheets.

Logged by:	Equipment:	Coordinates (OS NGR):	Ground Level:	Date:	
Checked by:	Contractor:	Easting: 466724.70m	Not surveyed	Start: 30/10/2020	
Status:	AECOM	Northing: 1215734.30m		End: 30/10/2020	

Style: AGS4_AECOM_LEV_TP File: \\S\WUK\ADMIN\GLASGOW\ADMIN\IELD\1...JOBS\GE GINT\GNT.GPJ Printed: 10/12/2020 17:14:12

Client: **Shetland Space Centre**
 Project: **Shetland Space Centre, Preliminary Ground Investigation, Unst, Shetland.**
 Contract No: **60617516**

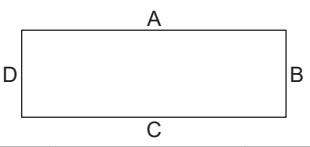


Record of Trial Pit
TP28

Samples & in situ Tests			Strata					
Depth	Type/No.	Test Results	Water Level	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Visual/Olfactory Observations
1						(1.38)	Very soft dark brown amorphous PEAT with rootlets to 0.1m. Von post H6 B3	
2						1.38	Weathered bedrock/boulders Trial pit terminated at 1.38m	

GENERAL REMARKS

Logged by: David Evans
 Checked by: David Raeside
 Equipment: Tracked excavator



Exploratory hole logs should be read in conjunction with corresponding Key Sheets.

Logged by:	Equipment:	Coordinates (OS NGR):	Ground Level:	Date:	
Checked by:	Contractor:	Easting: 466850.10m	Not surveyed	Start: 30/10/2020	
Status:	AECOM	Northing: 1215469.60m		End: 30/10/2020	

Style: AGS4_AECOM_LEV_TP File: \\S\WUK\ADMIN\GLASGOW\ADMIN\IELD\1..JOBS\GE GINT\GE GINT.GPJ Printed: 10/12/2020 17:14:12

Client: **Shetland Space Centre**
 Project: **Shetland Space Centre, Preliminary Ground Investigation, Unst, Shetland.**
 Contract No: **60617516**

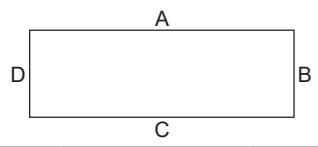


Record of Trial Pit
TP29

Samples & in situ Tests			Strata					
Depth	Type/No.	Test Results	Water Level	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Visual/Olfactory Observations
1.2	D/D1					(1.40)	Very soft dark brown amorphous PEAT with rootlets to 0.3m. Von post H7 B3	
						1.40		
2						(0.50)	Light grey very sandy very gravelly CLAY, both sand and gravel are fine to coarse. Boulders up to 1.6m	
						1.90		
Trial pit terminated at 1.90m								

GENERAL REMARKS

Logged by: David Evans
 Checked by: David Raeside
 Equipment: Tracked excavator



Exploratory hole logs should be read in conjunction with corresponding Key Sheets.

Logged by:	Equipment:	Coordinates (OS NGR):	Ground Level:	Date:	
Checked by:	Contractor:	Easting: 466903.20m	Not surveyed	Start: 30/10/2020	
Status:	AECOM	Northing: 1215508.90m		End: 30/10/2020	

File: \\S:\WUK\ADMIN\GLASGOW\ADMIN\IEL\SCOTLAND AND N IRELAND\RUSSELL.OLD\1 - JOBS\GE GINT\GE GINT.GPJ Printed: 10/12/2020 17:14:13
 Style: AGS4_AECOM_LEN_V_TP

Client: **Shetland Space Centre**
 Project: **Shetland Space Centre, Preliminary Ground Investigation, Unst, Shetland.**
 Contract No: **60617516**

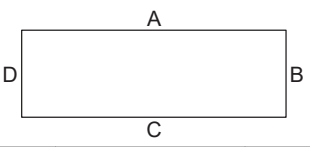


Record of Trial Pit
TP30

Samples & in situ Tests			Strata					
Depth	Type/No.	Test Results	Water Level	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Visual/Olfactory Observations
0.4	D/D1					(1.70)	Very soft dark brown amorphous PEAT with rootlets to 0.2m. Von Post H7 B3	
2.20	B/B1					(0.50)	Very sandy silty fine to coarse GRAVEL. Sand is fine to coarse	
							Suspected weathered bedrock Trial pit terminated at 2.20m	

GENERAL REMARKS

Logged by: David Evans
 Checked by: David Raeside
 Equipment: Tracked excavator
 Terminated due to very heavy digging, possible weathered bedrock



Exploratory hole logs should be read in conjunction with corresponding Key Sheets.

Logged by: Checked by: Status:	Equipment: Contractor: AECOM	Coordinates (OS NGR): Easting: 466890.10m Northing: 1215546.50m	Ground Level: Not surveyed	Date: Start: 02/11/2020 End: 02/11/2020	
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Style: AGS4_AECOM_LEN_V_TP File: \\S:\WUK\ADMIN\GLASGOW\ADMIN\IELS SCOTLAND AND N IRELAND\RUSSELL.OLD\1 - JOBS\GE GINT\GE GINT.GPJ Printed: 10/12/2020 17:14:14


Client: **Shetland Space Centre**

Project: **Shetland Space Centre, Preliminary Ground Investigation, Unst, Shetland.**

Contract No: **60617516**



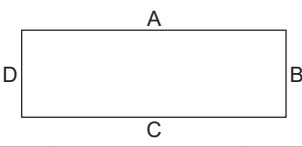
Record of Trial Pit
TP31

Samples & in situ Tests			Strata					
Depth	Type/No.	Test Results	Water Level	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Visual/Olfactory Observations
0.4	D/D1					(2.10)	Very soft dark brown amorphous PEAT with rootlets to 0.15m. Von Post H7 B3	
2						2.10	Weathered bedrock/boulders of microgranite Trial pit terminated at 2.10m	


GENERAL REMARKS

Logged by: David Evans
 Checked by: David Raeside
 Equipment: Tracked excavator

Terminated on weathered bedrock/boulders of microgranite



Exploratory hole logs should be read in conjunction with corresponding Key Sheets.

Logged by:	Equipment:	Coordinates (OS NGR):	Ground Level:	Date:	 Sheet 1 of 1
Checked by:	Contractor:	Easting: 466995.30m	Not surveyed	Start: 02/11/2020	
Status:	AECOM	Northing: 1215592.60m		End: 02/11/2020	

Style: AGS4_AECOM_LEN_TP File: NSWUK\ADMIN\GLASGOW\ADMIN\IEL SCOTLAND AND N IRELAND\RUSSELL.OID\1...JOBS\GE GINT\GPJ Printed: 10/12/2020 17:14:14

Client: **Shetland Space Centre**



Project: **Shetland Space Centre, Preliminary Ground Investigation, Unst, Shetland.**

Record of Trial Pit

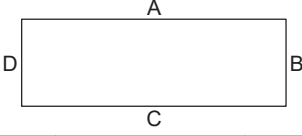
Contract No: **60617516**

TP32

Samples & in situ Tests			Strata					
Depth	Type/No.	Test Results	Water Level	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Visual/Olfactory Observations
0.3	D/D1					(0.90)	Very soft dark brown amorphous PEAT with rootlets to 0.1m. Von Post H7 B2	
1.0	B/B1					(0.30)	Very silty fine to coarse SAND and fine to coarse gravel.	
						1.20	Suspected weathered bedrock Trial pit terminated at 1.20m	

GENERAL REMARKS

Logged by: David Evans
 Checked by: David Raeside
 Equipment: Tracked excavator
 Terminated due to heavy digging, likely bedrock



Exploratory hole logs should be read in conjunction with corresponding Key Sheets.

Logged by:	Equipment:	Coordinates (OS NGR):	Ground Level:	Date:	
Checked by:	Contractor:	Easting: 467022.20m	Not surveyed	Start: 02/11/2020	
Status:	AECOM	Northing: 1215628.50m		End: 02/11/2020	

Style: AGS4_AECOM_LEN_V_TP File: \\S:\WUK\ADMIN\GLASGOW\ADMIN\IELD11_JOBS\GE GINT\GNT.GPJ Printed: 10/12/2020 17:14:15

Client: **Shetland Space Centre**

Project: **Shetland Space Centre, Preliminary Ground Investigation, Unst, Shetland.**

Contract No: **60617516**

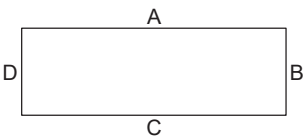


Record of Trial Pit
TP34

Samples & in situ Tests			Strata					
Depth	Type/No.	Test Results	Water Level	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Visual/Olfactory Observations
0.3	D/D1					(1.80)	Very soft dark brown amorphous PEAT with rootlets to 0.1m. Von Post H7 B3	
2						1.80	Weathered bedrock Trial pit terminated at 1.80m	

GENERAL REMARKS

Logged by: David Evans
 Checked by: David Raeside
 Equipment: Tracked excavator
 Terminated on bedrock



Exploratory hole logs should be read in conjunction with corresponding Key Sheets.

Logged by:	Equipment:	Coordinates (OS NGR):	Ground Level:	Date:	
Checked by:	Contractor:	Easting: 466986.10m	Not surveyed	Start: 02/11/2020	
Status:	AECOM	Northing: 1215713.10m		End: 02/11/2020	

Style: AGS4_AECOM_LEN_VP File: \\S:\WUK\ADMIN\GLASGOW\ADMIN\IEL SCOTLAND AND N IRELAND\RUSSELL.LO1.D1 - JOBS\GE GINT\GE GINT.GPJ Printed: 10/12/2020 17:14:15

Client: **Shetland Space Centre**
 Project: **Shetland Space Centre, Preliminary Ground Investigation, Unst, Shetland.**
 Contract No: **60617516**

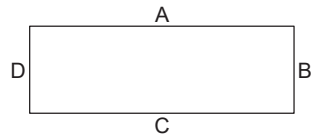


Record of Trial Pit
TP36

Samples & in situ Tests			Strata					
Depth	Type/No.	Test Results	Water Level	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Visual/Olfactory Observations
0.5	D/D1					(0.50) 0.50	Very soft dark brown peaty TOPSOIL. Von Post H7 B2	
							Suspected weathered bedrock Trial pit terminated at 0.50m	

GENERAL REMARKS

Logged by: David Evans
 Checked by: David Raeside
 Equipment: Tracked excavator



Exploratory hole logs should be read in conjunction with corresponding Key Sheets.

Logged by: Checked by: Status:	Equipment: Contractor: AECOM	Coordinates (OS NGR): Easting: 467048.90m Northing: 1215672.40m	Ground Level: Not surveyed	Date: Start: 02/11/2020 End: 02/11/2020	
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Style: AGS4_AECOM_LEN_VP File: \\SIVUK\ADMIN\GLASGOW\ADMIN\IEL SCOTLAND AND N IRELAND\RUSSELL.OLD11_JOBS\GE GINT\GE GINT.GPJ Printed: 10/12/2020 17:14:16

Client: **Shetland Space Centre**



Project: **Shetland Space Centre, Preliminary Ground Investigation, Unst, Shetland.**

Record of Trial Pit

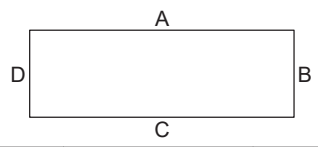
Contract No: **60617516**

TP38

Samples & in situ Tests			Strata					
Depth	Type/No.	Test Results	Water Level	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Visual/Olfactory Observations
0.3	D/D1					(0.50) 0.50	Very soft dark brown peaty TOPSOIL with rootlets to 0.1m. Von Post H7 B2	
0.8	B/B1					(0.67) 1.17	Silty fine to coarse SAND and fine to medium gravel	
							Suspected weathered bedrock Trial pit terminated at 1.17m	

GENERAL REMARKS

Logged by: David Evans
 Checked by: David Raeside
 Equipment: Tracked excavator
 Terminated due to heavy digging, possibly weathered bedrock and boulders



Exploratory hole logs should be read in conjunction with corresponding Key Sheets.

Logged by:	Equipment:	Coordinates (OS NGR):	Ground Level:	Date:	
Checked by:	Contractor:	Easting: 466996.30m	Not surveyed	Start: 30/10/2020	
Status:	AECOM	Northing: 1215509.10m		End: 30/10/2020	

File: \\S:\WUK\ADMIN\GLASGOW\ADMIN\IEL SCOTLAND AND N IRELAND\RUSSELL.OLD\1 - JOBS\GE GINT\GE GINT.GPJ Printed: 10/12/2020 17:14:17
 Style: AGS4_AECOM_LEN_VP

Client: **Shetland Space Centre**
 Project: **Shetland Space Centre, Preliminary Ground Investigation, Unst, Shetland.**
 Contract No: **60617516**

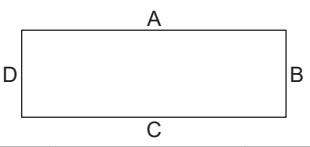


Record of Trial Pit
TP40

Samples & in situ Tests			Strata					
Depth	Type/No.	Test Results	Water Level	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Visual/Olfactory Observations
0.2	D/D1					(0.50)	Peaty TOPSOIL. Von post H7 B3	
0.7	B/B1					(0.56)	Soft to firm grey and orange sandy gravelly CLAY with cobbles and boulders of microgranite up to 0.4m. Sand and Gravel are both fine to coarse. Sand, gravel, cobbles and boulders all of Microgranite. Likely residual soil of granite (kaolinisation)	
1						1.06	Suspected weathered bedrock Trial pit terminated at 1.06m	
2								

GENERAL REMARKS

Logged by: David Evans
 Checked by: David Raeside
 Equipment: Tracked excavator
 Terminated due to heavy digging in boulders. Likely weathered bedrock



Exploratory hole logs should be read in conjunction with corresponding Key Sheets.

Logged by: Checked by: Status:	Equipment: Contractor: AECOM	Coordinates (OS NGR): Easting: 467121.50m Northing: 1215460.10m	Ground Level: Not surveyed	Date: Start: 02/11/2020 End: 02/11/2020	 Sheet 1 of 1
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2019 AECOM www.AECOM.com File: NSWUK\ADMIN\GLASGOW\ADMIN\IEL SCOTLAND AND N IRELAND\RUSSELL.OLD11_JOBS\GE GINT\GE GINT.GPJ Printed: 10/12/2020 17:14:17

Client: **Shetland Space Centre**



Project: **Shetland Space Centre, Preliminary Ground Investigation, Unst, Shetland.**

Record of Trial Pit

Contract No: **60617516**

TP41

Samples & in situ Tests			Strata					
Depth	Type/No.	Test Results	Water Level	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Visual/Olfactory Observations
0.2	D/D1					0.35	Very soft dark brown peaty TOPSOIL with roots to 0.1m. Von Post H6 B3	
0.8	B/B1					1.05	Soft grey and orange, very sandy very gravelly CLAY with boulders up to 0.4m of microgranite. Sand and gravel are both fine to coarse of microgranite	
							Suspected weathered bedrock Trial pit terminated at 1.05m	

GENERAL REMARKS

Logged by: David Evans
 Checked by: David Raeside
 Equipment: Tracked excavator
 Terminated on suspected bedrock/boulders



Exploratory hole logs should be read in conjunction with corresponding Key Sheets.

Logged by:	Equipment:	Coordinates (OS NGR):	Ground Level:	Date:	
Checked by:	Contractor:	Easting: 467229.70m	Not surveyed	Start: 02/11/2020	
Status:	AECOM	Northing: 1215453.30m		End: 02/11/2020	

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 Style: AGS4_AECOM_LEN_VP

Client: **Shetland Space Centre**
 Project: **Shetland Space Centre, Preliminary Ground Investigation, Unst, Shetland.**
 Contract No: **60617516**



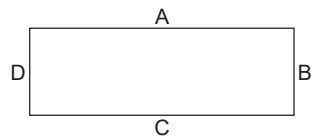
Record of Trial Pit

TP42

Samples & in situ Tests			Strata					
Depth	Type/No.	Test Results	Water Level	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Visual/Olfactory Observations
0.2	D/D1					(0.37)	Very soft dark brown peaty TOPSOIL. Von Post H7 B2	
						0.37		
0.6	B/B1					0.50	Dark grey very gravelly very clayey fine to coarse SAND with boulders of microgranite	
						(0.67)	Soft orange very gravelly very sandy SILT with boulders up to 0.4m of microgranite. Both sand and gravel are fine to coarse and of microgranite	
						1.17	Suspected weathered bedrock	
Trial pit terminated at 1.17m								

GENERAL REMARKS

Logged by: David Evans
 Checked by: David Raeside
 Equipment: Tracked excavator
 Terminated in suspected weathered bedrock



Exploratory hole logs should be read in conjunction with corresponding Key Sheets.

Logged by:	Equipment:	Coordinates (OS NGR):	Ground Level:	Date:	
Checked by:	Contractor:	Easting: 467292.00m	Not surveyed	Start: 02/11/2020	
Status:	AECOM	Northing: 1215480.50m		End: 02/11/2020	

Style: AGS4_AECOM_LEN_VP File: NSWUKADMIN\GLASGOW-ADMIN\IEL SCOTLAND AND N IRELAND\RUSSELL.OLD11_JOBS\GE GINT\GE GINT.GPJ Printed: 10/12/2020 17:14:19

Client: **Shetland Space Centre**
 Project: **Shetland Space Centre, Preliminary Ground Investigation, Unst, Shetland.**
 Contract No: **60617516**



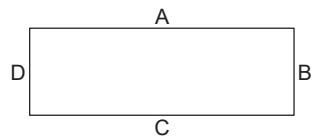
Record of Trial Pit

TP43

Samples & in situ Tests			Strata					
Depth	Type/No.	Test Results	Water Level	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Visual/Olfactory Observations
0.2	D/D1					(0.30)	Peaty TOPSOIL. Von Post H7 B2	
0.4	B/B1					0.30 0.45	Soft orange sandy gravelly CLAY with cobbles and boulders up to 0.3m. Sand and gravel are both fine to coarse. Sand, gravel, cobbles and boulders all of microgranite	
Trial pit terminated at 0.45m								

GENERAL REMARKS

Logged by: David Evans
 Checked by: David Raeside
 Equipment: Tracked excavator
 Trial pit terminated due to unearthing archeology at 0.4m



Exploratory hole logs should be read in conjunction with corresponding Key Sheets.

Logged by:	Equipment:	Coordinates (OS NGR):	Ground Level:	Date:	
Checked by:	Contractor:	Easting: 467337.50m	Not surveyed	Start: 02/11/2020	
Status:	AECOM	Northing: 1215552.30m		End: 02/11/2020	

Style: AGS4_AECOM_LEN_V_TP File: \\S\WUK\ADMIN\GLASGOW\ADMIN\NELS SCOTLAND AND N IRELAND\RUSSELL.OLD11 - JOBS\GE GINT\GE GINT.GPJ Printed: 10/12/2020 17:14:19

Client: **Shetland Space Centre**

Project: **Shetland Space Centre, Preliminary Ground Investigation, Unst, Shetland.**

Contract No: **60617516**



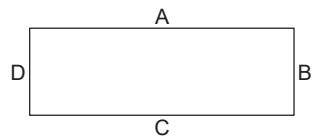
Record of Trial Pit

TP44

Samples & in situ Tests			Strata					
Depth	Type/No.	Test Results	Water Level	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Visual/Olfactory Observations
0.5	B/B1					0.20	Peaty TOPSOIL. Von post H7 B3	
						0.40	Soft grey gravelly sandy CLAY. Both sand and gravel are fine to coarse	
						0.48	Grey very sandy clayey fine to coarse GRAVEL with boulders up to 0.4m. Sand is fine to coarse	
						(0.44)	Very sandy very gravelly SILT. Sand and gravel both fine to coarse.	
						0.92	Suspected weathered bedrock	
-1							Trial pit terminated at 0.92m	
-2								

GENERAL REMARKS

Logged by: David Evans
 Checked by: David Raeside
 Equipment: Tracked excavator
 Terminated on suspected bedrock



Exploratory hole logs should be read in conjunction with corresponding Key Sheets.

Logged by:	Equipment:	Coordinates (OS NGR):	Ground Level:	Date:	
Checked by:	Contractor:	Easting: 467416.20m	Not surveyed	Start: 02/11/2020	
Status:	AECOM	Northing: 1215586.70m		End: 02/11/2020	

Style: AGS4_AECOM_LEN_VP File: \\S\WUK\ADMIN\GLASGOW\ADMIN\IELD\11_JOBS\GE GINT\GE GINT.GPJ Printed: 10/12/2020 17:14:20

Client: **Shetland Space Centre**
 Project: **Shetland Space Centre, Preliminary Ground Investigation, Unst, Shetland.**
 Contract No: **60617516**

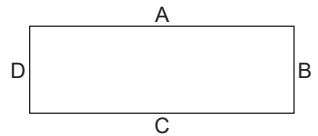


Record of Trial Pit
TP45

Samples & in situ Tests			Strata					
Depth	Type/No.	Test Results	Water Level	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Visual/Olfactory Observations
0.3	B/B1					0.10	Peaty TOPSOIL. Von post H7 B2	
						(0.37)	Soft brown sandy gravelly CLAY with cobbles and boulders up to 0.1. Sand and gravel are both fine to coarse	
						0.47		
						0.56	Grey sandy slightly clayey GRAVEL with boulders up to 0.2m	
						(0.32)	Soft orange sandy gravelly CLAY with cobbles and boulders up to 0.4m of microgranite. Sand and gravel are both fine to coarse and of microgranite.	
1						0.88	Suspected weathered bedrock	
Trial pit terminated at 0.88m								

GENERAL REMARKS

Logged by: David Evans
 Checked by: David Raeside
 Equipment: Tracked excavator
 Terminated due to heavy digging, suspected weathered bedrock



Exploratory hole logs should be read in conjunction with corresponding Key Sheets.

Logged by: Checked by: Status:	Equipment: Contractor: AECOM	Coordinates (OS NGR): Easting: 467417.10m Northing: 1215615.60m	Ground Level: Not surveyed	Date: Start: 02/11/2020 End: 02/11/2020	
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 Style: AGS4_AECOM_LEN_VP

Client: **Shetland Space Centre**



Project: **Shetland Space Centre, Preliminary Ground Investigation, Unst, Shetland.**

Record of Trial Pit

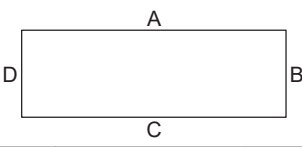
Contract No: **60617516**

TP46

Samples & in situ Tests			Strata					
Depth	Type/No.	Test Results	Water Level	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Visual/Olfactory Observations
0.2	D/D1					(0.30)	Peaty TOPSOIL. Von Post H7 B3	
						0.30 - 0.40	Dark grey very gravelly clayey fine to coarse SAND with boulders up to 0.2m. Gravel is fine to coarse	
0.8	B/B1					(0.50)	Very soft orange very sandy very gravelly SILT with cobbles and boulders up to 0.4m. Sand and gravel are both fine to coarse. Sand, gravel, cobbles and boulders are all of microgranite	
1						0.90	Suspected weathered bedrock	
Trial pit terminated at 0.90m								

GENERAL REMARKS

Logged by: David Evans
 Checked by: David Raeside
 Equipment: Tracked excavator
 Terminated on suspected weathered bedrock



Exploratory hole logs should be read in conjunction with corresponding Key Sheets.

Logged by:	Equipment:	Coordinates (OS NGR):	Ground Level:	Date:	 Sheet 1 of 1
Checked by:	Contractor:	Easting: 467494.70m	Not surveyed	Start: 02/11/2020	
Status:	AECOM	Northing: 1215562.90m		End: 02/11/2020	

File: \\S:\WUK\ADMIN\GLASGOW\ADMIN\NEL SCOTLAND AND N IRELAND\RUSSELL.OLD11 - JOBS\GE GINT\GE GINT.GPJ Printed: 10/12/2020 17:14:21
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Client: **Shetland Space Centre**

Project: **Shetland Space Centre, Preliminary Ground Investigation, Unst, Shetland.**

Contract No: **60617516**



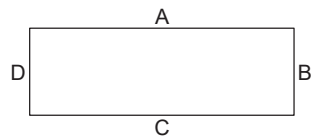
Record of Trial Pit

TP47

Samples & in situ Tests			Strata					
Depth	Type/No.	Test Results	Water Level	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Visual/Olfactory Observations
0.2	D/D1					0.40	Very soft dark brown peaty TOPSOIL. Von Post H7 B3	
						0.40		
						0.50	Dark grey sandy clayey fine to coarse GRAVEL. Sand is fine to coarse	
0.7	B/B1					0.54	Soft orange sandy gravelly CLAY with boulders up to 0.3m. Sand and gravel both fine to coarse. Sand, gravel and boulders all of microgranite	
						1.04		
							Suspected weathered bedrock	
							Trial pit terminated at 1.04m	

GENERAL REMARKS

Logged by: David Evans
 Checked by: David Raeside
 Equipment: Tracked excavator
 Terminated on suspected bedrock



Exploratory hole logs should be read in conjunction with corresponding Key Sheets.

Logged by:	Equipment:	Coordinates (OS NGR):	Ground Level:	Date:	
Checked by:	Contractor:	Easting: 467416.20m	Not surveyed	Start: 02/11/2020	
Status:	AECOM	Northing: 1215586.70m		End: 02/11/2020	

Style: AGS4_AECOM_LEV_TP File: \\S\WUK\ADMIN\GLASGOW\ADMIN\IEL SCOTLAND AND N IRELAND\RUSSELL.OLD11 - JOBS\GE GINT\GE GINT.GPJ Printed: 10/12/2020 17:14:22

Client: **Shetland Space Centre**

Project: **Shetland Space Centre, Preliminary Ground Investigation, Unst, Shetland.**

Contract No: **60617516**



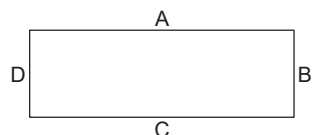
Record of Trial Pit

TP48

Samples & in situ Tests			Strata					
Depth	Type/No.	Test Results	Water Level	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Visual/Olfactory Observations
0.3	D/D1					0.40	Very soft dark brown peaty TOPSOIL. Von post H7 B2	
0.7	B/B1					0.60	Grey sandy clayey fine to coarse GRAVEL. Sand is fine to coarse	
1						0.60	Very gravelly very silty fine to coarse SAND. Gravel is fine to coarse	
1.20						1.20	Terminated due to heavy digging on suspected bedrock Trial pit terminated at 1.20m	

GENERAL REMARKS

Logged by: David Evans
 Checked by: David Raeside
 Equipment: Tracked excavator
 Terminated due to heavy digging on suspected bedrock



Exploratory hole logs should be read in conjunction with corresponding Key Sheets.

Logged by:	Equipment:	Coordinates (OS NGR):	Ground Level:	Date:	
Checked by:	Contractor:	Easting: 467467.40m	Not surveyed	Start: 02/11/2020	
Status:	AECOM	Northing: 1215623.90m		End: 02/11/2020	

Appendix C - Trial Pit Photographs

Trial Pit 2



Trial Pit 3



Trial Pit 4



Trial Pit 5



Trial Pit 6



Trial Pit 7



Trial Pit 8



Trial Pit 9



Trial Pit 10



Trial Pit 11



Trial Pit 12



Trial Pit 13



Trial Pit 14



Trial Pit 15



Trial Pit 16



Trial Pit 17



Trial Pit 18



Trial Pit 20



Trial Pit 21



Trial Pit 22



Trial Pit 23



Trial Pit 24



Trial Pit 25



Trial Pit 26



Trial Pit 27



Trial Pit 28



Trial Pit 29



Trial Pit 30



Trial Pit 31



Trial Pit 32



Trial Pit 34



Trial Pit 36



Trial Pit 38



Trial Pit 40



Trial Pit 41



Trial Pit 42



Trial Pit 43



Trial Pit 44



Trial Pit 45



Trial Pit 46



Trial Pit 47



Trial Pit 48



Appendix D - Peat Probe Results

Peat Probing Measurements [27/10/2020 - 03/11/2020]

<u>Sheet Number</u>	<u>Peat Probe Location</u>	<u>Easting</u>	<u>Northing</u>	<u>Peat Thickness [m]</u>	<u>Notes</u>
1	1	465450.79	1215501.81	0.25	
1	2	465474.07	1215510.92	0.15	
1	3	465497.35	1215520.04	0.25	
1	4	465520.63	1215529.15	0.45	
1	5	465556.62	1215500.30	0.55	
1	6	465556.06	1215525.29	0.65	
1	7	465581.61	1215500.73	0.65	
1	8	465581.06	1215525.72	0.45	
1	9	465606.61	1215501.15	0.5	
1	10	465606.06	1215526.14	0.45	
1	11	465605.50	1215551.14	0.4	
1	12	465631.60	1215501.57	0.4	
1	13	465631.05	1215526.57	0.25	
1	14	465630.50	1215551.56	0.35	
1	15	465656.60	1215502.00	0.4	
1	16	465656.05	1215526.99	0.35	
1	17	465655.50	1215551.99	0.5	
1	18	465681.79	1215491.00	0.4	
1	19	465681.24	1215516.00	0.35	
1	20	465680.69	1215540.99	0.325	
1	21	465710.09	1215341.59	0.4	
1	22	465709.54	1215366.58	0.5	
1	23	465708.99	1215391.58	0.6	
1	24	465708.44	1215416.57	0.5	
1	25	465707.89	1215441.57	0.5	
1	26	465707.34	1215466.56	0.5	
1	27	465703.46	1215490.14	0.5	
1	28	465707.23	1215511.94	0.5	
1	29			-	Cancelled
1	30	465735.08	1215342.14	0.4	
1	31	465734.53	1215367.13	0.3	
1	32	465733.98	1215392.13	0.35	
1	33	465733.43	1215417.12	0.3	
1	34	465732.88	1215442.11	0.45	
1	35	465736.01	1215467.83	0.3	
1	36			-	Cancelled
1	37			-	Cancelled
1	38			-	Cancelled
1	39	465760.08	1215342.69	0.25	
1	40	465759.53	1215367.68	0.25	
1	41	465758.98	1215392.68	0.3	
1	42			-	Cancelled
1	43			-	Cancelled
1	44			-	Cancelled
1	45			-	Cancelled
1	46			-	Cancelled
1	47			-	Cancelled
1	48			-	Cancelled
1	49	465783.97	1215393.23	0.65	
1	50	465783.42	1215418.22	0.45	
1	51	465782.87	1215443.22	0.25	
1	52	465782.32	1215468.21	0.5	
1	53	465781.77	1215493.20	0.3	5m south of fence
1	54	465781.21	1215518.20	0.15	
1	55	465781.20	1215539.10	0.25	
1	56			-	Cancelled
1	57			-	Cancelled

1	58	465808.96	1215393.78	0.4	
1	59	465808.41	1215418.77	0.35	
1	60	465807.86	1215443.77	0.55	
1	61	465807.31	1215468.76	0.3	
1	62	465806.76	1215493.75	0.25	9m south of fence
1	63	465806.21	1215518.75	0.15	
1	64	465805.66	1215543.74	0.45	
1	65	465805.10	1215568.74	0.15	
1	66	465804.55	1215593.73	0.3	
1	67	465833.96	1215394.33	0.3	crater between 67 and 68
1	68	465833.41	1215419.32	0.3	
1	69	465832.86	1215444.32	0.5	
1	70	465832.31	1215469.31	0.25	
1	71	465831.75	1215494.31	0.35	
1	72	465831.20	1215519.30	0.4	
1	73	465830.65	1215544.29	0.45	
1	74	465830.10	1215569.29	0.4	
1	75	465829.55	1215594.28	0.15	
1	76	465858.95	1215394.88	0.25	
1	77	465858.40	1215419.87	0.35	
1	78	465857.85	1215444.87	0.35	
1	79	465857.30	1215469.86	0.4	
1	80	465856.75	1215494.86	0.4	
1	81	465856.20	1215519.85	0.4	
1	82	465883.41	1215419.88	0.2	
1	83	465882.85	1215444.88	0.2	
1	84	465882.30	1215469.88	0.3	
1	85	465881.75	1215494.88	0.35	
1	86A	465881.20	1215519.88	0.2	
1	86B	465880.65	1215544.88	0.4	
1	87	465907.86	1215444.88	0.3	
1	88	465907.31	1215469.88	0.25	
1	89	465906.76	1215494.88	0.3	
1	90	465906.21	1215519.88	0.2	
1	91	465905.66	1215544.88	0.2	
1	92	465930.66	1215544.88	0.4	
1	93	465931.21	1215519.88	0.35	
1	94	465931.76	1215494.88	0.25	
1	95	465932.32	1215469.88	0.45	
1	96	465955.67	1215544.88	0.2	
1	97	465956.22	1215519.88	0.15	
1	98	465956.77	1215494.88	0.2	
1	99	465957.32	1215469.88	0.3	
1	100	465981.23	1215519.88	0.15	TP09 in between 100 and 101
1	101	465981.78	1215494.88	0.2	
1	102	465982.33	1215469.88	0.3	
1	103	466007.33	1215469.88	0.2	
1	104	466006.78	1215494.88	0.1	
1	105	466006.23	1215519.88	0.25	
1	106			-	Cancelled
1	107	466027.05	1215486.58	0.25	
1	108	466025.12	1215512.10	0.2	
2	109			-	Cancelled (in quarry)
2	110	466088.14	1215498.23	0.2	
2	111	466133.29	1215483.74	0.25	South of TP10
2	112	466158.61	1215478.55	0.25	
2	113	466182.95	1215464.61	0.15	
2	114	466196.60	1215431.93	0.35	South of TP11
2	115	466207.55	1215398.87	0.35	
2	116	466220.27	1215375.11	0.55	
2	117	466230.17	1215352.64	0.5	
2	118	466269.73	1215341.76	0.7	

2	119	466267.34	1215366.64	0.75	
2	120	466264.94	1215391.53	0.35	
2	121	466262.55	1215416.41	0.2	
2	122	466260.15	1215441.30	0.2	
2	123	466294.61	1215344.15	0.65	
2	124	466292.22	1215369.04	0.65	
2	125	466289.83	1215393.92	0.55	
2	126	466287.43	1215418.81	0.25	
2	127	466285.04	1215443.69	0.2	
2	128	466326.95	1215328.21	0.5	
2	129	466319.50	1215346.54	0.45	
2	130	466317.11	1215371.43	0.5	
2	131	466314.71	1215396.31	0.4	
2	132	466312.32	1215421.20	0.4	
2	133	466309.92	1215446.08	0.5	Final telegraph pole 5m east
2	134	466344.38	1215348.93	0.4	
2	135	466341.99	1215373.82	0.45	
2	136	466339.60	1215398.70	0.45	
2	137	466337.20	1215423.59	0.6	
2	138	466334.81	1215448.47	0.4	
2	139	466377.05	1215337.39	0.6	
2	140	466369.27	1215351.33	0.45	
2	141	466366.88	1215376.21	0.4	
2	142	466364.48	1215401.10	0.45	
2	143	466362.09	1215425.98	0.4	Concrete base 10m south
2	144	466359.69	1215450.87	0.45	
2	145	466394.15	1215353.72	0.45	
2	146	466391.76	1215378.60	0.45	
2	147	466389.37	1215403.49	0.45	
2	148	466386.97	1215428.37	0.45	
2	149	466384.58	1215453.26	0.5	
2	150	466426.95	1215342.89	0.45	
2	151	466419.04	1215356.11	0.65	
2	152	466415.66	1215380.43	0.4	
2	153	466414.25	1215405.88	0.45	
2	154	466411.86	1215430.77	0.55	
2	155	466415.22	1215458.78	0.45	7m east of track
2	156	466453.46	1215360.30	0.4	
2	157	466474.38	1215354.35	0.4	
2	158	466496.16	1215371.47	0.3	
2	159	466523.00	1215368.33	0.4	
2	160	466568.05	1215392.35	0.3	
2	161	466594.71	1215389.64	0.45	
2	162	466614.28	1215407.56	0.4	North side of road
3	163	466640.46	1215415.64	0.3	North side of road
3	164	466662.46	1215423.39	0.8	Strong, organic odour
3	165	466689.71	1215419.63	1.3	Strong, organic odour
3	166	466712.33	1215442.12	1.5	
3	167	466694.39	1215459.54	1.65	
3	168	466710.81	1215482.21	1.6	
3	169	466713.52	1215500.71	1.3	
3	170	466712.75	1215517.27	1.1	
3	171	466711.19	1215542.23	0.9	
3	172	466709.64	1215567.18	1.1	
3	173	466708.09	1215592.13	1.25	
3	174	466706.53	1215617.08	0.95	
3	175	466680.03	1215640.48	1	
3	176	466678.47	1215665.43	1	
3	177	466676.92	1215690.38	0.65	
3	178	466675.36	1215715.33	0.4	
3	179	466673.80	1215740.28	0.6	
3	180	466704.98	1215642.03	1.15	

3	181	466703.43	1215666.98	0.95	
3	182	466701.87	1215691.94	0.65	
3	183	466700.31	1215716.89	0.5	
3	184	466698.75	1215741.84	0.3	
3	185	466758.36	1215454.25	1.25	
3	186	466737.34	1215453.01	1.7	27m between 186 and 187
3	187	466734.90	1215475.53	1.1	
3	188	466738.51	1215500.20	1	
3	189	466737.70	1215518.83	1	
3	190	466736.14	1215543.78	0.9	
3	191	466734.59	1215568.73	0.85	
3	192	466733.04	1215593.68	1	
3	193	466732.43	1215618.07	1	
3	194	466729.93	1215643.59	0.75	
3	195	466728.38	1215668.54	0.8	
3	196	466726.82	1215693.49	0.65	
3	197	466725.26	1215718.44	0.5	
3	198	466723.96	1215746.96	0.6	
3	199	466784.97	1215453.23	1.1	
3	200	466774.95	1215461.76	1.65	17m between 200 and 202 4m between 200 and road
3	201	466804.48	1215470.96	1	
3	202	466778.50	1215478.38	1.2	17m between 200 and 202
3	203	466763.51	1215499.69	1.3	
3	204	466762.65	1215520.38	1	
3	205	466761.10	1215545.33	1.3	
3	206	466759.54	1215570.28	0.65	
3	207	466757.99	1215595.24	0.85	
3	208	466756.44	1215620.19	0.6	
3	209	466754.88	1215645.14	0.65	
3	210	466753.33	1215670.09	0.45	
3	211	466751.77	1215695.04	0.65	
3	212	466750.21	1215719.99	0.6	
3	213	466748.66	1215744.95	0.7	
3	214	466779.83	1215646.70	0.55	
3	215	466784.10	1215676.52	0.45	
3	216	466770.72	1215696.57	0.4	
3	217	466783.84	1215720.27	0.45	
3	218	466773.61	1215746.50	0.55	
3	219	466852.39	1215486.71	1.1	
3	220	466873.41	1215483.86	1.3	Taken west of stream as area was flooded.
3	221	466879.69	1215512.09	1.65	
3	222	466891.09	1215526.06	2	
3	223	466905.97	1215551.06	1.8	
3	224	466920.86	1215576.06	2	
3	225			-	Cancelled
3	226			-	Cancelled
3	227	466926.60	1215661.27	1.2	
3	228	466941.14	1215681.61	1.6	
3	229	466955.67	1215701.95	0.6	
3	230	466970.21	1215722.29	1.55	
3	231	466984.74	1215742.63	1.65	
3	232	466946.95	1215646.73	1.75	
3	233	466961.48	1215667.07	2.6	
3	234	466976.01	1215687.42	0.8	
3	235	466990.55	1215707.76	2.15	
3	236	467005.08	1215728.10	2	
3	237	466920.19	1215526.06	2	Only 18m apart to avoid archaeological interest
3	238	466935.07	1215551.06	1.65	
3	239	466949.95	1215576.06	1.85	

3	240	466964.83	1215601.06	1.3	
3	241			-	Cancelled
3	242	466967.29	1215632.20	2.45	
3	243	466983.24	1215644.93	2.75	
3	244			-	Cancelled
3	245	467010.89	1215693.22	2.5	
3	246	467025.42	1215713.56	1.7	
3	247	466925.10	1215488.60	0.7	
3	248	466949.28	1215526.06	0.75	Only 21m apart to avoid archaeological interest
3	249	466964.16	1215551.06	1.1	
3	250	466979.04	1215576.06	1.8	
3	251	466993.93	1215601.06	1.9	Only 11m apart to avoid archaeological interest
3	252	467006.71	1215622.54	2.1	
3	253	466987.63	1215617.67	2.5	
3	254	467002.16	1215638.01	2.15	
3	255	467016.70	1215658.35	1.25	
3	256	467031.23	1215678.69	1.2	
3	257	467045.76	1215699.03	0.55	
3	258	466954.75	1215494.53	0.4	
3	259	466978.38	1215526.06	0.5	
3	260	466993.26	1215551.06	1.9	
3	261			-	Cancelled
3	262	467027.27	1215613.38	2.25	
3	263	467022.50	1215623.47	1.55	
3	264	467037.04	1215643.81	0.3	
3	265	467051.57	1215664.15	0.5	
3	266	467066.11	1215684.50	0.4	
3	267	467007.06	1215478.05	0.5	Moved 30m east to avoid archaeological site
3	268	466983.64	1215505.66	0.45	
3	269	466986.25	1215530.53	0.5	
3	270	466995.74	1215558.80	0.55	
3	271	467008.50	1215503.05	0.45	
3	272	467011.11	1215527.91	0.4	
3	273	467013.72	1215552.77	0.4	
3	274	467033.36	1215500.43	0.6	
3	275	467035.97	1215525.30	0.25	
3	276	467038.58	1215550.16	0.2	
3	277	467054.47	1215473.56	0.4	
3	278	467058.22	1215497.82	0.2	
3	279	467060.84	1215522.69	0.3	
3	280	467063.45	1215547.55	0.15	
3	281	467077.50	1215481.95	0.25	
3	282	467101.45	1215469.09	0.1	
4	283	467151.65	1215472.79	0.2	
4	284	467175.65	1215461.14	0.3	
4	285	467201.37	1215467.91	0.4	
4	286	467251.27	1215453.36	0.35	
4	287	467265.90	1215483.46	0.55	
4	288	467281.49	1215497.55	0.45	
4	289	467288.14	1215516.20	0.15	
4	290	467301.50	1215543.41	0.15	
4	291	467362.08	1215595.80	0.25	
4	292	467401.31	1215607.35	0.05	
4	293	467414.26	1215620.20	0.1	
4	294	467437.71	1215628.83	0.15	
4	295	467459.20	1215642.11	0.3	
4	296	467481.67	1215653.07	0.2	
4	297	467284.91	1215467.23	0.35	
4	298	467302.74	1215484.38	0.25	

4	299	467311.64	1215507.65	0.15	
4	300	467322.63	1215530.05	0.15	
4	301	467337.74	1215546.65	0.25	
4	302	467357.80	1215564.86	0.25	
4	303	467380.27	1215575.82	0.1	
4	304	467402.74	1215586.77	0.1	
4	305	467425.76	1215598.74	0.2	
4	306	467441.21	1215608.43	0.15	
4	307	467470.16	1215619.64	0.15	
4	308	467492.63	1215630.60	0.15	
4	309	467323.99	1215471.22	0.3	
4	310	467335.13	1215499.10	0.15	
4	311	467343.76	1215516.69	0.25	
4	312	467355.95	1215532.03	0.15	
4	313			-	Cancelled
4	314	467406.36	1215550.08	0.05	
4	315	467413.70	1215564.30	0.1	
4	316	467436.17	1215575.26	0.3	
4	317	467458.64	1215586.22	0.15	
4	318	467472.41	1215597.69	0.1	
4	319	467503.58	1215608.13	0.1	
4	320	467447.13	1215552.79	0.15	
4	321	467469.60	1215563.74	0.3	
4	322	467492.07	1215574.70	0.25	
4	323	467511.66	1215584.39	0.15	
4	324	467480.55	1215541.27	0.3	
4	325	467503.03	1215552.23	0.15	

Appendix E - Laboratory Test Results (provisional)

AECOM


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For the attention of David Raeside

Report No: A13753

Issue No 01

LABORATORY TEST REPORT

Project Name	SHETLAND SPACE CENTRE - PRELIMINARY INVESTIGATION		
Project Number	A13753	Date samples received	13/11/2020
Your Ref		Date written instructions received	17/11/2020
Purchase Order	ALQ/02575	Date testing commenced	18/11/2020
Please find enclosed the results as summarised below			
Figure / Table	Test Quantity	Description	ISO 17025 Accredited
	33	Summary of Geotechnical Tests	See Sheets
	23	Client Specified Suite - Soil	Yes
	18	Atterberg Limit (to follow)	Yes
	18	Particle Size Distribution	Yes
	~	Notes on Laboratory Procedures	n/a
Remarks : Interim results.			
Issued by : C Donnelly		Date of Issue : 05/12/2020	Key to symbols used in this report S/C : Testing was sub-contracted
Approved Signatories :  05/12/2020			
D McGiff (Laboratory Coordinator), C Loudon (Quality Manager), C Donnelly (Laboratory Supervisor), I McMillan (Site Supervisor)			
<p>Unless we are notified to the contrary, samples will be disposed after a period of one month from this date. The results reported relate to samples received in the laboratory only. All results contained in this report are provisional unless signed by an approved signatory This report should not be reproduced except in full without the written approval of the laboratory. Under multisite accreditation the testing contained in this report may have been performed at another Terra Tek laboratory. The enclosed results remain the property of Terra Tek Limited and we reserve the right to withdraw our report if we have not received cleared funds in accordance with our standard terms and conditions Only those results indicated in this report are UKAS accredited and any opinions or interpretations expressed are outside the scope of UKAS accreditation. Feedback on the this report may be left via our website www.terratek.co.uk/contact-us</p>			



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 Offices in Airdrie, Birmingham and Aston Clinton

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES		Site SHETLAND SPACE CENTRE - PRELIMINARY INVESTIGATION		Contract No A13753															
Client AECOM		Engineer		~ Indicates test not carried out															
Exploratory Hole	Depth m	Sample Ref	Sample Type	Lab Sample ID	Non Engineering Sample Description	Moisture Content %	Atterberg limits				Particle Density Mg/m ³	Density		Total Stress			Other Tests		
							Liquid Limit %	Plastic Limit %	Plasticity Index	Percentage retained 425µm %		Atterberg Classification	Bulk Mg/m ³	Dry Mg/m ³	Shear Strength kPa	Apparent Cohesion C kPa		Angle of Shearing Resistance Phi	
TP02	0.40		T	182697	Brown fibrous PEAT	197					1.06	0.36							
TP06	0.30		T	182698	Brown fibrous PEAT	355					1.05	0.23							
TP13	2.00		B	182702	Brown gravelly very silty SAND with cobbles. Gravel is fine to coarse	22												PSD	
TP14	0.60		B	182703	Brown slightly gravelly silty SAND. Gravel is fine	30												PSD Chemistry	
TP15	0.50		B	182704	Brown slightly gravelly silty SAND. Gravel is fine	54												PSD	
Notes		Opinions and interpretations are outside the scope of UKAS accreditation			UKAS Accredited Test Y/N		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	See individual report sheets
Originator	Checked & Approved		SUMMARY OF GEOTECHNICAL TESTS																
CD	CD 05/12/2020		TKK																

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES		Site SHETLAND SPACE CENTRE - PRELIMINARY INVESTIGATION		Contract No A13753															
Client AECOM		Engineer		~ Indicates test not carried out															
Exploratory Hole	Depth m	Sample Ref	Sample Type	Lab Sample ID	Non Engineering Sample Description	Moisture Content %	Atterberg limits				Particle Density Mg/m ³	Density			Total Stress			Other Tests	
							Liquid Limit %	Plastic Limit %	Plasticity Index	Percentage retained 425µm %		Atterberg Classification	Bulk Mg/m ³	Dry Mg/m ³	Shear Strength kPa	Apparent Cohesion C kPa	Angle of Shearing Resistance Phi		
TP15	1.10		B	182705	Brown slightly gravelly silty SAND. Gravel is fine	29	?	?	?	?	?	?	?	?	?	?	?	PSD Chemistry	
TP16	1.05		B	182706	Brown silty SAND and GRAVEL. Gravel is fine to coarse	31	?	?	?	?	?	?	?	?	?	?	?	PSD	
TP17	1.10		B	182707	Brown gravelly very silty SAND. Gravel is fine to medium	17	?	?	?	?	?	?	?	?	?	?	?	PSD Chemistry	
TP17	1.80		B	182708	Brown silty SAND and GRAVEL with cobbles. Gravel is fine to coarse	20	?	?	?	?	?	?	?	?	?	?	?	PSD	
TP20	1.00		T	182709	Brown fibrous PEAT	667	?	?	?	?	1.07	0.14	?	?	?	?	?	Chemistry	
Notes		Opinions and interpretations are outside the scope of UKAS accreditation			UKAS Accredited Test Y/N		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	See individual report sheets
Originator	Checked & Approved		SUMMARY OF GEOTECHNICAL TESTS																
CD	CD 05/12/2020		TKK																

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES		Site SHETLAND SPACE CENTRE - PRELIMINARY INVESTIGATION		Contract No A13753															
Client AECOM		Engineer		~ Indicates test not carried out															
Exploratory Hole	Depth m	Sample Ref	Sample Type	Lab Sample ID	Non Engineering Sample Description	Moisture Content %	Atterberg limits				Particle Density Mg/m ³	Density		Total Stress			Other Tests		
							Liquid Limit %	Plastic Limit %	Plasticity Index	Percentage retained 425µm %		Atterberg Classification	Bulk Mg/m ³	Dry Mg/m ³	Shear Strength kPa	Apparent Cohesion C kPa		Angle of Shearing Resistance Phi	
TP21	0.50		T	182710	Brown fibrous PEAT	920						1.07	0.11					Chemistry	
TP21	1.30		B	182711	Brown silty very gravelly SAND. Gravel is fine to medium	39												PSD Chemistry	
TP22	2.00		B	182713	Brown silty SAND and GRAVEL with cobbles. Gravel is fine to coarse	28												PSD	
TP23	0.90		T	182714	Brown fibrous PEAT	449						1.07	0.19					Chemistry	
TP24	0.30		T	182715	Brown fibrous PEAT	138						1.10	0.46					Chemistry	
Notes		Opinions and interpretations are outside the scope of UKAS accreditation			UKAS Accredited Test Y/N		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	See individual report sheets
Originator	Checked & Approved	SUMMARY OF GEOTECHNICAL TESTS																	
CD	CD 05/12/2020	TKK																	



TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES		SHELLAND SPACE CENTRE - PRELIMINARY INVESTIGATION										Contract No A13753					
Site		AECOM										~ Indicates test not carried out					
Client		AECOM															
Engineer																	
Sample Identification		Lab Sample ID	Moisture Content	Atterberg limits				Particle Density		Density		Total Stress		Other Tests			
Exploratory Hole	Depth m	Sample Ref	Sample Type	Non Engineering Sample Description	Liquid Limit	Plastic Limit	Plasticity Index	Percentage retained 425µm	Atterberg Classification	Mg/m ³	Bulk	Dry	Shear Strength	Apparent Cohesion	Angle of Shearing Resistance Phi		
TP25	1.00		B	Brown silty SAND and GRAVEL. Gravel is fine to coarse	29	?	?	?	?	?	?	?	?	?	?	?	PSD
TP26	1.00		B	Brown silty very sandy fine to coarse GRAVEL with cobbles	21	?	?	?	?	?	?	?	?	?	?	?	PSD Chemistry
TP27	0.30		T	Brown fibrous PEAT	188	?	?	?	?	?	1.20	0.42	?	?	?	?	Chemistry
TP29	1.20		T	Brown fibrous PEAT	823	?	?	?	?	?	1.14	0.12	?	?	?	?	Chemistry
TP30	0.40		T	Brown fibrous PEAT	748	?	?	?	?	?	1.06	0.13	?	?	?	?	Chemistry
Notes		Opinions and interpretations are outside the scope of UKAS accreditation		UKAS Accredited Test Y/N		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	See individual report sheets
Originator	Checked & Approved	SUMMARY OF GEOTECHNICAL TESTS															
CD	CD 05/12/2020																



TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES		SHELLAND SPACE CENTRE - PRELIMINARY INVESTIGATION										Contract No A13753		
Site		AECOM										~ Indicates test not carried out		
Client		AECOM												
Engineer														
Sample Identification		Lab Sample ID	Moisture Content	Atterberg limits				Density		Total Stress			Other Tests	
Exploratory Hole	Depth m	Sample Type	%	Liquid Limit	Plastic Limit	Plasticity Index	Percentage retained 425µm	Atterberg Classification	Mg/m ³	Mg/m ³	Shear Strength kPa	Apparent Cohesion C kPa	Angle of Shearing Resistance Phi	
TP30	2.00	B	46	%	%	%	%		Mg/m ³	Mg/m ³	kPa	kPa	?	PSD
TP31	0.40	T	742	%	%	%	%		1.05	0.12	?	?	?	Chemistry
TP32	0.30	T	321	%	%	%	%		1.05	0.25	?	?	?	Chemistry
TP32	1.00	B	38	%	%	%	%		?	?	?	?	?	PSD Chemistry
TP34	0.30	T	769	%	%	%	%		1.06	0.12	?	?	?	Chemistry
Notes		Opinions and interpretations are outside the scope of UKAS accreditation	UKAS Accredited Test Y/N	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	See individual report sheets
Originator	Checked & Approved	SUMMARY OF GEOTECHNICAL TESTS												
CD	CD 05/12/2020	TKK												

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES		Site SHETLAND SPACE CENTRE - PRELIMINARY INVESTIGATION		Contract No A13753														
Client AECOM		Engineer AECOM		~ Indicates test not carried out														
Exploratory Hole	Depth m	Sample Ref	Sample Type	Lab Sample ID	Non Engineering Sample Description	Moisture Content %	Atterberg limits				Particle Density Mg/m ³	Density		Total Stress			Other Tests	
							Liquid Limit %	Plastic Limit %	Plasticity Index	Percentage retained 425µm %		Atterberg Classification	Bulk Mg/m ³	Dry Mg/m ³	Shear Strength kPa	Apparent Cohesion C kPa		Angle of Shearing Resistance Phi
TP38	0.80		B	182729	Brown silty SAND and GRAVEL. Gravel is fine to medium	26	?	?	?	?	?	?	?	?	?	?	PSD Chemistry	
TP42	0.20		T	182734	Brown fibrous PEAT	195	?	?	?	?	1.03	0.35	?	?	?	?	Chemistry	
TP42	0.60		B	182735	Brown very gravell very sandy SILT. Gravel is fine to medium	40	?	?	?	?	?	?	?	?	?	?	PSD	
TP44	0.50		B	182738	Brown very silty SAND and GRAVEL. Gravel is fine to coarse	37	?	?	?	?	?	?	?	?	?	?	PSD Chemistry	
TP46	0.80		B	182741	Brown silty SAND and GRAVEL with cobbles. Gravel is fine to coarse	29	?	?	?	?	?	?	?	?	?	?	PSD	
Notes		Opinions and interpretations are outside the scope of UKAS accreditation			UKAS Accredited Test Y/N		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	See individual report sheets
Originator	Checked & Approved	SUMMARY OF GEOTECHNICAL TESTS																
CD	CD 05/12/2020	Tik																

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES		Site SHETLAND SPACE CENTRE - PRELIMINARY INVESTIGATION		Contract No A13753																	
Client AECOM		Engineer		~ Indicates test not carried out																	
Exploratory Hole	Depth m	Sample Ref	Sample Type	Lab Sample ID	Non Engineering Sample Description	Moisture Content %	Atterberg limits				Particle Density Mg/m ³	Density		Total Stress			Other Tests				
							Liquid Limit %	Plastic Limit %	Plasticity Index	Percentage retained 425µm		Atterberg Classification	Bulk Mg/m ³	Dry Mg/m ³	Shear Strength kPa	Apparent Cohesion C kPa		Angle of Shearing Resistance Phi			
TP47	0.70		B	182743	Brown gravelly sandy CLAY. Gravel is fine	?	?	?	?	?	?	?	?	?	?	?	?	?	?	Chemistry	
TP48	0.30		T	182744	Brown fibrous PEAT	206	?	?	?	?	?	1.05	0.34	?	?	?	?	?	?	Chemistry	
TP48	0.70		B	182745	Brown very silty very gravelly SAND. Gravel is fine to coarse	29	?	?	?	?	?	?	?	?	?	?	?	?	?	PSD	
Notes		Opinions and interpretations are outside the scope of UKAS accreditation			UKAS Accredited Test Y/N		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	See individual report sheets	
Originator	Checked & Approved		SUMMARY OF GEOTECHNICAL TESTS																		
CD	CD 05/12/2020		Tik																		

 <small>SITE INVESTIGATION AND LABORATORY SERVICES</small>		SHELLAND SPACE CENTRE - PRELIMINARY INVESTIGATION										Contract No A13753														
		Site		Client		Engineer		Aecom																		
Sample Identification			Depth m	Sample Ref	Sample Type	Lab Sample ID	pH	Sulphate (soluble in 2:1 water extract) as SO4 g/l	Loss on Ignition %																	
Hole																										
TP26											1.00	B	182718	5.2	0.10	~										
TP27											0.30	T	182719	4.9	~	27.3										
TP29											1.20	T	182720	5.1	~	91.4										
TP30											0.40	T	182721	5.0	~	91.7										
TP31											0.40	T	182723	5.0	~	88.3										
TP32											0.30	T	182724	5.0	~	75.6										
TP32											1.00	B	182725	5.7	0.03	~										
TP34											0.30	T	182726	4.8	~	91.9										
TP38											0.80	B	182729	5.8	0.10	~										
TP42											0.20	T	182734	5.4	~	36.4										
			Accreditation M=Meets U=UKAS N=No accreditation Limits of Detection Terra Tek Analysis Method TP019 M TP169 M TP042 M																							
Originator	Checked & Approved																									
DAB	 02/12/2020																									



BRE SUITE

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES		SHELLAND SPACE CENTRE - PRELIMINARY INVESTIGATION										Contract No A13753			
Client		Aecom										Engineer			
Sample Identification		Depth m	Sample Ref	Sample Type	Lab Sample ID	pH	Sulphate (soluble in 2:1 water extract) as SO4 g/l	Loss on Ignition %							
TP44	0.50		B	182738	6.3	0.05	~								
TP47	0.70		B	182743	6.0	0.07	~								
TP48	0.30		T	182744	5.6	~	35.1								
Originator		Checked & Approved		BRE SUITE										TK	
DAB	S. Longman 02/12/2020												Sheet 3 of 3		



SITE INVESTIGATION AND LABORATORY SERVICES

Site SHETLAND SPACE CENTRE - PRELIMINARY INVESTIGATION

Contract No **A13753**

Client AECOM

Hole TP13

Engineer

Sample Ref

Depth (m) 2.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	79
63.0 mm	79
50.0 mm	79
37.5 mm	76
28.0 mm	74
20.0 mm	72
14.0 mm	72
10.0 mm	71
6.30 mm	70
5.00 mm	70
3.35 mm	68
2.00 mm	67
1.18 mm	64
600 µm	59
425 µm	55
300 µm	50
212 µm	44
150 µm	34
63 µm	30
20 µm	14
6 µm	6
2 µm	3

Non Engineering Description
Brown gravelly very silty SAND with cobbles. Gravel is fine to coarse

Sample Proportions - %

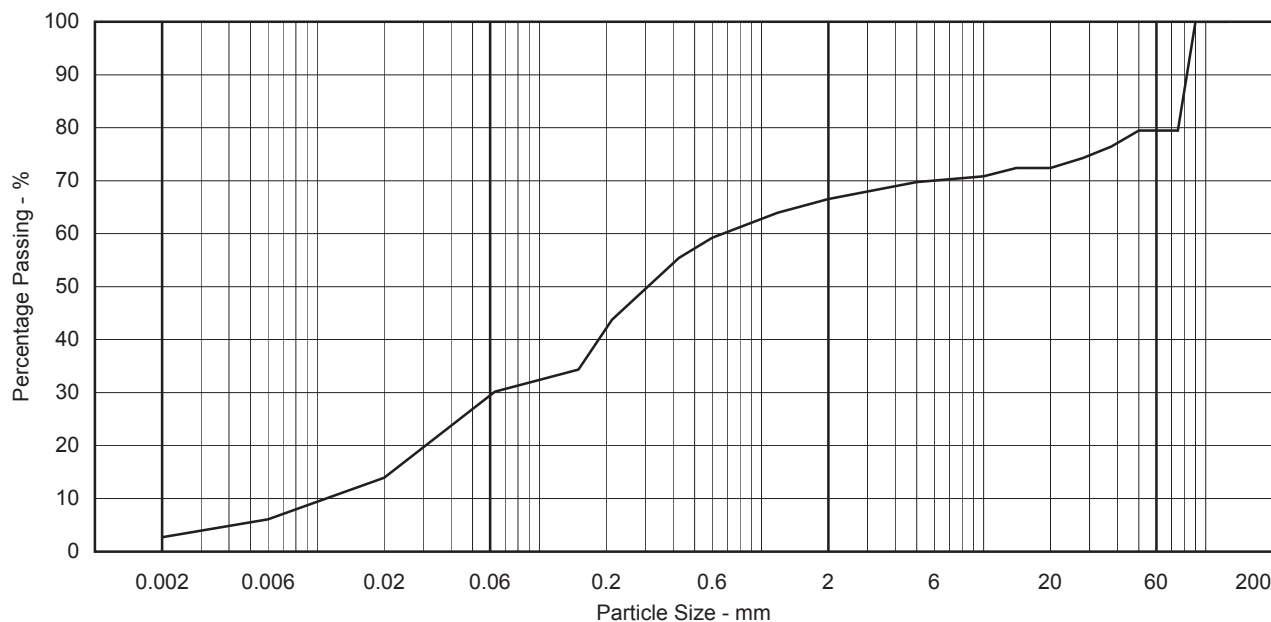
Cobbles	20.5
Gravel	12.9
Sand	37.5
Silt	26.3
Clay	2.7

Particle Diameter - mm

D100	90
D60	0.67
D10	0.011
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	60.9

Notes
Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



Originator	Checked & Approved
DW	CD 05/12/2020

PARTICLE SIZE DISTRIBUTION
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving
BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette





SITE INVESTIGATION AND LABORATORY SERVICES

Site	SHETLAND SPACE CENTRE - PRELIMINARY INVESTIGATION
Client	AECOM
Engineer	

Contract No **A13753**

Hole	TP14
Sample Ref	
Depth (m)	0.60
Sample Type	B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	99
600 µm	86
425 µm	49
300 µm	19
212 µm	14
150 µm	12
63 µm	11
20 µm	4
6 µm	1
2 µm	0

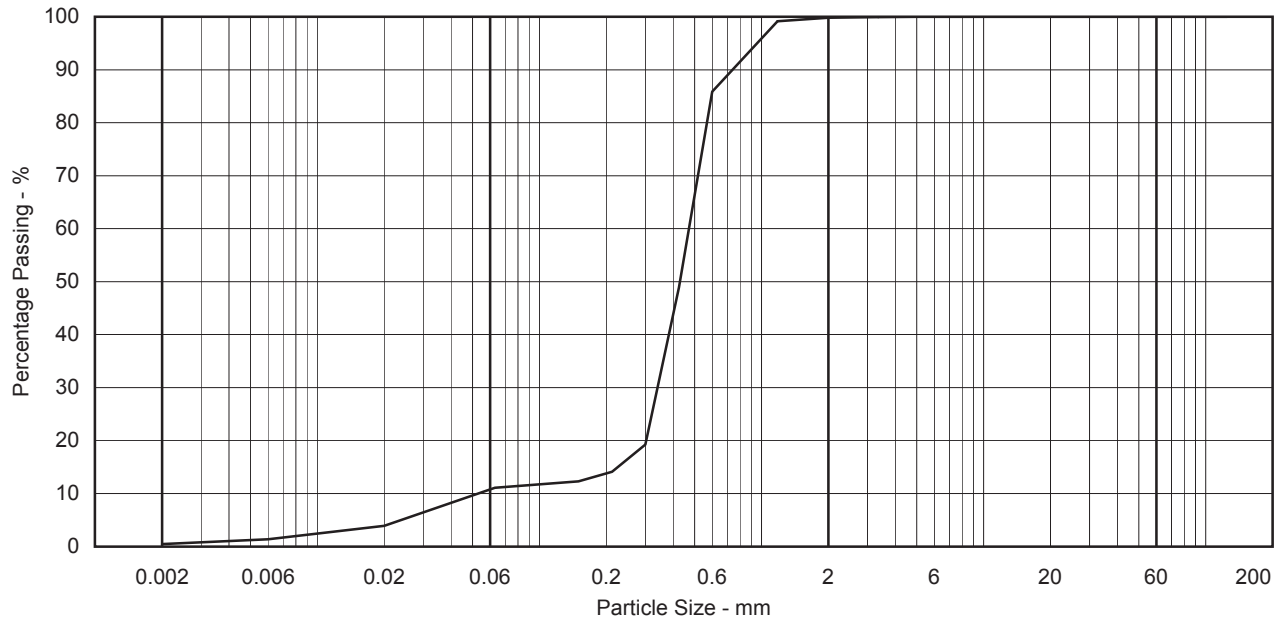
Non Engineering Description
Brown slightly gravelly silty SAND. Gravel is fine

Sample Proportions - %	
Cobbles	0.0
Gravel	0.2
Sand	89.3
Silt	10.2
Clay	0.4

Particle Diameter - mm	
D100	5.0
D60	0.47
D10	0.053
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	8.9

Notes
Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



Originator	Checked & Approved
DW	 05/12/2020

PARTICLE SIZE DISTRIBUTION
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette





SITE INVESTIGATION AND LABORATORY SERVICES

Site	SHETLAND SPACE CENTRE - PRELIMINARY INVESTIGATION
Client	AECOM
Engineer	

Contract No	A13753
Hole	TP15
Sample Ref	
Depth (m)	0.50
Sample Type	B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	99
2.00 mm	99
1.18 mm	97
600 µm	77
425 µm	54
300 µm	33
212 µm	29
150 µm	24
63 µm	20
20 µm	8
6 µm	5
2 µm	3

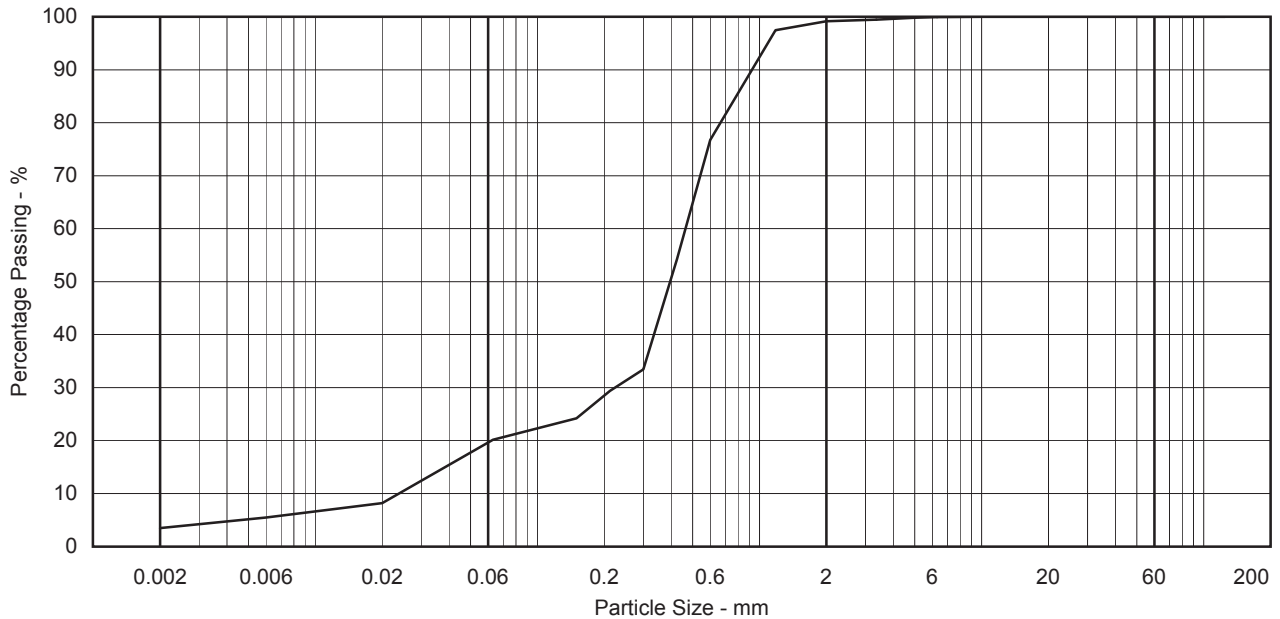
Non Engineering Description
Brown slightly gravelly silty SAND. Gravel is fine

Sample Proportions - %	
Cobbles	0.0
Gravel	0.9
Sand	79.9
Silt	15.8
Clay	3.4

Particle Diameter - mm	
D100	10
D60	0.46
D10	0.024
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	19.2

Notes
Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



Originator	Checked & Approved
DW	 05/12/2020

PARTICLE SIZE DISTRIBUTION
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving
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SITE INVESTIGATION AND LABORATORY SERVICES

Site SHETLAND SPACE CENTRE - PRELIMINARY INVESTIGATION

Contract No **A13753**

Client AECOM

Hole TP15

Engineer

Sample Ref

Depth (m) 1.10

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	99
600 µm	92
425 µm	56
300 µm	22
212 µm	15
150 µm	12
63 µm	9

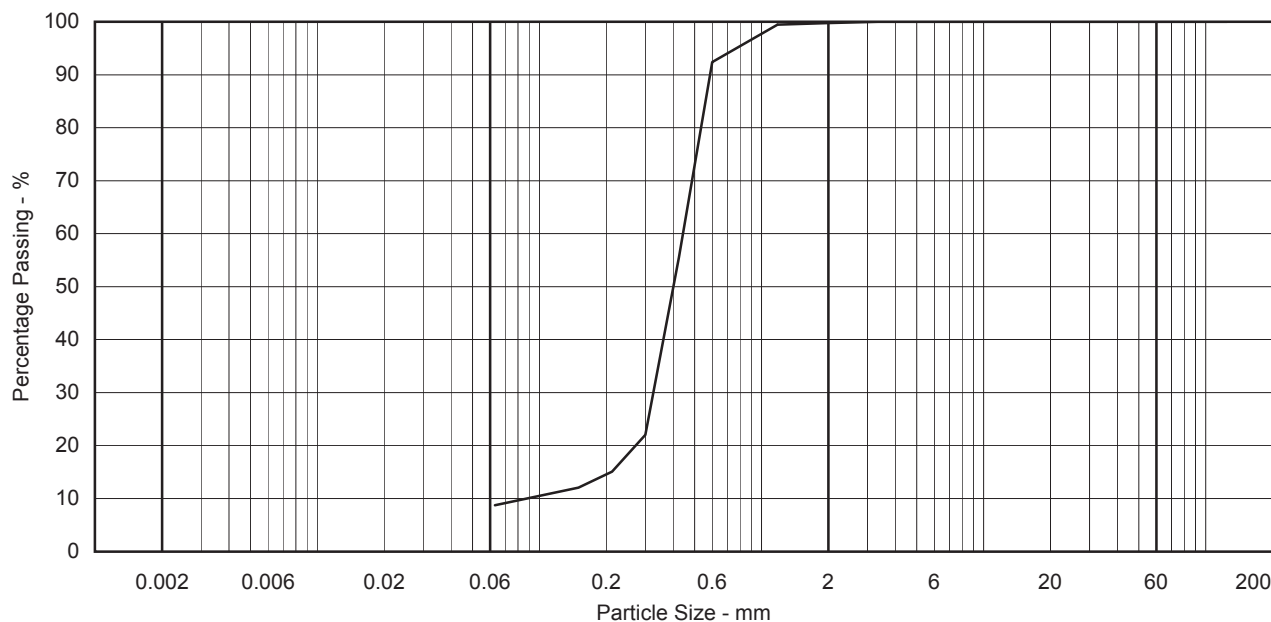
Non Engineering Description
Brown slightly gravelly silty SAND. Gravel is fine

Sample Proportions - %	
Cobbles	0.0
Gravel	0.2
Sand	91.1
Silt & Clay	8.7

Particle Diameter - mm	
D100	3.4
D60	0.44
D10	0.088
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	5.0

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



Originator	Checked & Approved
DW	 05/12/2020

PARTICLE SIZE DISTRIBUTION
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site SHETLAND SPACE CENTRE - PRELIMINARY INVESTIGATION

Contract No **A13753**

Client AECOM

Hole TP16

Engineer

Sample Ref

Depth (m) 1.05

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	98
14.0 mm	94
10.0 mm	90
6.30 mm	88
5.00 mm	86
3.35 mm	75
2.00 mm	61
1.18 mm	44
600 µm	29
425 µm	24
300 µm	21
212 µm	19
150 µm	17
63 µm	14
20 µm	2
6 µm	1
2 µm	0

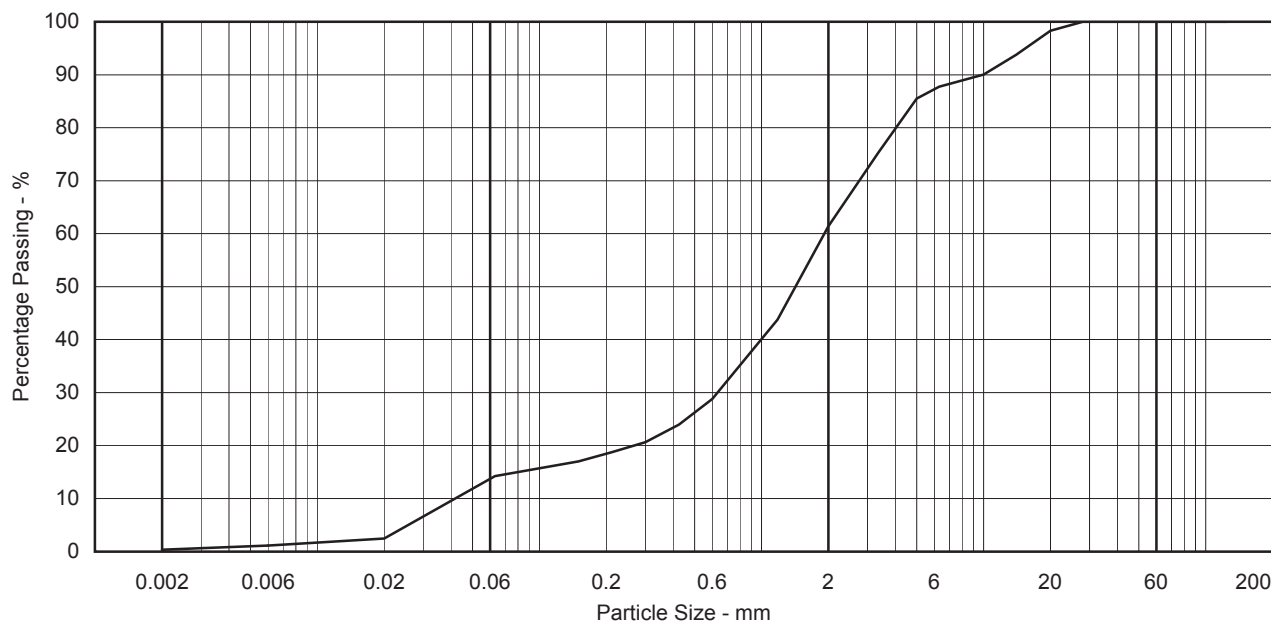
Non Engineering Description
Brown silty SAND and GRAVEL. Gravel is fine to coarse

Sample Proportions - %	
Cobbles	0.0
Gravel	38.6
Sand	48.0
Silt	13.1
Clay	0.3

Particle Diameter - mm	
D100	28
D60	1.9
D10	0.042
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	45.2

Notes
Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



Originator	Checked & Approved
DW	 05/12/2020

PARTICLE SIZE DISTRIBUTION
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving
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SITE INVESTIGATION AND LABORATORY SERVICES

Site SHETLAND SPACE CENTRE - PRELIMINARY INVESTIGATION

Contract No **A13753**

Client AECOM

Hole TP17

Engineer

Sample Ref

Depth (m) 1.10

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	99
3.35 mm	96
2.00 mm	89
1.18 mm	76
600 µm	61
425 µm	54
300 µm	46
212 µm	42
150 µm	37
63 µm	33
20 µm	10
6 µm	3
2 µm	1

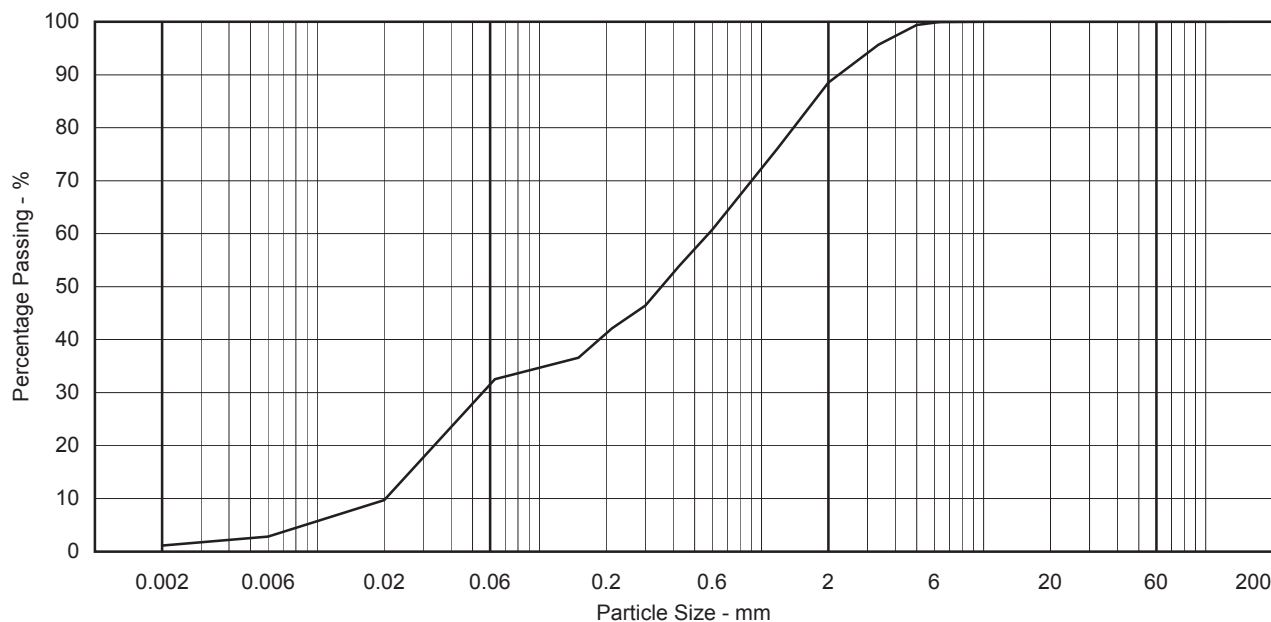
Non Engineering Description
Brown gravelly very silty SAND. Gravel is fine to medium

Sample Proportions - %	
Cobbles	0.0
Gravel	11.5
Sand	57.6
Silt	29.8
Clay	1.1

Particle Diameter - mm	
D100	10
D60	0.58
D10	0.020
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	29.0

Notes
Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



Originator	Checked & Approved
DW	05/12/2020

PARTICLE SIZE DISTRIBUTION
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette





SITE INVESTIGATION AND LABORATORY SERVICES

Site SHETLAND SPACE CENTRE - PRELIMINARY INVESTIGATION

Contract No **A13753**

Client AECOM

Hole TP17

Engineer

Sample Ref

Depth (m) 1.80

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	84
63.0 mm	84
50.0 mm	84
37.5 mm	84
28.0 mm	83
20.0 mm	80
14.0 mm	78
10.0 mm	74
6.30 mm	70
5.00 mm	68
3.35 mm	59
2.00 mm	50
1.18 mm	43
600 µm	35
425 µm	32
300 µm	26
212 µm	24
150 µm	20
63 µm	17
20 µm	4
6 µm	2
2 µm	1

Non Engineering Description
Brown silty SAND and GRAVEL with cobbles. Gravel is fine to coarse

Sample Proportions - %

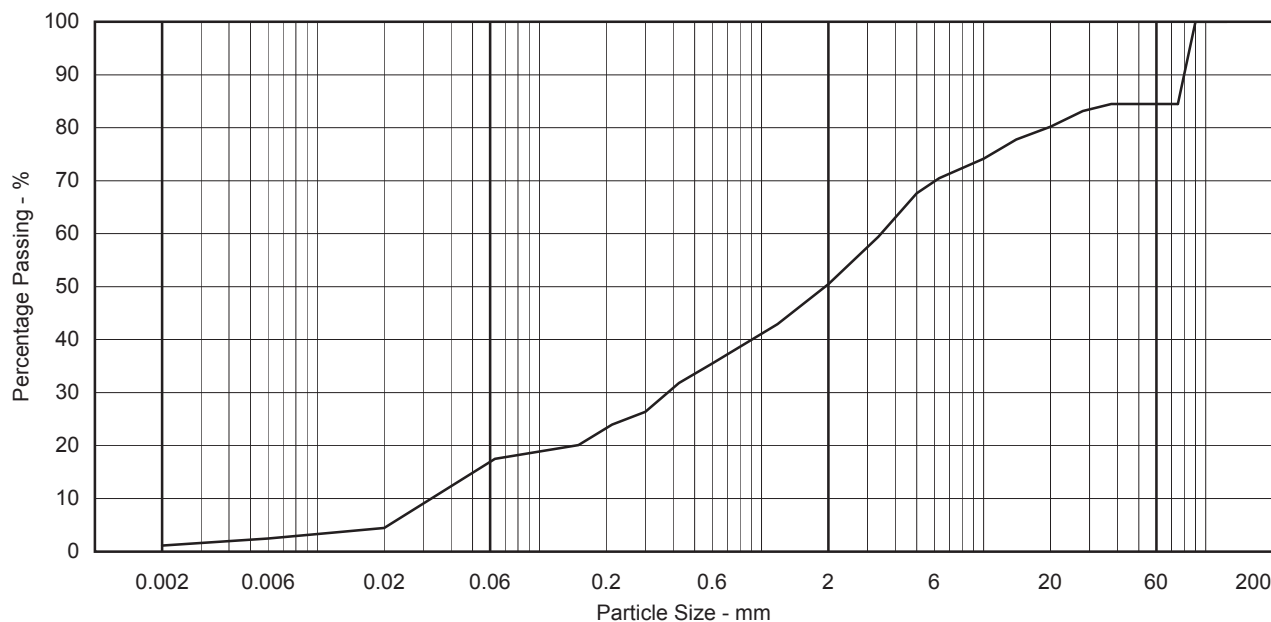
Cobbles	15.5
Gravel	34.0
Sand	33.9
Silt	15.5
Clay	1.1

Particle Diameter - mm

D100	90
D60	3.4
D10	0.033
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	103.0

Notes
Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



Originator	Checked & Approved
DW	05/12/2020

PARTICLE SIZE DISTRIBUTION
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving
BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette





SITE INVESTIGATION AND LABORATORY SERVICES

Site SHETLAND SPACE CENTRE - PRELIMINARY INVESTIGATION

Contract No **A13753**

Client AECOM

Hole TP21

Engineer

Sample Ref

Depth (m) 1.30

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	99
10.0 mm	96
6.30 mm	92
5.00 mm	89
3.35 mm	81
2.00 mm	71
1.18 mm	63
600 µm	51
425 µm	38
300 µm	21
212 µm	14
150 µm	12
63 µm	7

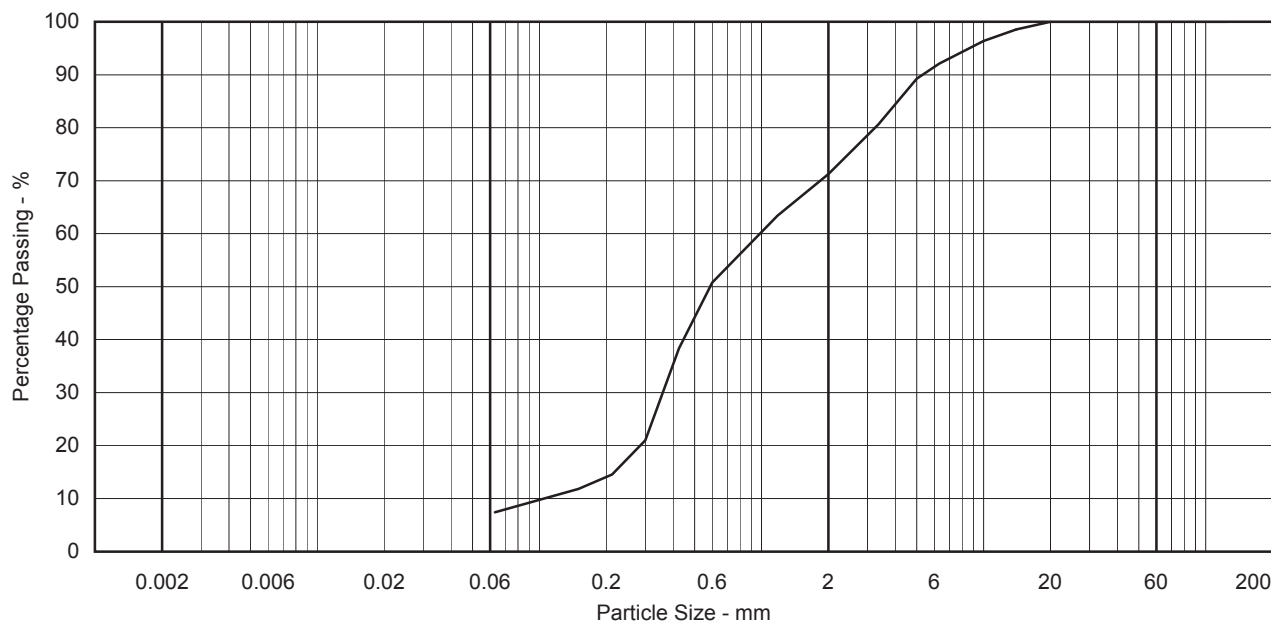
Non Engineering Description
Brown silty very gravelly SAND. Gravel is fine to medium

Sample Proportions - %	
Cobbles	0.0
Gravel	28.7
Sand	63.9
Silt & Clay	7.3

Particle Diameter - mm	
D100	20
D60	0.98
D10	0.11
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	8.9

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



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PARTICLE SIZE DISTRIBUTION
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site	SHETLAND SPACE CENTRE - PRELIMINARY INVESTIGATION
Client	AECOM
Engineer	

Contract No	A13753
Hole	TP22
Sample Ref	
Depth (m)	2.00
Sample Type	B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	76
63.0 mm	64
50.0 mm	64
37.5 mm	64
28.0 mm	61
20.0 mm	60
14.0 mm	60
10.0 mm	58
6.30 mm	56
5.00 mm	54
3.35 mm	46
2.00 mm	37
1.18 mm	30
600 µm	24
425 µm	23
300 µm	21
212 µm	20
150 µm	18
63 µm	17
20 µm	6
6 µm	3
2 µm	2

Non Engineering Description

Brown silty SAND and GRAVEL with cobbles. Gravel is fine to coarse

Sample Proportions - %

Cobbles	36.2
Gravel	26.7
Sand	20.6
Silt	14.8
Clay	1.7

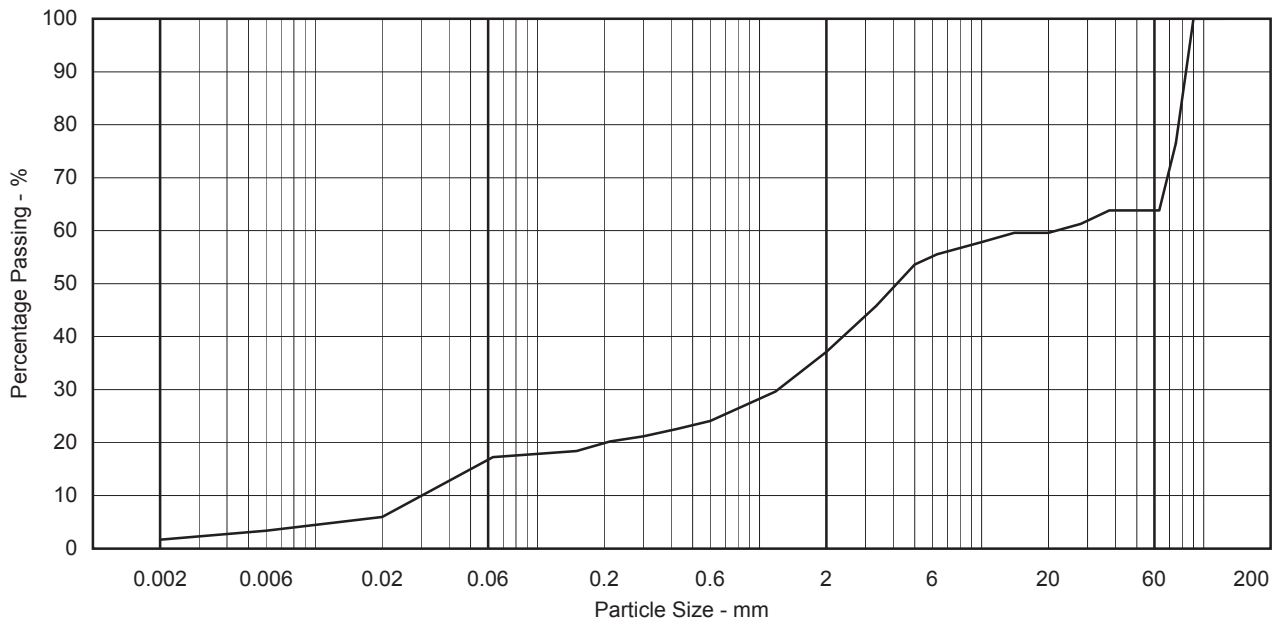
Particle Diameter - mm

D100	90
D60	22
D10	0.030
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	733.3

Notes

Sample does not comply with BS1377 minimum mass requirements
Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



Originator	Checked & Approved
DW	CD 05/12/2020

PARTICLE SIZE DISTRIBUTION
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving
BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette





SITE INVESTIGATION AND LABORATORY SERVICES

Site SHETLAND SPACE CENTRE - PRELIMINARY INVESTIGATION

Contract No **A13753**

Client AECOM

Hole TP25

Engineer

Sample Ref
Depth (m) 1.00
Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	99
6.30 mm	96
5.00 mm	94
3.35 mm	74
2.00 mm	57
1.18 mm	42
600 µm	31
425 µm	26
300 µm	20
212 µm	17
150 µm	15
63 µm	12
20 µm	1
6 µm	1
2 µm	0

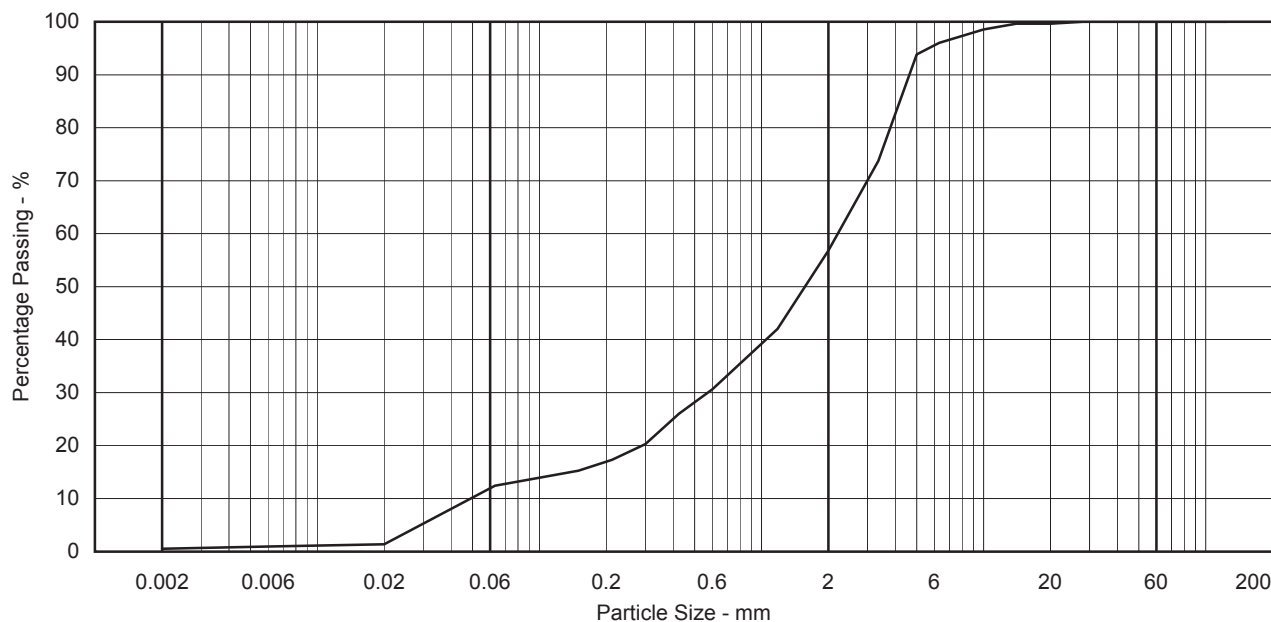
Non Engineering Description
Brown silty SAND and GRAVEL. Gravel is fine to coarse

Sample Proportions - %	
Cobbles	0.0
Gravel	43.2
Sand	45.2
Silt	11.2
Clay	0.5

Particle Diameter - mm	
D100	28
D60	2.2
D10	0.049
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	44.9

Notes
Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



Originator	Checked & Approved
DW	 05/12/2020

PARTICLE SIZE DISTRIBUTION
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette





SITE INVESTIGATION AND LABORATORY SERVICES

Site SHETLAND SPACE CENTRE - PRELIMINARY INVESTIGATION

Contract No **A13753**

Client AECOM

Hole TP26

Engineer

Sample Ref
Depth (m) 1.00
Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	95
37.5 mm	95
28.0 mm	95
20.0 mm	90
14.0 mm	90
10.0 mm	85
6.30 mm	79
5.00 mm	75
3.35 mm	60
2.00 mm	43
1.18 mm	32
600 µm	24
425 µm	22
300 µm	20
212 µm	18
150 µm	17
63 µm	14
20 µm	4
6 µm	2
2 µm	1

Non Engineering Description

Brown silty very sandy fine to coarse GRAVEL with cobbles

Sample Proportions - %

Cobbles	1.2
Gravel	55.9
Sand	29.3
Silt	12.8
Clay	0.9

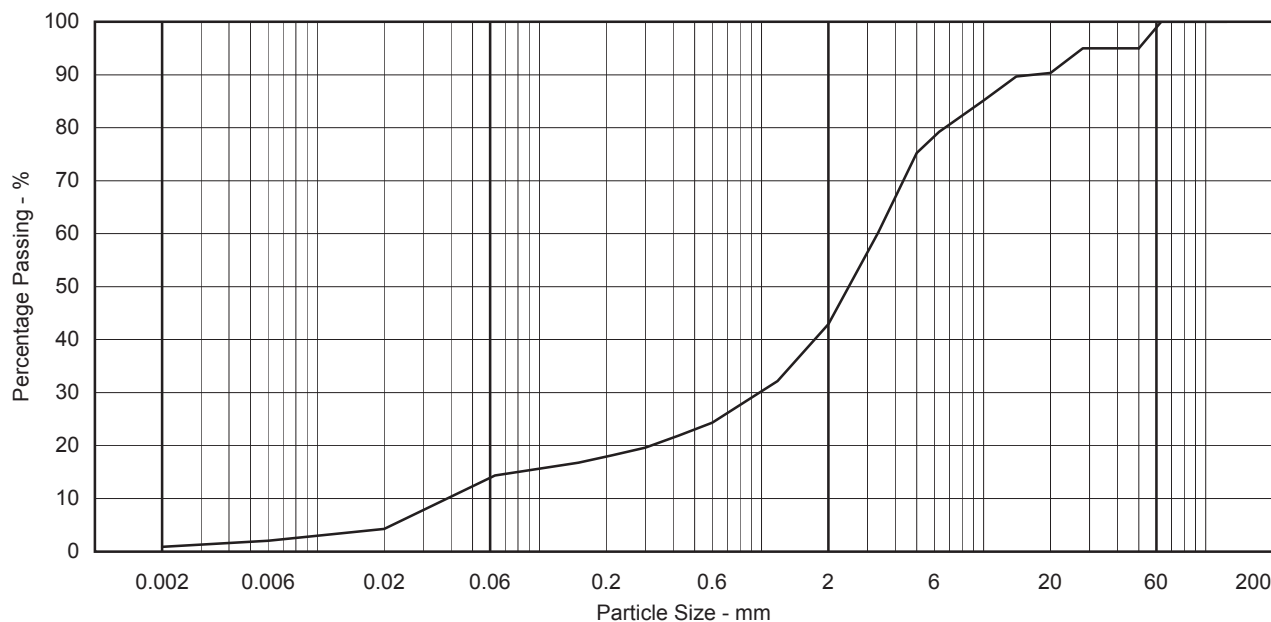
Particle Diameter - mm

D100	63
D60	3.3
D10	0.039
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	84.6

Notes

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



Originator	Checked & Approved
DW	 05/12/2020

PARTICLE SIZE DISTRIBUTION
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving
BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette





SITE INVESTIGATION AND LABORATORY SERVICES

Site SHETLAND SPACE CENTRE - PRELIMINARY INVESTIGATION

Contract No **A13753**

Client AECOM

Hole TP30

Engineer

Sample Ref

Depth (m) 2.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	84
37.5 mm	84
28.0 mm	83
20.0 mm	81
14.0 mm	81
10.0 mm	80
6.30 mm	76
5.00 mm	72
3.35 mm	61
2.00 mm	50
1.18 mm	35
600 µm	24
425 µm	21
300 µm	18
212 µm	16
150 µm	13
63 µm	11
20 µm	3
6 µm	2
2 µm	1

Non Engineering Description

Brown silty very sandy fine to coarse GRAVEL with cobbles

Sample Proportions - %

Cobbles	3.7
Gravel	46.8
Sand	39.0
Silt	10.0
Clay	0.6

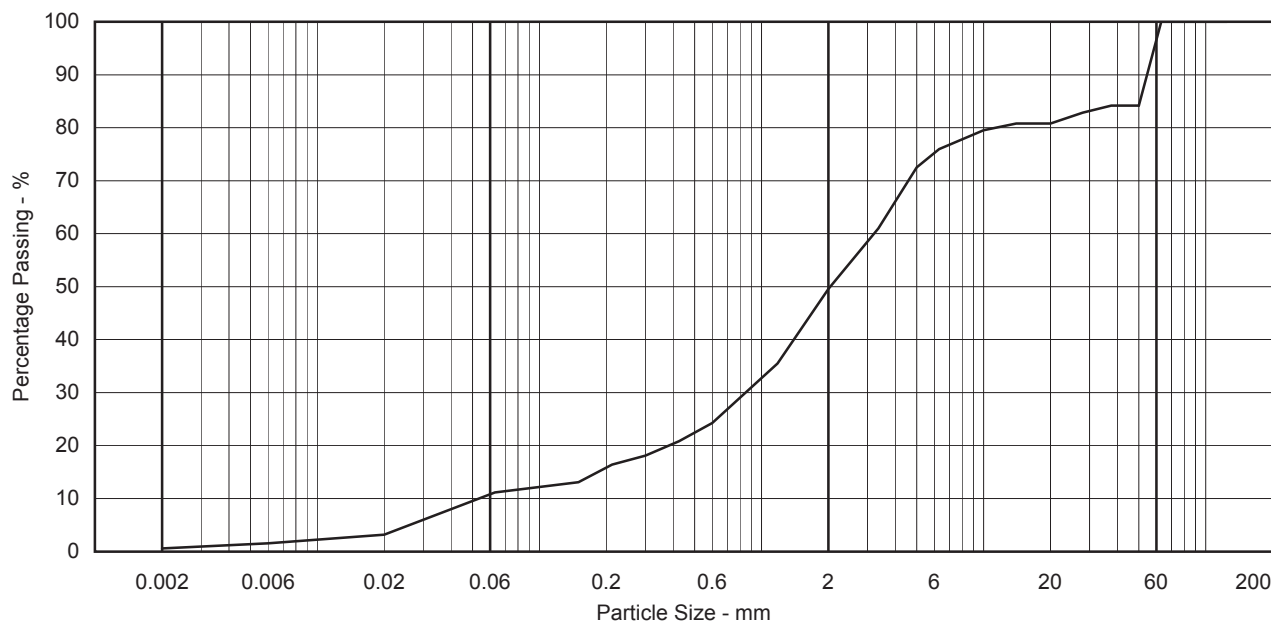
Particle Diameter - mm

D100	63
D60	3.2
D10	0.054
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	59.3

Notes

Sample does not comply with BS1377 minimum mass requirements
Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



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PARTICLE SIZE DISTRIBUTION
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving
BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette





SITE INVESTIGATION AND LABORATORY SERVICES

Site SHETLAND SPACE CENTRE - PRELIMINARY INVESTIGATION

Contract No **A13753**

Client AECOM

Hole TP32

Engineer

Sample Ref
Depth (m) 1.00
Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	84
50.0 mm	76
37.5 mm	76
28.0 mm	76
20.0 mm	74
14.0 mm	74
10.0 mm	73
6.30 mm	69
5.00 mm	68
3.35 mm	60
2.00 mm	53
1.18 mm	46
600 µm	39
425 µm	36
300 µm	33
212 µm	31
150 µm	26
63 µm	23
20 µm	7
6 µm	3
2 µm	1

Non Engineering Description
Brown very silty SAND and GRAVEL with cobbles. Gravel is fine to coarse

Sample Proportions - %

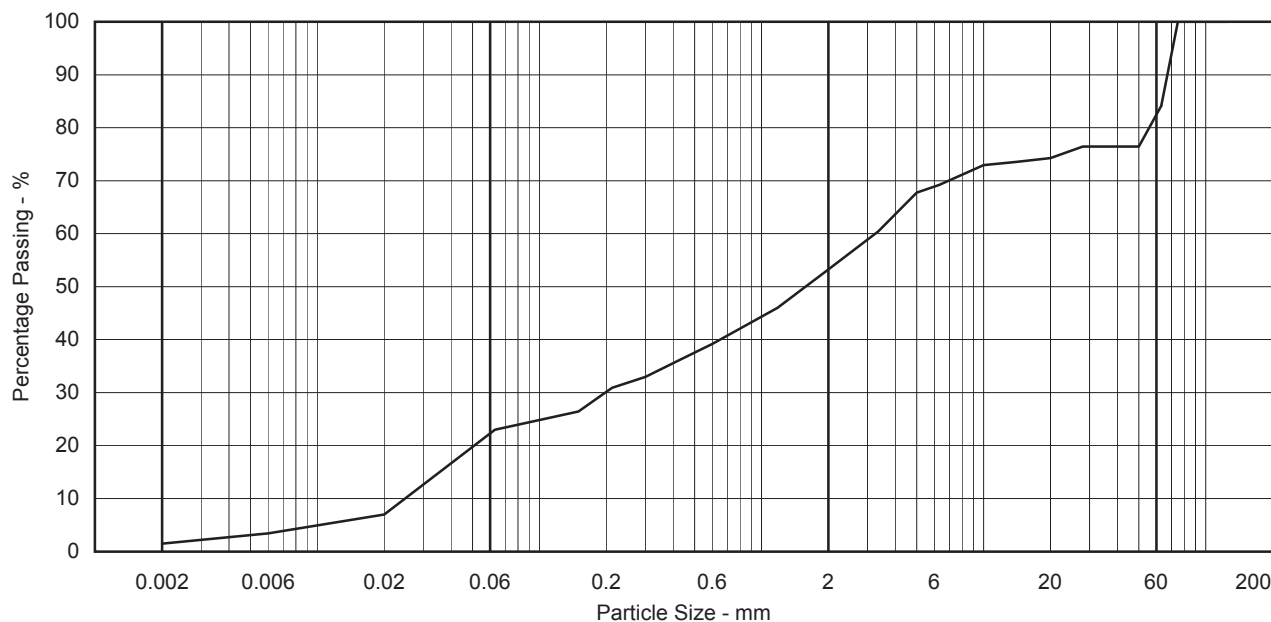
Cobbles	17.7
Gravel	29.1
Sand	31.4
Silt	20.4
Clay	1.5

Particle Diameter - mm

D100	75
D60	3.2
D10	0.025
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	128.0

Notes
Sample does not comply with BS1377 minimum mass requirements
Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



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PARTICLE SIZE DISTRIBUTION
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving
BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette





SITE INVESTIGATION AND LABORATORY SERVICES

Site SHETLAND SPACE CENTRE - PRELIMINARY INVESTIGATION

Contract No **A13753**

Client AECOM

Hole TP38

Engineer

Sample Ref

Depth (m) 0.80

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	97
10.0 mm	95
6.30 mm	91
5.00 mm	88
3.35 mm	73
2.00 mm	58
1.18 mm	44
600 µm	32
425 µm	28
300 µm	25
212 µm	23
150 µm	20
63 µm	17
20 µm	2
6 µm	1
2 µm	1

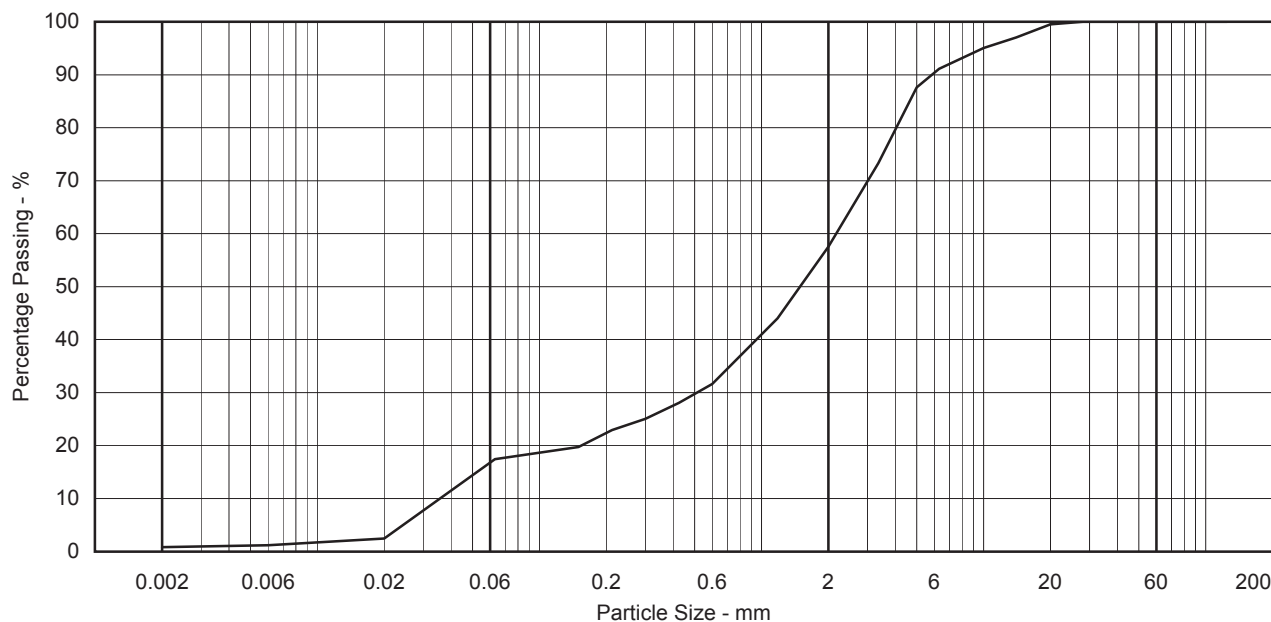
Non Engineering Description
Brown silty SAND and GRAVEL. Gravel is fine to medium

Sample Proportions - %	
Cobbles	0.0
Gravel	42.5
Sand	41.1
Silt	15.6
Clay	0.8

Particle Diameter - mm	
D100	28
D60	2.2
D10	0.036
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	61.1

Notes
Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



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PARTICLE SIZE DISTRIBUTION
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette



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SITE INVESTIGATION AND LABORATORY SERVICES

Site SHETLAND SPACE CENTRE - PRELIMINARY
INVESTIGATION

Client AECOM

Engineer

Contract No **A13753**

Hole TP42

Sample Ref

Depth (m) 0.60

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	98
6.30 mm	97
5.00 mm	94
3.35 mm	88
2.00 mm	78
1.18 mm	67
600 µm	58
425 µm	54
300 µm	50
212 µm	47
150 µm	42
63 µm	38
20 µm	10
6 µm	5
2 µm	3

Non Engineering Description

Brown very gravell very sandy SILT. Gravel is fine to medium

Sample Proportions - %

Cobbles	0.0
Gravel	21.8
Sand	42.1
Silt	33.4
Clay	2.6

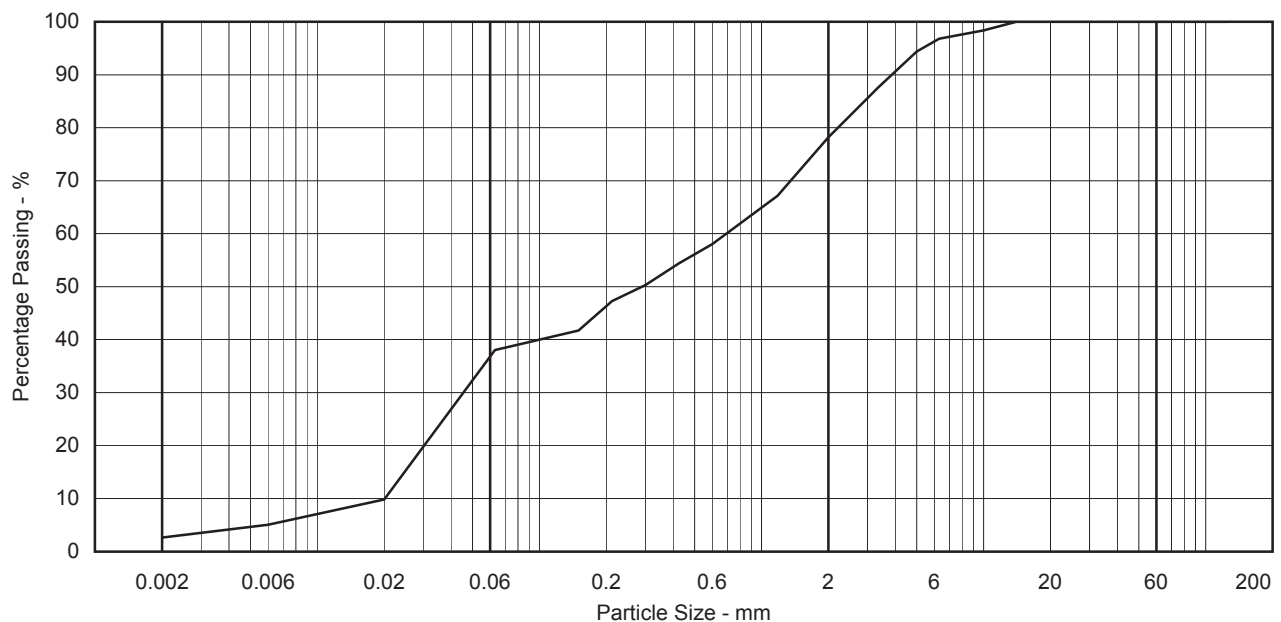
Particle Diameter - mm

D100	14
D60	0.70
D10	0.020
Uniformity Coefficient (SHW series 600, Table 6/1, footnote 5)	35.0

Notes

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



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SITE INVESTIGATION AND LABORATORY SERVICES

Site SHETLAND SPACE CENTRE - PRELIMINARY INVESTIGATION

Contract No **A13753**

Client AECOM

Hole TP44

Engineer

Sample Ref

Depth (m) 0.50

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	98
6.30 mm	95
5.00 mm	93
3.35 mm	82
2.00 mm	69
1.18 mm	55
600 µm	45
425 µm	41
300 µm	36
212 µm	33
150 µm	28
63 µm	24
20 µm	11
6 µm	4
2 µm	1

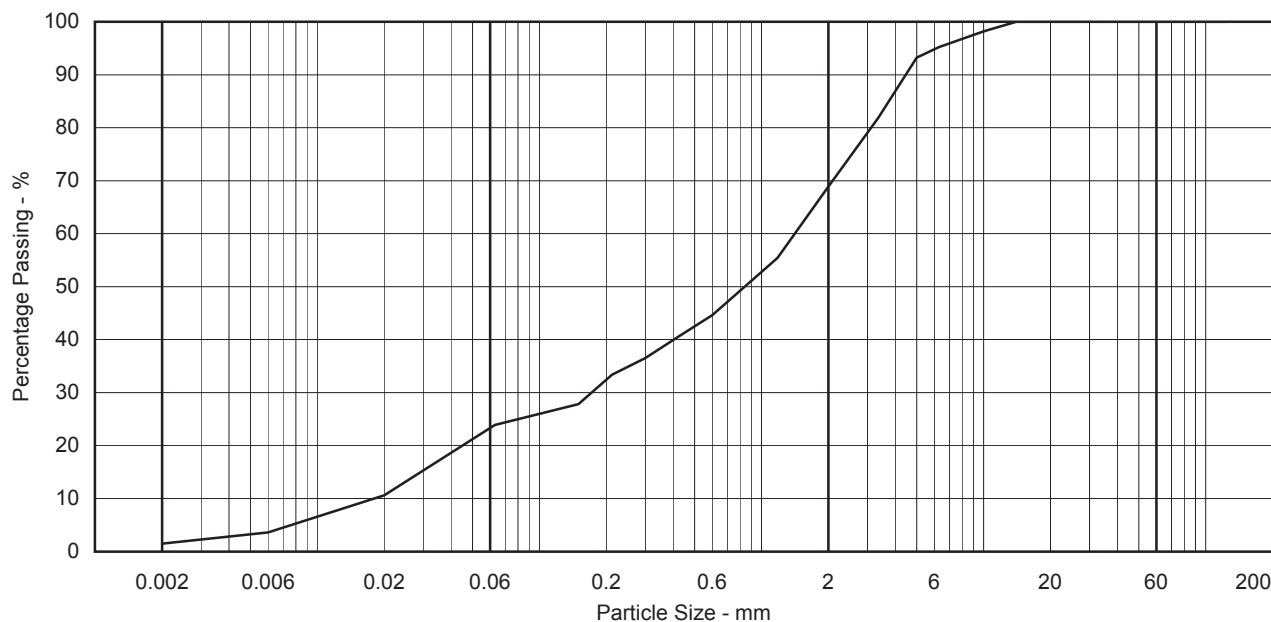
Non Engineering Description
Brown very silty SAND and GRAVEL. Gravel is fine to coarse

Sample Proportions - %	
Cobbles	0.0
Gravel	31.1
Sand	46.0
Silt	21.5
Clay	1.5

Particle Diameter - mm	
D100	14
D60	1.4
D10	0.018
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	77.8

Notes
Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



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 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette





SITE INVESTIGATION AND LABORATORY SERVICES

Site SHETLAND SPACE CENTRE - PRELIMINARY INVESTIGATION

Contract No **A13753**

Client AECOM

Hole TP46

Engineer

Sample Ref

Depth (m) 0.80

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	79
63.0 mm	79
50.0 mm	79
37.5 mm	73
28.0 mm	71
20.0 mm	71
14.0 mm	70
10.0 mm	67
6.30 mm	64
5.00 mm	62
3.35 mm	52
2.00 mm	42
1.18 mm	34
600 µm	27
425 µm	25
300 µm	23
212 µm	22
150 µm	19
63 µm	17
20 µm	4
6 µm	2
2 µm	1

Non Engineering Description
Brown silty SAND and GRAVEL with cobbles. Gravel is fine to coarse

Sample Proportions - %

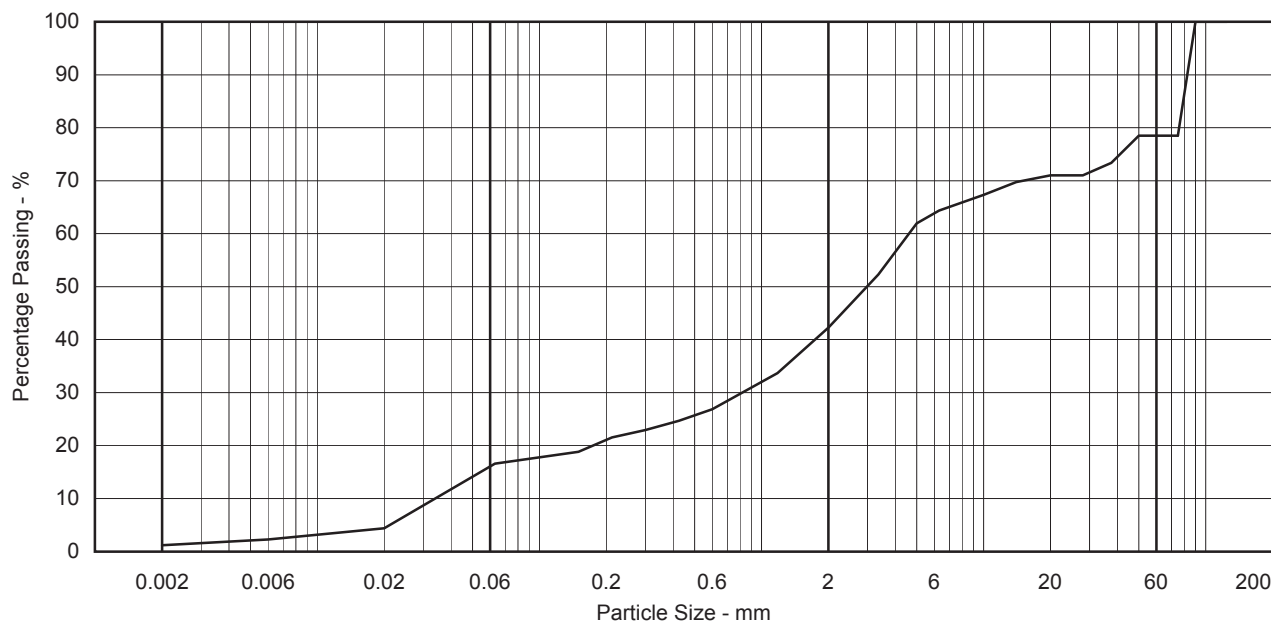
Cobbles	21.5
Gravel	36.3
Sand	26.5
Silt	14.6
Clay	1.1

Particle Diameter - mm

D100	90
D60	4.6
D10	0.034
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	135.3

Notes
Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



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BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette





SITE INVESTIGATION AND LABORATORY SERVICES

Site SHETLAND SPACE CENTRE - PRELIMINARY INVESTIGATION

Contract No **A13753**

Client AECOM

Hole TP48

Engineer

Sample Ref

Depth (m) 0.70

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	98
20.0 mm	98
14.0 mm	98
10.0 mm	96
6.30 mm	93
5.00 mm	91
3.35 mm	83
2.00 mm	71
1.18 mm	58
600 µm	47
425 µm	43
300 µm	39
212 µm	36
150 µm	31
63 µm	27
20 µm	7
6 µm	4
2 µm	2

Non Engineering Description
Brown very silty very gravelly SAND. Gravel is fine to coarse

Sample Proportions - %

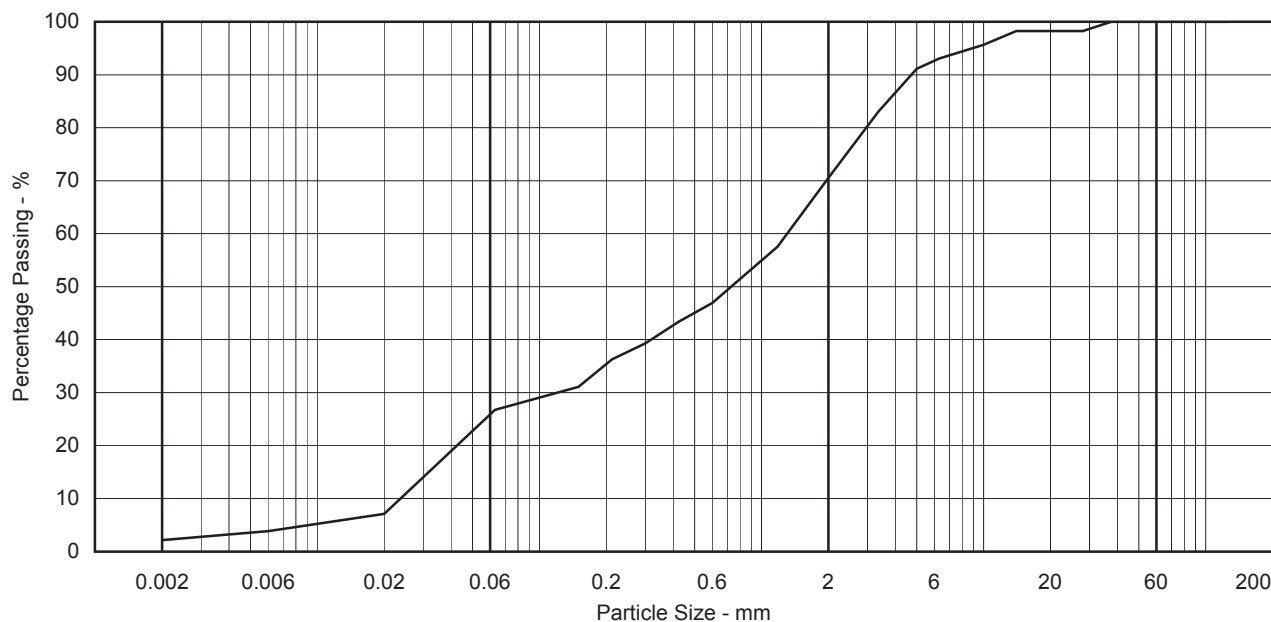
Cobbles	0.0
Gravel	29.5
Sand	45.2
Silt	23.2
Clay	2.1

Particle Diameter - mm

D100	38
D60	1.3
D10	0.024
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	54.2

Notes
Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



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PARTICLE SIZE DISTRIBUTION
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving
BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette



Samples of soil and rock taken during the site works are examined in the laboratory and assessments of their characteristics used to supplement field observations, and in-situ and laboratory test results, in the preparation of the borehole records. Preparation and testing is carried out to the requirements of British or other international Standards where applicable, or otherwise in accordance with good practice. UKAS accredited tests are indicated thus : (U). All other tests reported or opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

LABORATORY TESTING (SOILS) CLASSIFICATION TESTS

Determination of moisture content (U)
Determination of liquid limit (U)
Determination of plastic limit and plasticity index (U)
Determination of bulk density (U)
Determination of particle density (U)
Sieve analysis (wet or dry sieving) (U)
Sedimentation analysis (pipette or hydrometer) (U)

STANDARD

BS 1377 : Part 2 : 1990, Section 3.2
BS 1377 : Part 2 : 1990, Section 4.2 and 4.3
BS 1377 : Part 2 : 1990, Section 5
BS 1377 : Part 2 : 1990, Section 7.2
BS 1377 : Part 2 : 1990, Section 8.2 and 8.3
BS 1377 : Part 2 : 1990, Section 9.2 and 9.3
BS 1377 : Part 2 : 1990, Section 9.4 and 9.5

CHEMICAL AND CONTAMINATION TESTS

An extensive range of UKAS and MCERTS chemical and contamination test procedures is available for the identification and quantification of levels of contamination in the ground. Selection of the test methodology and suite of contaminants to be determined is based upon site history, conditions revealed in the course of the investigation, and intended future use. Procedures are described and referenced as appropriate in the text of this report.

COMPACTION RELATED TESTS

Determination of dry density/moisture content relationship (U)
Determination of minimum & maximum density
Determination of moisture condition value (MCV) (U)
Determination of MCV/moisture content relationship (U)
Determination of California Bearing Ratio (U)

BS 1377 : Part 4 : 1990, Section 3
BS 1377 : Part 4 : 1990, Section 4
BS 1377 : Part 4 : 1990, Section 5
BS 1377 : Part 4 : 1990, Section 5
BS 1377 : Part 4 : 1990, Section 7

CONSOLIDATION AND STRENGTH TESTS

Determination of one-dimensional consolidation properties (U)
Determination of shear strength by direct shear (small shearbox) (U)
Determination of shear strength by direct shear (large shearbox) (U)
Determination of undrained shear strength in triaxial compression (U)
Determination of shear strength
with pore water pressure measurements (U)
Hand Shear Vane (U)

BS 1377 : Part 5 : 1990, Section 3
BS 1377 : Part 7 : 1990, Section 4
BS 1377 : Part 7 : 1990, Section 5
BS 1377 : Part 7 : 1990, Section 8 and 9

BS 1377 : Part 8 : 1990
NZ Geotechnical Society Inc Aug 2001

AGGREGATE TESTS

Particle size distribution (U)
Particle size distribution (U)
Flakiness Index (U)
Ten percent fines value (dry and soaked) (U)
Resistance to fragmentation by Los Angeles method (U)

BS 812 : Part 103 : 1985, Section 103.1
BS EN 933-1 : 2012
BS EN 933-3 : 2012
BS 812 : Part 111 : 1990
BS EN 1097-2 : 2010

LABORATORY TESTING (ROCKS)

The laboratory testing of rock specimens has not reached the degree of standardisation achieved for soils testing. A wide range of test procedures are described in the relevant literature. All these methods are to a greater or lesser degree unique to particular contexts (ie, relative to a specific rock type or individual project design requirements).

TEST

Determination of point load strength (U)
End preparation of Rock Specimens (U)
Determination of unconfined compressive strength (U)
Determination of unconfined compressive strength (U)
Determination of dry density and porosity (U)
Determination of water content (U)
Slake Durability Index (U)

ISRM Commission on Testing Methods, 1985
ASTM Testing method D4543-08
ISRM Commission on Testing Methods, 1985
ASTM Testing method D7012-14
ISRM Commission on Testing Methods, 1985
ISRM Commission on Testing Methods, 1985
ISRM Commission on Testing Methods, 1985

LABORATORY TESTING (CONCRETE)

Samples of concrete taken during the site works are examined in the laboratory and testing is carried out to the requirements of British or other international Standards where applicable, or otherwise in accordance with good practice.

CONCRETE RELATED TESTS

Determination of unconfined compressive strength
Determination of shape, dimensions and other requirements for specimens and moulds
Estimated Actual Strength & Estimated Potential Strength

SOIL DESCRIPTION

Laboratory (non-engineering) soil descriptions are generally given in accordance with Clause 41 of BS 5930 : 1999

Originator

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**SOIL, AGGREGATE, ROCK CONCRETE
TESTING**



Appendix X

DM

GW

Sheet 1 of 2





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