



APPENDIX 4-6

HES TRIAL PIT MONITORING REPORT

**SEVEN HILLS WIND FARM
DECEMBER 2021 SITE INVESTIGATION**

FACTUAL SITE INVESTIGATION REPORT

FINAL REPORT

Prepared for:
ENERGIA

Prepared by:
HYDRO-ENVIRONMENTAL SERVICES

DOCUMENT INFORMATION

DOCUMENT TITLE:	SEVEN HILLS WIND FARM – DECEMBER 2021 SITE INVESTIGATION FACTUAL SITE INVESTIGATION ASSESSMENT REPORT
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1. INTRODUCTION

Hydro-Environmental Services (HES) were commissioned by MKO, on behalf of Energia, to supervise site investigation works at the site of the proposed Seven Hills Wind Farm, Co. Roscommon.

The site investigation was completed to provide detailed factual geological and hydrogeological information for the proposed discharge outfall locations associated with the proposed wind farm development.

The sitework commenced on December 16th 2021 and was completed on 21st December 2021.

2. SITE AND GEOLOGY

The proposed Seven Hills Wind Farm is located between Dysart and Brideswell, Co. Roscommon. The R363 bisects the proposed wind farm, forming a Northern and Southern cluster. The Northern Cluster is located ~1.6km northeast of Dysart and consists of 7 no. proposed turbines. The Southern Cluster is located ~3.3km southeast of Dysart and ~11km northwest of Athlone town and consists of 13 no. proposed turbines.

The sitework was carried predominantly on agricultural grassland primarily used for the grazing of sheep, and also across areas of rough scrub, often strewn with boulders.

The general area of the proposed Seven Hills Wind Farm Site is mapped by the GSI as being overlain by Limestone Tills with some areas of bedrock outcrop mapped on higher ground and isolated ribbons of esker deposits mapped to the south of the site.

The GSI indicate that the site is underlain by undifferentiated Visean Limestone.

3. SITEWORK

A total of 39 no. trial pits were completed at the site using a CAT backhoe excavator. The trial pits were excavated to depths ranging from 1.15 to 2.1mbgl (metres below ground level). The trial pits were logged in accordance with BS5930 and photographed by a HES engineer.

28 no. trial pits were completed in the southern cluster of the proposed Seven Hills Wind Farm site. The trial pit locations are shown in **Figure A**. These trial pit excavations ranged from 1.35m to 2.1mbgl. Bedrock was not encountered in any of the trial pits, however several pits encountered large limestone boulders and as a result were unable to excavated deeper. The subsoils were described as a combination of a brown sandy gravelly clay TOPSOIL overlying clayey sandy GRAVEL and sandy gravelly CLAY with cobbles and boulders of limestone.

An additional 11 no. trial pits excavated across the area of the proposed Northern Cluster. These site investigation locations are shown in Error! Reference source not found.. The trial pit excavations ranged from 1.15 to 2.0mbgl. The trial pits did not encounter any bedrock, however several pits encountered large boulders and were unable to proceed deeper. The soils/subsoils generally comprised of a brown gravelly clay TOPSOIL overlying yellowish brown sandy gravelly CLAY and greysih brown gravelly SAND and sandy GRAVEL with frequent cobbles and boulders of limestone.

The trial pit logs are attached as **Appendix I**.

Bulk samples were taken from each trial pit. These samples were delivered to NTML Ltd, Tullow, Co. Carlow for laboratory testing. PSD analysis results arising from the laboratory testing of the bulk samples are attached as **Appendix II**. Density analysis and permeability test results are attached as **Appendix III**.

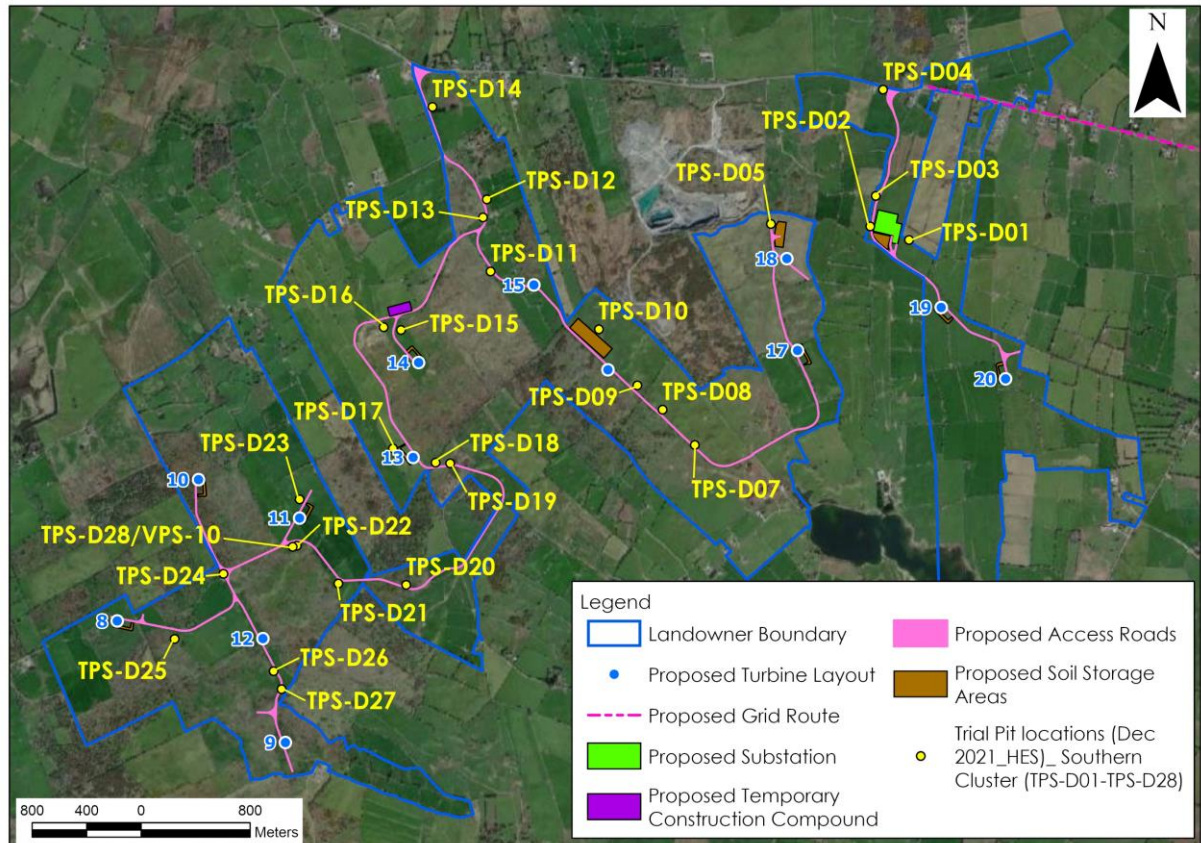


Figure A: Trial Pit Locations in Southern Cluster

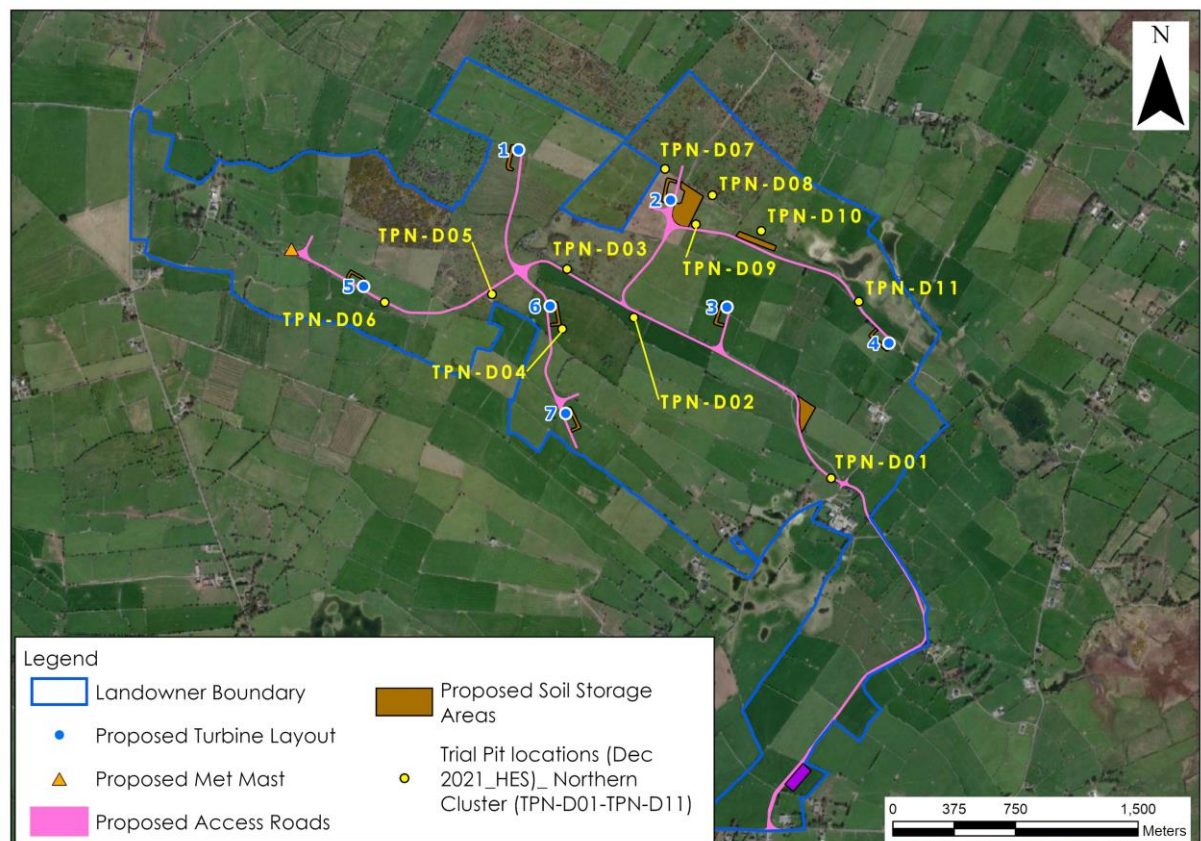


Figure B: Trial Pit Locations in Northern Cluster

APPENDICES

Appendix I: Trial Pit Geological Logs



Project No: P1500-0
Site: Seven Hills WF, Co. Roscommon
Client: Energia

Trial Pit Log

Date started: 20/12/2021
Date finished: 20/12/2021

Trial Pit No: TPN-D01
Easting: 587490
Northing: 747168
Elevation: 70.7mOD

SUBSURFACE PROFILE

Depth	Symbol	Depth/Elev.	Description	Water Strikes	Sample Type	Comments
0.00		70.70 0.00	Ground Surface Dark brown slightly gravelly CLAY (TOPSOIL) with rootlets and occasional gravels			
1.00		70.20 0.50	Creamy yellow, slightly sandy, very gravelly SILT/CLAY with cobbles and boulders of limestone Gravels are subangular to subrounded			
2.00		68.70 2.00			B	Bulk sample taken at 1.8mbgl



Remarks:

Trial hole completed ~10m to the NE of discharge point.
 Good drainage. Reclaimed farmland.
 No ponding or karst features recorded.

Sample: Bulk sample taken at 1.8mbgl

Sample ID: TPN-D01

Logged by: C.McG

Scale as shown

Sheet: 1 of 1



Project No: P1500-0
Site: Seven Hills WF, Co. Roscommon
Client: Energia

Trial Pit Log

Date started: 20/12/2021
Date finished: 20/12/2021

Trial Pit No: TPN-D02
Easting: 586773
Northing: 747754
Elevation: 87.63mOD

SUBSURFACE PROFILE

Depth	Symbol	Depth/Elev.	Description	Water Strikes	Sample Type	Comments
0.00		87.63 0.00	Ground Surface Brown, slightly gravelly CLAY (TOPSOIL) with rootlets			
		87.33 0.30	Loose, light brown to grey, very gravelly SILT/CLAY with subangular to subrounded cobbles and boulders of limestone			
1.00						
		85.83 1.80				
2.00						



Remarks:

No karst features.
 Reclaimed farmland.
 No ponding, good drainage.

Sample: Bulk sample taken at 1.3mbgl

Sample ID: TPN-D02

Logged by: C.McG

Scale as shown

Sheet: 1 of 1



Project No: P1500-0

Site: Seven Hills WF, Co. Roscommon

Client: Energia

Trial Pit Log

Date started: 20/12/2021

Date finished: 20/12/2021

Trial Pit No: TPN-D03

Easting: 586529

Northing: 747931

Elevation: 92.8mOD

SUBSURFACE PROFILE

Depth	Symbol	Depth/Elev.	Description	Water Strikes	Sample Type	Comments
0.00		92.80	Ground Surface			
		0.00	Brown CLAY (TOPSOIL) with rootlets and subangular gravels and pebbles			
		92.60				
		0.20	Loose, grey, slightly clayey, very gravelly SAND with cobbles and boulders of limestone			
			Gravels and cobbles are subangular to subrounded			
1.00						
		91.50				
		1.30	EOH - Refusal due to large boulder		B	Bulk sample taken at 1.2mbgl



Remarks:

No karst features.
Reclaimed farmland.
Very good drainage.

Sample: Bulk sample taken at 1.2mbgl

Sample ID: TPN-D03

Logged by: C.McG

Scale as shown

Sheet: 1 of 1



Project No: P1500-0
Site: Seven Hills WF, Co. Roscommon
Client: Energia

Trial Pit Log

Date started: 21/12/2021
Date finished: 21/12/2021

Trial Pit No: TPN-D04
Easting: 586511
Northing: 747713
Elevation: 85.63mOD

SUBSURFACE PROFILE

Depth	Symbol	Depth/Elev.	Description	Water Strikes	Sample Type	Comments
0.00		85.63	Ground Surface			
		0.00	Brown, slightly gravelly CLAY (TOPSOIL)			
		85.53				
		0.10	Orange-brown, gravelly SILT/CLAY with frequent subrounded cobbles of limestone			
		85.23				
		0.40	Loose, light grey, slightly clayey, very sandy, angular to subangular GRAVELS with frequent cobbles and boulders of limestone			
1.00						
		84.23			B	Bulk sample taken at 1.4mbgl
		1.40				



Remarks:

Undulating local topography.
 Reclaimed grassland.
 Good drainage. No karst, no ponding.

Sample: Bulk sample taken at 1.4mbgl

Sample ID: TPN-D04

Logged by: C.McG

Scale as shown

Sheet: 1 of 1



Project No: P1500-0
Site: Seven Hills WF, Co. Roscommon
Client: Energia

Trial Pit Log

Date started: 21/12/2021
Date finished: 21/12/2021

Trial Pit No: TPN-D05
Easting: 586255
Northing: 747840
Elevation: 90.59mOD

SUBSURFACE PROFILE

Depth	Symbol	Depth/Elev.	Description	Water Strikes	Sample Type	Comments
0.00		90.59 0.00	Ground Surface Dark brown CLAY (TOPSOIL) with rootlets and cobbles			
		90.29 0.30	Loose, light grey, slightly clayey, very sandy GRAVELS with frequent cobbles and boulders of limestone Gravels are subangular to subrounded Clasts are angular to subangular and make up ~ 20% of total volume			
1.00		88.99 1.60			B	Bulk sample taken at 1.6mbgl



Remarks:

Unrelcaimed rough grassland with boulders protruding at surface.
 Locally undulating topography.
 Good drainage.

Sample: Bulk sample taken at 1.6mbgl

Sample ID: TPN-D05

Logged by: C.McG

Scale as shown

Sheet: 1 of 1



Project No: P1500-0
Site: Seven Hills WF, Co. Roscommon
Client: Energia

Trial Pit Log

Date started: 21/12/2021
Date finished: 21/12/2021

Trial Pit No: TPN-D06
Easting: 585864
Northing: 747812
Elevation: 88.41mOD

SUBSURFACE PROFILE

Depth	Symbol	Depth/Elev.	Description	Water Strikes	Sample Type	Comments
0.00		88.41	Ground Surface			
		0.00	Brown slightly gravelly CLAY (TOPSOIL) with subrounded cobbles and boulders			
		88.21	Gravel is subangular to subrounded			
		0.20	Loose light grey, slightly clayey, very sandy GRAVELS with frequent cobbles and boulders of limestone			
			Cobbles and boulders account for ~40% of total volume. Matrix is comprised of very gravelly sand			
1.00					B	Bulk sample taken at 1.0mbgl
		87.26				
		1.15				



Remarks:

Undulating local topography.
 Reclaimed grassland.
 Good drainage. No karst, no ponding.

Sample: Bulk sample taken at 1.0mbgl

Sample ID: TPN-D06

Logged by: C.McG

Scale as shown

Sheet: 1 of 1



Project No: P1500-0
Site: Seven Hills WF, Co. Roscommon
Client: Energia

Trial Pit Log

Date started: 21/12/2021
Date finished: 21/12/2021

Trial Pit No: TPN-D07
Easting: 586887
Northing: 748294
Elevation: 73.78mOD

SUBSURFACE PROFILE

Depth	Symbol	Depth/Elev.	Description	Water Strikes	Sample Type	Comments
0.00		73.78	Ground Surface			
		0.00	Dark brown, gravelly CLAY (TOPSOIL) with pebbles, cobbles and large boulders of limestone			
		73.48				
		0.30	Loose, damp, pale grey, slightly clayey, very gravelly SAND with frequent cobbles and boulders of limestone Clasts are subangular to subrounded			
1.00						
		72.18			B	Bulk sample taken at 1.5mbgl
		1.60				



Remarks:

Unreclaimed grassland with boulders and cobbles protruding at surface.
 Flat to gently undulating topography. Good drainage. No karst, no ponding.

Sample: Bulk sample taken at 1.5mbgl

Sample ID: TPN-D07

Logged by: C.McG

Scale as shown

Sheet: 1 of 1



Project No: P1500-0
Site: Seven Hills WF, Co. Roscommon
Client: Energia

Trial Pit Log

Date started: 21/12/2021
Date finished: 21/12/2021

Trial Pit No: TPN-D08
Easting: 587061
Northing: 748198
Elevation: 71.35mOD

SUBSURFACE PROFILE

Depth	Symbol	Depth/Elev.	Description	Water Strikes	Sample Type	Comments
0.00		71.35	Ground Surface			
		0.00	Brown pebbly CLAY (TOPSOIL) with rootlets			
		71.25				
		0.10	Medium dense, orange-brown, gravelly SILT/CLAY			
		70.95				
		0.40	Loose, light grey, slightly clayey, very gravelly SAND with large subangular to subrounded boulders and cobbles of limestone		B	Bulk sample taken at 1.0mbgl
			Clasts make up 40% of total volume			
1.00						
		70.05				
		1.30				



Remarks:

Unreclaimed grassland with boulders and cobbles protruding at surface.
 Good drainage. No karst, no ponding.

Sample: Bulk sample taken at 1.0mbgl

Sample ID: TPN-D08

Logged by: C.McG

Scale as shown

Sheet: 1 of 1



Project No: P1500-0
Site: Seven Hills WF, Co. Roscommon
Client: Energia

Trial Pit Log

Date started: 21/12/2021
Date finished: 21/12/2021

Trial Pit No: TPN-D09
Easting: 587000
Northing: 748092
Elevation: 75.18mOD

SUBSURFACE PROFILE

Depth	Symbol	Depth/Elev.	Description	Water Strikes	Sample Type	Comments
0.00		75.18	Ground Surface			
		0.00	Brown, slightly sandy, CLAY (TOPSOIL)			
			Medium dense, orange-brown, slightly sandy, gravelly SILT/CLAY			
		74.68				
		0.50	Loose, light grey, clayey, very gravelly SAND with cobbles and boulders of limestone			
1.00						
		73.58				
		1.60				



Remarks:

Reclaimed grassland.
 Locally undulating topography - depressions to the north.
 Good drainage. No karst, no ponding.

Sample: Bulk sample taken at 1.2mbgl

Sample ID: TPN-D09

Logged by: C.McG

Scale as shown

Sheet: 1 of 1



Project No: P1500-0

Site: Seven Hills WF, Co. Roscommon

Client: Energia

Trial Pit Log

Date started: 21/12/2021

Date finished: 21/12/2021

Trial Pit No: TPN-D10

Easting: 587238

Northing: 748067

Elevation: 70.51mOD

SUBSURFACE PROFILE

Depth	Symbol	Depth/Elev.	Description	Water Strikes	Sample Type	Comments
0.00		70.51 0.00	Ground Surface Brown slightly gravelly CLAY (TOPSOIL) with rootlets and cobbles and large boulders of limestone at the surface			
		70.31 0.20	Gravel is subangular to subrounded Loose, light brown to pale grey, slightly clayey, very gravelly SAND with subangular to subrounded cobbles and boulders of limestone			
1.00						
		68.81 1.70	EOH - Refusal due to large boulders		B	Bulk sample taken at 1.5mbgl



Remarks:

Undulating land with general slope to the north.
Unrelcaimed land with boulders at surface.
Hard digging. Good drainage. No karst, no ponding.

Sample: Bulk sample taken at 1.5mbgl

Sample ID: TPN-D10

Logged by: C.McG

Scale as shown

Sheet: 1 of 1



Project No: P1500-0
Site: Seven Hills WF, Co. Roscommon
Client: Energia

Trial Pit Log

Date started: 21/12/2021
Date finished: 21/12/2021

Trial Pit No: TPN-D11
Easting: 587594
Northing: 747810
Elevation: 69.58mOD

SUBSURFACE PROFILE

Depth	Symbol	Depth/Elev.	Description	Water Strikes	Sample Type	Comments
0.00		69.58	Ground Surface			
		0.00	Brown slightly gravelly CLAY (TOPSOIL) with rootlets			
		69.38	Gravel is subangular to subrounded			
		0.20	Medium dense, brown, slightly sandy, gravelly SILT/CLAY with subangular cobbles and boulders of limestone			
1.00						
2.00		67.58				
		2.00				



Remarks:

No karst features. No ponding.
 Reclaimed farmland - sloping to the north.
 Good drainage.

Sample: Bulk sample taken at 1.5mbgl

Sample ID: TPN-D11

Logged by: C.McG

Scale as shown

Sheet: 1 of 1



Project No: P1500-0
Site: Seven Hills WF, Co. Roscommon
Client: Energia

Trial Pit Log

Date started: 17/12/2021
Date finished: 17/12/2021

Trial Pit No: TPS-D01
Easting: 591009
Northing: 744683
Elevation: 91.5mOD

SUBSURFACE PROFILE

Depth	Symbol	Depth/Elev.	Description	Water Strikes	Sample Type	Comments
0.00		91.50 0.00	Ground Surface Brown, sandy CLAY (TOPSOIL) with occasional pebbles			
		91.08 0.42	Medium dense, grey, sandy, gravelly CLAY with occasional subangular cobbles of limestone			
1.00						
		90.10 1.40	Loose, grey, slightly clayey, very sandy, GRAVELS of limestone with occasional large boulders		B	Bulk sample taken at 1.5mbgl
2.00		89.50 2.00	EOH - refusal on large boulder			



Remarks:

No groundwater encountered.
No karst. Good drainage.
No ponding.

Sample: Bulk sample taken at 1.5mbgl

Sample ID: TPS-D01

Logged by: M. Gill

Scale as shown

Sheet: 1 of 1



Project No: P1500-0
Site: Seven Hills WF, Co. Roscommon
Client: Energia

Trial Pit Log

Date started: 17/12/2021
Date finished: 17/12/2021

Trial Pit No: TPS-D02
Easting: 590840
Northing: 744744
Elevation: 97.59mOD

SUBSURFACE PROFILE

Depth	Symbol	Depth/Elev.	Description	Water Strikes	Sample Type	Comments
0.00		97.59	Ground Surface		B	Bulk sample taken at 1.5mbgl
		0.00	Brown, sandy TOPSOIL with some large cobbles of limestone near ground level			
		97.39				
		0.20	Grey, very sandy, gravelly SILT/CLAY with subrounded to subangular cobbles and occasional boulders of limestone			
1.00						
		95.79				
		1.80				
2.00						



Remarks:

No groundwater encountered.
Land slopes locally to the north.
No karst, no ponding.

Sample: Bulk sample taken at 1.5mbgl

Sample ID: TPS-D02

Logged by: M. Gill

Scale as shown

Sheet: 1 of 1



Project No: P1500-0

Site: Seven Hills WF, Co. Roscommon

Client: Energia

Trial Pit Log

Date started: 16/12/2021

Date finished: 16/12/2021

Trial Pit No: TPS-D03

Easting: 590865

Northing: 744877

Elevation: 90.88mOD

SUBSURFACE PROFILE

Depth	Symbol	Depth/Elev.	Description	Water Strikes	Sample Type	Comments
0.00		90.88	Ground Surface			
		0.00	Brown, sandy and gravelly organic CLAY (TOPSOIL)			
		90.68				
		0.20	Brownish grey, very sandy, very clayey GRAVEL with frequent angular to subangular cobbles and large rectangular and rounded limestone boulders			
1.00						
		89.08				
		1.80	EOH - Refusal on large boulder			
2.00						



Remarks:

No groundwater encountered.
No karst, no ponding.
Good drainage.

Sample: Bulk sample taken at 1.2mbgl

Sample ID: TPS-D03

Logged by: M. Gill

Scale as shown

Sheet: 1 of 1



Project No: P1500-0
Site: Seven Hills WF, Co. Roscommon
Client: Energia

Trial Pit Log

Date started: 17/12/2021
Date finished: 17/12/2021

Trial Pit No: TPS-D04
Easting: 590897
Northing: 745340
Elevation: 93.783mOD

SUBSURFACE PROFILE

Depth	Symbol	Depth/Elev.	Description	Water Strikes	Sample Type	Comments
0.00		93.78	Ground Surface			
		0.00	Brown, slightly sandy, CLAY (TOPSOIL) with occasional gravels of limestone			
		93.46				
		0.32	Loose, grey, slightly clayey, very sandy, GRAVELS of limestone with occasional large cobbles and boulders of angular to subangular limestone			
1.00						
		92.43			B	Bulk sample taken at 1.3mbgl
		1.35	EOH - refusal on large boulder			



Remarks:

No groundwater encountered.
 Good drainage.
 No karst, no ponding.

Sample: Bulk sample taken at 1.3mbgl

Sample ID: TPS-D04

Logged by: M. Gill

Scale as shown

Sheet: 1 of 1



Project No: P1500-0
Site: Seven Hills WF, Co. Roscommon
Client: Energia

Trial Pit Log

Date started: 16/12/2021
Date finished: 16/12/2021

Trial Pit No: TPS-D05
Easting: 590405
Northing: 744755
Elevation: 103.59mOD

SUBSURFACE PROFILE

Depth	Symbol	Depth/Elev.	Description	Water Strikes	Sample Type	Comments
0.00		103.59 0.00	Ground Surface Orange-brown, clayey TOPSOIL with roots and occasional gravels			
		103.29 0.30	Loose, grey, clayey, sandy, angular to subrounded GRAVELS and BOULDERS of limestone Clayey, sandy, gravelly matrix			
1.00		102.39 1.20			B	Bulk sample taken at 1.0mbgl



Remarks:

No groundwater encountered.
 Free draining.
 No karst, no ponding.

Sample: Bulk sample taken at 1.0mbgl

Sample ID: TPS-D05

Logged by: M. Gill

Scale as shown

Sheet: 1 of 1



Project No: P1500-0
Site: Seven Hills WF, Co. Roscommon
Client: Energia

Trial Pit Log

Date started: 16/12/2021
Date finished: 16/12/2021

Trial Pit No: TPS-D06
Easting: 585864
Northing: 747812
Elevation: 68.69mOD

SUBSURFACE PROFILE

Depth	Symbol	Depth/Elev.	Description	Water Strikes	Sample Type	Comments
0.00		68.69 0.00	Ground Surface Brown, sandy, CLAY (TOPSOIL)			
		68.29 0.40	Loose, grey, very sandy subrounded GRAVEL with cobbles and occasional limestone boulders			
1.00						
		66.99 1.70	EOH - refusal due to angular rock within sandy matix			

B Bulk sample taken at 0.75mbgl
Orange-brown sandy CLAY at 1mbgl



Remarks:

No groundwater encountered.
Good drainage.
No karst, no ponding.

Sample: Bulk sample taken at 0.75mbgl

Sample ID: TPS-D06

Logged by: M. Gill

Scale as shown

Sheet: 1 of 1



Project No: P1500-0
Site: Seven Hills WF, Co. Roscommon
Client: Energia

Trial Pit Log

Date started: 16/12/2021
Date finished: 16/12/2021

Trial Pit No: TPS-D07
Easting: 590069
Northing: 743791
Elevation: 75.02mOD

SUBSURFACE PROFILE

Depth	Symbol	Depth/Elev.	Description	Water Strikes	Sample Type	Comments
0.00		75.02 0.00	Ground Surface Orange-brown, sandy , gravelly CLAY (TOPSOIL)		B	Bulk sample taken at 0.6mbgl
		74.52 0.50	Grey, rounded limestone SAND and GRAVEL			
1.00		74.02 1.00	Light grey, slightly gravelly, sandy SILT			
		73.87 1.15	Grey, rounded limestone SAND and GRAVEL with large boulders			
2.00		73.17 1.85	EOH - Refusal due to large boulder			



Remarks:

No groundwater encountered.
 Good drainage and aquifer protection.
 No karst, no ponding.

Sample: Bulk sample taken at 0.6mbgl

Sample ID: TPS-D07

Logged by: M. Gill

Scale as shown

Sheet: 1 of 1



Project No: P1500-0
Site: Seven Hills WF, Co. Roscommon
Client: Energia

Trial Pit Log

Date started: 16/12/2021
Date finished: 16/12/2021

Trial Pit No: TPS-D08
Easting: 589928
Northing: 743945
Elevation: 84.89mOD

SUBSURFACE PROFILE

Depth	Symbol	Depth/Elev.	Description	Water Strikes	Sample Type	Comments
0.00		84.89	Ground Surface			
		0.00	Brown, sandy, CLAY (TOPSOIL) with rootlets			
		84.64				
		0.25	Light brown, slightly sandy, SILT/CLAY with occasional angular gravels			
		84.29				
		0.60	Loose, grey to white, slightly clayey, very sandy, angular to subangular GRAVELS of limestone with occasional large boulders			
1.00						
					B	Bulk sample taken at 1.5mbgl
2.00						
		82.79				
		2.10				



Remarks:

No groundwater encountered.
 Subsoil geology indicates good drainage.
 No karst, no ponding.

Sample: Bulk sample taken at 1.5mbgl

Sample ID: TPS-D08

Logged by: M. Gill

Scale as shown

Sheet: 1 of 1



Project No: P1500-0
Site: Seven Hills WF, Co. Roscommon
Client: Energia

Trial Pit Log

Date started: 16/12/2021
Date finished: 16/12/2021

Trial Pit No: TPS-D09
Easting: 589818
Northing: 744051
Elevation: 77.64mOD

SUBSURFACE PROFILE

Depth	Symbol	Depth/Elev.	Description	Water Strikes	Sample Type	Comments
0.00		77.64	Ground Surface		B	Bulk sample taken at 1.0mbgl
		0.00	Brown, sandy CLAY (TOPSOIL)			
		77.54				
		0.10	Grey, very sandy, silty, clayey GRAVEL with large angular cobbles of limestone			
1.00						
		76.24				
		1.40				



Remarks:

No groundwater encountered. Hard digging.
 Weathered limestone cobbles in a gravelly matrix.
 Undulating land. Reclaimed field. No karst, no ponding.

Sample: Bulk sample taken at 1.0mbgl

Sample ID: TPS-D09

Logged by: M. Gill

Scale as shown

Sheet: 1 of 1



Project No: P1500-0

Site: Seven Hills WF, Co. Roscommon

Client: Energia

Trial Pit Log

Date started: 16/12/2021

Date finished: 16/12/2021

Trial Pit No: TPS-D10

Easting: 589650

Northing: 744297

Elevation: 86.37mOD

SUBSURFACE PROFILE

Depth	Symbol	Depth/Elev.	Description	Water Strikes	Sample Type	Comments
0.00		86.37	Ground Surface		B	Bulk sample taken at 0.8mbgl
		0.00	Organic, clayey TOPSOIL with rootlets			
		86.27				
		0.10	Loose, grey, slightly clayey, very sandy GRAVEL with large angular and subangular cobbles and boulders of limestone			
1.00						
		84.77				
		1.60				



Remarks:

Very hard digginng
No groundwater encountered.
Subsoil geology indicates good drainage. No karst, no ponding.

Sample: Bulk sample taken at 0.8mbgl

Sample ID: TPS-D10

Logged by: M. Gill

Scale as shown

Sheet: 1 of 1



Project No: P1500-0
Site: Seven Hills WF, Co. Roscommon
Client: Energia

Trial Pit Log

Date started: 17/12/2021
Date finished: 17/12/2021

Trial Pit No: TPS-D11
Easting: 589177
Northing: 744550
Elevation: 73.06mOD

SUBSURFACE PROFILE

Depth	Symbol	Depth/Elev.	Description	Water Strikes	Sample Type	Comments
0.00		73.06	Ground Surface			
		0.00	Brown sandy, CLAY (TOPSOIL) with rootlets			
		72.86				
		0.20	Loose, grey, poorly sorted, slightly clayey, very sandy, GRAVELS of angular limestone			
1.00						
		71.31				
		1.75	EOH - Refusal on large boulder		B	Bulk sample taken at 1.7mbgl



Remarks:

No groundwater encountered.
 Good drainage.
 No karst, no ponding.

Sample: Bulk sample taken at 1.7mbgl

Sample ID: TPS-D11

Logged by: M. Gill

Scale as shown

Sheet: 1 of 1



Project No: P1500-0
Site: Seven Hills WF, Co. Roscommon
Client: Energia

Trial Pit Log

Date started: 17/12/2021
Date finished: 17/12/2021

Trial Pit No: TPS-D12
Easting: 589144
Northing: 744786
Elevation: 76.5mOD

SUBSURFACE PROFILE

Depth	Symbol	Depth/Elev.	Description	Water Strikes	Sample Type	Comments
0.00		76.50	Ground Surface			
		0.00	Orange-brown, sandy CLAY (TOPSOIL)			
		76.25				
		0.25	Light brown CLAY			
		76.05				
		0.45	Loose, grey, very sandy, poorly sorted, subangular to subrounded GRAVELs of limestone with occasional angular boulders in a sandy matrix			
1.00						
		74.90				
		1.60	EOH - Refusal on large boulder in sand matrix			



Remarks:

No groundwater encountered.
 Good drainage.
 No karst, no ponding.

Sample: Bulk sample taken at 1.3mbgl

Sample ID: TPS-D12

Logged by: M. Gill

Scale as shown

Sheet: 1 of 1



Project No: P1500-0
Site: Seven Hills WF, Co. Roscommon
Client: Energia

Trial Pit Log

Date started: 17/12/2021
Date finished: 17/12/2021

Trial Pit No: TPS-D13
Easting: 589161
Northing: 744865
Elevation: 79.55mOD

SUBSURFACE PROFILE

Depth	Symbol	Depth/Elev.	Description	Water Strikes	Sample Type	Comments
0.00		79.55 0.00	Ground Surface Brown, slightly sandy CLAY (TOPSOIL) with occasional pebbles and gravels			
1.00		79.05 0.50	Loose, grey, slightly clayey, very sandy, angular and subangular GRAVELS with large cobbles of limestone			
2.00		77.70 1.85	EOH - Refusal on large boulder		B	Bulk sample taken at 1.6mbgl



Remarks:

No groundwater encountered.
 Good drainage. No karst, no ponding.

Sample: Bulk sample taken at 1.6mbgl

Sample ID: TPS-D13

Logged by: M. Gill

Scale as shown

Sheet: 1 of 1



Project No: P1500-0
Site: Seven Hills WF, Co. Roscommon
Client: Energia

Trial Pit Log

Date started: 17/12/2021
Date finished: 17/12/2021

Trial Pit No: TPS-D14
Easting: 588924
Northing: 745268
Elevation: 74.02mOD

SUBSURFACE PROFILE

Depth	Symbol	Depth/Elev.	Description	Water Strikes	Sample Type	Comments
0.00		74.02 0.00	Ground Surface Brown, slightly gravelly, sandy CLAY (TOPSOIL)			
1.00		73.42 0.60	Loose, grey, slightly clayey, sandy GRAVELS with occasional boulders of angular to subrounded limestone Large boulder comprises ~10% of total extracted volume			
2.00		72.22 1.80			B	Bulk sample taken at 1.6mbgl



Remarks:

No groundwater encountered.
 Good drainage.
 No karst, no ponding.

Sample: Bulk sample taken at 1.6mbgl

Sample ID: TPS-D14

Logged by: M. Gill

Scale as shown

Sheet: 1 of 1



Project No: P1500-0
Site: Seven Hills WF, Co. Roscommon
Client: Energia

Trial Pit Log

Date started: 20/12/2021
Date finished: 20/12/2021

Trial Pit No: TPS-D15
Easting: 588784
Northing: 744296
Elevation: 73.76mOD

SUBSURFACE PROFILE

Depth	Symbol	Depth/Elev.	Description	Water Strikes	Sample Type	Comments
0.00		73.76 0.00	Ground Surface			
			Soft, brown, CLAY (TOPSOIL) with rootlets and occasional pebbles and gravels			
		73.56 0.20	Light brown-grey, slightly sandy, very gravelly SILT/CLAY with frequent cobbles and boulders of limestone Cobbles and boulders make up 20% of total volume Gravels are subangular to subrounded			
1.00						
		72.26 1.50			B	Bulk sample taken at 1.3mbgl



Remarks:

No groundwater encountered.
 Very good drainage.
 No karst, no ponding.

Sample: Bulk sample taken at 1.3mbgl

Sample ID: TPS-D15

Logged by: C.McG

Scale as shown

Sheet: 1 of 1



Project No: P1500-0
Site: Seven Hills WF, Co. Roscommon
Client: Energia

Trial Pit Log

Date started: 20/12/2021
Date finished: 20/12/2021

Trial Pit No: TPS-D16
Easting: 588709
Northing: 744308
Elevation: 73.32mOD

SUBSURFACE PROFILE

Depth	Symbol	Depth/Elev.	Description	Water Strikes	Sample Type	Comments
0.00		73.32 0.00	Ground Surface Soft, brown CLAY (TOPSOIL) with occasional gravel and pebbles			
		73.02 0.30	Light brown, damp, very sandy, gravelly SILT/CLAY with occasional large angular to subrounded boulders of limestone Excavated material is slightly cohesive			
1.00						
2.00		71.22 2.10	EOH - Getting sandier at base of excavation		B	Bulk sample taken at 1.7mbgl



Remarks:

No groundwater encountered.
Reasonable drainage.
Good aquifer protection. No karst, no ponding.

Sample: Bulk sample taken at 1.7mbgl

Sample ID: TPS-D16

Logged by: M.Gill

Scale as shown

Sheet: 1 of 1



Project No: P1500-0
Site: Seven Hills WF, Co. Roscommon
Client: Energia

Trial Pit Log

Date started: 20/12/2021
Date finished: 20/12/2021

Trial Pit No: TPS-D17
Easting: 588748
Northing: 743778
Elevation: 80.41mOD

SUBSURFACE PROFILE

Depth	Symbol	Depth/Elev.	Description	Water Strikes	Sample Type	Comments
0.00		80.41	Ground Surface			
		0.00	Soft, brown CLAY (TOPSOIL) with rootlets and occasional pebbles			
		80.11				
		0.30	Loose, grey, slightly clayey, very sandy, subangular to subrounded GRAVELS with cobbles and boulders of limestone			
1.00						
		78.81				
		1.60				



Remarks:

No groundwater encountered.
 Good drainage.
 No karst, no ponding.

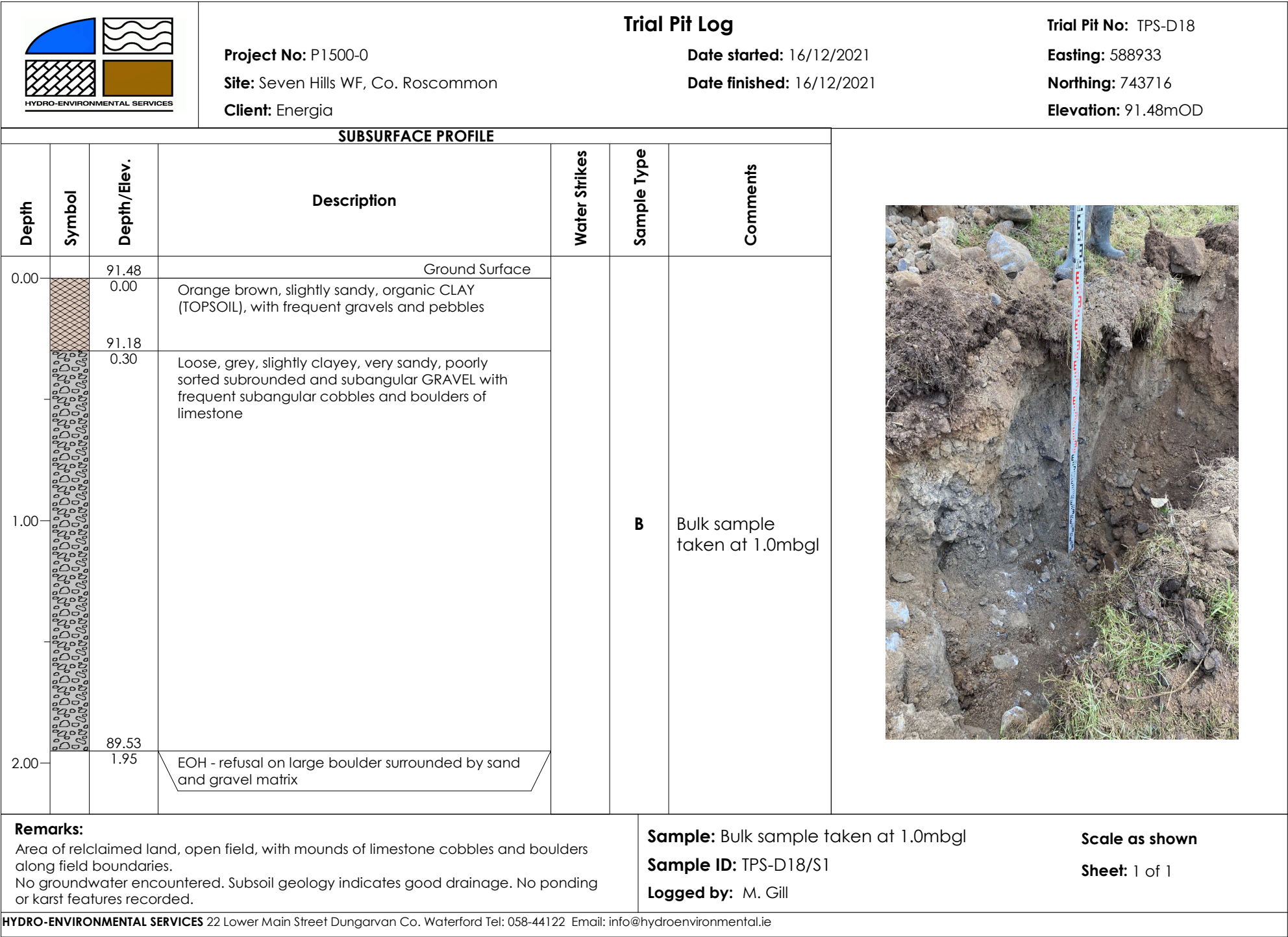
Sample: Bulk sample taken at 1.5mbgl

Sample ID: TPS-D17

Logged by: C.McG

Scale as shown

Sheet: 1 of 1





Project No: P1500-0
Site: Seven Hills WF, Co. Roscommon
Client: Energia

Trial Pit Log

Date started: 16/12/2021
Date finished: 16/12/2021

Trial Pit No: TPS-D19
Easting: 588998
Northing: 743713
Elevation: 91.29mOD

SUBSURFACE PROFILE

Depth	Symbol	Depth/Elev.	Description	Water Strikes	Sample Type	Comments
0.00		91.29	Ground Surface			
		0.00	Light brown, slightly sandy, organic CLAY (TOPSOIL), with frequent gravels and pebbles			
		91.04				
		0.25	Loose, brownish grey, slightly clayey, very sandy, poorly sorted subrounded and subangular GRAVEL with increasing subangular cobbles and boulders of limestone with depth			
1.00						
		89.59				
		1.70	EOH - large boulders surrounded by sand and gravel matrix, used ripper to get from 1.4 to 1.7mbgl			
2.00						



Remarks:

Area of reclaimed land, open field, with mounds of limestone cobbles and boulders along field boundaries.
 No groundwater encountered. Subsoil geology indicates good drainage. No ponding or karst features recorded.

Sample: Bulk sample taken at 1.5mbgl

Sample ID: TPS-D19/S1

Logged by: M. Gill

Scale as shown

Sheet: 1 of 1



Project No: P1500-0
Site: Seven Hills WF, Co. Roscommon
Client: Energia

Trial Pit Log

Date started: 16/12/2021
Date finished: 16/12/2021

Trial Pit No: TPS-D20
Easting: 588804
Northing: 743182
Elevation: 103.45mOD

SUBSURFACE PROFILE

Depth	Symbol	Depth/Elev.	Description	Water Strikes	Sample Type	Comments
0.00		103.45	Ground Surface			
		0.00	Brown, slightly sandy, clayey TOPSOIL, with frequent gravels and cobbles at ground level			
		103.15				
		0.30	Loose, grey, slightly silty/clayey, very sandy poorly sorted subrounded and subangular GRAVEL with frequent subangular cobbles and boulders of limestone			
1.00						
		102.05				
		1.40	EOH - large boulders surrounded by sand and gravel matrix		B	Bulk sample taken at 1.4mbgl



Remarks:

Area of scrub and rough undulating natural ground (no reclamation completed).
 No groundwater encountered. Subsoil geology indicates good drainage. No ponding or karst features recorded

Sample: Bulk sample taken at 1.4mbgl

Sample ID: TPS-D20/S1

Logged by: M. Gill

Scale as shown

Sheet: 1 of 1



Project No: P1500-0
Site: Seven Hills WF, Co. Roscommon
Client: Energia

Trial Pit Log

Date started: 20/12/2021
Date finished: 20/12/2021

Trial Pit No: TPS-D21
Easting: 588507
Northing: 743189
Elevation: 99.41mOD

SUBSURFACE PROFILE

Depth	Symbol	Depth/Elev.	Description	Water Strikes	Sample Type	Comments
0.00		99.41	Ground Surface			
		0.00	Brown, gravelly CLAY (TOPSOIL)			
		99.19				
		0.22	Orange-brown, gravelly CLAY			
		99.06				
		0.35	Loose, grey, slightly clayey, very sandy, subangular to subrounded GRAVELS and COBBLES of limestone with occasional boulders			
			Matrix is composed predominantly of sand			
1.00						
		97.91				
		1.50	EOH - Large boulders			



Remarks:

No groundwater encountered.
 Very good drainage.
 No karst, no ponding.

Sample: Bulk sample taken at 0.8mbgl

Sample ID: TPS-D21

Logged by: M.Gill

Scale as shown

Sheet: 1 of 1



Project No: P1500-0

Site: Seven Hills WF, Co. Roscommon

Client: Energia

Trial Pit Log

Date started: 20/12/2021

Date finished: 20/12/2021

Trial Pit No: TPS-D22

Easting: 588326

Northing: 743355

Elevation: 89.98mOD

SUBSURFACE PROFILE

Depth	Symbol	Depth/Elev.	Description	Water Strikes	Sample Type	Comments
0.00		89.98	Ground Surface			
		0.00	Brown, gravelly CLAY (TOPSOIL)			
		89.73				
		0.25	Loose, grey, very sandy GRAVEL and COBBLES of limestone with occasional large subrounded limestone boulders			
1.00						
		88.63				
		1.35	EOH - Refusal due to large boulder			



Remarks:

No groundwater encountered.
Very good drainage.
No karst, no ponding recorded.

Sample: Bulk sample taken at 0.9mbgl

Sample ID: TPS-D22

Logged by: M. Gill

Scale as shown

Sheet: 1 of 1



Project No: P1500-0

Site: Seven Hills WF, Co. Roscommon

Client: Energia

Trial Pit Log

Date started: 20/12/2021

Date finished: 20/12/2021

Trial Pit No: TPS-D23

Easting: 588338

Northing: 743558

Elevation: 82.23mOD

SUBSURFACE PROFILE

Depth	Symbol	Depth/Elev.	Description	Water Strikes	Sample Type	Comments
0.00		82.23 0.00	Ground Surface Brown, gravelly CLAY (TOPSOIL)			
		81.93 0.30	Loose, grey, very sandy, subangular to subrounded GRAVELS of limestone with occasional cobbles and 1 no. large boulder of limestone			
1.00						
		80.43 1.80				
2.00						

B

Bulk sample taken at 0.8mbgl



Remarks:

No groundwater encountered.
Very good drainage.
No karst and no ponding recorded.

Sample: Bulk sample taken at 0.8mbgl

Sample ID: TPS-D23

Logged by: M.Gill

Scale as shown

Sheet: 1 of 1



Project No: P1500-0
Site: Seven Hills WF, Co. Roscommon
Client: Energia

Trial Pit Log

Date started: 20/12/2021
Date finished: 20/12/2021

Trial Pit No: TPS-D24
Easting: 588004
Northing: 743233
Elevation: 79.63mOD

SUBSURFACE PROFILE

Depth	Symbol	Depth/Elev.	Description	Water Strikes	Sample Type	Comments
0.00		79.63	Ground Surface			
		0.00	Soft, brown, organic CLAY (TOPSOIL)			
		79.43				
		0.20	Orange brown, gravelly CLAY			
		79.23				
		0.40	Loose, grey-brown, slightly sandy, clayey GRAVELs of broken, angular and subangular gravels and cobbles of limestone			
1.00						
		77.93				
		1.70	EOH - Refusal on large boulder			
					B	Bulk sample taken at 1.55mbgl



Remarks:

Dry land.
 No groundwater encountered.
 No karst and no ponding recorded.

Sample: Bulk sample taken at 1.55mbgl

Sample ID: TPS-D24

Logged by: M. Gill

Scale as shown

Sheet: 1 of 1



Project No: P1500-0

Site: Seven Hills WF, Co. Roscommon

Client: Energia

Trial Pit Log

Date started: 20/12/2021

Date finished: 20/12/2021

Trial Pit No: TPS-D25

Easting: 587789

Northing: 742949

Elevation: 74.52mOD

SUBSURFACE PROFILE

Depth	Symbol	Depth/Elev.	Description	Water Strikes	Sample Type	Comments
0.00		74.52	Ground Surface			
		0.00	Brown, slightly sandy CLAY (TOPSOIL) with pebbles and gravels			
		74.22				
		0.30	Loose, grey, slightly silty, very sandy, subangular to subrounded COBBLES and GRAVELS of limestone with occasional large subangular boulders			
			Gravels and cobbles make up 30% of the volume Matrix is comprised of sand and gravel			
1.00						
		72.77				
		1.75	EOH - Refusal on large boulder			

B

Bulk sample taken at 1.2mbgl



Remarks:

No groundwater encountered.
Very good drainage.
No karst and no ponding recorded.

Sample: Bulk sample taken at 1.2mbgl

Sample ID: TPS-D25

Logged by: M. Gill

Scale as shown

Sheet: 1 of 1



Project No: P1500-0
Site: Seven Hills WF, Co. Roscommon
Client: Energia

Trial Pit Log

Date started: 20/12/2021
Date finished: 20/12/2021

Trial Pit No: TPS-D26
Easting: 588223
Northing: 742807
Elevation: 85.94mOD

SUBSURFACE PROFILE

Depth	Symbol	Depth/Elev.	Description	Water Strikes	Sample Type	Comments
0.00		85.94	Ground Surface			
		0.00	Brown CLAY (TOPSOIL) with rootlets			
		85.74				
		0.20	Orange-brown, gravelly CLAY with subangular to subrounded gravels			
		85.49			B	Bulk sample taken at 1.4mbgl
		0.45	Grey-brown, slightly clayey, very sandy GRAVEL with occasional subangular cobbles and boulders			
1.00						
		84.14				
		1.80				
2.00						



Remarks:

No groundwater encountered.
No karst and no ponding recorded.

Sample: Bulk sample taken at 1.4mbgl

Sample ID: TPS-D26

Logged by: M. Gill

Scale as shown

Sheet: 1 of 1



Project No: P1500-0
Site: Seven Hills WF, Co. Roscommon
Client: Energia

Trial Pit Log

Date started: 20/12/2021
Date finished: 20/12/2021

Trial Pit No: TPS-D27
Easting: 588258
Northing: 742729
Elevation: 83.67mOD

SUBSURFACE PROFILE

Depth	Symbol	Depth/Elev.	Description	Water Strikes	Sample Type	Comments
0.00		83.67 0.00	Ground Surface Orange-brown, gravelly CLAY (TOPSOIL) with rootlets			
		83.27 0.40	Loose, grey, poorly sorted, very sandy GRAVELS of limestone with occasional subrounded to rounded cobbles			
1.00						
		82.17 1.50			B	Bulk sample taken at 1.4mbgl



Remarks:

No groundwater encountered.
 Very good drainage.
 No karst and no ponding recorded.

Sample: Bulk sample taken at 1.4mbgl

Sample ID: TPS-D27

Logged by: M. Gill

Scale as shown

Sheet: 1 of 1



Project No: P1500-0
Site: Seven Hills WF, Co. Roscommon
Client: Energia

Trial Pit Log

Date started: 20/12/2021
Date finished: 20/12/2021

Trial Pit No: TPS-D28/VPS-10
Easting: 588307
Northing: 743350
Elevation: 89.02mOD

SUBSURFACE PROFILE

Depth	Symbol	Depth/Elev.	Description	Water Strikes	Sample Type	Comments
0.00		89.02	Ground Surface			
		0.00	Brown organic CLAY (TOPSOIL) with pebbles, gravels and rootlets			
		88.77				
		0.25	Loose, grey, slightly clayey, sandy GRAVEL with several large boulders of limestone			
1.00						
		87.62				
		1.40				



Remarks:

No groundwater encountered.
 Very good drainage.
 No karst and no ponding recorded.

Sample: No sample

Sample ID: No sample

Logged by: M.Gill

Scale as shown

Sheet: 1 of 1

Appendix II: Bulk Samples - PSD Laboratory Test Report

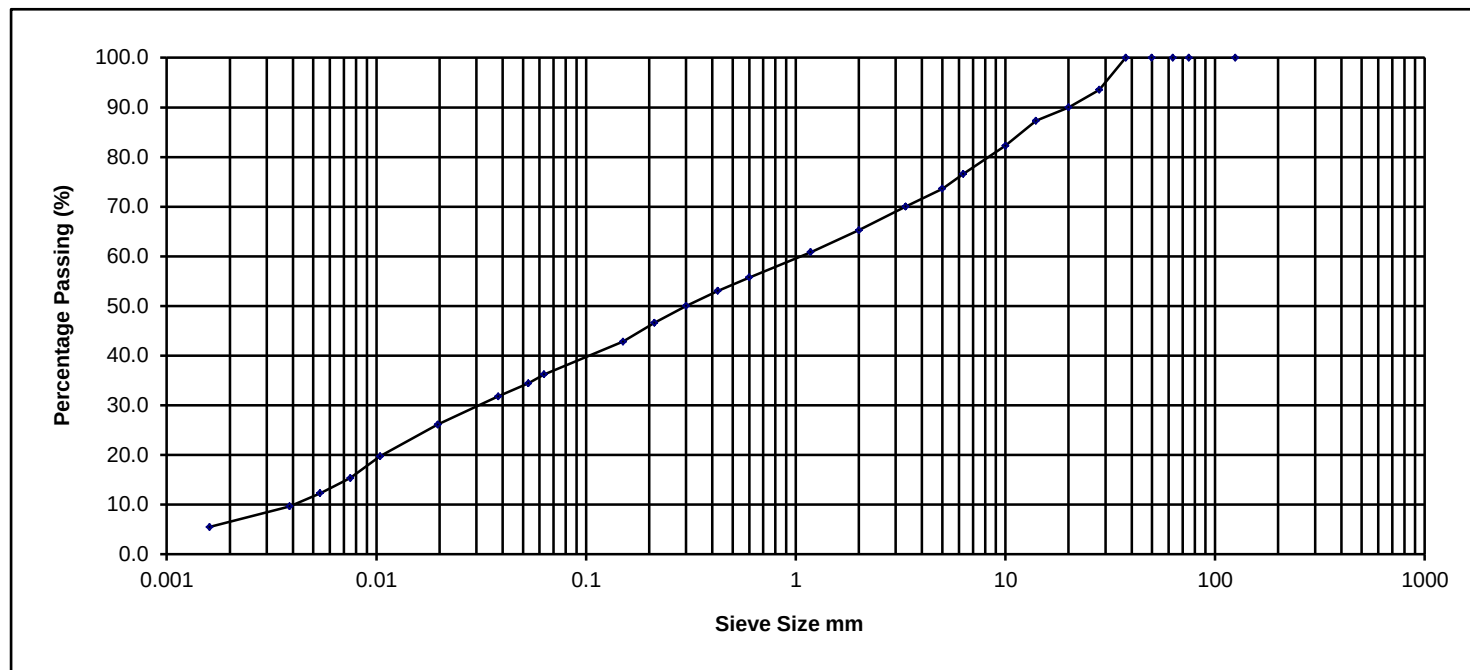
NMTL Ltd

Sieve	%
Size mm	Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	100.0
37.500	100.0
28.000	93.5
20.000	90.0
14.000	87.3
10.000	82.3
6.300	76.6
5.000	73.6
3.350	70.0
2.000	65.3
1.180	60.9
0.600	55.8
0.425	53.1
0.300	50.0
0.212	46.6
0.150	42.8
0.063	36.2
0.053	34.4
0.038	31.8
0.020	26.1
0.010	19.7
0.008	15.4
0.005	12.3
0.004	9.7
0.002	5.5

NMTL Ltd

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size										Cobbles	Boulder
Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse		
	Silt			Sand			Gravel				
5.5	30.7			29.1			34.7			0.0	0.0

Sample Description Light brown slightly sandy slightly gravelly clayey SILT.

Project No. NMTL 3486

BH/TP No. TPN

Project Seven Hills WF

Sample No. D01

Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	18/01/2022	Depth	1.80m
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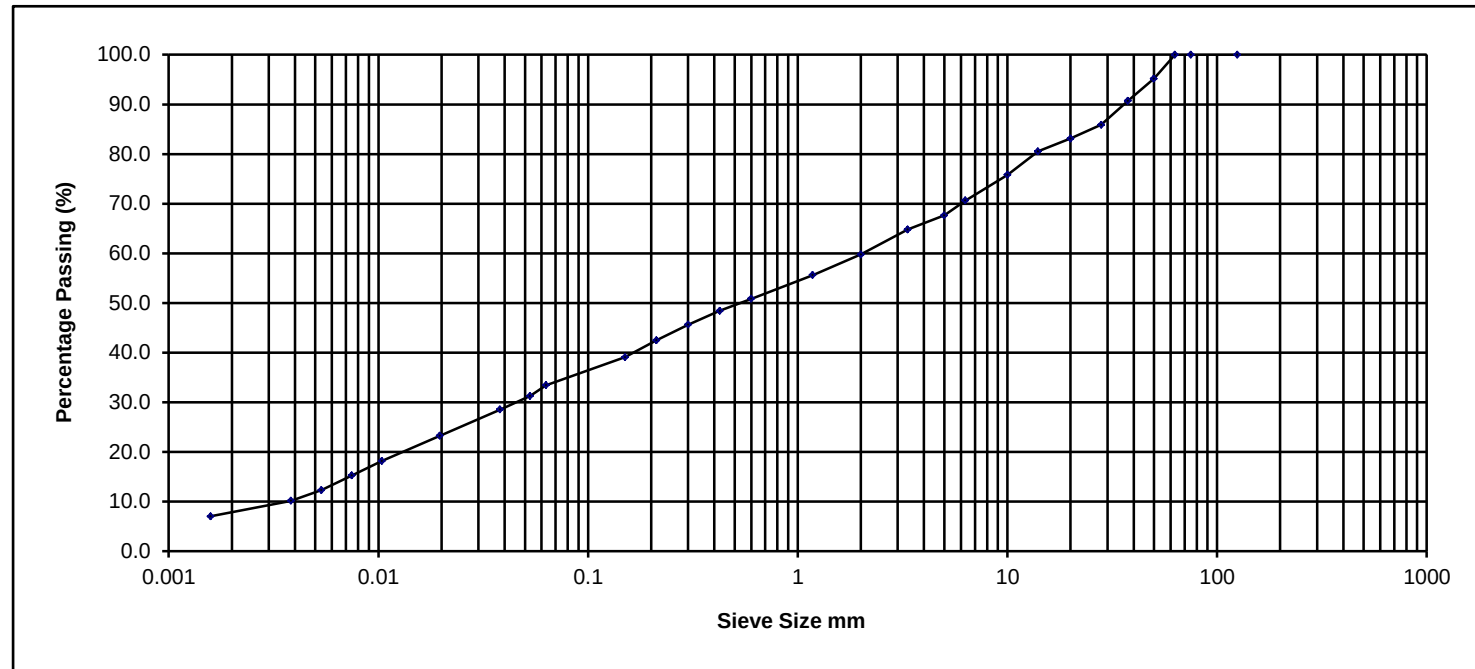
NMTL Ltd

Sieve	%
Size mm	Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	95.2
37.500	90.7
28.000	85.9
20.000	83.1
14.000	80.6
10.000	75.8
6.300	70.7
5.000	67.6
3.350	64.8
2.000	59.8
1.180	55.6
0.600	50.9
0.425	48.4
0.300	45.6
0.212	42.5
0.150	39.1
0.063	33.4
0.053	31.3
0.038	28.5
0.020	23.3
0.010	18.2
0.007	15.2
0.005	12.3
0.004	10.2
0.002	7.0

NMTL Ltd

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size										Cobbles	Boulder
Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse		
	Silt			Sand			Gravel				
7.0	26.4			26.3			40.2			0.0	0.0

Sample Description Brown slightly sandy gravelly silty CLAY.

Project No. NMTL 3486

BH/TP No. TPN

Project Seven Hills WF

Sample No. D02

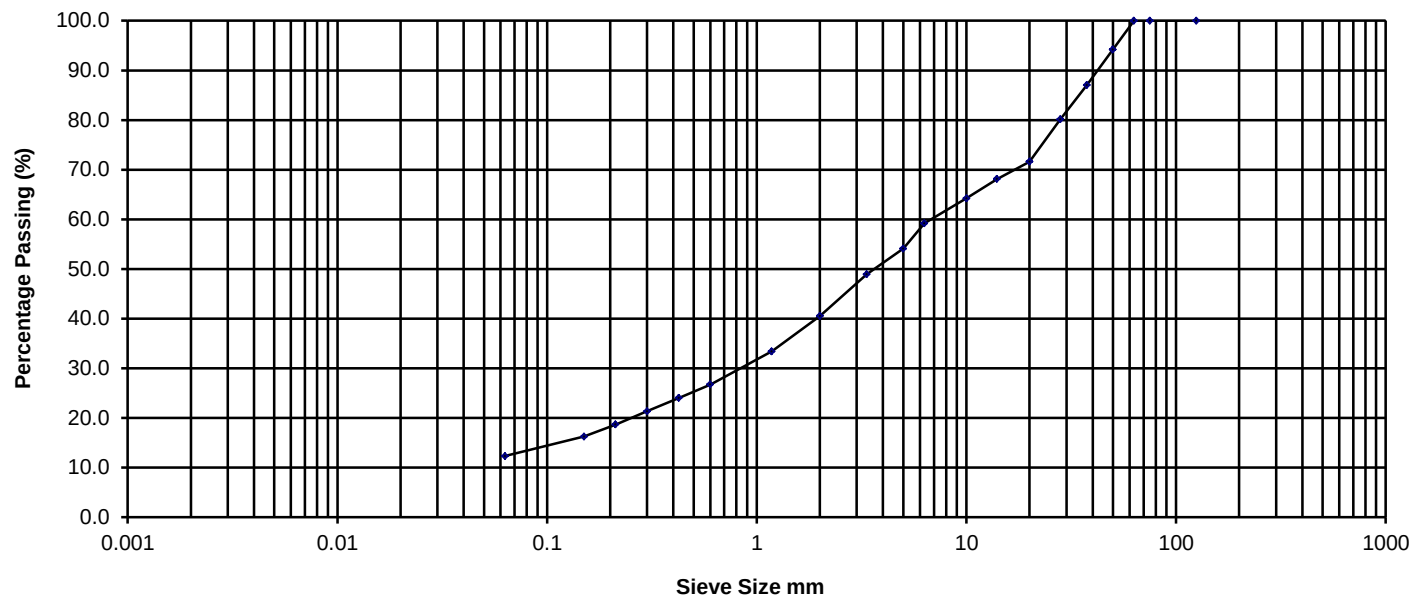
Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	19/01/2022	Depth	1.30m
----------	-----	---------	----	----------	----	--------------------	------------	-------	-------

NMTL Ltd

Sieve	%
Size mm	Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	94.2
37.500	87.0
28.000	80.1
20.000	71.6
14.000	68.1
10.000	64.2
6.300	59.2
5.000	54.1
3.350	48.9
2.000	40.5
1.180	33.4
0.600	26.7
0.425	24.0
0.300	21.4
0.212	18.7
0.150	16.2
0.063	12.3

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
	Silt			Sand			Gravel			0.0	0.0
	12.3			28.2			59.5				

Sample Description Brown silty very sandy GRAVEL.

Project No. NMTL 3486

BH/TP No. TPN

Sample No. D03

NM

TL

Ltd

Project Seven Hills WF

Operator

Tzr

Checked

Nc

Approved

Bc

Date sample tested

18/01/2022

Depth

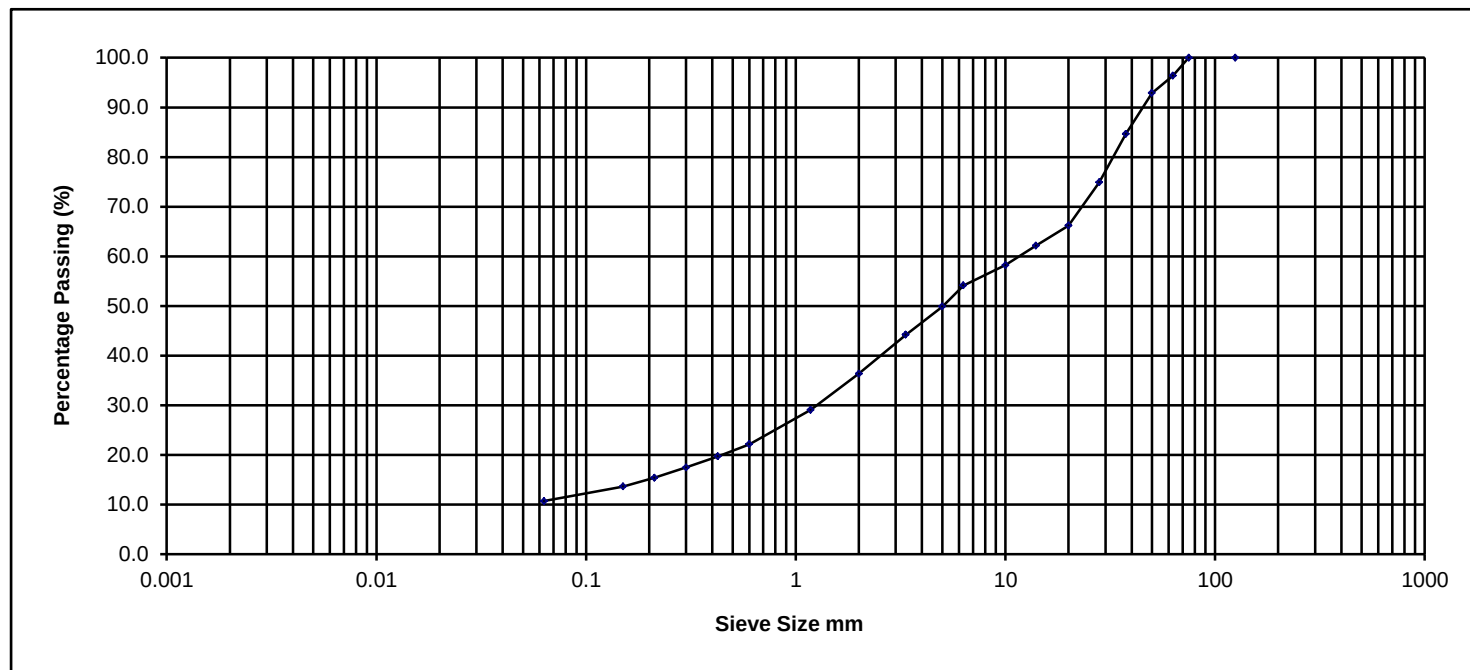
1.20m

NMTL Ltd

Sieve	%
Size mm	Passing
125.000	100.0
75.000	100.0
63.000	96.4
50.000	92.9
37.500	84.6
28.000	74.9
20.000	66.2
14.000	62.1
10.000	58.2
6.300	54.1
5.000	49.9
3.350	44.2
2.000	36.4
1.180	29.1
0.600	22.2
0.425	19.7
0.300	17.5
0.212	15.4
0.150	13.6
0.063	10.7

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
	Silt			Sand			Gravel			3.6	0.0
	10.7			25.7			60.0				

Sample Description Brown silty very sandy GRAVEL.

Project No. NMTL 3486

BH/TP No. TPN

Sample No. D04

NM

TL

Ltd

Project Seven Hills WF

Operator

Tzr

Checked

Nc

Approved

Bc

Date sample tested

18/01/2022

Depth

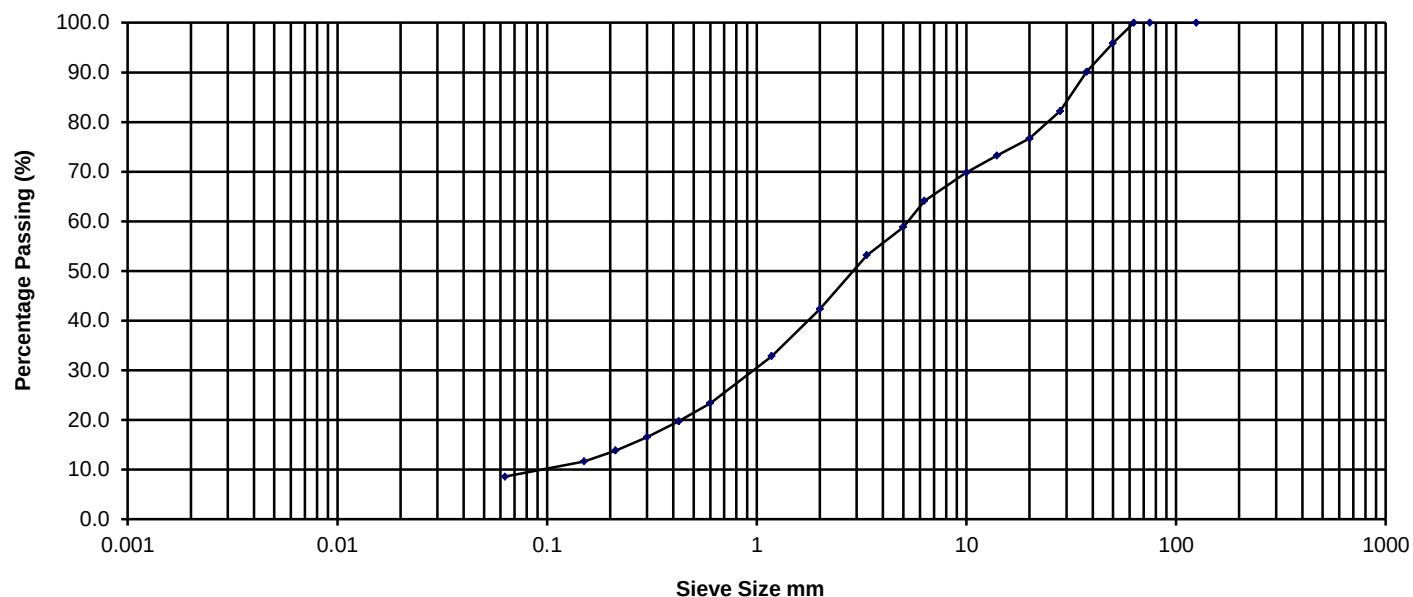
1.40m

NMTL Ltd

Sieve	%
Size mm	Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	95.9
37.500	90.1
28.000	82.2
20.000	76.7
14.000	73.3
10.000	69.8
6.300	64.1
5.000	58.8
3.350	53.2
2.000	42.3
1.180	32.9
0.600	23.4
0.425	19.7
0.300	16.5
0.212	13.8
0.150	11.6
0.063	8.6

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
	Silt			Sand			Gravel			0.0	0.0
	8.6			33.8			57.7				

Sample Description Brown silty very sandy GRAVEL.

Project No. NMTL 3486

BH/TP No. TPN

Sample No. D05

NM

TL

Ltd

Project Seven Hills WF

Operator

Tzr

Checked

Nc

Approved

Bc

Date sample tested

18/01/2022

Depth

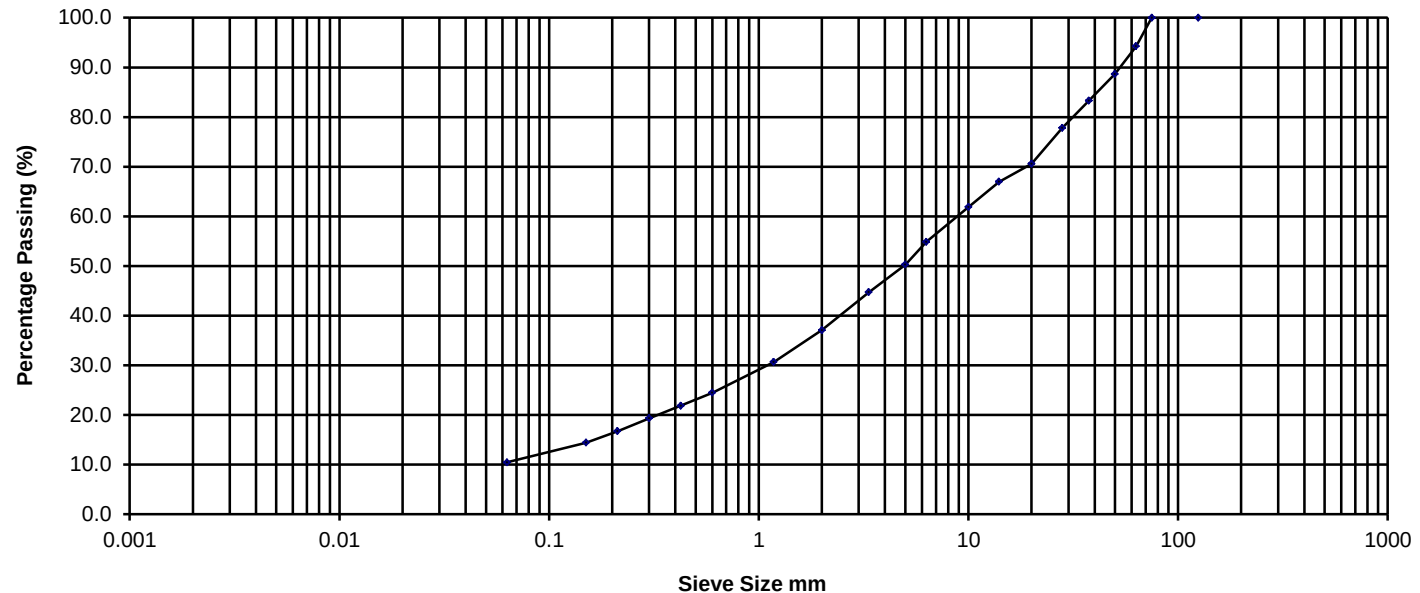
1.60m

NMTL Ltd

Sieve	%
Size mm	Passing
125.000	100.0
75.000	100.0
63.000	94.2
50.000	88.7
37.500	83.3
28.000	77.8
20.000	70.6
14.000	67.0
10.000	61.9
6.300	54.9
5.000	50.3
3.350	44.7
2.000	37.1
1.180	30.7
0.600	24.5
0.425	21.9
0.300	19.3
0.212	16.7
0.150	14.4
0.063	10.5

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
	Silt			Sand			Gravel			5.8	0.0
	10.5			26.6			57.2				

Sample Description Brown silty very sandy GRAVEL.

Project No. NMTL 3486

BH/TP No. TPN

Sample No. D06

NM

TL

Ltd

Project Seven Hills WF

Operator

Tzr

Checked

Nc

Approved

Bc

Date sample tested

18/01/2022

Depth

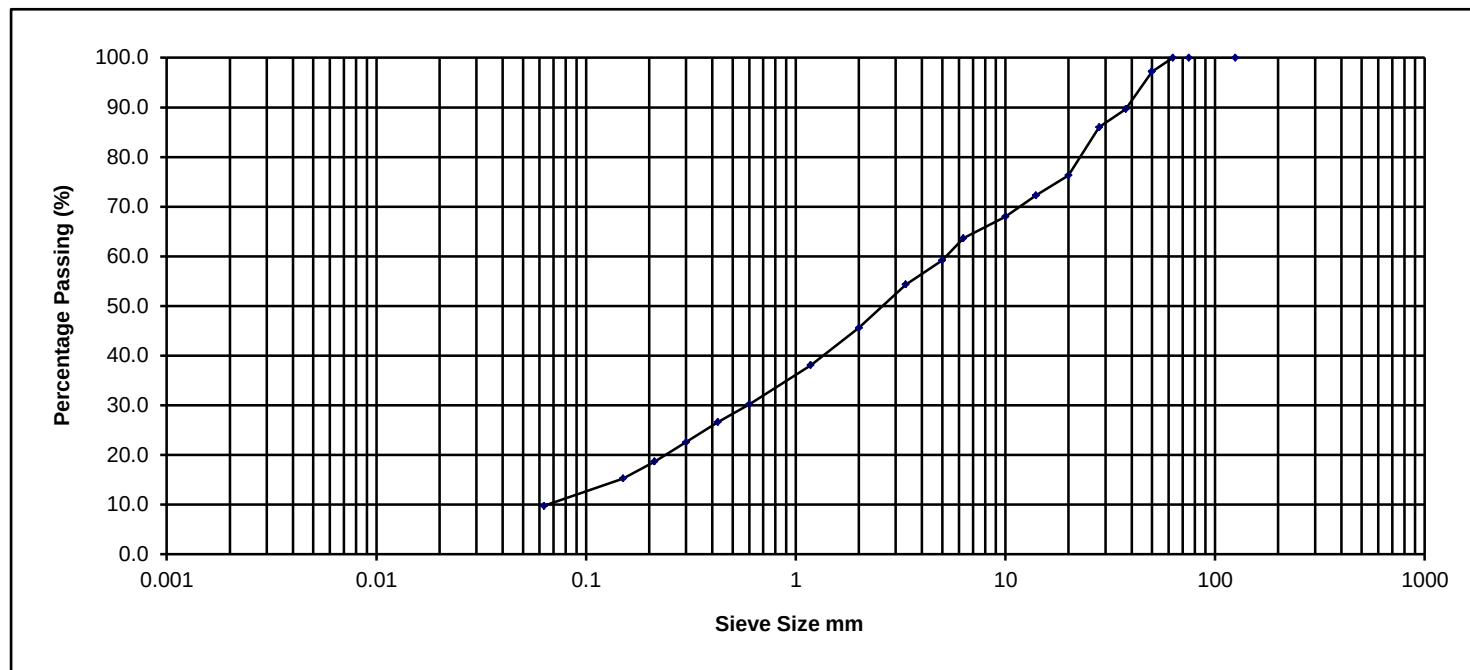
1.00m

NMTL Ltd

Sieve	%
Size mm	Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	97.2
37.500	89.7
28.000	86.0
20.000	76.3
14.000	72.3
10.000	68.0
6.300	63.6
5.000	59.2
3.350	54.3
2.000	45.6
1.180	38.1
0.600	30.2
0.425	26.6
0.300	22.6
0.212	18.7
0.150	15.3
0.063	9.7

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
	Silt			Sand			Gravel			0.0	0.0
	9.7			35.8			54.4				

Sample Description Brown silty very sandy GRAVEL.

Project No. NMTL 3486

BH/TP No. TPN

Sample No. D07

NMTL Ltd

Project Seven Hills WF

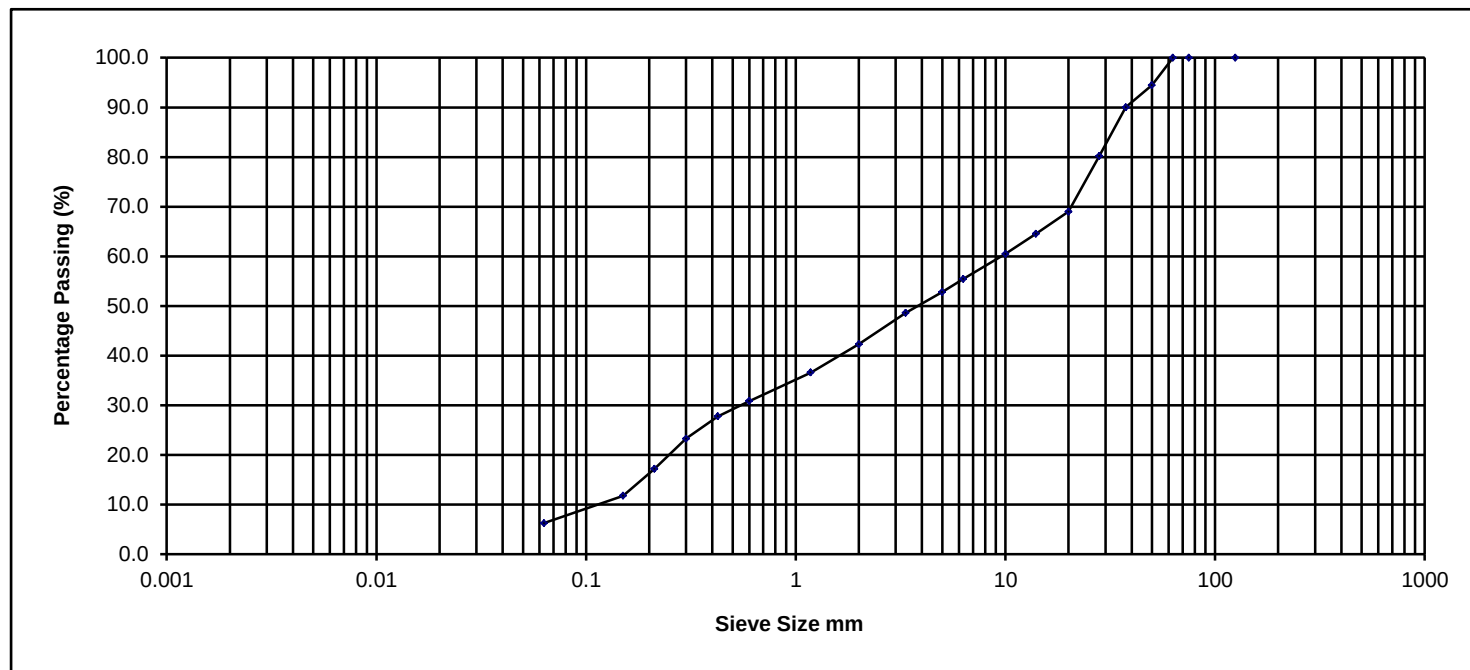
Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	19/01/2022	Depth	1.50m
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NMTL Ltd

Sieve	%
Size mm	Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	94.5
37.500	90.0
28.000	80.2
20.000	69.0
14.000	64.6
10.000	60.5
6.300	55.5
5.000	52.8
3.350	48.6
2.000	42.3
1.180	36.6
0.600	30.9
0.425	27.8
0.300	23.3
0.212	17.2
0.150	11.8
0.063	6.3

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
		Silt			Sand			Gravel			
		6.3			36.1			57.7		0.0	0.0

Sample Description Brown silty very sandy GRAVEL.

Project No. NMTL 3486

BH/TP No. TPN

Sample No. D08

NMTL Ltd

Project Seven Hills WF

Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	19/01/2022	Depth	1.00m
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NMTL Ltd

Sieve	%
Size mm	Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	95.3
37.500	92.0
28.000	88.7
20.000	83.2
14.000	79.6
10.000	77.8
6.300	72.7
5.000	69.5
3.350	66.0
2.000	60.0
1.180	53.8
0.600	47.4
0.425	44.1
0.300	40.2
0.212	35.5
0.150	31.0
0.063	23.1

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
	Silt			Sand			Gravel			0.0	0.0
	23.1			36.8			40.0				

Sample Description Brown silty very sandy GRAVEL.

Project No. NMTL 3486

BH/TP No. TPN

Sample No. D09

NM**TL****Ltd**

Project Seven Hills WF

Operator

Tzr

Checked

Nc

Approved

Bc

Date sample tested

19/01/2022

Depth

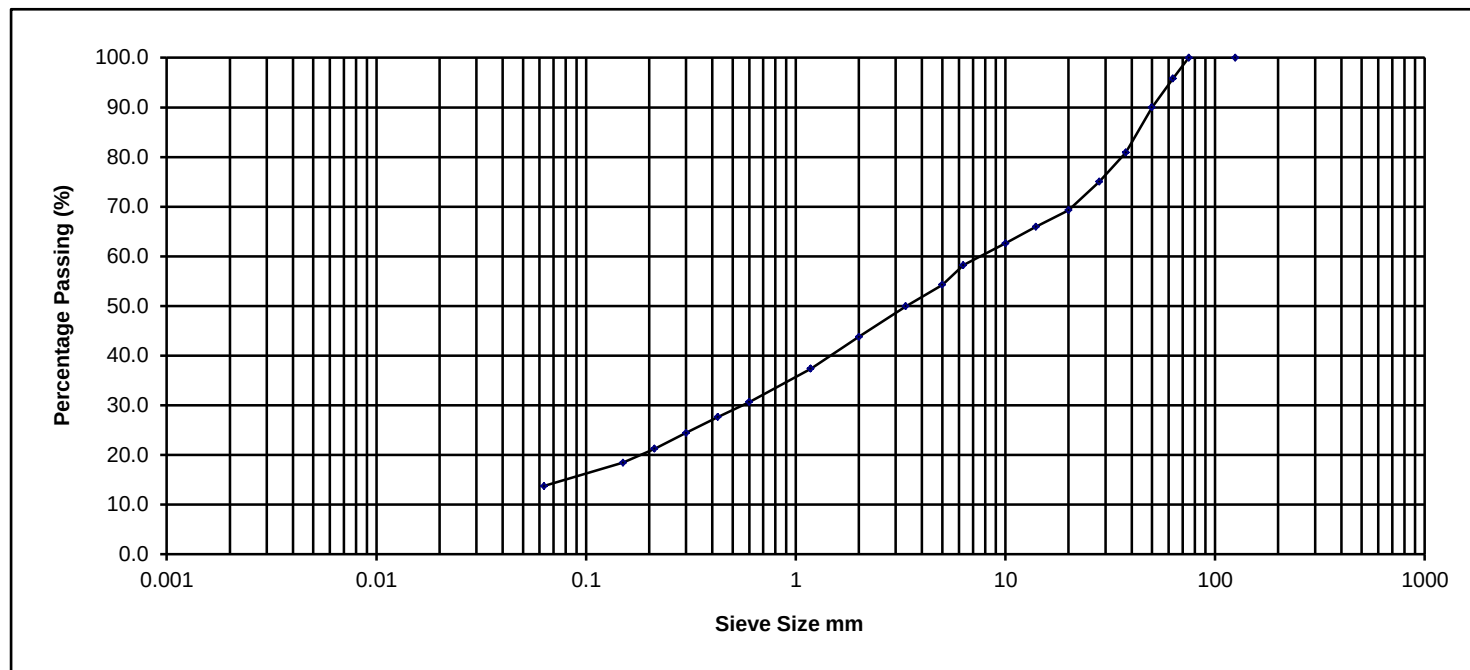
1.20m

NMTL Ltd

Sieve	%
Size mm	Passing
125.000	100.0
75.000	100.0
63.000	95.8
50.000	90.0
37.500	80.9
28.000	75.0
20.000	69.3
14.000	66.0
10.000	62.6
6.300	58.2
5.000	54.3
3.350	49.9
2.000	43.8
1.180	37.4
0.600	30.7
0.425	27.6
0.300	24.5
0.212	21.3
0.150	18.4
0.063	13.7

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
	Silt			Sand			Gravel			4.2	0.0
	13.7			30.0			52.0				

Sample Description Brown silty very sandy GRAVEL.

Project No. NMTL 3486

BH/TP No. TPN

Sample No. D10

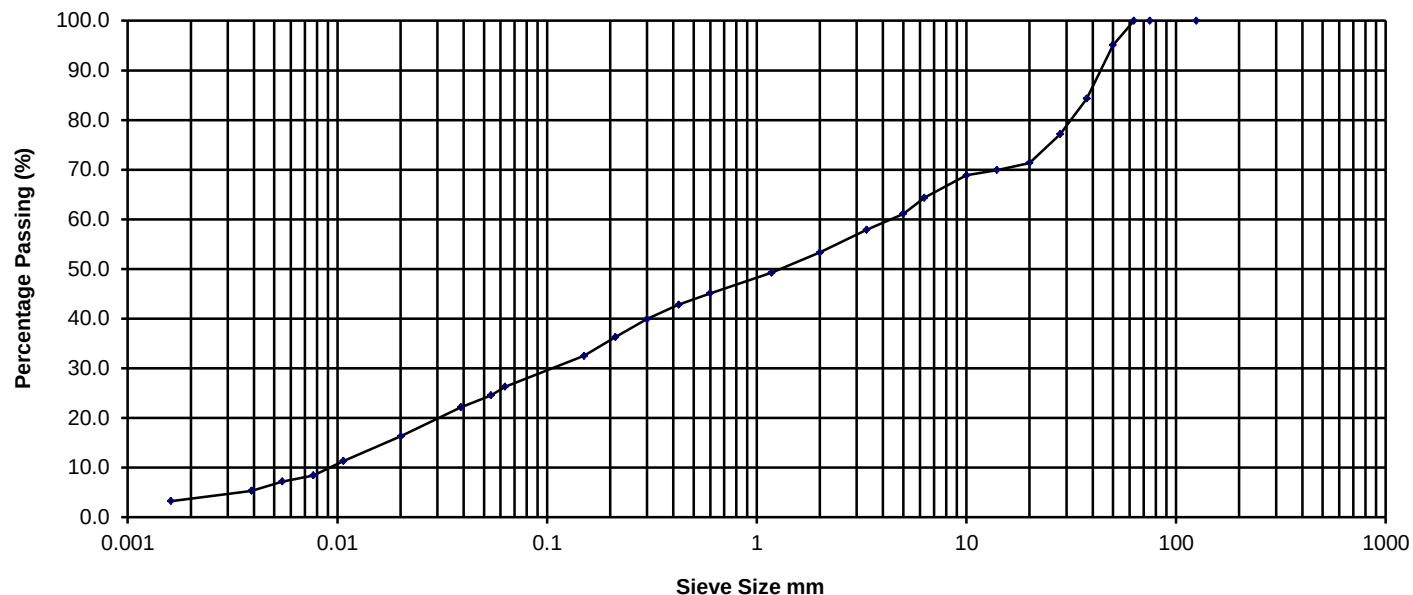
NMTL Ltd

Project Seven Hills WF

Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	19/01/2022	Depth	1.50m
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NMTL Ltd

Sieve	%
Size mm	Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	95.1
37.500	84.3
28.000	77.1
20.000	71.4
14.000	69.9
10.000	68.9
6.300	64.3
5.000	61.1
3.350	57.9
2.000	53.3
1.180	49.3
0.600	45.1
0.425	42.8
0.300	39.9
0.212	36.3
0.150	32.5
0.063	26.3
0.054	24.6
0.039	22.1
0.020	16.3
0.011	11.3
0.008	8.4
0.005	7.2
0.004	5.3
0.002	3.3

NM**TL****Ltd****Determination of Particle Size Distribution****BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5**

Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
	Silt			Sand			Gravel				
3.3	23.0			27.1			46.7			0.0	0.0

Sample Description Brown slightly sandy gravelly clayey SILT.

Project No. NMTL 3486

BH/TP No. TPN

Project Seven Hills WF

Sample No. D11

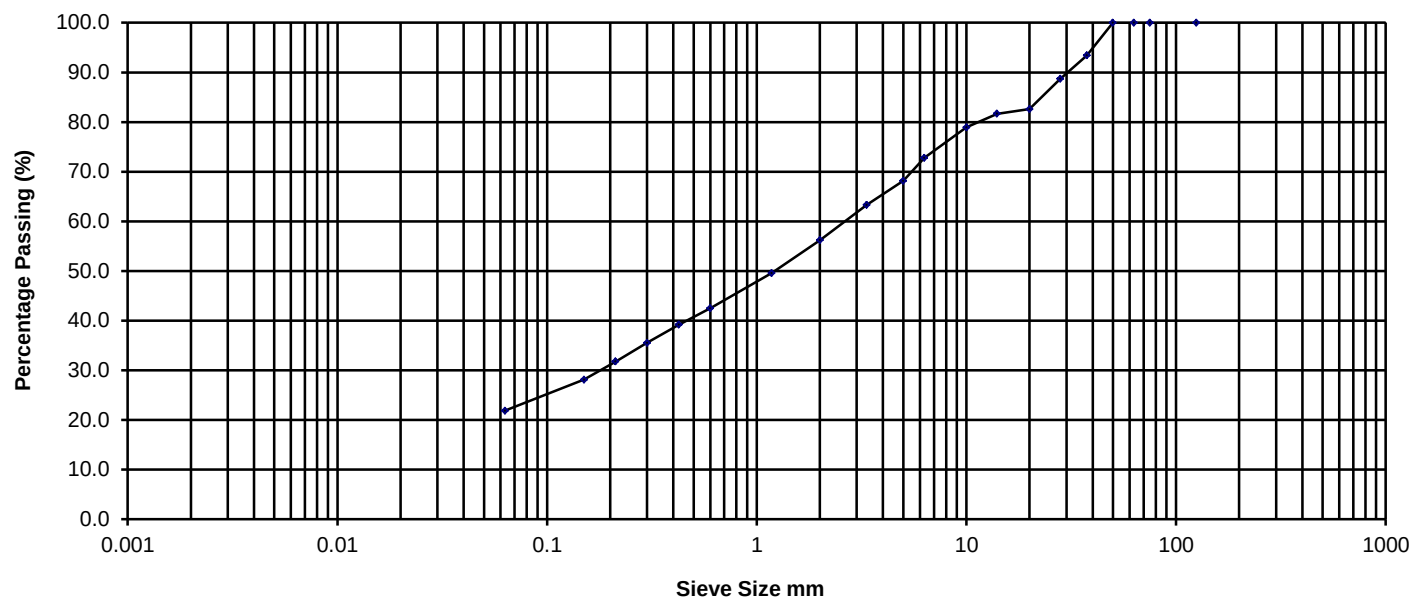
Operator Tzr Checked Nc Approved Bc Date sample tested 19/01/2022 Depth 1.50m

NMTL Ltd

Sieve	%
Size mm	Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	100.0
37.500	93.4
28.000	88.7
20.000	82.6
14.000	81.7
10.000	78.9
6.300	72.8
5.000	68.1
3.350	63.3
2.000	56.2
1.180	49.6
0.600	42.5
0.425	39.2
0.300	35.5
0.212	31.8
0.150	28.1
0.063	21.9

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
	Silt			Sand			Gravel				
	21.9			34.3			43.8			0.0	0.0

Sample Description Brown silty vey sandy GRAVEL.

Project No. NMTL 3486

BH/TP No. TPS

Sample No. D01

NM
TL

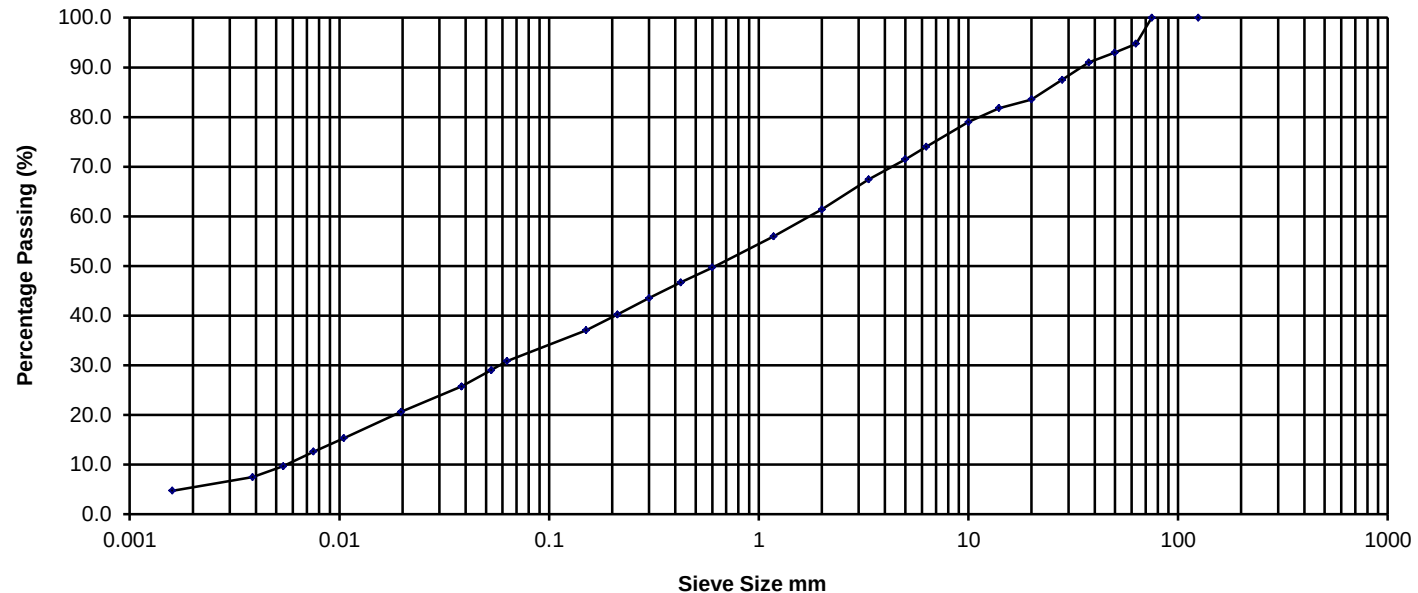
Project Seven Hills WF

Ltd

Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	19/01/2022	Depth	1.30m
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NMTL Ltd

Sieve	%
Size mm	Passing
125.000	100.0
75.000	100.0
63.000	94.7
50.000	93.0
37.500	91.0
28.000	87.5
20.000	83.5
14.000	81.8
10.000	79.0
6.300	74.0
5.000	71.5
3.350	67.4
2.000	61.4
1.180	56.0
0.600	49.7
0.425	46.7
0.300	43.5
0.212	40.3
0.150	37.0
0.063	30.9
0.053	29.0
0.038	25.7
0.020	20.6
0.010	15.3
0.008	12.6
0.005	9.7
0.004	7.5
0.002	4.7

NM**TL****Ltd****Determination of Particle Size Distribution****BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5**

Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
	Silt			Sand			Gravel				
4.7	26.1			30.5			33.4			5.3	0.0

Sample Description Grey/brown slightly sandy slightly gravelly clayey SILT.

Project No.

NMTL 3486

BH/TP No.

TPS

Project

Seven Hills WF

Sample No.

D02

Operator

Tzr

Checked

Nc

Approved

Bc

Date sample tested

19/01/2022

Depth

1.50M

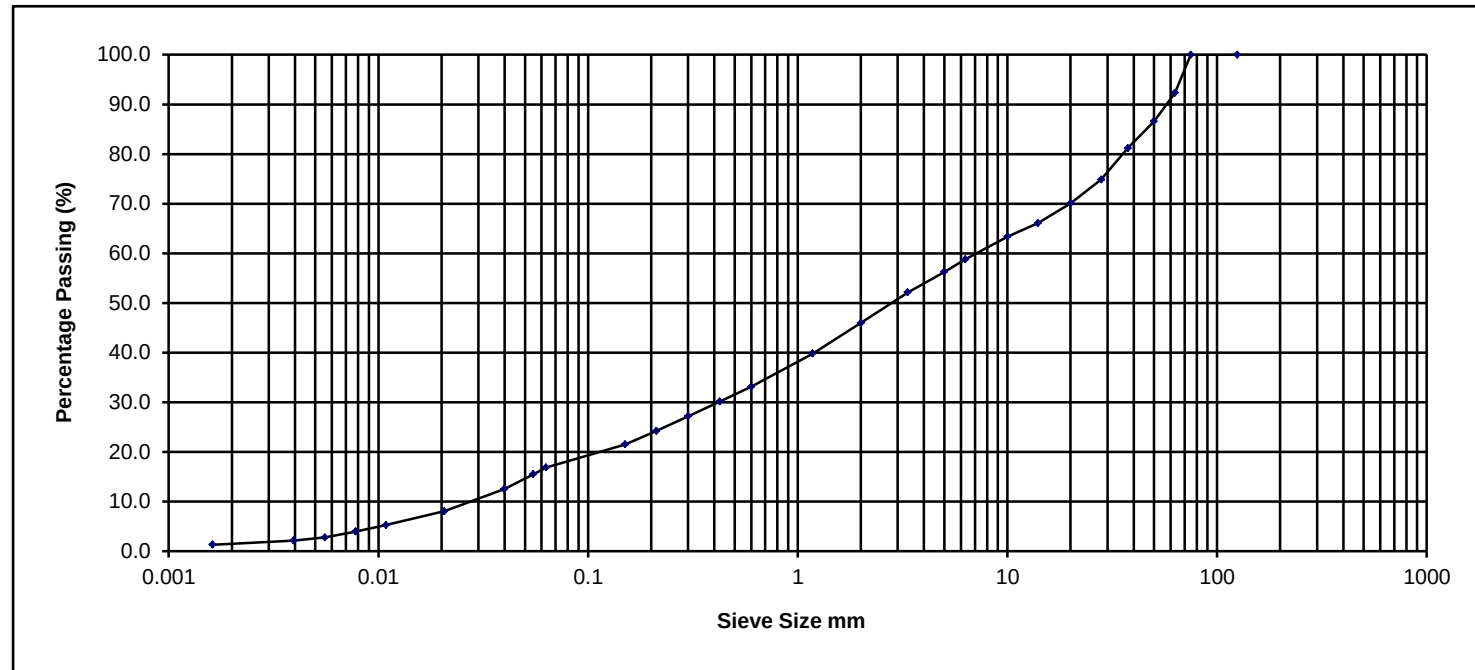
NMTL Ltd

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	92.3
50.000	86.6
37.500	81.2
28.000	74.9
20.000	70.0
14.000	66.1
10.000	63.3
6.300	58.8
5.000	56.3
3.350	52.1
2.000	46.0
1.180	39.8
0.600	33.2
0.425	30.1
0.300	27.2
0.212	24.2
0.150	21.5
0.063	16.9
0.055	15.5
0.040	12.5
0.021	8.1
0.011	5.3
0.008	4.0
0.006	2.8
0.004	2.2
0.002	1.3

NMTL Ltd

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size										Cobbles	Boulder
Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse		
	Silt			Sand			Gravel				
1.3	15.5			29.1			46.4			7.7	0.0

Sample Description Brown silty very sandy GRAVEL.

Project No. NMTL 3486

BH/TP No. TPS

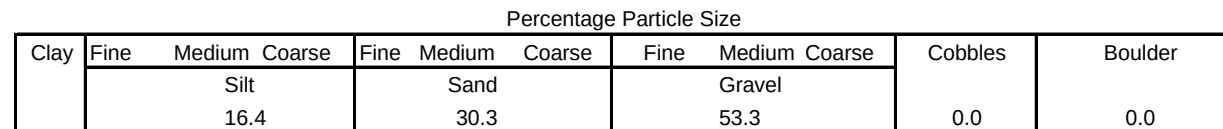
Project Seven Hills WF

Sample No. D03

Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	19/01/2022	Depth	1.20m
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[illegible]

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	19/01/2022	Depth	1.30m
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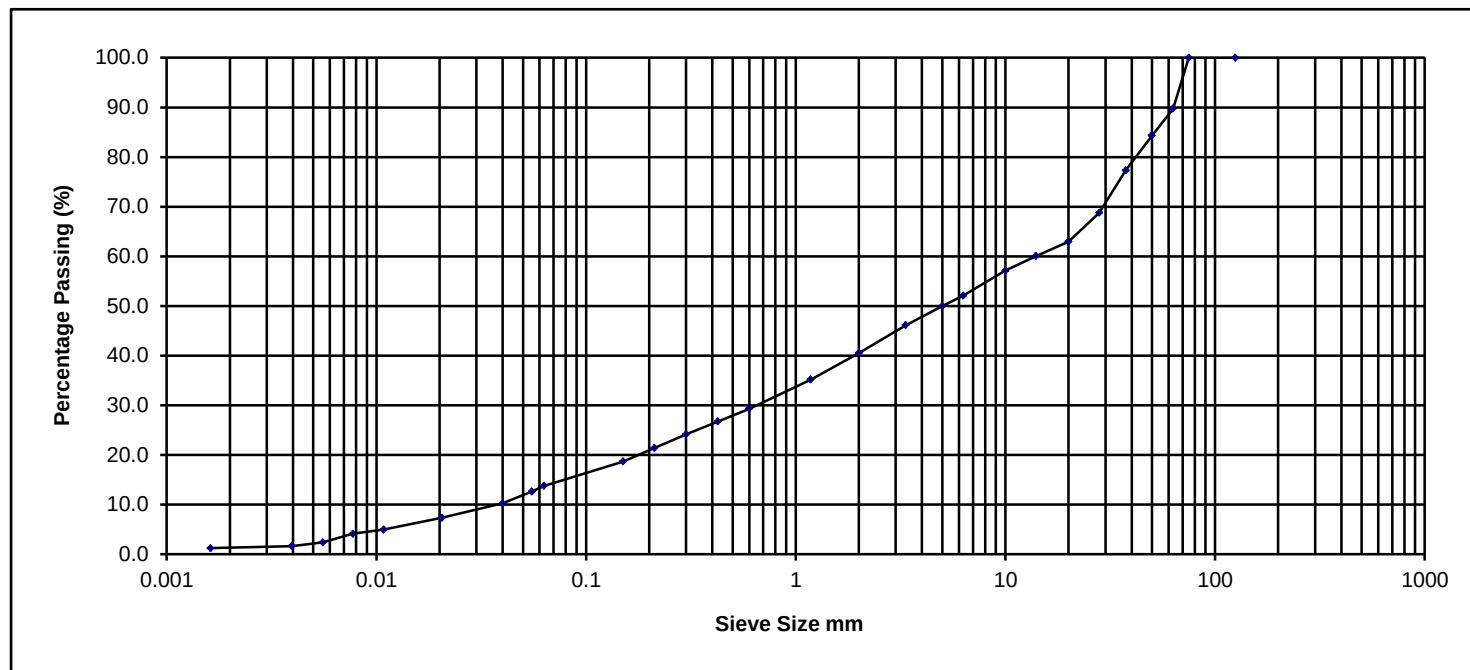
NMTL Ltd

Sieve	%
Size mm	Passing
125.000	100.0
75.000	100.0
63.000	89.7
50.000	84.3
37.500	77.3
28.000	68.8
20.000	63.0
14.000	60.1
10.000	57.1
6.300	52.1
5.000	50.0
3.350	46.1
2.000	40.5
1.180	35.2
0.600	29.3
0.425	26.7
0.300	24.1
0.212	21.4
0.150	18.7
0.063	13.8
0.055	12.6
0.040	10.3
0.021	7.4
0.011	5.0
0.008	4.1
0.006	2.4
0.004	1.7
0.002	1.2

NMTL Ltd

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size										Cobbles	Boulder
Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse		
	Silt			Sand			Gravel				
1.2	12.5			26.7			49.2			10.3	0.0

Sample Description Brown silty very sandy GRAVEL.

Project No. NMTL 3486

BH/TP No. TPS

Project Seven Hills WF

Sample No. D05

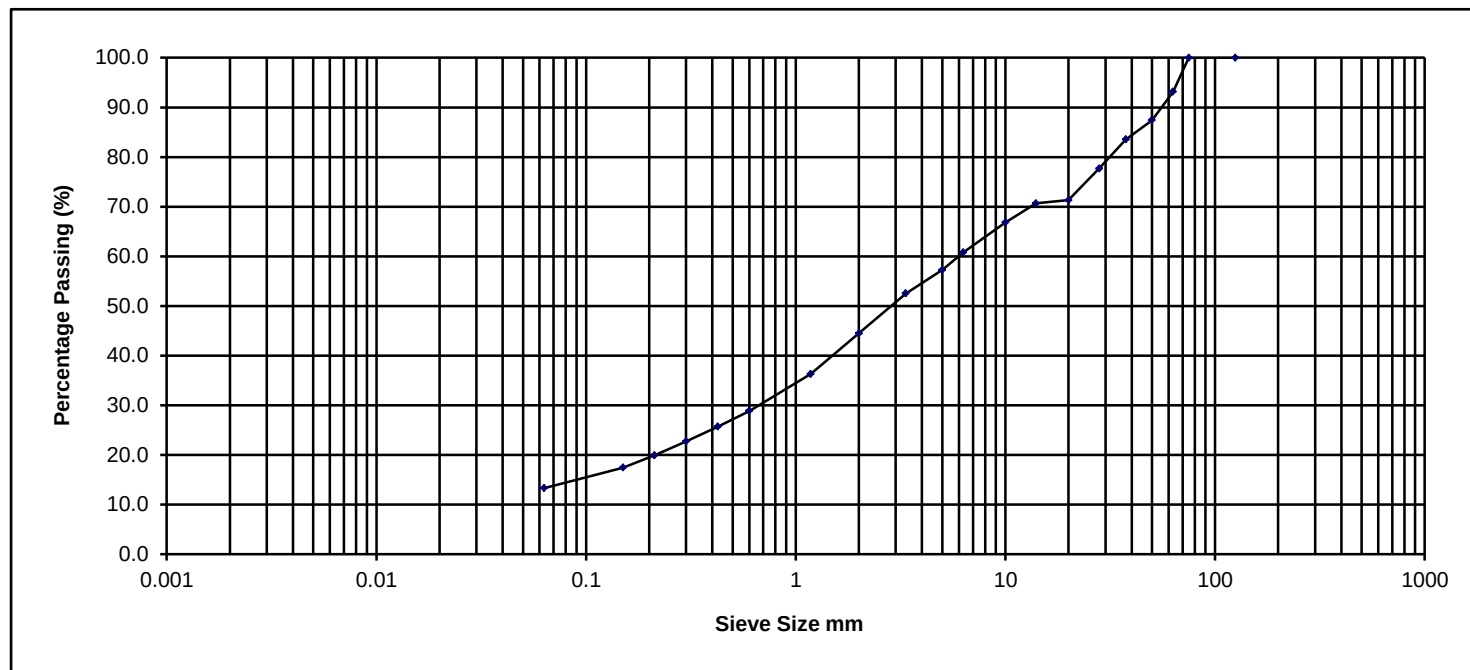
Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	18/01/2022	Depth	1.00m
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NMTL Ltd

Sieve	%
Size mm	Passing
125.000	100.0
75.000	100.0
63.000	93.1
50.000	87.4
37.500	83.5
28.000	77.7
20.000	71.3
14.000	70.7
10.000	66.8
6.300	60.8
5.000	57.3
3.350	52.5
2.000	44.5
1.180	36.3
0.600	28.9
0.425	25.7
0.300	22.7
0.212	19.9
0.150	17.4
0.063	13.3

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
	Silt			Sand			Gravel			6.9	0.0
	13.3			31.2			48.7				

Sample Description Brown silty vey sandy GRAVEL.

Project No. NMTL 3486

BH/TP No. TPS

Sample No. D06

NMTL Ltd

Project Seven Hills WF

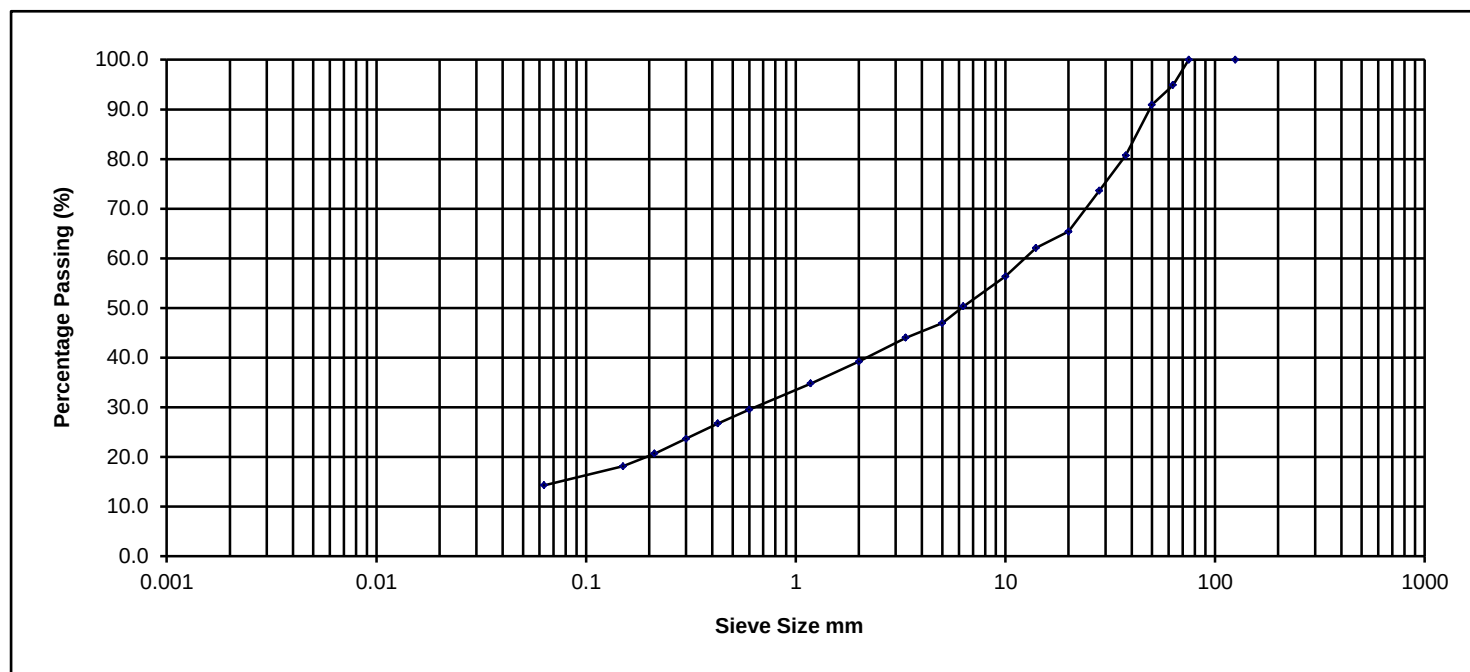
Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	18/01/2022	Depth	0.75m
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NMTL Ltd

Sieve	%
Size mm	Passing
125.000	100.0
75.000	100.0
63.000	94.9
50.000	90.9
37.500	80.7
28.000	73.6
20.000	65.4
14.000	62.1
10.000	56.3
6.300	50.3
5.000	46.9
3.350	44.0
2.000	39.2
1.180	34.8
0.600	29.6
0.425	26.7
0.300	23.7
0.212	20.7
0.150	18.1
0.063	14.3

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
	Silt			Sand			Gravel			5.1	0.0
	14.3			24.9			55.7				

Sample Description Brown silty vey sandy GRAVEL.

Project No. NMTL 3486

BH/TP No. TPS

Sample No. D07

NMTL Ltd

Project Seven Hills WF

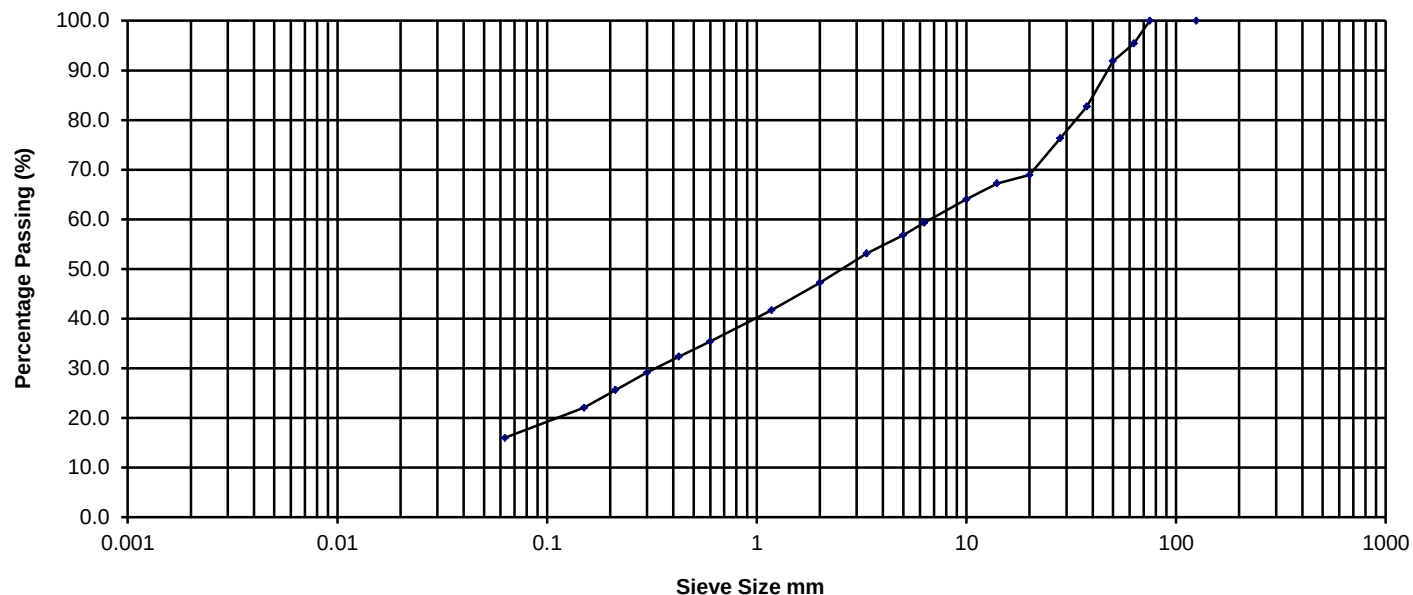
Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	18/01/2022	Depth	0.60m
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NMTL Ltd

Sieve	%
Size mm	Passing
125.000	100.0
75.000	100.0
63.000	95.4
50.000	91.9
37.500	82.7
28.000	76.3
20.000	68.9
14.000	67.2
10.000	64.0
6.300	59.3
5.000	56.8
3.350	53.1
2.000	47.2
1.180	41.7
0.600	35.4
0.425	32.3
0.300	29.1
0.212	25.6
0.150	22.1
0.063	16.0

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
	Silt			Sand			Gravel				
	16.0			31.2			48.2			4.6	0.0

Sample Description Brown silty vey sandy GRAVEL.

Project No. NMTL 3486

BH/TP No. TPS

Sample No. D08

NM**TL****Ltd**

Project Seven Hills WF

Operator

Tzr

Checked

Nc

Approved

Bc

Date sample tested

19/01/2022

Depth

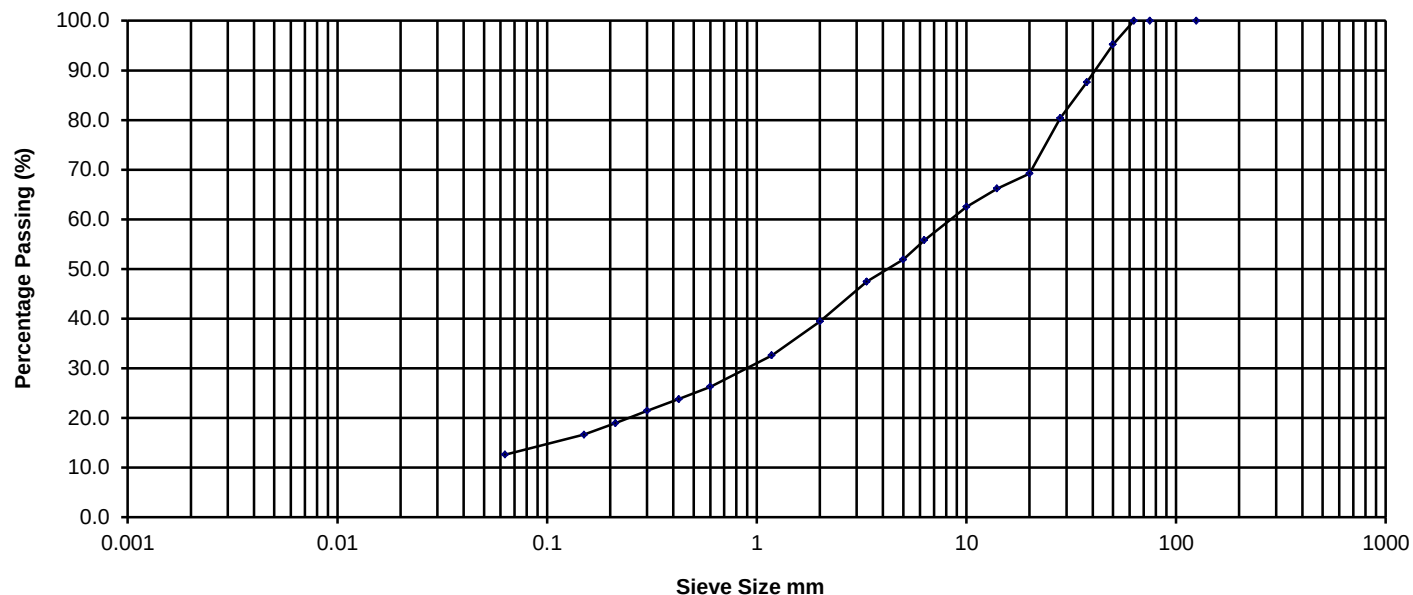
1.50m

NMTL Ltd

Sieve	%
Size mm	Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	95.2
37.500	87.6
28.000	80.4
20.000	69.2
14.000	66.2
10.000	62.5
6.300	55.8
5.000	51.9
3.350	47.5
2.000	39.4
1.180	32.6
0.600	26.3
0.425	23.8
0.300	21.4
0.212	18.9
0.150	16.6
0.063	12.6

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
	Silt			Sand			Gravel			0.0	0.0
	12.6			26.8			60.6				

Sample Description Brown silty vey sandy GRAVEL.

Project No. NMTL 3486

BH/TP No. TPS

Sample No. D09

NM

TL

Ltd

Project Seven Hills WF

Operator

Tzr

Checked

Nc

Approved

Bc

Date sample tested

18/01/2022

Depth

1.00m

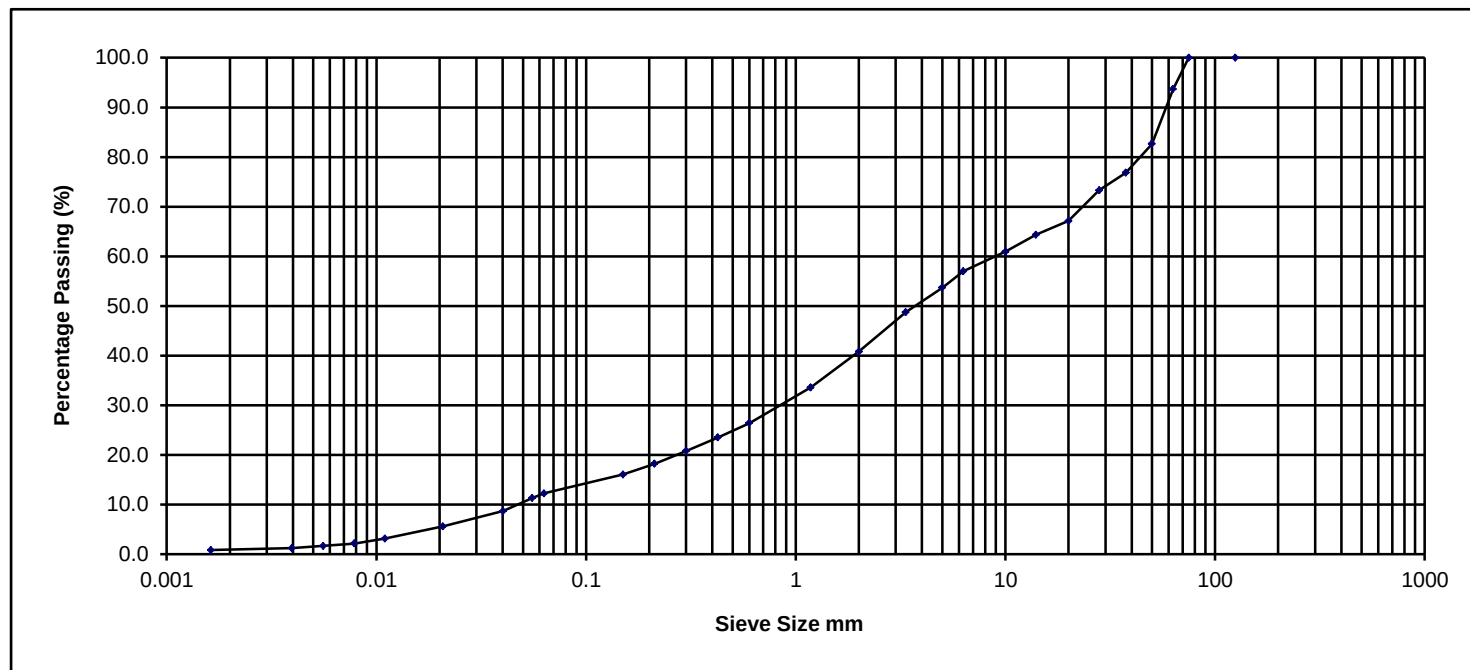
NMTL Ltd

Sieve	%
Size mm	Passing
125.000	100.0
75.000	100.0
63.000	93.7
50.000	82.7
37.500	76.8
28.000	73.3
20.000	67.1
14.000	64.4
10.000	60.9
6.300	57.0
5.000	53.7
3.350	48.7
2.000	40.8
1.180	33.6
0.600	26.4
0.425	23.5
0.300	20.8
0.212	18.2
0.150	16.1
0.063	12.3
0.055	11.3
0.040	8.7
0.021	5.6
0.011	3.2
0.008	2.2
0.006	1.7
0.004	1.2
0.002	0.8

NMTL Ltd

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size										Cobbles	Boulder
Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse		
	Silt			Sand			Gravel				
0.8	11.4			28.6			52.8			6.3	0.0

Sample Description Brown silty very sandy GRAVEL.

Project No. NMTL 3486

BH/TP No. TPS

Project Seven Hills WF

Sample No. D10

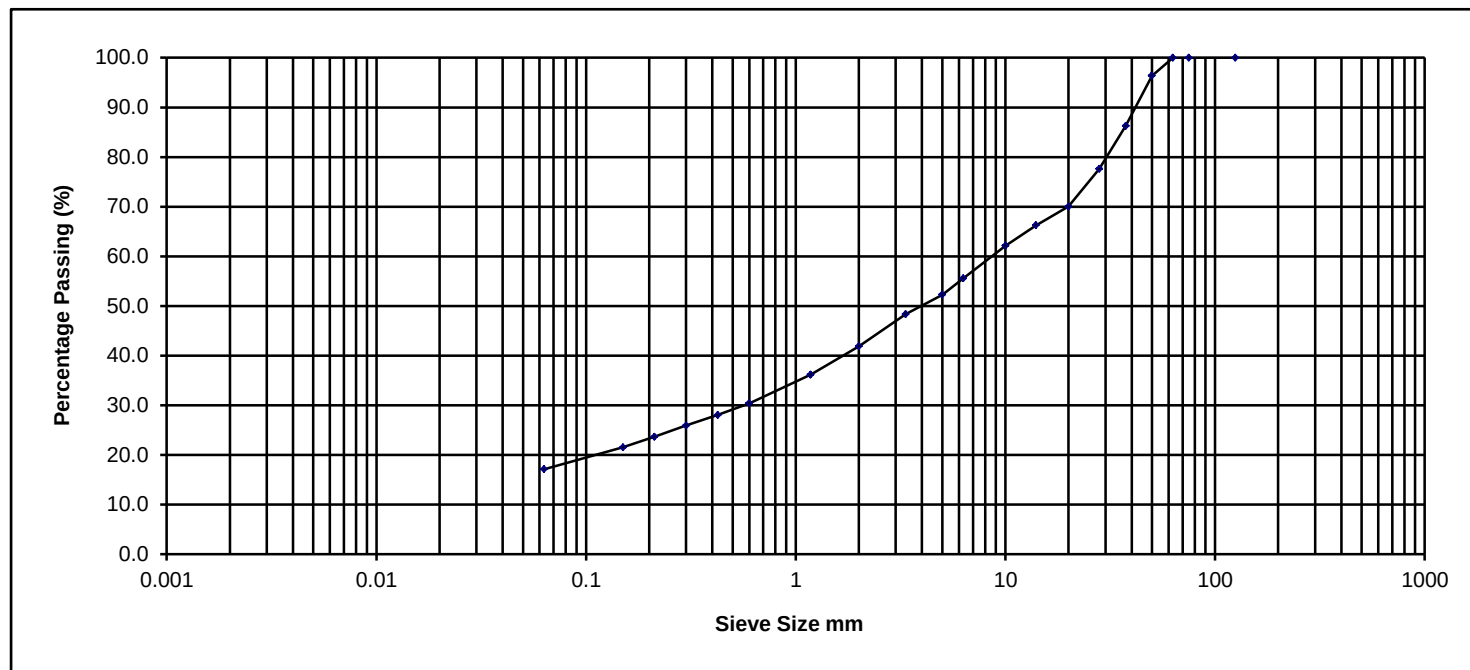
Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	18/01/2022	Depth	0.80m
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NMTL Ltd

Sieve	%
Size mm	Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	96.4
37.500	86.3
28.000	77.6
20.000	70.0
14.000	66.3
10.000	62.1
6.300	55.6
5.000	52.3
3.350	48.4
2.000	41.9
1.180	36.2
0.600	30.4
0.425	28.1
0.300	25.9
0.212	23.7
0.150	21.5
0.063	17.1

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
	Silt			Sand			Gravel			0.0	0.0
	17.1			24.8			58.1				

Sample Description Brown silty vey sandy GRAVEL.

Project No. NMTL 3486

BH/TP No. TPS

Sample No. D11

NMTL Ltd

Project Seven Hills WF

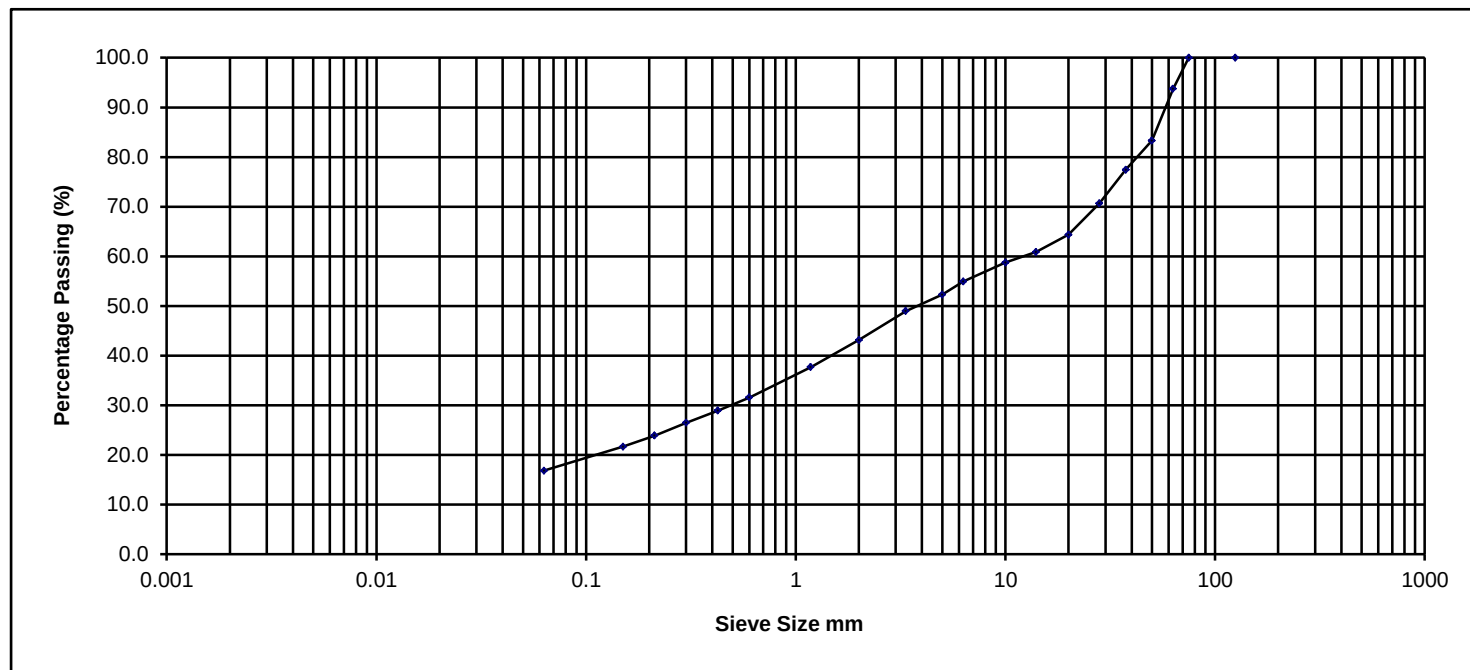
Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	18/01/2022	Depth	1.40m
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NMTL Ltd

Sieve	%
Size mm	Passing
125.000	100.0
75.000	100.0
63.000	93.7
50.000	83.3
37.500	77.5
28.000	70.6
20.000	64.4
14.000	60.9
10.000	58.8
6.300	54.9
5.000	52.3
3.350	49.0
2.000	43.1
1.180	37.7
0.600	31.6
0.425	28.9
0.300	26.5
0.212	23.9
0.150	21.7
0.063	16.8

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
	Silt			Sand			Gravel			6.3	0.0
	16.8			26.3			50.6				

Sample Description Brown silty vey sandy GRAVEL.

Project No. NMTL 3486

BH/TP No. TPS

Sample No. D12

NM
TL
Ltd

Project Seven Hills WF

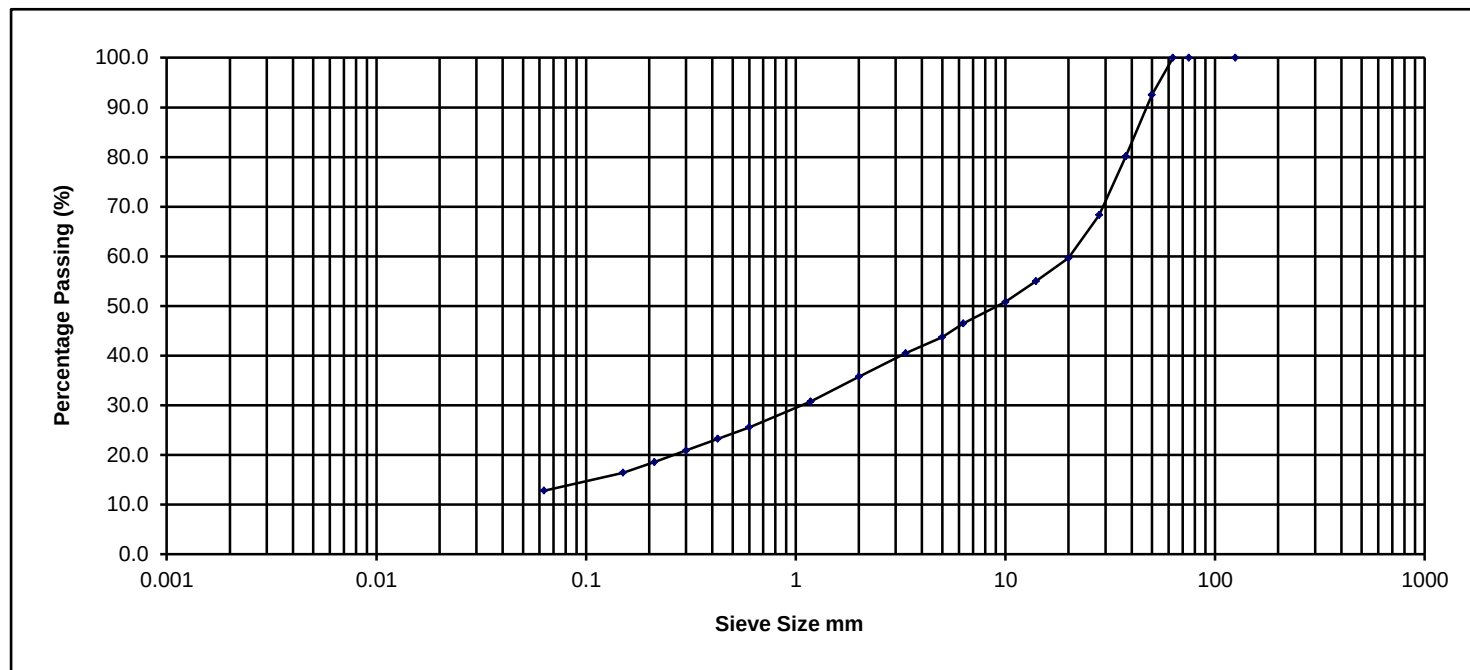
Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	18/01/2022	Depth	1.30m
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NMTL Ltd

Sieve	%
Size mm	Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	92.5
37.500	80.1
28.000	68.3
20.000	59.7
14.000	55.0
10.000	50.8
6.300	46.5
5.000	43.7
3.350	40.5
2.000	35.8
1.180	30.8
0.600	25.6
0.425	23.3
0.300	20.9
0.212	18.6
0.150	16.4
0.063	12.8

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
	Silt			Sand			Gravel				
	12.8			23.0			64.2			0.0	0.0

Sample Description Brown silty very sandy GRAVEL.

Project No. NMTL 3486

BH/TP No. TPS

Sample No. D13

NMTL Ltd

Project Seven Hills WF

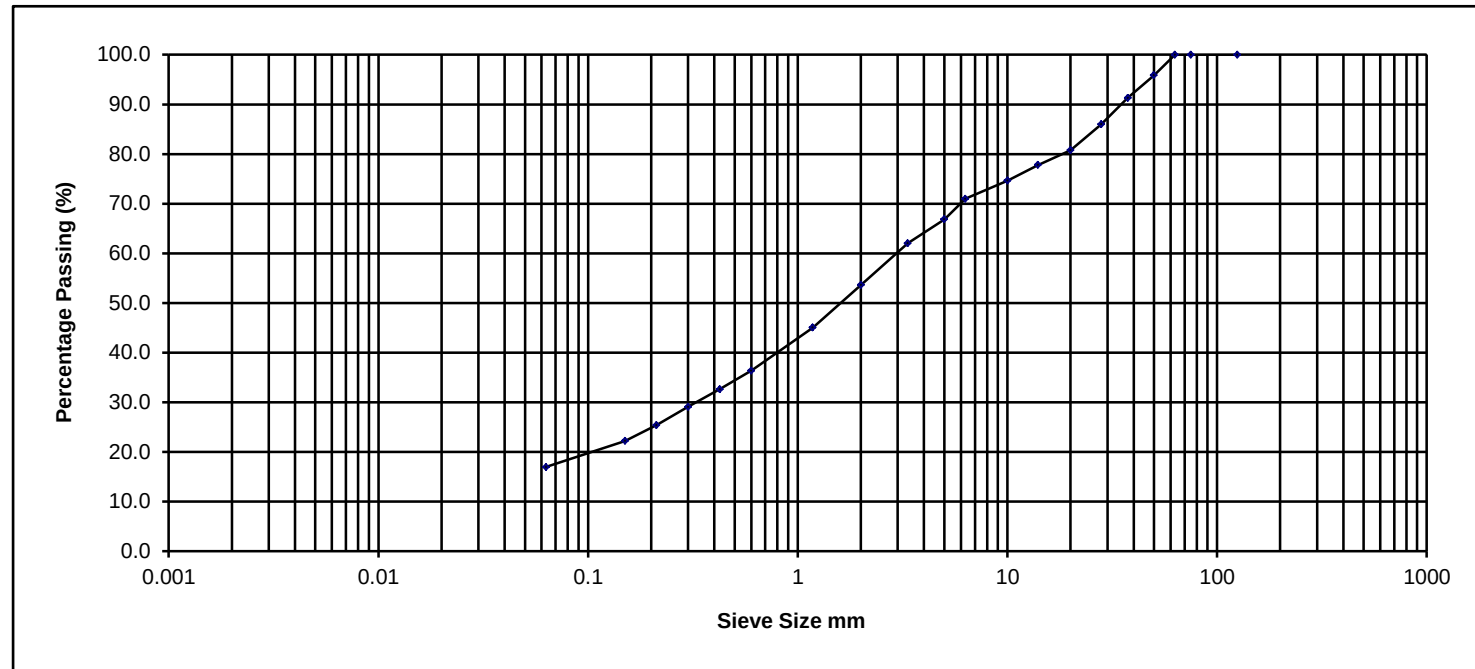
Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	19/01/2022	Depth	1.60m
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NMTL Ltd

Sieve	%
Size mm	Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	95.8
37.500	91.3
28.000	86.0
20.000	80.8
14.000	77.8
10.000	74.6
6.300	71.0
5.000	66.8
3.350	62.0
2.000	53.6
1.180	45.1
0.600	36.4
0.425	32.6
0.300	29.1
0.212	25.4
0.150	22.2
0.063	17.0

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
	Silt			Sand			Gravel			0.0	0.0
	17.0			36.7			46.4				

Sample Description Brown silty very sandy GRAVEL.

Project No. NMTL 3486

BH/TP No. TPS

Sample No. D14

NM

TL

Ltd

Project Seven Hills WF

Operator

Tzr

Checked

Nc

Approved

Bc

Date sample tested

19/01/2022

Depth

1.60m

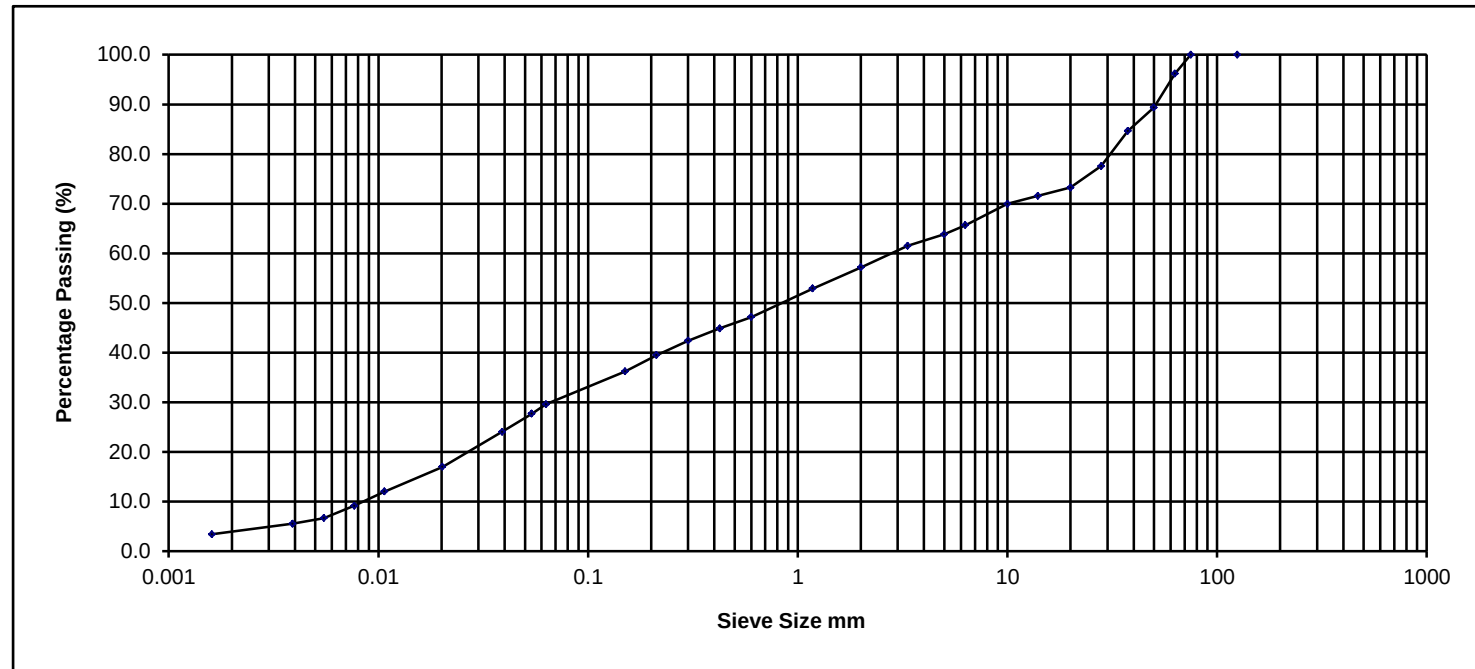
NMTL Ltd

Sieve	%
Size mm	Passing
125.000	100.0
75.000	100.0
63.000	96.2
50.000	89.4
37.500	84.6
28.000	77.6
20.000	73.2
14.000	71.6
10.000	70.0
6.300	65.7
5.000	63.8
3.350	61.5
2.000	57.2
1.180	52.9
0.600	47.2
0.425	44.9
0.300	42.4
0.212	39.5
0.150	36.2
0.063	29.6
0.054	27.7
0.039	24.1
0.020	17.0
0.011	12.0
0.008	9.2
0.005	6.7
0.004	5.5
0.002	3.4

NMTL Ltd

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size									
Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse
	Silt			Sand			Gravel		
3.4	26.2			27.6			39.1		

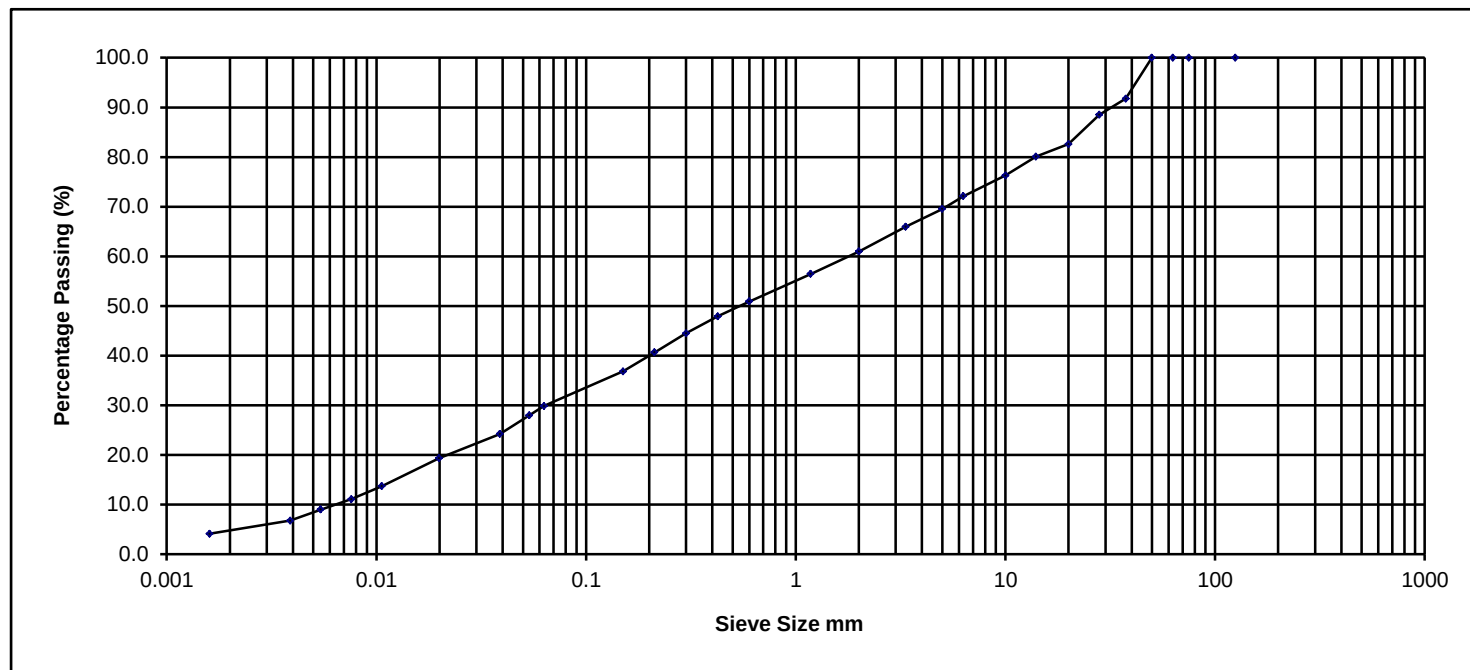
NMTL Ltd

Sieve	%
Size mm	Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	100.0
37.500	91.8
28.000	88.5
20.000	82.6
14.000	80.1
10.000	76.3
6.300	72.1
5.000	69.5
3.350	66.0
2.000	61.0
1.180	56.5
0.600	50.9
0.425	47.9
0.300	44.5
0.212	40.7
0.150	36.8
0.063	29.9
0.054	28.0
0.039	24.2
0.020	19.3
0.011	13.7
0.008	11.1
0.005	9.0
0.004	6.8
0.002	4.1

NMTL Ltd

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size										Cobbles	Boulder
Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse		
	Silt			Sand			Gravel				
4.1	25.7			31.1			39.0			0.0	0.0

Sample Description Brown slightly sandy gravelly clayey SILT.

Project No. NMTL 3486

BH/TP No. TPS

Project Seven Hills WF

Sample No. D16

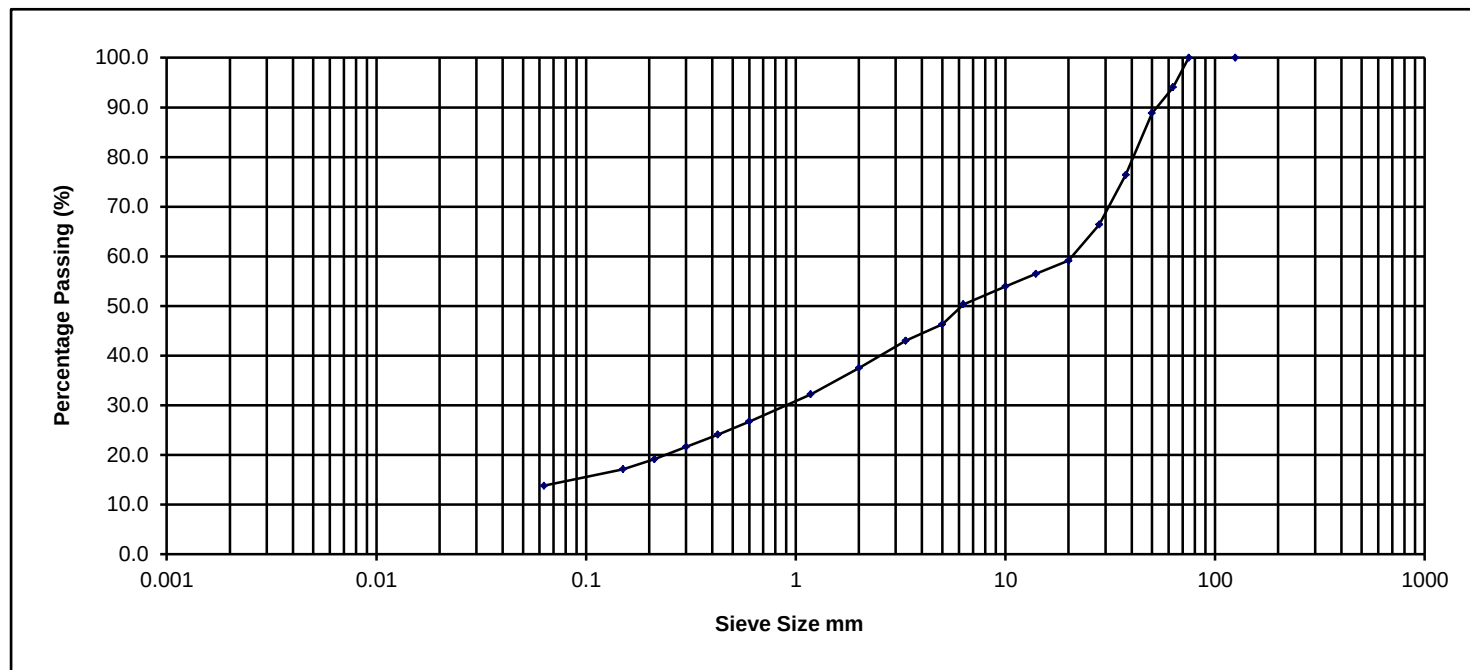
Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	19/01/2022	Depth	1.70m
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NMTL Ltd

Sieve	%
Size mm	Passing
125.000	100.0
75.000	100.0
63.000	94.0
50.000	88.8
37.500	76.4
28.000	66.4
20.000	59.1
14.000	56.5
10.000	53.9
6.300	50.3
5.000	46.3
3.350	43.0
2.000	37.5
1.180	32.2
0.600	26.7
0.425	24.1
0.300	21.7
0.212	19.2
0.150	17.1
0.063	13.8

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
	Silt			Sand			Gravel			6.0	0.0
	13.8			23.7			56.5				

Sample Description Brown silty very sandy GRAVEL.

Project No. NMTL 3486

BH/TP No. TPS

Sample No. D17

NMTL Ltd

Project Seven Hills WF

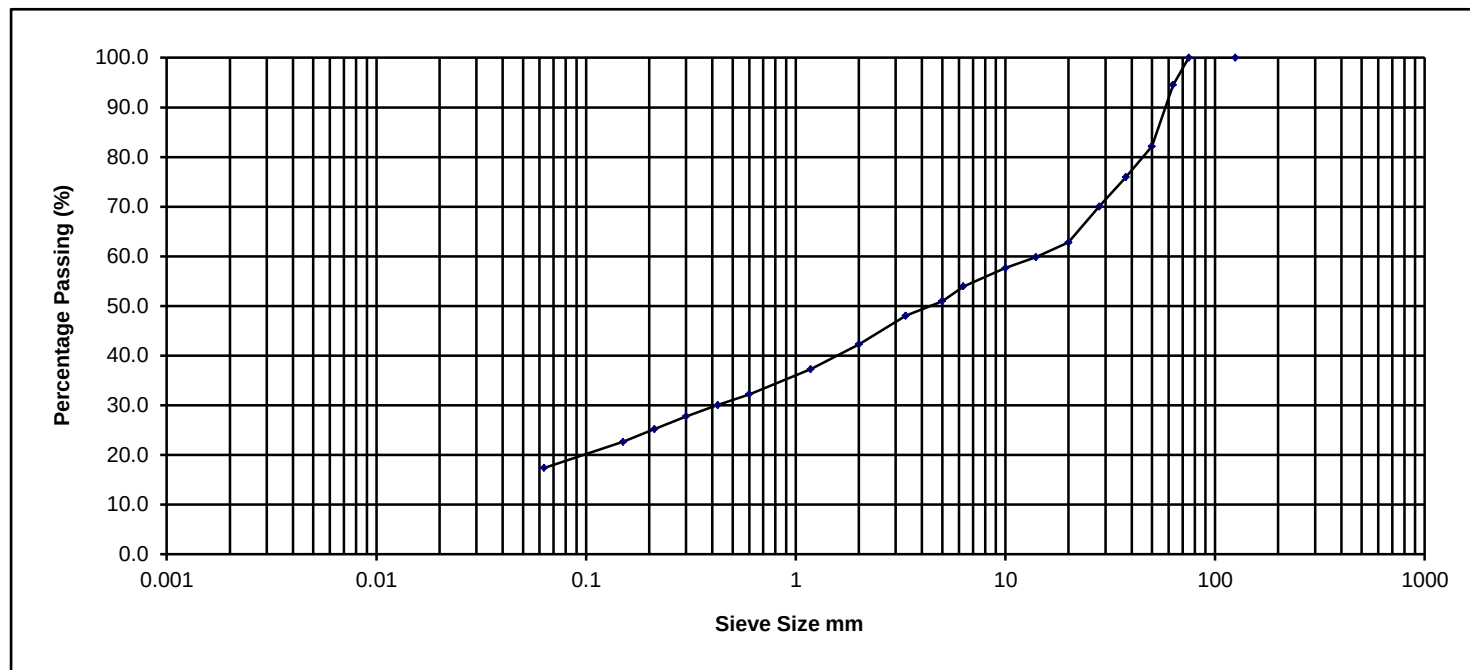
Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	19/01/2022	Depth	1.50m
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NMTL Ltd

Sieve	%
Size mm	Passing
125.000	100.0
75.000	100.0
63.000	94.5
50.000	82.2
37.500	75.9
28.000	70.0
20.000	62.8
14.000	59.8
10.000	57.7
6.300	53.9
5.000	51.0
3.350	48.1
2.000	42.3
1.180	37.3
0.600	32.2
0.425	30.1
0.300	27.8
0.212	25.2
0.150	22.6
0.063	17.4

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
	Silt			Sand			Gravel			5.5	0.0
	17.4			24.9			52.2				

Sample Description Brown silty very sandy GRAVEL.

Project No. NMTL 3486

BH/TP No. TPS

Sample No. D18

NMTL Ltd

Project Seven Hills WF

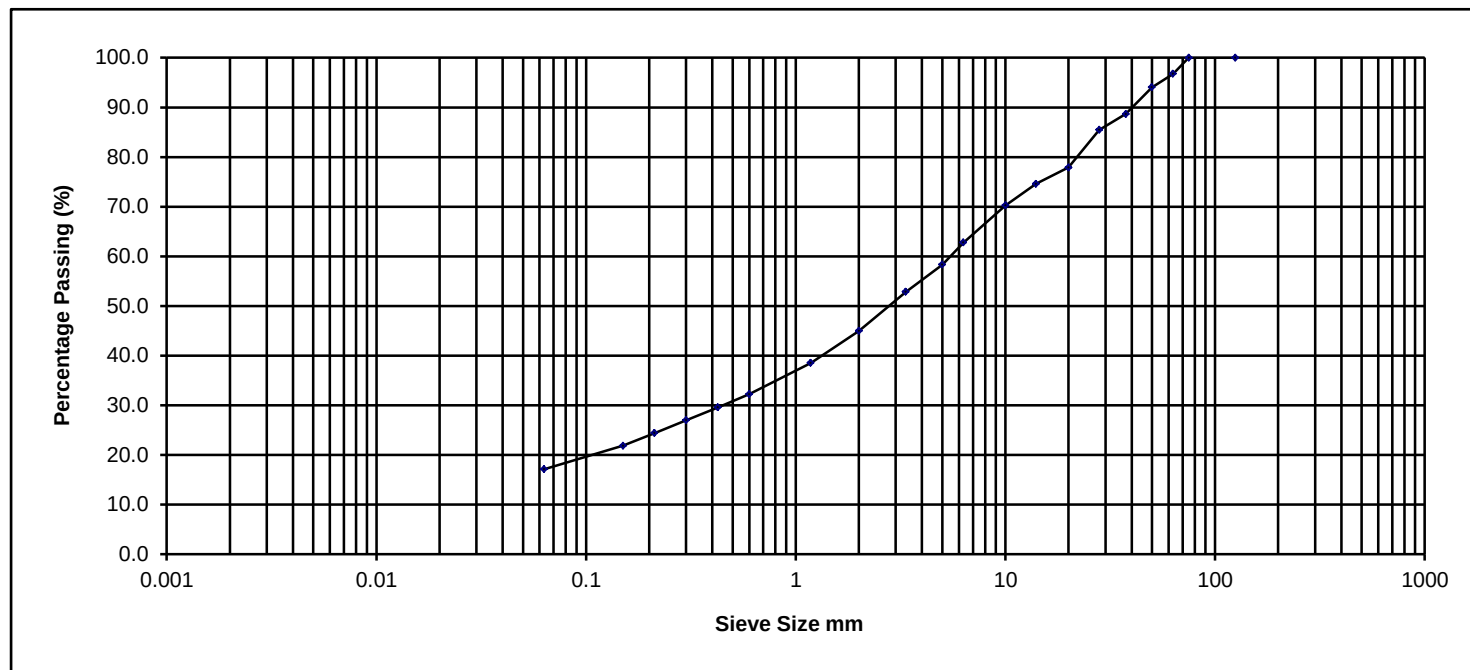
Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	19/01/2022	Depth	1.00m
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NMTL Ltd

Sieve	%
Size mm	Passing
125.000	100.0
75.000	100.0
63.000	96.8
50.000	94.0
37.500	88.7
28.000	85.5
20.000	77.9
14.000	74.6
10.000	70.3
6.300	62.8
5.000	58.3
3.350	52.8
2.000	45.0
1.180	38.5
0.600	32.3
0.425	29.6
0.300	27.0
0.212	24.4
0.150	21.9
0.063	17.1

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
	Silt			Sand			Gravel			3.2	0.0
	17.1			27.8			51.8				

Sample Description Grey/brown silty very sandy GRAVEL.

Project No. NMTL 3486

BH/TP No. TPS

Sample No. D19

NMTL

Ltd

Project Seven Hills WF

Operator

Tzr

Checked

Nc

Approved

Bc

Date sample tested

18/01/2022

Depth

1.50m

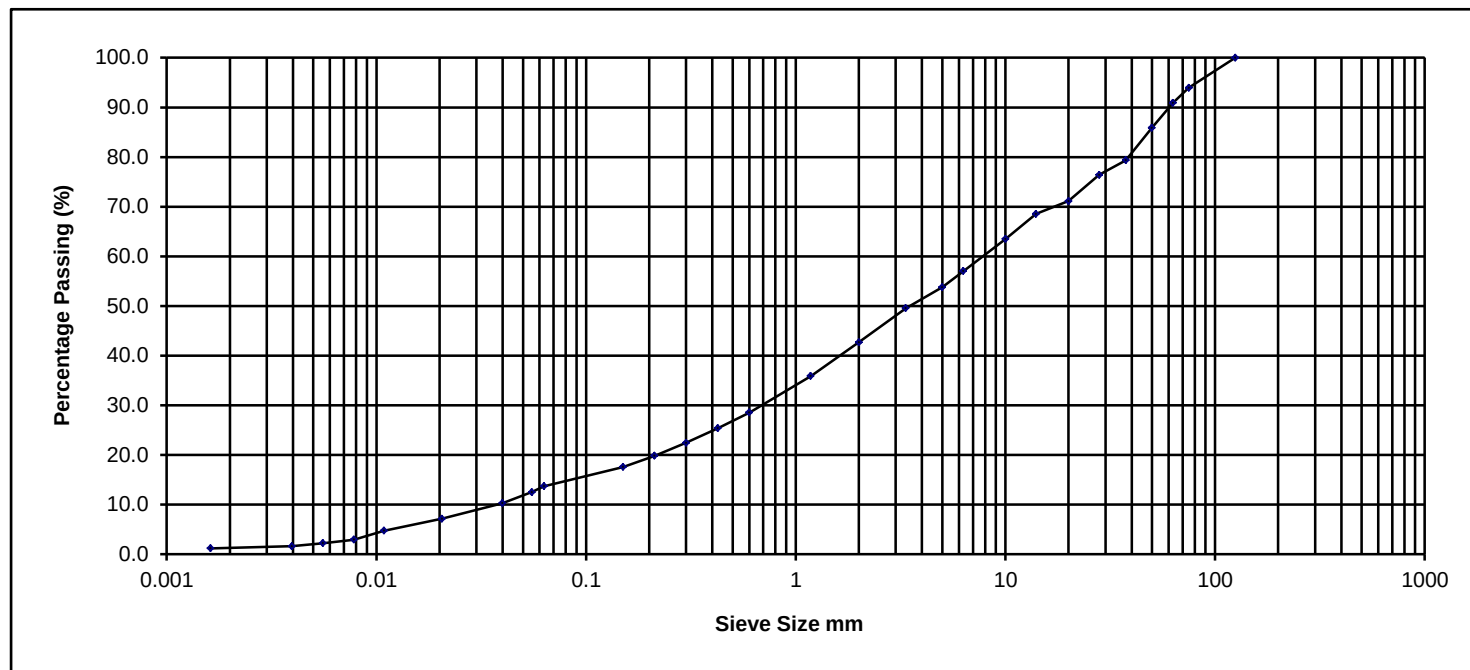
NMTL Ltd

Sieve	%
Size mm	Passing
125.000	100.0
75.000	94.0
63.000	90.9
50.000	85.9
37.500	79.4
28.000	76.4
20.000	71.1
14.000	68.6
10.000	63.5
6.300	57.0
5.000	53.8
3.350	49.6
2.000	42.7
1.180	35.9
0.600	28.5
0.425	25.4
0.300	22.4
0.212	19.8
0.150	17.6
0.063	13.7
0.055	12.5
0.040	10.3
0.021	7.2
0.011	4.7
0.008	2.9
0.006	2.2
0.004	1.6
0.002	1.2

NMTL Ltd

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size										Cobbles	Boulder
Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse		
	Silt			Sand			Gravel				
1.2	12.5			29.0			48.2			9.1	0.0

Sample Description Grey/brown silty very sandy GRAVEL.

Project No. NMTL 3486

BH/TP No. TPS

Project Seven Hills WF

Sample No. D20

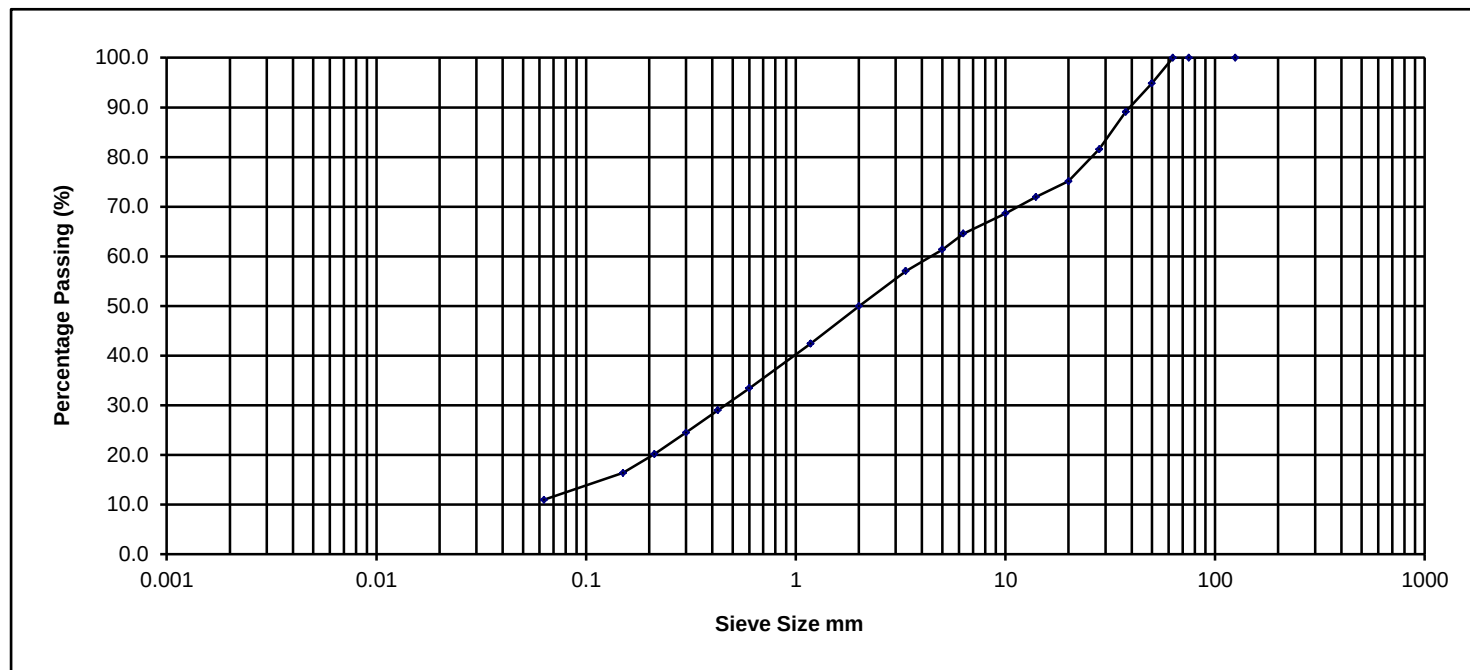
Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	18/01/2022	Depth	1.40m
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NMTL Ltd

Sieve	%
Size mm	Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	94.8
37.500	89.1
28.000	81.6
20.000	75.1
14.000	72.0
10.000	68.7
6.300	64.6
5.000	61.4
3.350	57.0
2.000	49.9
1.180	42.4
0.600	33.4
0.425	29.0
0.300	24.5
0.212	20.2
0.150	16.4
0.063	11.0

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
	Silt			Sand			Gravel			0.0	0.0
	11.0			39.0			50.1				

Sample Description Grey/brown silty very sandy GRAVEL.

Project No. NMTL 3486

BH/TP No. TPS

Sample No. D21

NMTL Ltd

Project Seven Hills WF

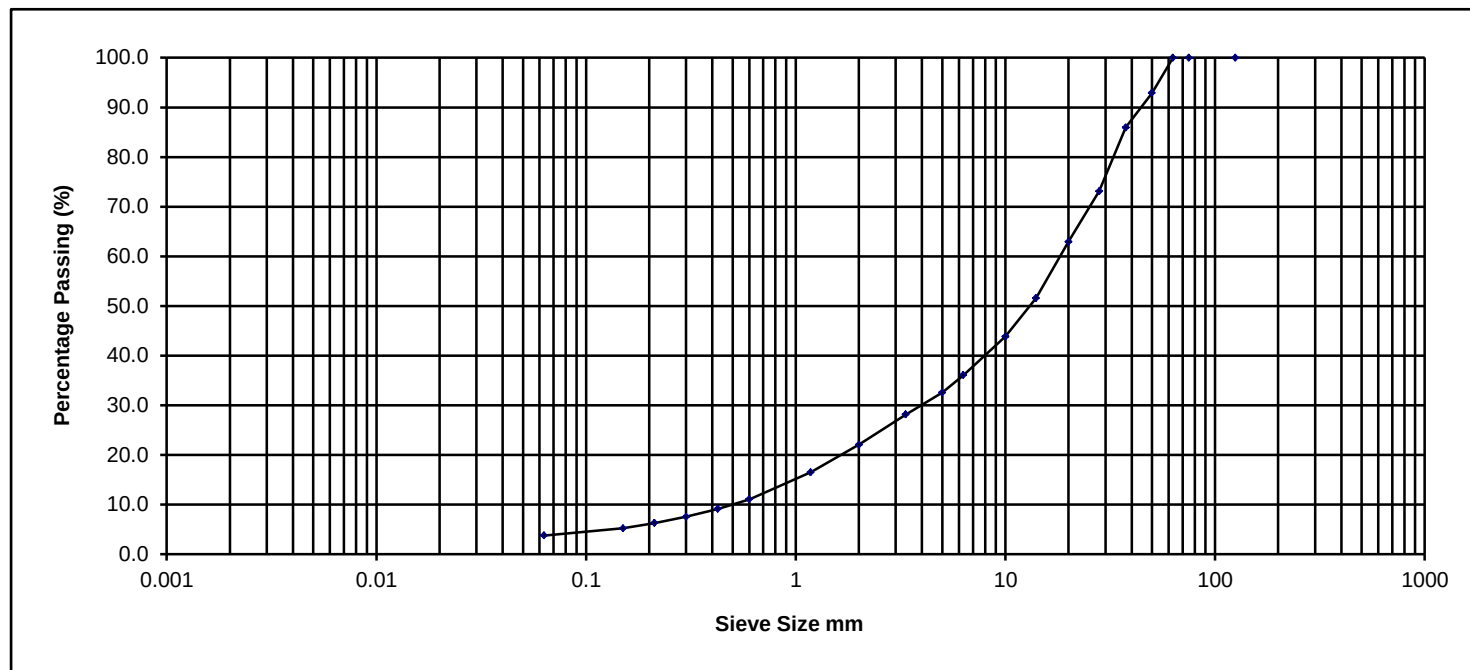
Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	18/01/2022	Depth	0.80m
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NMTL Ltd

Sieve	%
Size mm	Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	92.9
37.500	86.0
28.000	73.1
20.000	62.9
14.000	51.6
10.000	43.9
6.300	36.1
5.000	32.6
3.350	28.2
2.000	22.1
1.180	16.5
0.600	11.1
0.425	9.1
0.300	7.6
0.212	6.3
0.150	5.2
0.063	3.8

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
		Silt			Sand			Gravel		0.0	0.0
		3.8			18.3			77.9			

Sample Description Grey/brown slightly silty sandy GRAVEL.

Project No. NMTL 3486

BH/TP No. TPS

Sample No. D22

NMTL Ltd

Project Seven Hills WF

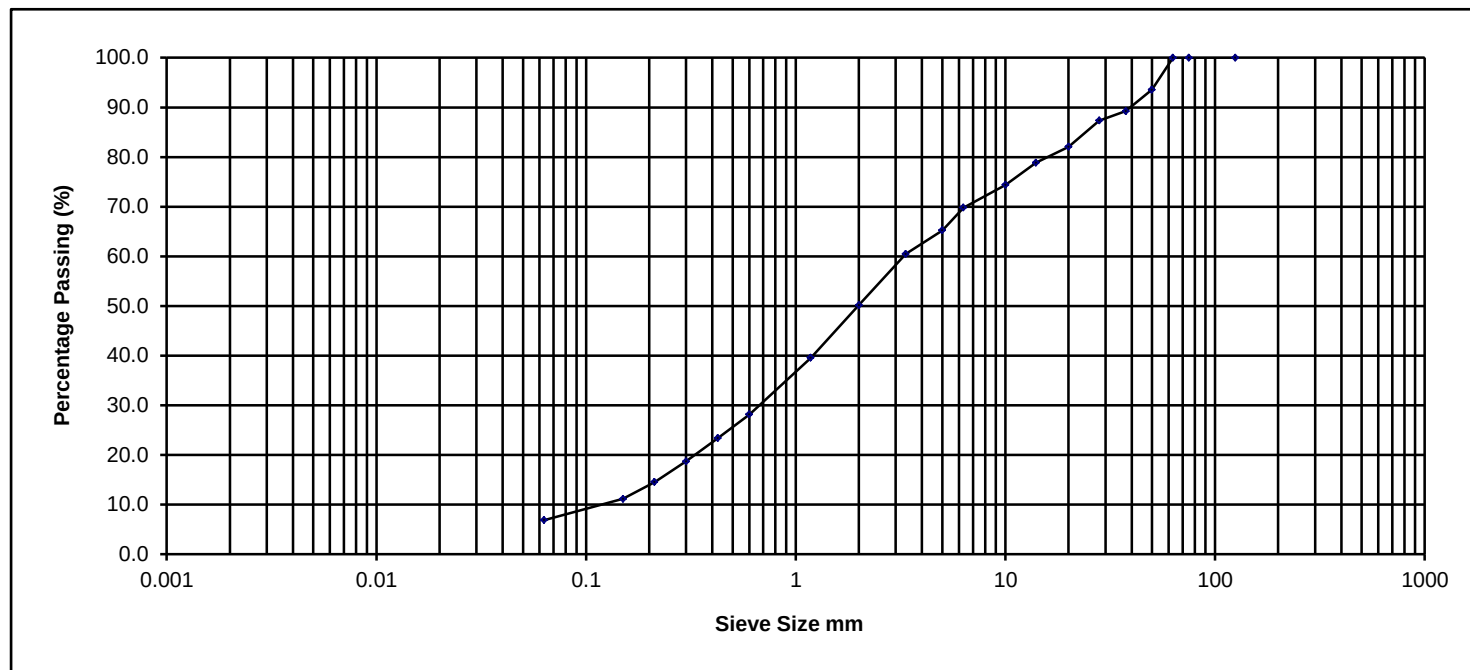
Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	19/01/2022	Depth	0.90m
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NMTL Ltd

Sieve	%
Size mm	Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	93.6
37.500	89.2
28.000	87.3
20.000	82.1
14.000	78.9
10.000	74.4
6.300	69.8
5.000	65.2
3.350	60.5
2.000	50.2
1.180	39.5
0.600	28.1
0.425	23.4
0.300	18.7
0.212	14.6
0.150	11.2
0.063	6.9

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
	Silt			Sand			Gravel			0.0	0.0
	6.9			43.3			49.8				

Sample Description Brown grey silty very sandy GRAVEL.

Project No. NMTL 3486

BH/TP No. TPS

Sample No. D23

NM

TL

Ltd

Project Seven Hills WF

Operator

Tzr

Checked

Nc

Approved

Bc

Date sample tested

19/01/2022

Depth

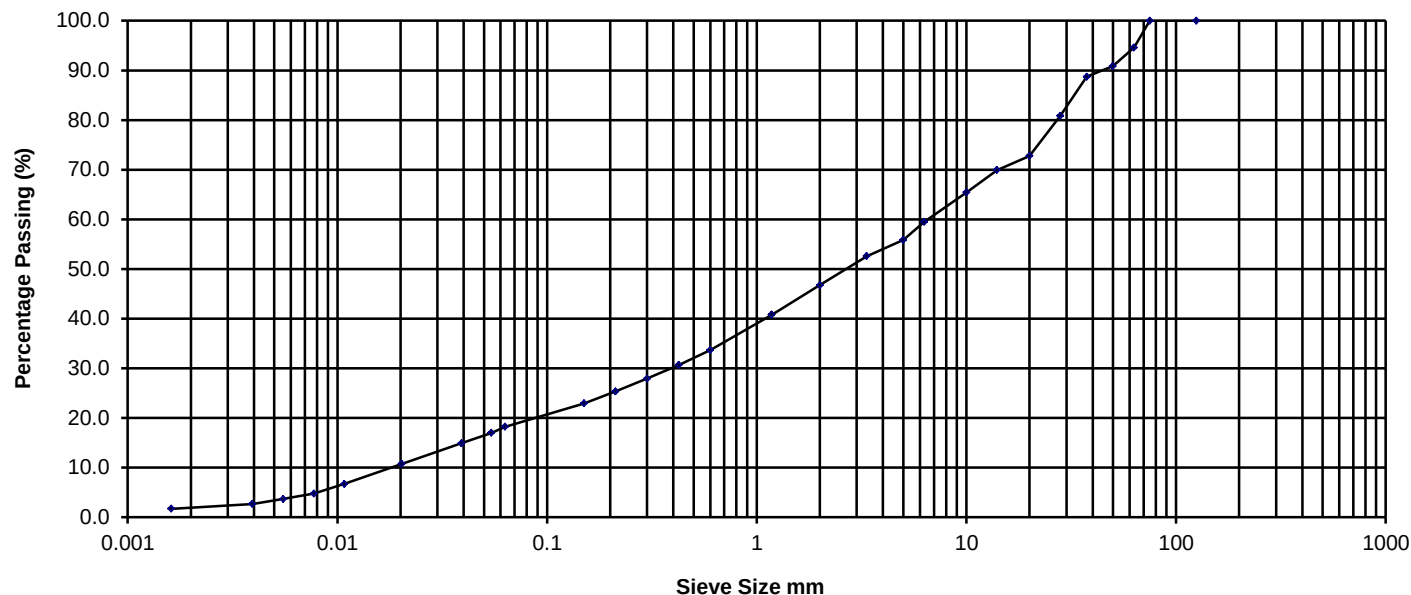
0.80m

NMTL Ltd

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	94.6
50.000	90.9
37.500	88.7
28.000	80.8
20.000	72.8
14.000	69.9
10.000	65.4
6.300	59.5
5.000	55.9
3.350	52.6
2.000	46.7
1.180	40.8
0.600	33.6
0.425	30.7
0.300	27.9
0.212	25.3
0.150	22.9
0.063	18.2
0.054	17.0
0.039	14.9
0.020	10.8
0.011	6.7
0.008	4.8
0.006	3.7
0.004	2.7
0.002	1.7

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
	Silt			Sand			Gravel				
1.7	16.5			28.5			47.9			5.4	0.0

Sample Description Brown silty very sandy GRAVEL.

Project No. NMTL 3486

BH/TP No. TPS

Sample No. D24

NMTL Ltd

Project Seven Hills WF

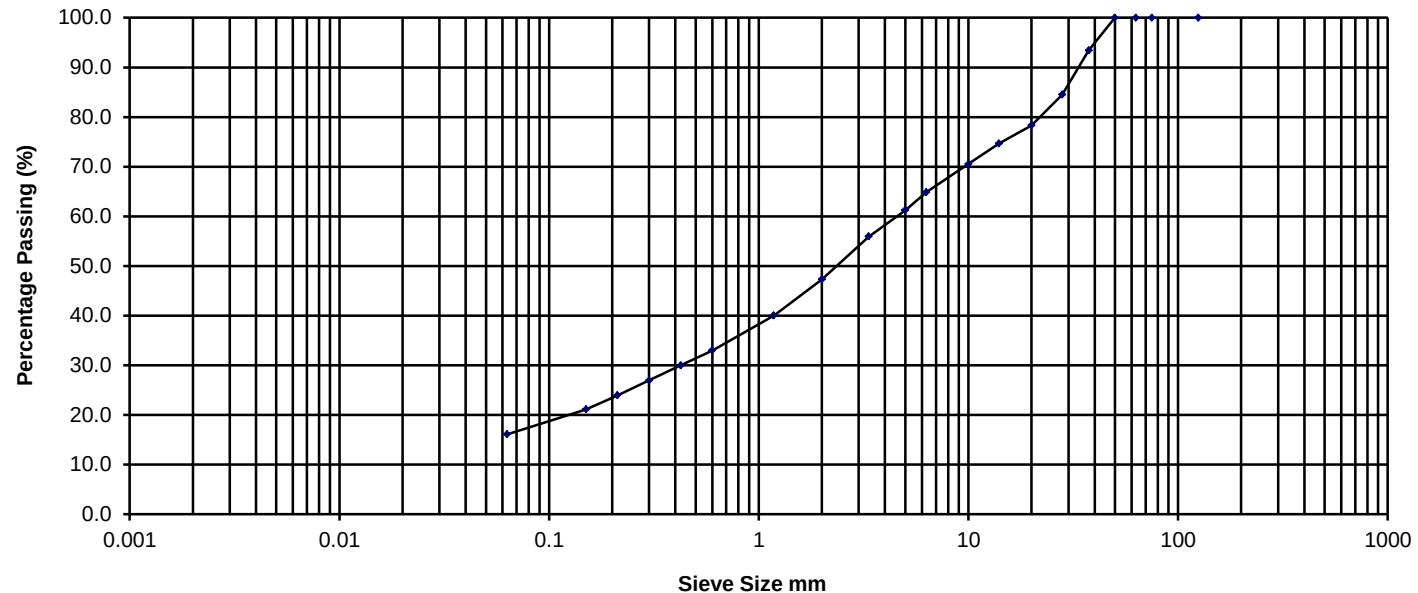
Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	18/01/2022	Depth	1.55m
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NMTL Ltd

Sieve	%
Size mm	Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	100.0
37.500	93.4
28.000	84.5
20.000	78.3
14.000	74.7
10.000	70.5
6.300	64.9
5.000	61.2
3.350	56.0
2.000	47.3
1.180	40.0
0.600	33.0
0.425	30.0
0.300	26.9
0.212	24.0
0.150	21.1
0.063	16.1

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
	Silt			Sand			Gravel			0.0	0.0
	16.1			31.2			52.7				

Sample Description Brown silty very sandy GRAVEL.

Project No. NMTL 3486

BH/TP No. TPS

Sample No. D25

NM

TL

Ltd

Project Seven Hills WF

Operator

Tzr

Checked

Nc

Approved

Bc

Date sample tested

18/01/2022

Depth

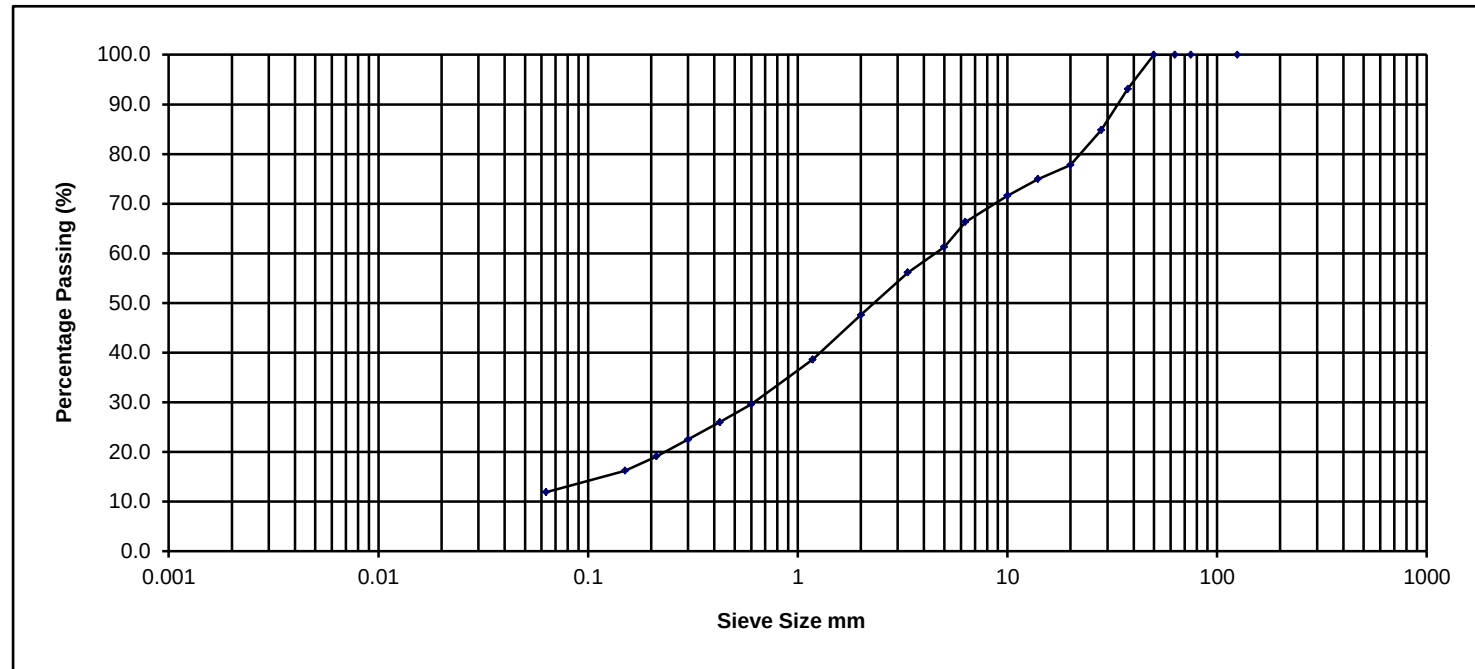
1.20m

NMTL Ltd

Sieve	%
Size mm	Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	100.0
37.500	93.1
28.000	84.8
20.000	77.8
14.000	75.0
10.000	71.6
6.300	66.3
5.000	61.3
3.350	56.1
2.000	47.6
1.180	38.6
0.600	29.6
0.425	26.0
0.300	22.5
0.212	19.1
0.150	16.2
0.063	11.9

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
	Silt			Sand			Gravel			0.0	0.0
	11.9			35.7			52.4				

Sample Description Brown silty very sandy GRAVEL.

Project No. NMTL 3486

BH/TP No. TPS

Sample No. D26

NM
TL

Project Seven Hills WF

Ltd

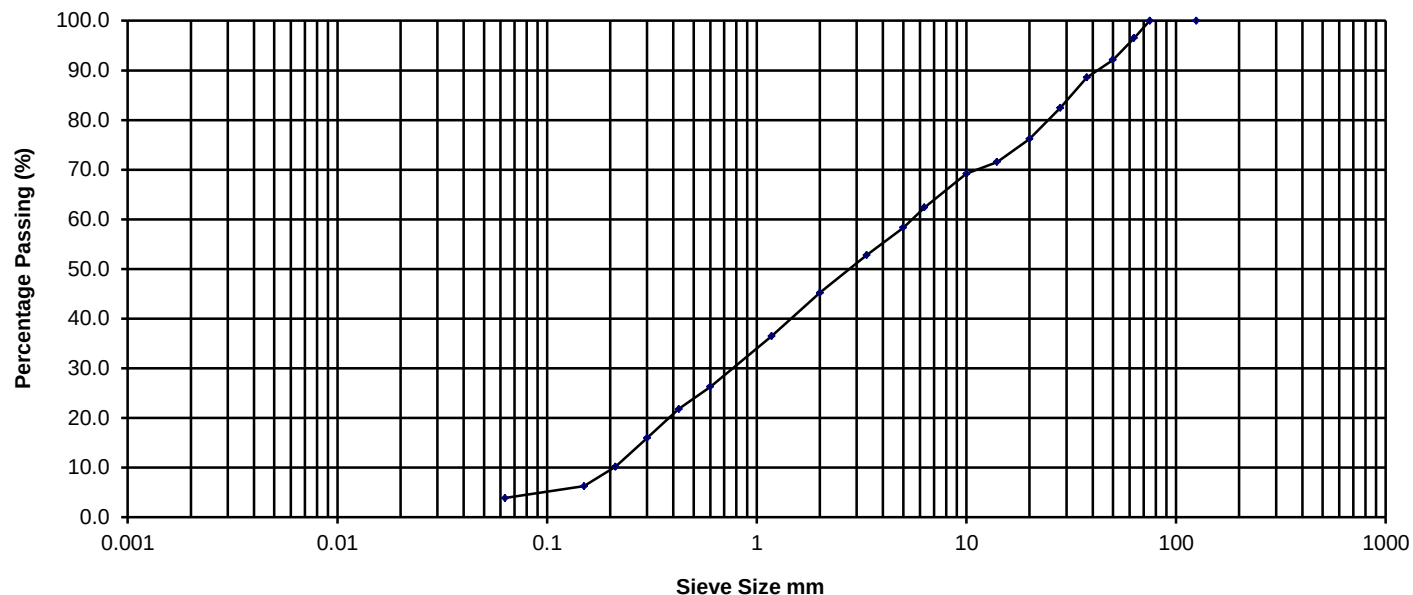
Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	18/01/2022	Depth	1.40m
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NMTL Ltd

Sieve	%
Size mm	Passing
125.000	100.0
75.000	100.0
63.000	96.5
50.000	92.1
37.500	88.6
28.000	82.4
20.000	76.2
14.000	71.5
10.000	69.2
6.300	62.4
5.000	58.3
3.350	52.8
2.000	45.2
1.180	36.5
0.600	26.3
0.425	21.8
0.300	16.0
0.212	10.2
0.150	6.3
0.063	3.9

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
	Silt			Sand			Gravel			3.5	0.0
	3.9			41.3			51.3				

Sample Description Brown slightly silty very sandy GRAVEL.

Project No. NMTL 3486

BH/TP No. TPS

Sample No. D27

NM**TL****Ltd**

Project Seven Hills WF

Operator

Tzr

Checked

Nc

Approved

Bc

Date sample tested

18/01/2022

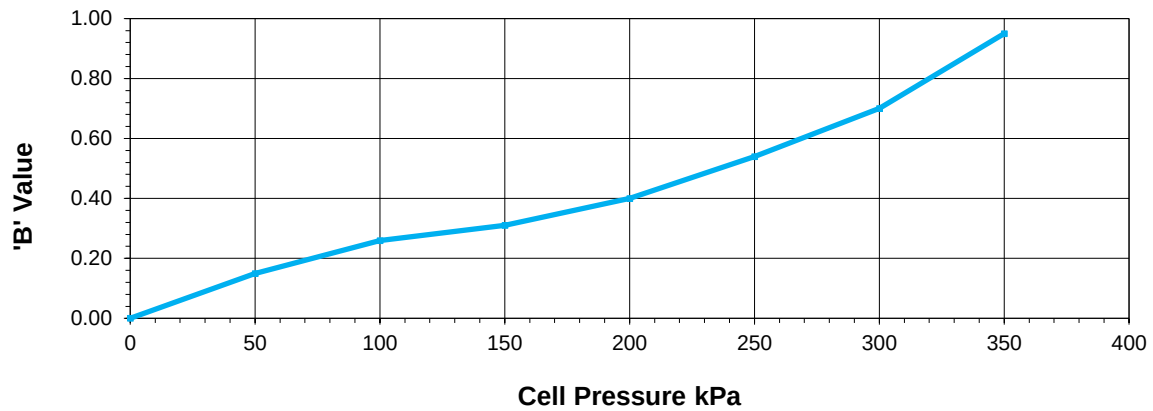
Depth

0.60m

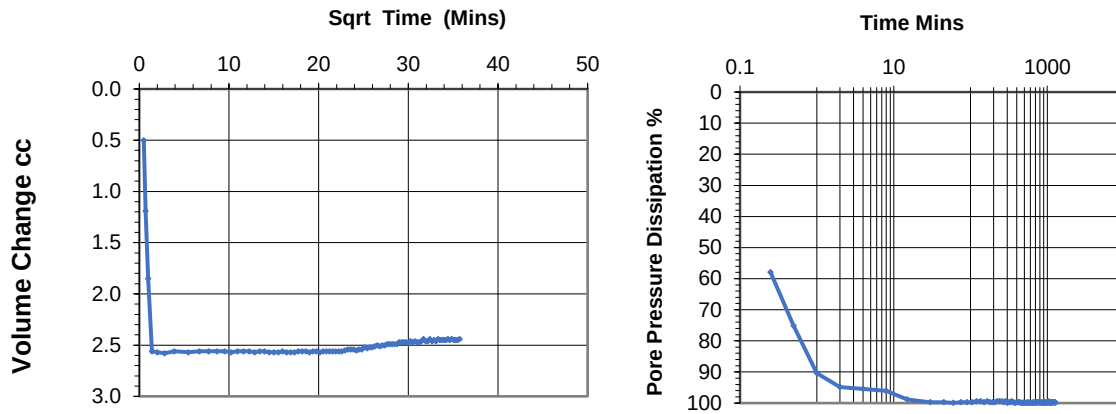
Appendix III: Bulk Samples – Density and Permeability Laboratory Test Report

SUMMARY OF TEST RESULTS						
		Initial			Initial	Final
Specimen Length	mm	115.00	Bulk Density	Mg/m3	2.205	2.241
Specimen Diameter	mm	105.24	Dry Density	Mg/m3	2.008	2.008
Area	mm2	8698.64	Moisture	%	9.8	11.6
Volume	cc	1000.34	Saturation	%	81.45	96.33
Saturation Stage			Voids Ratio		0.3199	0.3199
Test Stage	Cell Pressure (kPa)		Particle Density	Assumed	2.65	
			Pore Pressure Parameter 'B'			
			Base			
Initial	0		0			
1	50		0.15			
2	100		0.26			
3	150		0.31			
4	200		0.40			
5	250		0.54			
7	300		0.70			
8	350		0.95			
Isotropic Consolidation Stage						
Cell Pressure		350	kPa			
Back Pressure		300	kPa			
Radial Effective stress		50	kPa			
Test Temperature ° C		20				
Final Height Hf		114.92	mm			
Coef. Of Consolidation Cv		8250.00	m2/year			
Coef. Of Vol. Compressibility mv		0.074	m2/MN			
Permeability		1.8846E-07	m/sec			
PERMEABILITY RESULTS						
Cell Pressure		350	kPa			
Top Pressure		310	kPa			
Base Pressure		300	kPa			
Mean Effective Stress		45.0	kPa			
Moisture Content		11.6	%			
Dry Density		2.008	Mg/m3			
Voids ratio		0.3199				
Deg of Saturation		96.33	%			
Hydraulic Gradient	i	8.876				
Mean Flow Rate q	Flow in	1.940000	mL/min			
Permeability Kv	Flow in	4.185E-07	m/sec			
Permeability Kv	Flow out	3.926E-07	m/sec			
Test Temperature		20°C				
Notes	1 Direction of flow is down					
Sample Description	Brown silty very sandy GRAVEL.					
NM TL Ltd	Constant Head Triaxial Permeability Test			Project No.	NMTL-3486	
	Test Method : BS 1377 : Part 6 : 1990			BH/TP	TPN	
	Project:		Tested-Tch	Sample No.	D03	
	Seven Hills WF		Checked-Bc	14/02/2022	Depth.	1.20m

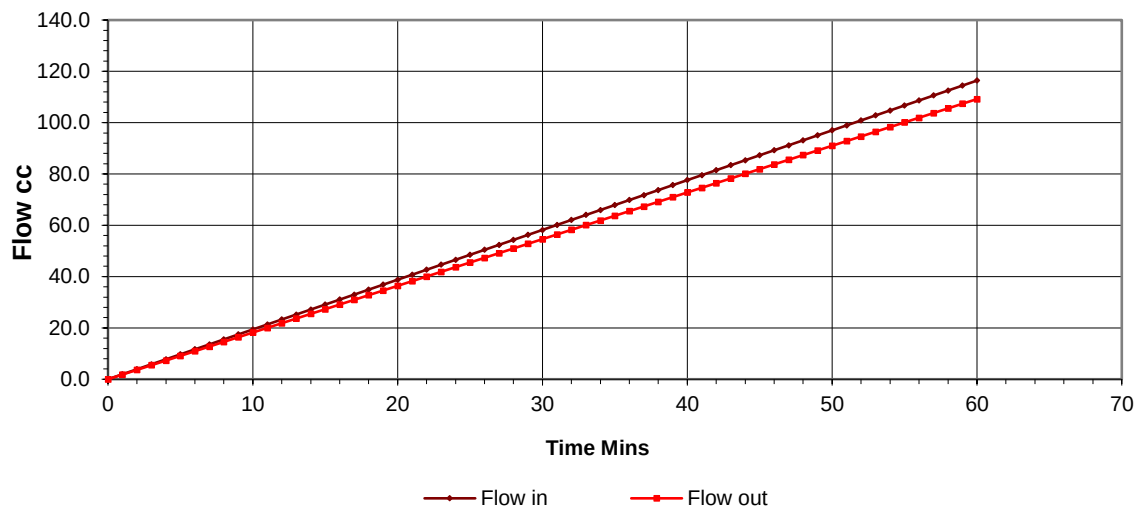
SATURATION STAGE



ISOTROPIC CONSOLIDATION STAGE



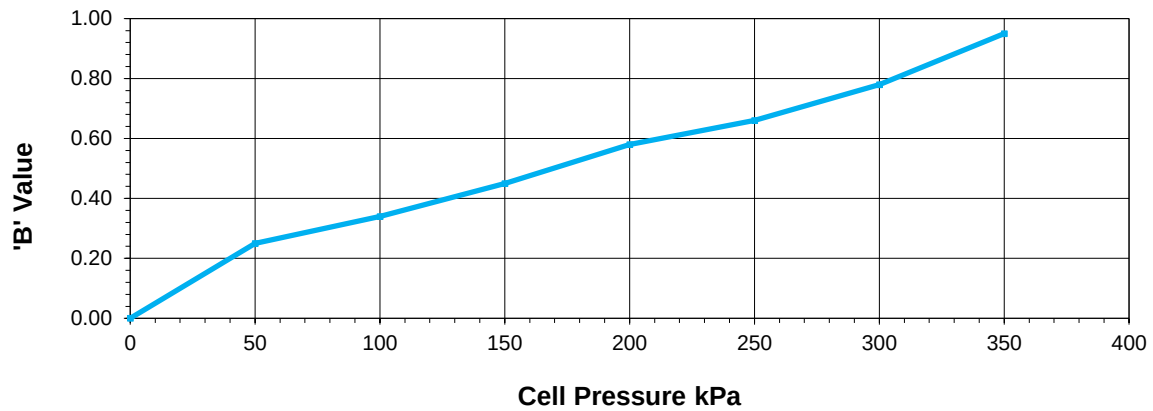
PERMEABILITY STAGE



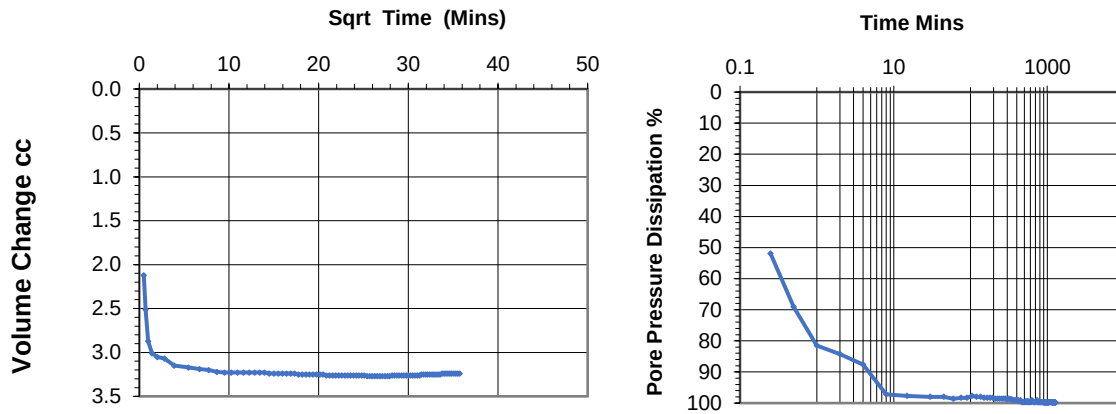
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	Test Method : BS 1377 : Part 6 : 1990			BH/TP	TPN
	Project:	Seven Hills WF		Sample No.	D03
		Tested-Tch		Depth.	1.20m
		Checked-Bc	14/02/2022		

SUMMARY OF TEST RESULTS						
		Initial			Initial	Final
Specimen Length	mm	115.00	Bulk Density	Mg/m3	2.258	2.260
Specimen Diameter	mm	105.24	Dry Density	Mg/m3	2.030	2.030
Area	mm2	8698.64	Moisture	%	11.2	11.3
Volume	cc	1000.34	Saturation	%	97.49	98.37
Saturation Stage			Voids Ratio		0.3055	0.3055
Test Stage	Cell Pressure (kPa)		Particle Density	Assumed	2.65	
			Pore Pressure Parameter 'B'			
			Base			
Initial	0		0			
1	50		0.25			
2	100		0.34			
3	150		0.45			
4	200		0.58			
5	250		0.66			
7	300		0.78			
8	350		0.95			
Isotropic Consolidation Stage						
Cell Pressure		350	kPa			
Back Pressure		300	kPa			
Radial Effective stress		50	kPa			
Test Temperature ° C		20				
Final Height Hf		114.89	mm			
Coef. Of Consolidation Cv		4400.00	m2/year			
Coef. Of Vol. Compressibility mv		0.091	m2/MN			
Permeability		1.2410E-07	m/sec			
PERMEABILITY RESULTS						
Cell Pressure		350	kPa			
Top Pressure		310	kPa			
Base Pressure		300	kPa			
Mean Effective Stress		45.0	kPa			
Moisture Content		11.3	%			
Dry Density		2.030	Mg/m3			
Voids ratio		0.3055				
Deg of Saturation		98.37	%			
Hydraulic Gradient	i	8.878				
Mean Flow Rate q	Flow in	1.630000	mL/min			
Permeability Kv	Flow in	3.517E-07	m/sec			
Permeability Kv	Flow out	3.345E-07	m/sec			
Test Temperature		20°C				
Notes	1 Direction of flow is down					
Sample Description	Brown silty very sandy GRAVEL.					
NM TL Ltd	Constant Head Triaxial Permeability Test			Project No.	NMTL-3486	
	Test Method : BS 1377 : Part 6 : 1990			BH/TP	TPN	
	Project:		Tested-Tch	Sample No.	D07	
	Seven Hills WF		Checked-Bc	14/02/2022	Depth.	1.50m

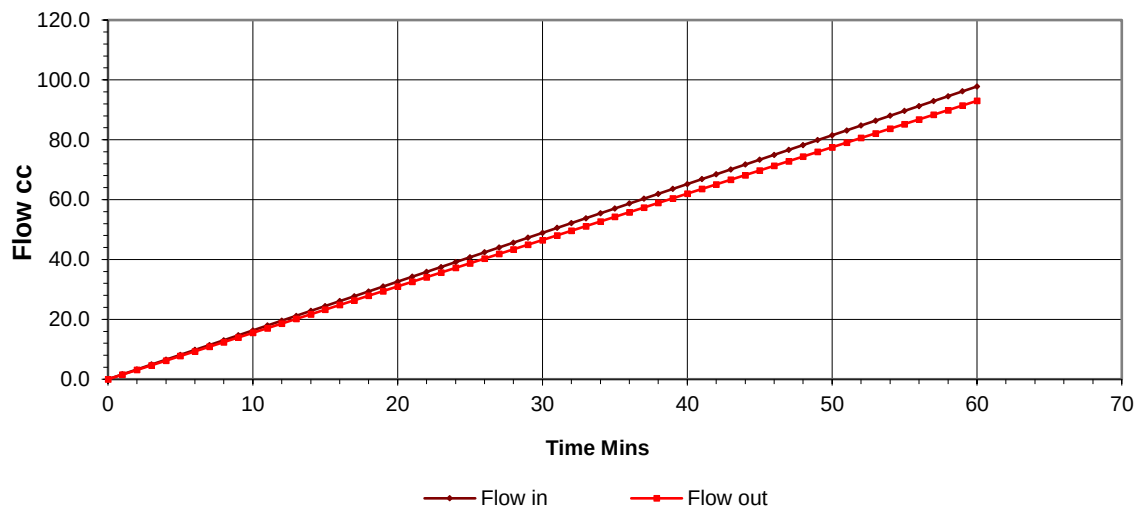
SATURATION STAGE



ISOTROPIC CONSOLIDATION STAGE



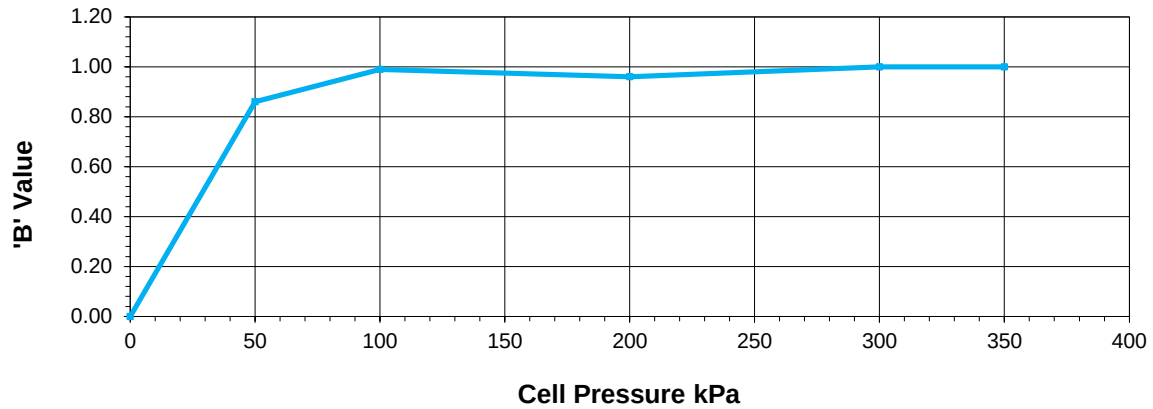
PERMEABILITY STAGE



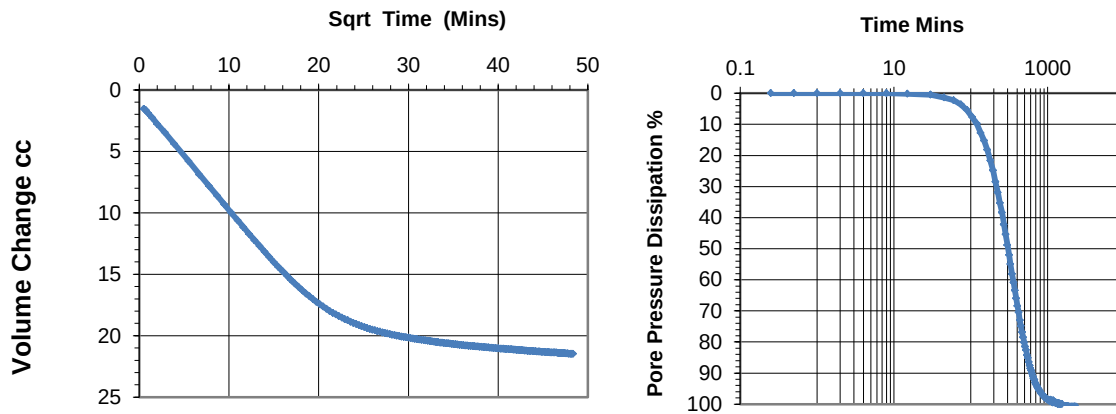
NM TL Ltd	Constant Head Triaxial Permeability Test			Project No.	NMTL-3486
	Test Method : BS 1377 : Part 6 : 1990			BH/TP	TPN
	Project:	Seven Hills WF	Tested-Tch	Sample No.	D07
			Checked-Bc	14/02/2022	Depth.

SUMMARY OF TEST RESULTS						
		Initial			Initial	Final
Specimen Length	mm	115.00	Bulk Density	Mg/m3	2.208	2.234
Specimen Diameter	mm	105.23	Dry Density	Mg/m3	1.949	1.992
Area	mm2	8696.99	Moisture	%	13.3	12.2
Volume	cc	1000.15	Saturation	%	97.97	97.62
Saturation Stage			Voids Ratio		0.3597	0.3305
Test Stage	Cell Pressure (kPa)		Particle Density	Assumed	2.65	
			Pore Pressure Parameter 'B'			
			Base			
Initial	0		0			
1	50		0.86			
2	100		0.99			
3	200		0.96			
4	300		1.00			
5	350		1.00			
Isotropic Consolidation Stage						
Cell Pressure		350	kPa			
Back Pressure		300	kPa			
Radial Effective stress		50	kPa			
Test Temperature ° C		20				
Final Height Hf		114.28	mm			
Coef. Of Consolidation Cv		80.00	m2/year			
Coef. Of Vol. Compressibility mv		0.487	m2/MN			
Permeability		1.2072E-08	m/sec			
PERMEABILITY RESULTS						
Cell Pressure		350	kPa			
Top Pressure		310	kPa			
Base Pressure		300	kPa			
Mean Effective Stress		45.0	kPa			
Moisture Content		12.2	%			
Dry Density		1.992	Mg/m3			
Voids ratio		0.3305				
Deg of Saturation		97.62	%			
Hydraulic Gradient	i	8.925				
Mean Flow Rate q	Flow in	0.005529	mL/min			
Permeability Kv	Flow in	1.203E-09	m/sec			
Permeability Kv	Flow out	1.026E-09	m/sec			
Test Temperature		20°C				
Notes	1 Direction of flow is down					
Sample Description	Brown slightly sandy gravelly clayey SILT.					
NM TL Ltd	Constant Head Triaxial Permeability Test			Project No.	NMTL-3486	
	Test Method : BS 1377 : Part 6 : 1990			BH/TP	TPN	
	Project:		Tested-Tch	Sample No.	D11	
	Seven Hills WF		Checked-Bc	30/01/2022	Depth.	1.50m

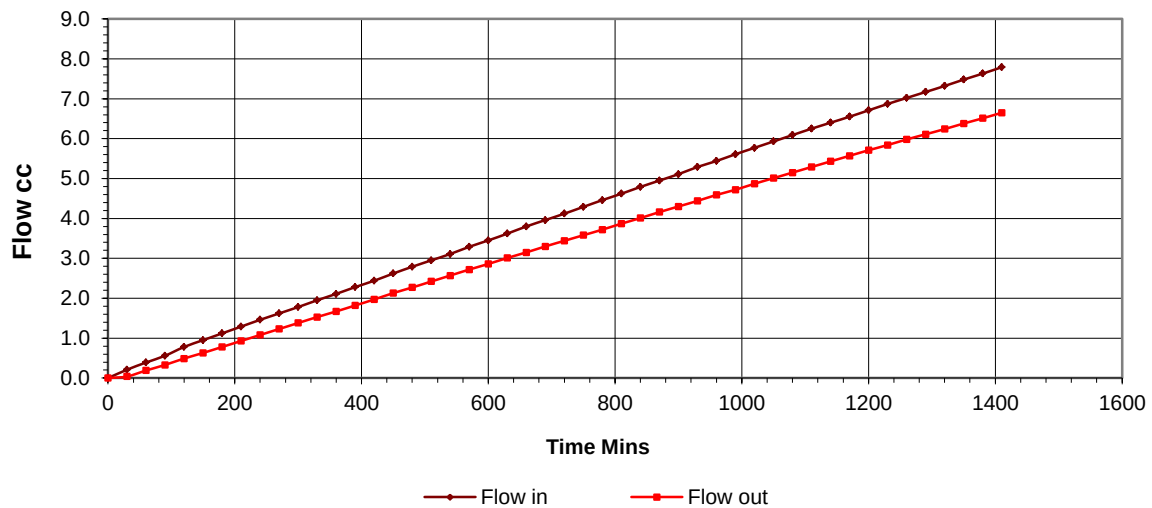
SATURATION STAGE



ISOTROPIC CONSOLIDATION STAGE



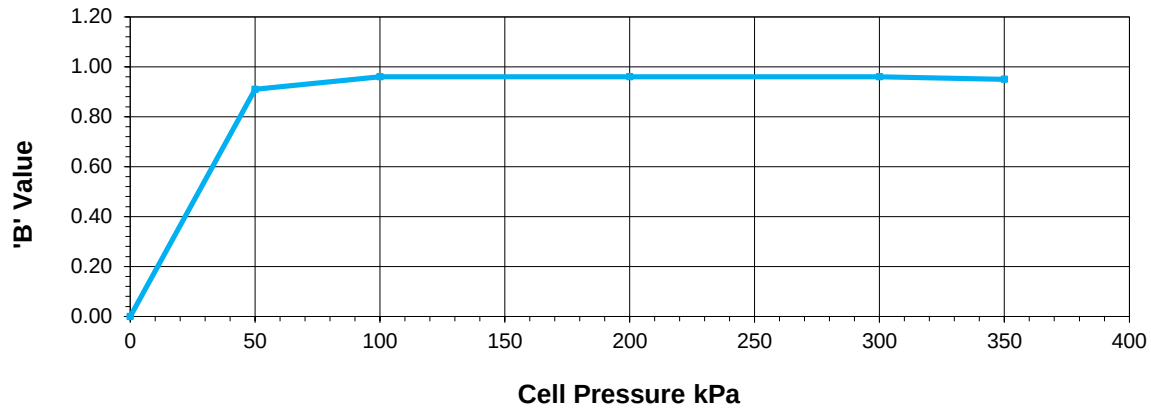
PERMEABILITY STAGE



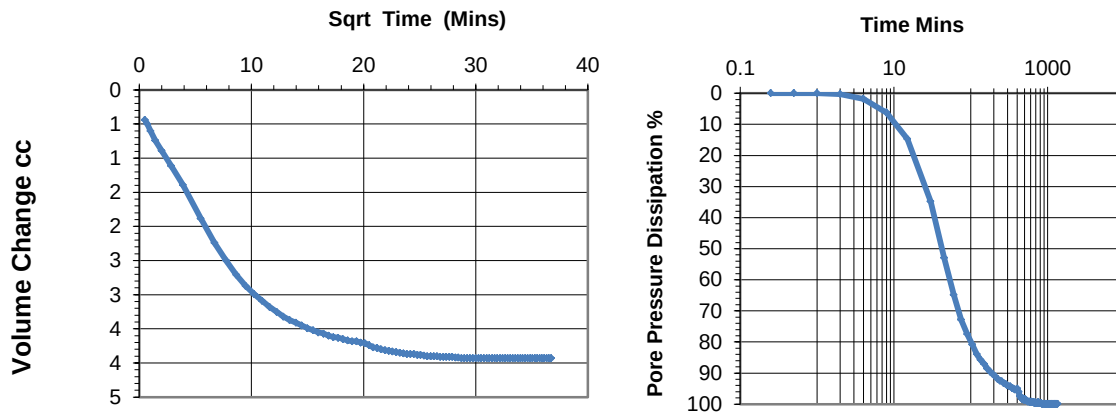
NM TL Ltd	Constant Head Triaxial Permeability Test			Project No.	NMTL-3486
	Test Method : BS 1377 : Part 6 : 1990			BH/TP	TPN
	Project:	Seven Hills WF	Tested-Tch	Sample No.	D11
		Checked-Bc	30/01/2022	Depth.	1.50m

SUMMARY OF TEST RESULTS						
		Initial			Initial	Final
Specimen Length	mm	114.96	Bulk Density	Mg/m3	2.325	2.327
Specimen Diameter	mm	105.24	Dry Density	Mg/m3	2.136	2.145
Area	mm2	8698.64	Moisture	%	8.8	8.5
Volume	cc	1000.00	Saturation	%	97.24	95.83
Saturation Stage			Voids Ratio		0.2405	0.2357
Test Stage	Cell Pressure (kPa)		Particle Density	Assumed	2.65	
			Pore Pressure Parameter 'B'			
			Base			
Initial	0		0			
1	50		0.91			
2	100		0.96			
3	200		0.96			
4	300		0.96			
5	350		0.95			
Isotropic Consolidation Stage						
Cell Pressure		350	kPa			
Back Pressure		300	kPa			
Radial Effective stress		50	kPa			
Test Temperature ° C		20				
Final Height Hf		114.83	mm			
Coef. Of Consolidation Cv		80.00	m2/year			
Coef. Of Vol. Compressibility Mv		0.101	m2/MN			
Permeability		2.4929E-09	m/sec			
PERMEABILITY RESULTS						
Cell Pressure		350	kPa			
Top Pressure		310	kPa			
Base Pressure		300	kPa			
Mean Effective Stress		45.0	kPa			
Moisture Content		8.5	%			
Dry Density		2.145	Mg/m3			
Voids ratio		0.2357				
Deg of Saturation		95.83	%			
Hydraulic Gradient	i	8.883				
Mean Flow Rate q	Flow in	0.008493	mL/min			
Permeability Kv	Flow in	1.832E-09	m/sec			
Permeability Kv	Flow out	1.528E-09	m/sec			
Test Temperature		21°C				
Notes	1 Direction of flow is down					
Sample Description	Grey/brown slightly sandy slightly gravelly clayey SILT.					
NM TL Ltd	Constant Head Triaxial Permeability Test			Project No.	NMTL-3486	
	Test Method : BS 1377 : Part 6 : 1990			BH/TP	TPS	
	Project:		Tested-Tch	Sample No.	D02	
	Seven Hills WF		Checked-Bc	30/01/2022	Depth.	1.50m

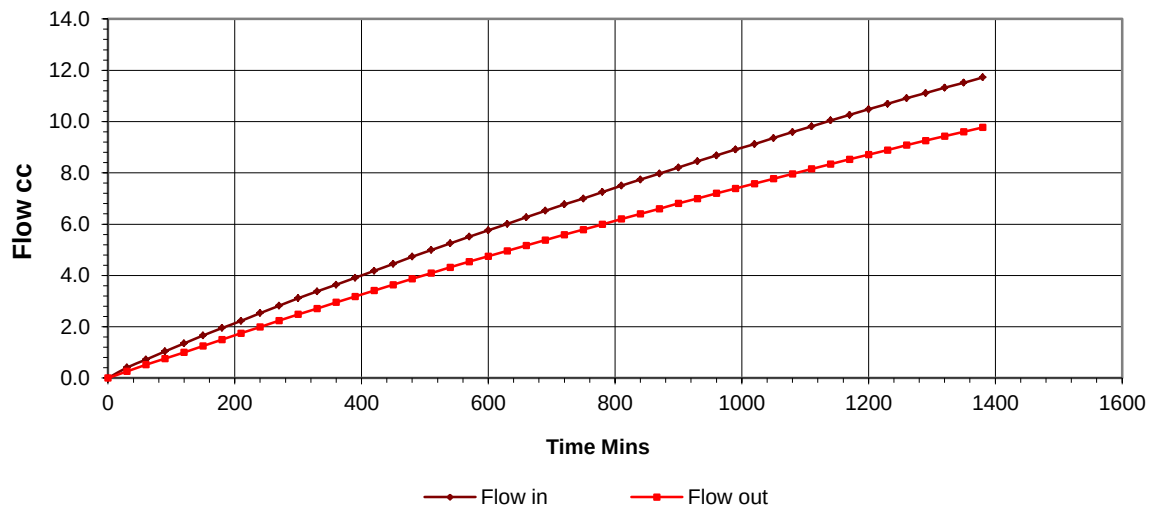
SATURATION STAGE



ISOTROPIC CONSOLIDATION STAGE



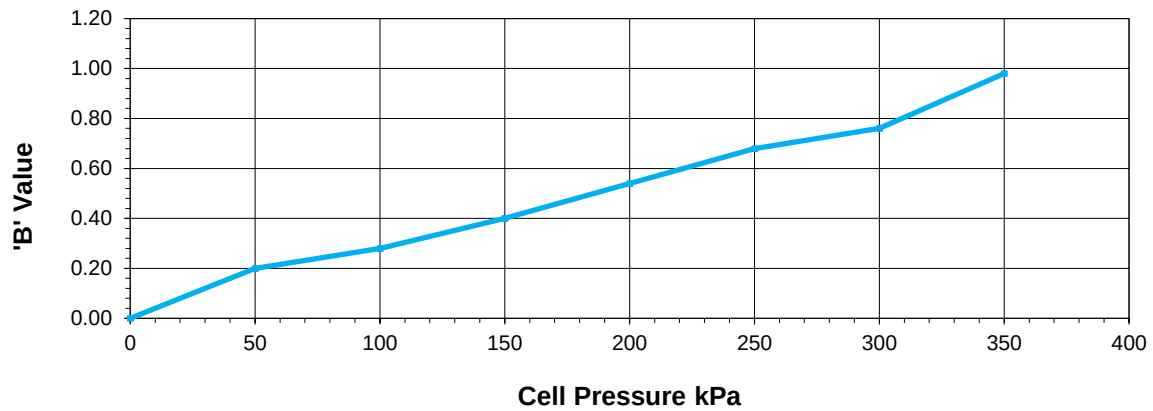
PERMEABILITY STAGE



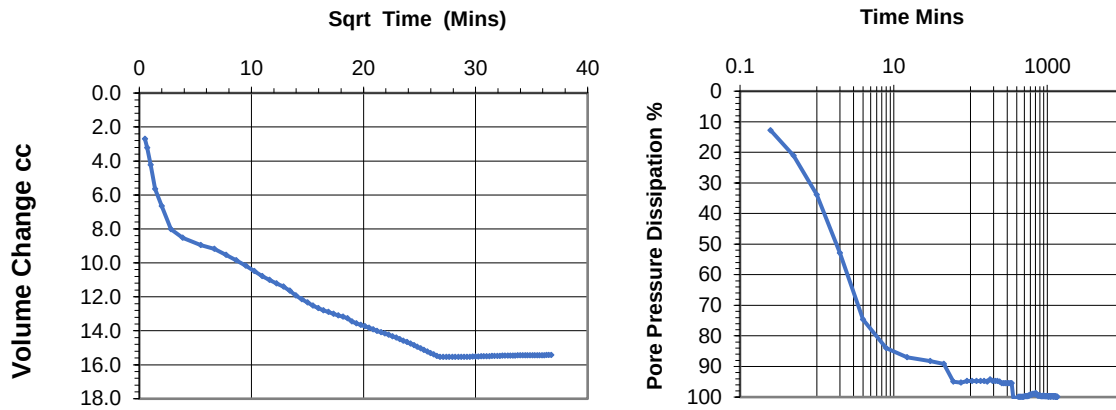
NM TL Ltd	Constant Head Triaxial Permeability Test			Project No.	NMTL-3486
	Test Method : BS 1377 : Part 6 : 1990			BH/TP	TPS
	Project:	Seven Hills WF	Tested-Tch	Sample No.	D02
		Checked-Bc	30/01/2022	Depth.	1.50m

SUMMARY OF TEST RESULTS							
		Initial			Initial	Final	
Specimen Length	mm	115.00		Bulk Density	Mg/m3	2.252	2.299
Specimen Diameter	mm	105.25		Dry Density	Mg/m3	2.068	2.100
Area	mm2	8700.30		Moisture	%	8.9	9.5
Volume	cc	1000.53		Saturation	%	83.84	95.98
				Voids Ratio		0.2812	0.2622
Saturation Stage				Particle Density	Assumed	2.65	
Test Stage	Cell Pressure (kPa)			Pore Pressure Parameter 'B' Base			
Initial	0			0			
1	50			0.20			
2	100			0.28			
3	150			0.40			
4	200			0.54			
5	250			0.68			
6	300			0.76			
7	350			0.98			
Isotropic Consolidation Stage							
Cell Pressure		350	kPa				
Back Pressure		300	kPa				
Radial Effective stress		50	kPa				
Test Temperature ° C		20					
Final Height Hf		114.51	mm				
Coef. Of Consolidation Cv		191.30	m2/year				
Coef. Of Vol. Compressibility mv		0.387	m2/MN				
Permeability		2.2922E-08	m/sec				
PERMEABILITY RESULTS							
Cell Pressure		350	kPa				
Top Pressure		310	kPa				
Base Pressure		300	kPa				
Mean Effective Stress		45.0	kPa				
Moisture Content		9.5	%				
Dry Density		2.100	Mg/m3				
Voids ratio		0.2622					
Deg of Saturation		95.98	%				
Hydraulic Gradient	i	8.908					
Mean Flow Rate q	Flow in	0.013333	mL/min				
Permeability Kv	Flow in	2.891E-09	m/sec				
Permeability Kv	Flow out	3.180E-09	m/sec				
Test Temperature		21°C					
Notes	1 Direction of flow is down						
Sample Description	Brown silty vey sandy GRAVEL.						
NM TL Ltd	Constant Head Triaxial Permeability Test				Project No.	NMTL-3486	
	Test Method : BS 1377 : Part 6 : 1990				BH/TP	TPS	
	Project: Seven Hills WF				Sample No.	D06	
	Checked-Bc				31/01/2022	Depth.	0.75m

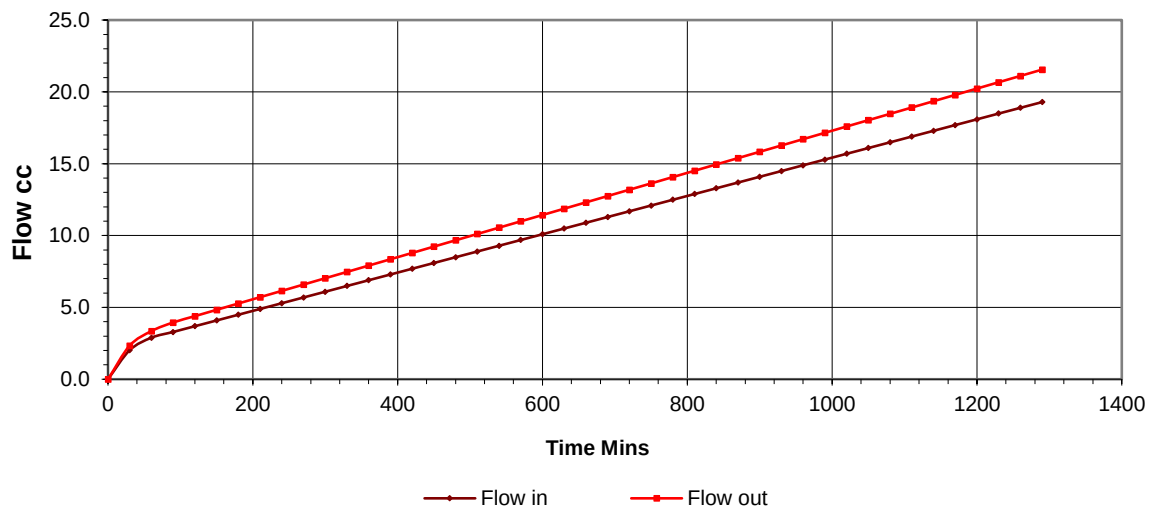
SATURATION STAGE



ISOTROPIC CONSOLIDATION STAGE



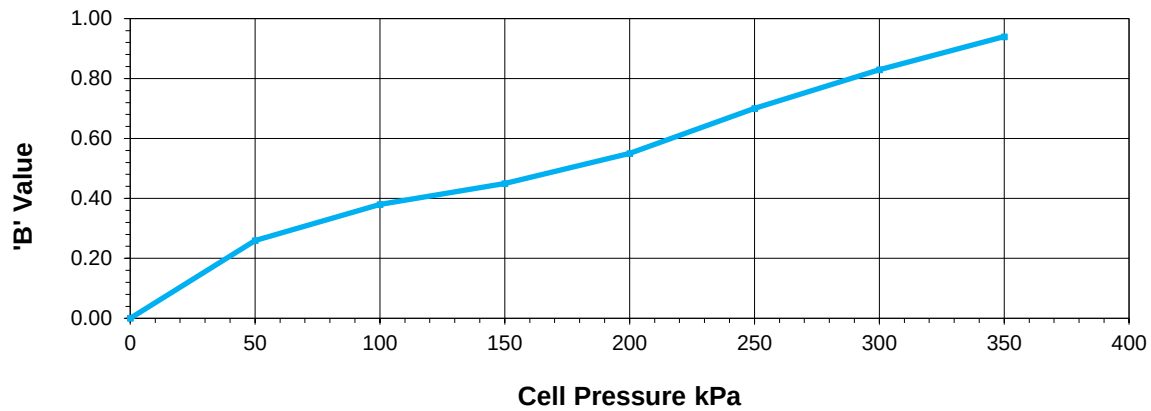
PERMEABILITY STAGE



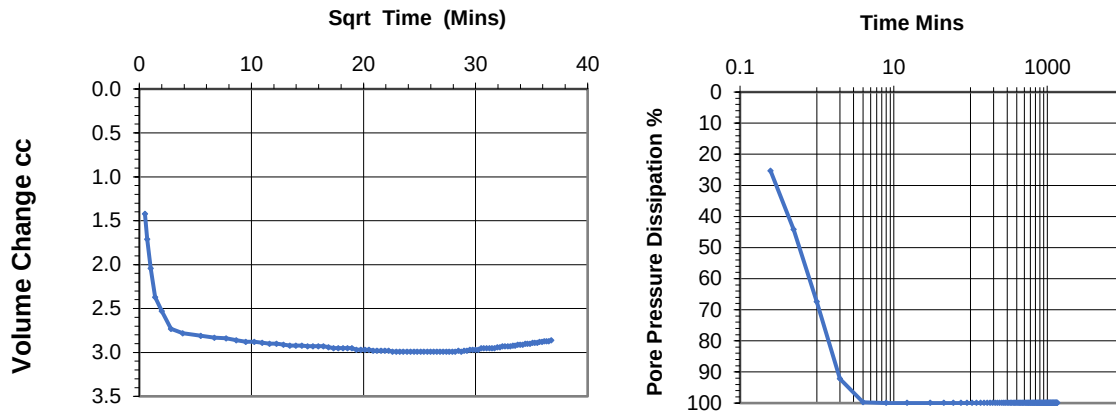
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	Test Method : BS 1377 : Part 6 : 1990			BH/TP	TPS
	Project:	Seven Hills WF	Tested-Tch	Sample No.	D06
			Checked-Bc		
				Depth.	0.75m

SUMMARY OF TEST RESULTS						
		Initial			Initial	Final
Specimen Length	mm	115.00	Bulk Density	Mg/m3	2.284	2.296
Specimen Diameter	mm	105.25	Dry Density	Mg/m3	2.088	2.094
Area	mm2	8700.30	Moisture	%	9.4	9.6
Volume	cc	1000.53	Saturation	%	92.43	96.13
Saturation Stage			Voids Ratio		0.2692	0.2654
Test Stage	Cell Pressure (kPa)		Particle Density	Assumed	2.65	
			Pore Pressure Parameter 'B'			
			Base			
Initial	0		0			
1	50		0.26			
2	100		0.38			
3	150		0.45			
4	200		0.55			
5	250		0.70			
6	300		0.83			
7	350		0.94			
Isotropic Consolidation Stage						
Cell Pressure		350	kPa			
Back Pressure		300	kPa			
Radial Effective stress		50	kPa			
Test Temperature ° C		20				
Final Height Hf		114.90	mm			
Coef. Of Consolidation Cv		2200.00	m2/year			
Coef. Of Vol. Compressibility mv		0.085	m2/MN			
Permeability		5.8193E-08	m/sec			
PERMEABILITY RESULTS						
Cell Pressure		350	kPa			
Top Pressure		310	kPa			
Base Pressure		300	kPa			
Mean Effective Stress		45.0	kPa			
Moisture Content		9.6	%			
Dry Density		2.094	Mg/m3			
Voids ratio		0.2654				
Deg of Saturation		96.13	%			
Hydraulic Gradient	i	8.877				
Mean Flow Rate q	Flow in	0.221938	mL/min			
Permeability Kv	Flow in	4.788E-08	m/sec			
Permeability Kv	Flow out	4.863E-08	m/sec			
Test Temperature		21°C				
Notes	1 Direction of flow is down					
Sample Description	Brown silty very sandy GRAVEL.					
NM TL Ltd	Constant Head Triaxial Permeability Test			Project No.	NMTL-3486	
	Test Method : BS 1377 : Part 6 : 1990			BH/TP	TPS	
	Project:		Tested-Tch	Sample No.	D09	
	Seven Hills WF		Checked-Bc	07/02/2022	Depth.	1.00m

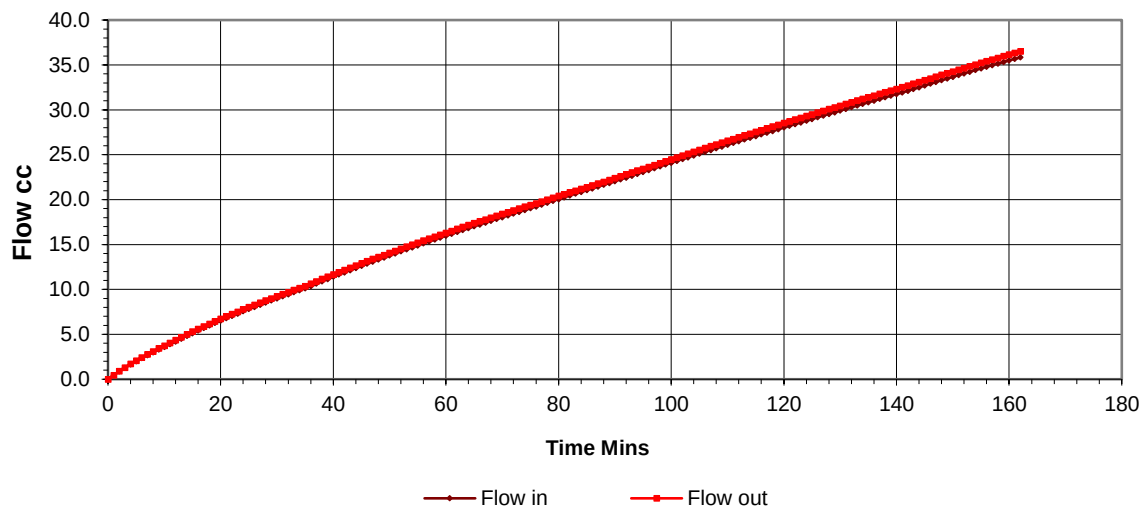
SATURATION STAGE



ISOTROPIC CONSOLIDATION STAGE



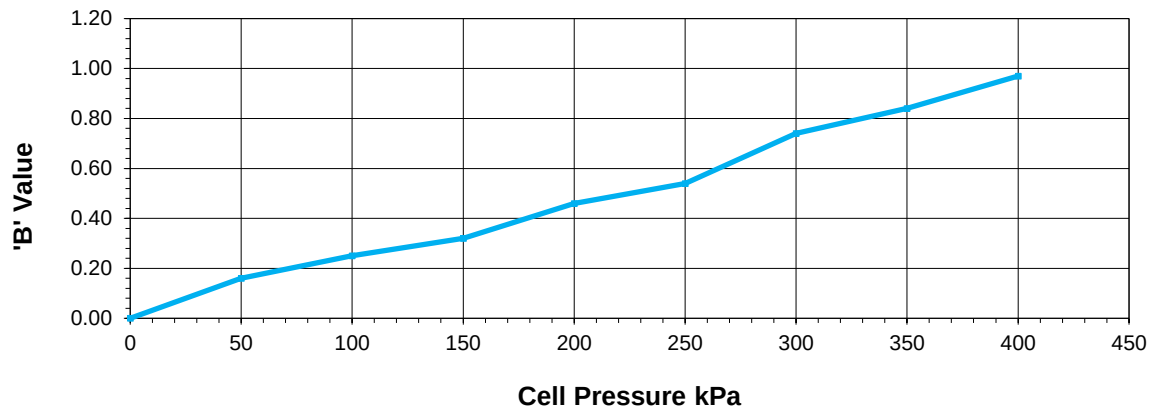
PERMEABILITY STAGE



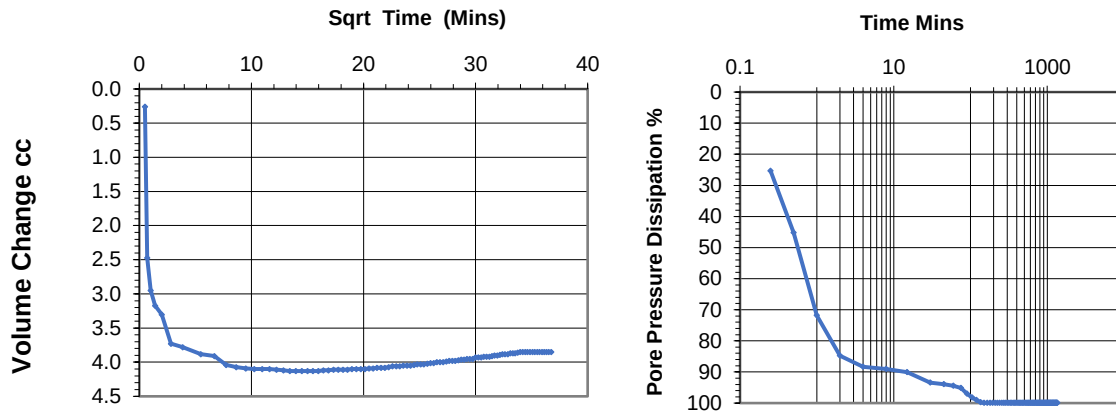
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	Test Method : BS 1377 : Part 6 : 1990			BH/TP	TPS
	Project:	Seven Hills WF		Sample No.	D09
		Tested-Tch		Depth.	1.00m
		Checked-Bc	07/02/2022		

SUMMARY OF TEST RESULTS						
		Initial			Initial	Final
Specimen Length	mm	115.00	Bulk Density	Mg/m3	2.277	2.309
Specimen Diameter	mm	105.26	Dry Density	Mg/m3	2.110	2.119
Area	mm2	8701.95	Moisture	%	7.9	9.0
Volume	cc	1000.72	Saturation	%	81.78	94.93
Saturation Stage			Voids Ratio		0.2558	0.2507
Test Stage	Cell Pressure (kPa)		Particle Density	Assumed	2.65	
			Pore Pressure Parameter 'B'			
			Base			
Initial	0		0			
1	50		0.16			
2	100		0.25			
3	150		0.32			
4	200		0.46			
5	250		0.54			
6	300		0.74			
7	350		0.84			
8	400		0.97			
Isotropic Consolidation Stage						
Cell Pressure		400	kPa			
Back Pressure		350	kPa			
Radial Effective stress		50	kPa			
Test Temperature ° C		20				
Final Height Hf		114.87	mm			
Coef. Of Consolidation Cv		440.00	m2/year			
Coef. Of Vol. Compressibility mv		0.098	m2/MN			
Permeability		1.3319E-08	m/sec			
PERMEABILITY RESULTS						
Cell Pressure		400	kPa			
Top Pressure		360	kPa			
Base Pressure		350	kPa			
Mean Effective Stress		45.0	kPa			
Moisture Content		9.0	%			
Dry Density		2.119	Mg/m3			
Voids ratio		0.2507				
Deg of Saturation		94.93	%			
Hydraulic Gradient	i	8.879				
Mean Flow Rate q	Flow in	0.309091	mL/min			
Permeability Kv	Flow in	6.669E-08	m/sec			
Permeability Kv	Flow out	6.336E-08	m/sec			
Test Temperature		21°C				
Notes	1 Direction of flow is down					
Sample Description	Brown slightly sandy gravelly clayey SILT.					
NM TL Ltd	Constant Head Triaxial Permeability Test			Project No.	NMTL-3486	
	Test Method : BS 1377 : Part 6 : 1990			BH/TP	TPS	
	Project:		Tested-Tch	Sample No.	D11	
	Seven Hills WF		Checked-Bc	07/02/2022	Depth.	1.40m

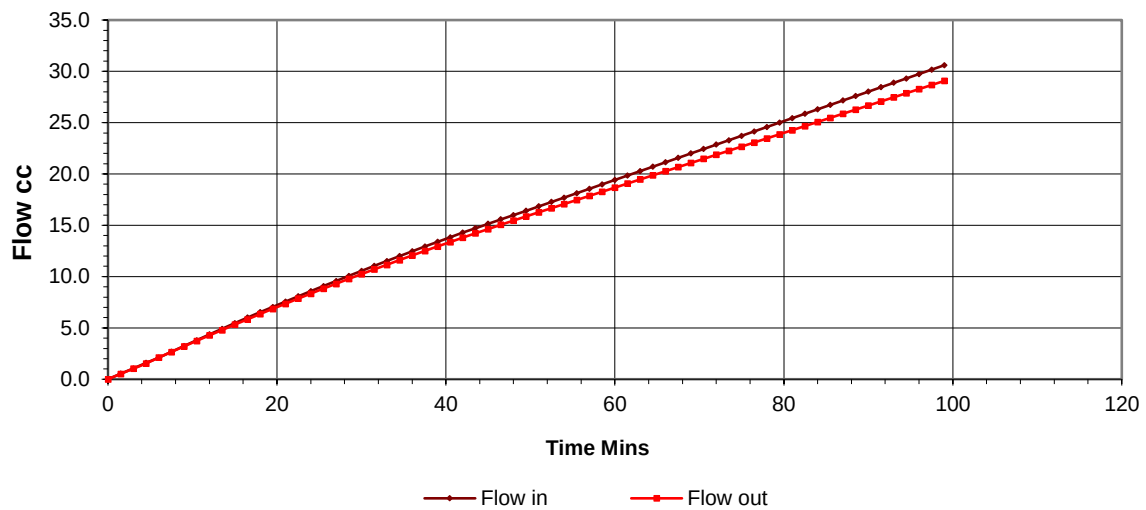
SATURATION STAGE



ISOTROPIC CONSOLIDATION STAGE



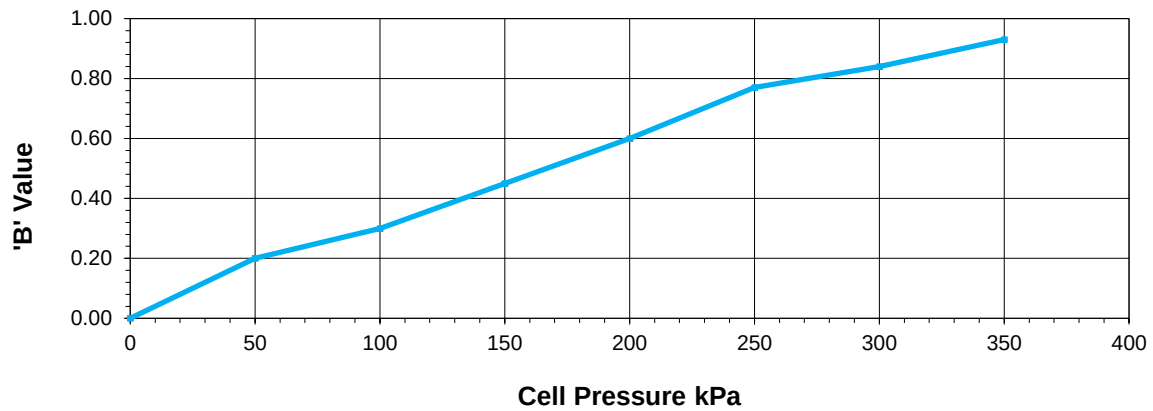
PERMEABILITY STAGE



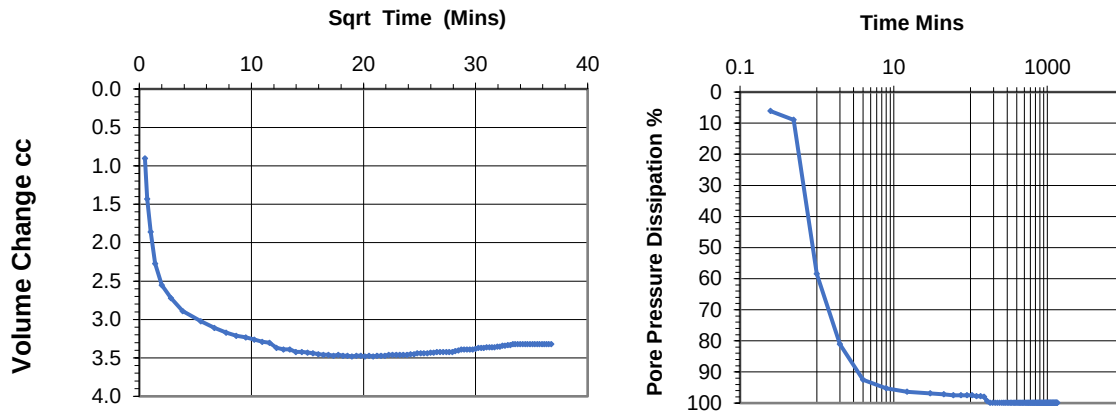
NM TL Ltd	Constant Head Triaxial Permeability Test			Project No.	NMTL-3486
	Test Method : BS 1377 : Part 6 : 1990			BH/TP	TPS
	Project:	Seven Hills WF	Tested-Tch	Sample No.	D11
		Checked-Bc	07/02/2022	Depth.	1.40m

SUMMARY OF TEST RESULTS						
		Initial			Initial	Final
Specimen Length	mm	115.00	Bulk Density	Mg/m3	2.239	2.272
Specimen Diameter	mm	105.24	Dry Density	Mg/m3	2.031	2.038
Area	mm2	8698.64	Moisture	%	10.2	11.5
Volume	cc	1000.34	Saturation	%	89.08	101.29
Saturation Stage			Voids Ratio		0.3047	0.3004
Test Stage	Cell Pressure (kPa)		Particle Density	Assumed	2.65	
			Pore Pressure Parameter 'B'			
			Base			
Initial	0		0			
1	50		0.20			
2	100		0.30			
3	150		0.45			
4	200		0.60			
5	250		0.77			
6	300		0.84			
7	350		0.93			
Isotropic Consolidation Stage						
Cell Pressure		350	kPa			
Back Pressure		300	kPa			
Radial Effective stress		50	kPa			
Test Temperature ° C		20				
Final Height Hf		114.89	mm			
Coef. Of Consolidation Cv		400.00	m2/year			
Coef. Of Vol. Compressibility mv		0.092	m2/MN			
Permeability		1.1463E-08	m/sec			
PERMEABILITY RESULTS						
Cell Pressure		350	kPa			
Top Pressure		310	kPa			
Base Pressure		300	kPa			
Mean Effective Stress		45.0	kPa			
Moisture Content		11.5	%			
Dry Density		2.038	Mg/m3			
Voids ratio		0.3004				
Deg of Saturation		101.29	%			
Hydraulic Gradient	i	8.878				
Mean Flow Rate q	Flow in	0.231000	mL/min			
Permeability Kv	Flow in	4.985E-08	m/sec			
Permeability Kv	Flow out	4.678E-08	m/sec			
Test Temperature		21°C				
Notes	1 Direction of flow is down					
Sample Description	Brown silty very sandy GRAVEL.					
NM TL Ltd	Constant Head Triaxial Permeability Test			Project No.	NMTL-3486	
	Test Method : BS 1377 : Part 6 : 1990			BH/TP	TPS	
	Project:		Tested-Tch	Sample No.	D14	
	Seven Hills WF		Checked-Bc	07/02/2022	Depth.	1.60m

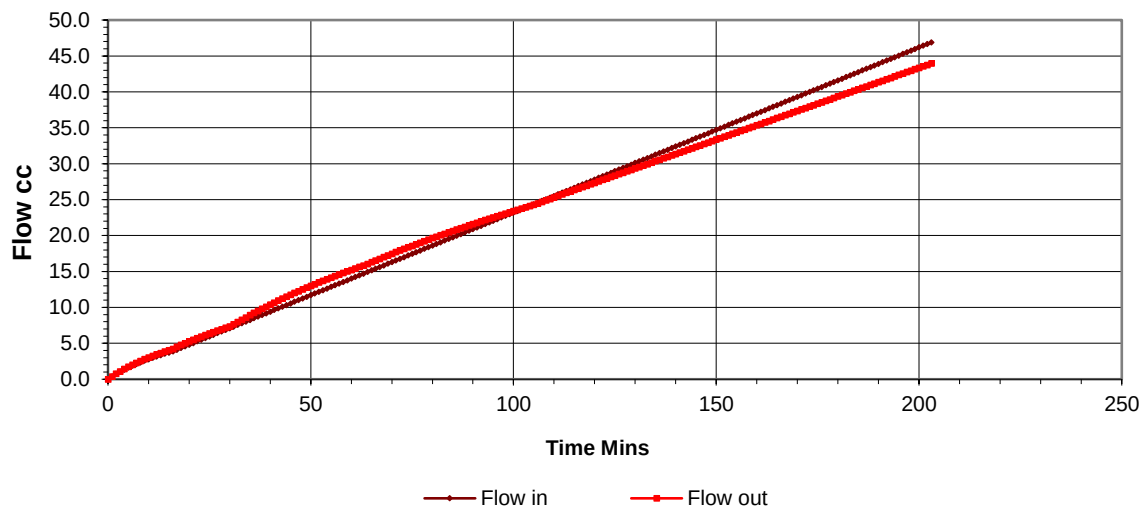
SATURATION STAGE



ISOTROPIC CONSOLIDATION STAGE



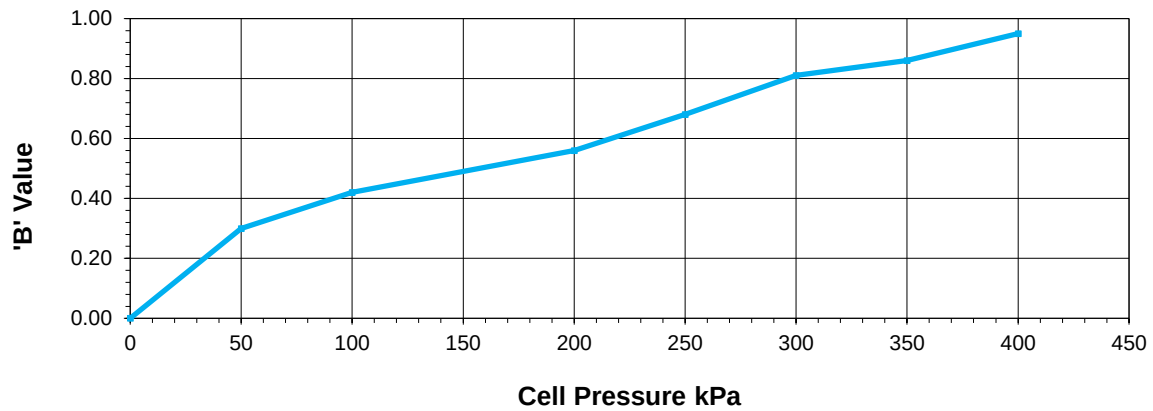
PERMEABILITY STAGE



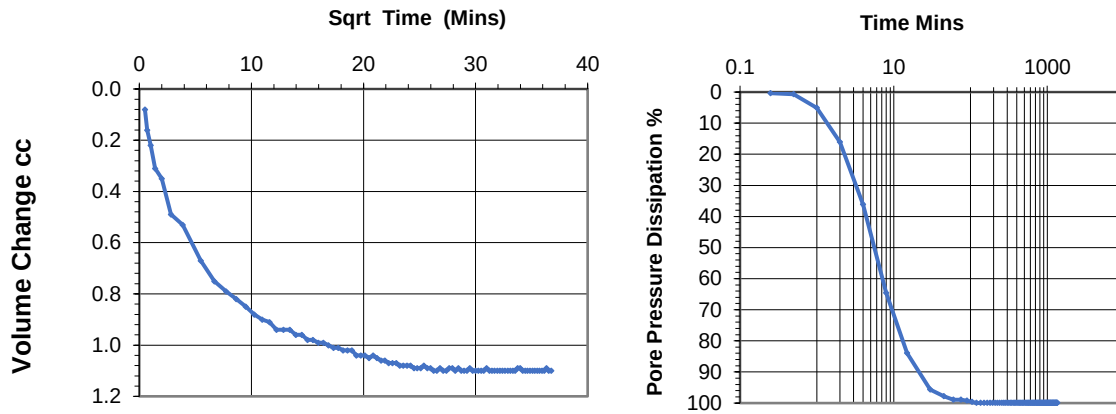
NM TL Ltd	Constant Head Triaxial Permeability Test			Project No.	NMTL-3486
	Test Method : BS 1377 : Part 6 : 1990			BH/TP	TPS
	Project:	Seven Hills WF		Sample No.	D14
		Tested-Tch		Depth.	1.60m
		Checked-Bc	07/02/2022		

SUMMARY OF TEST RESULTS						
		Initial			Initial	Final
Specimen Length	mm	115.00		Bulk Density	Mg/m3	2.256
Specimen Diameter	mm	105.25		Dry Density	Mg/m3	2.044
Area	mm2	8700.30		Moisture	%	10.3
Volume	cc	1000.53		Saturation	%	92.40
				Voids Ratio		0.2963
Saturation Stage				Particle Density	Assumed	2.65
Test Stage	Cell Pressure (kPa)			Pore Pressure Parameter 'B' Base		
Initial	0			0		
1	50			0.36		
2	100			0.42		
3	200			0.56		
4	250			0.68		
5	300			0.81		
6	350			0.86		
7	400			0.95		
Isotropic Consolidation Stage						
Cell Pressure		400	kPa			
Back Pressure		350	kPa			
Radial Effective stress		50	kPa			
Test Temperature ° C		20				
Final Height Hf		114.96	mm			
Coef. Of Consolidation Cv		80.00	m2/year			
Coef. Of Vol. Compressibility mv		0.040	m2/MN			
Permeability		9.8604E-10	m/sec			
PERMEABILITY RESULTS						
Cell Pressure		400	kPa			
Top Pressure		360	kPa			
Base Pressure		350	kPa			
Mean Effective Stress		45.0	kPa			
Moisture Content		10.8	%			
Dry Density		2.047	Mg/m3			
Voids ratio		0.2948				
Deg of Saturation		96.92	%			
Hydraulic Gradient	i	8.872				
Mean Flow Rate q	Flow in	0.005362	mL/min			
Permeability Kv	Flow in	1.156E-09	m/sec			
Permeability Kv	Flow out	1.095E-09	m/sec			
Test Temperature		21°C				
Notes	1 Direction of flow is down					
Sample Description	Brown/grey slightly sandy gravelly clayey SILT.					
NM TL Ltd	Constant Head Triaxial Permeability Test				Project No.	NMTL-3486
	Test Method : BS 1377 : Part 6 : 1990				BH/TP	TPS
	Project: Seven Hills WF		Tested-Tch		Sample No.	D15
			Checked-Bc	31/01/2022	Depth.	1.30m

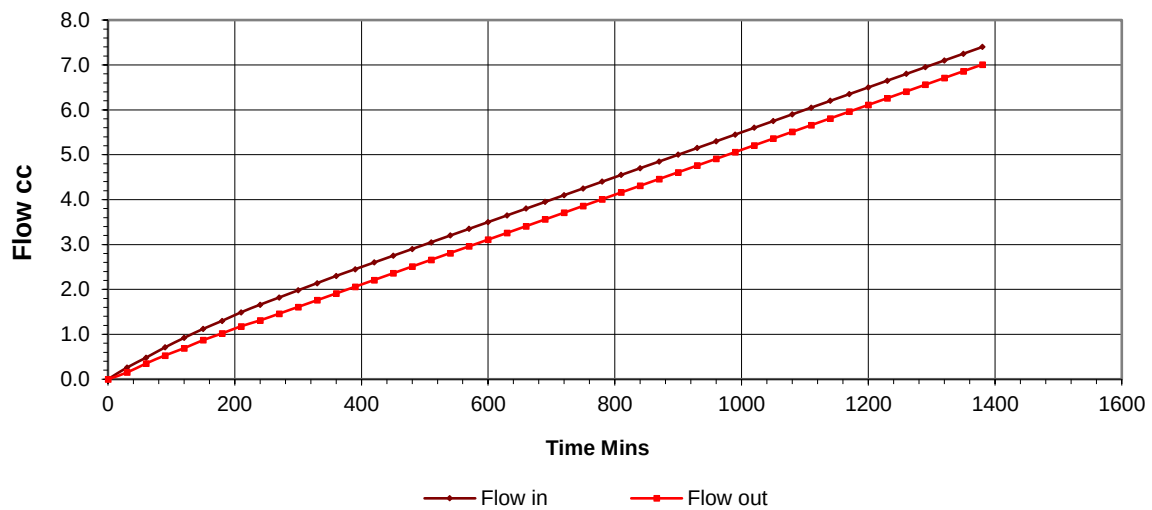
SATURATION STAGE



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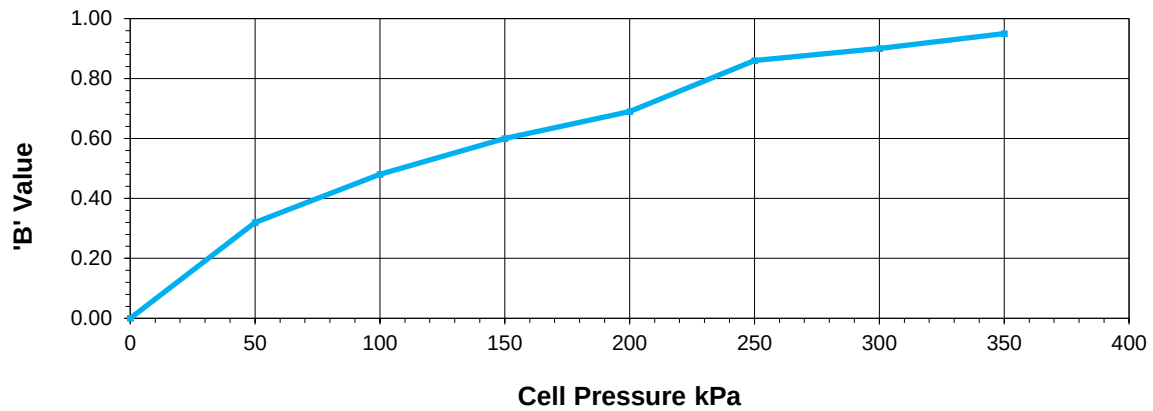
PERMEABILITY STAGE



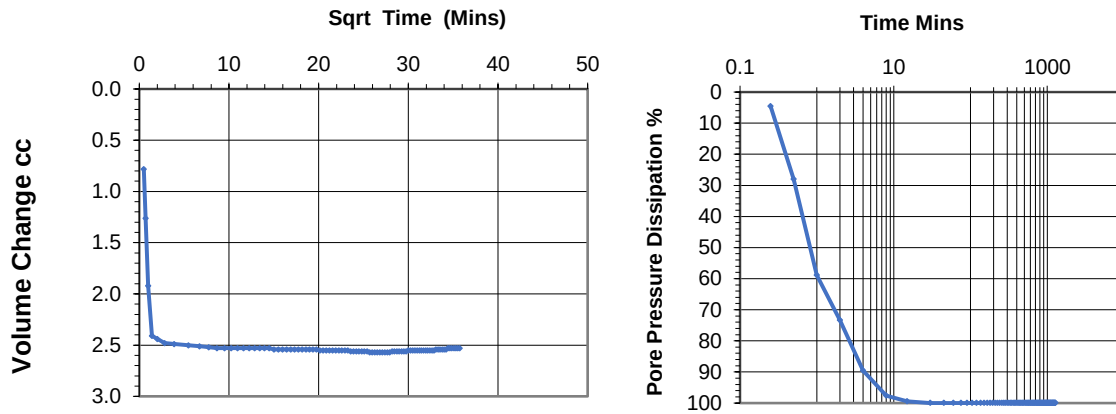
NM TL Ltd	Constant Head Triaxial Permeability Test			Project No.	NMTL-3486
	Test Method : BS 1377 : Part 6 : 1990			BH/TP	TPS
	Project: Seven Hills WF			Sample No.	D15
	Tested-Tch	Checked-Bc	31/01/2022	Depth.	1.30m

SUMMARY OF TEST RESULTS						
Initial			Initial		Final	
Specimen Length	mm	115.00	Bulk Density	Mg/m3	2.200	2.221
Specimen Diameter	mm	105.24	Dry Density	Mg/m3	1.976	1.976
Area	mm2	8698.64	Moisture	%	11.3	12.4
Volume	cc	1000.34	Saturation	%	87.99	96.41
Saturation Stage			Voids Ratio		0.3411	0.3411
Test Stage	Cell Pressure (kPa)		Particle Density	Assumed	2.65	
			Pore Pressure Parameter 'B'			
			Base			
Initial	0		0			
1	50		0.32			
2	100		0.48			
3	150		0.60			
4	200		0.69			
5	250		0.86			
7	300		0.90			
8	350		0.95			
Isotropic Consolidation Stage						
Cell Pressure		350	kPa			
Back Pressure		300	kPa			
Radial Effective stress		50	kPa			
Test Temperature ° C		20				
Final Height Hf		114.92	mm			
Coef. Of Consolidation Cv		8250.00	m2/year			
Coef. Of Vol. Compressibility mv		0.068	m2/MN			
Permeability		1.7388E-07	m/sec			
PERMEABILITY RESULTS						
Cell Pressure		350	kPa			
Top Pressure		310	kPa			
Base Pressure		300	kPa			
Mean Effective Stress		45.0	kPa			
Moisture Content		12.4	%			
Dry Density		1.976	Mg/m3			
Voids ratio		0.3411				
Deg of Saturation		96.41	%			
Hydraulic Gradient	i	8.876				
Mean Flow Rate q	Flow in	0.532000	mL/min			
Permeability Kv	Flow in	1.148E-07	m/sec			
Permeability Kv	Flow out	1.149E-07	m/sec			
Test Temperature		20°C				
Notes	1 Direction of flow is down					
Sample Description	Grey/brown silty very sandy GRAVEL.					
NM TL Ltd	Constant Head Triaxial Permeability Test			Project No.	NMTL-3486	
	Test Method : BS 1377 : Part 6 : 1990			BH/TP	TPS	
	Project:		Tested-Tch	Sample No.	D20	
	Seven Hills WF		Checked-Bc	14/02/2022	Depth.	1.40m

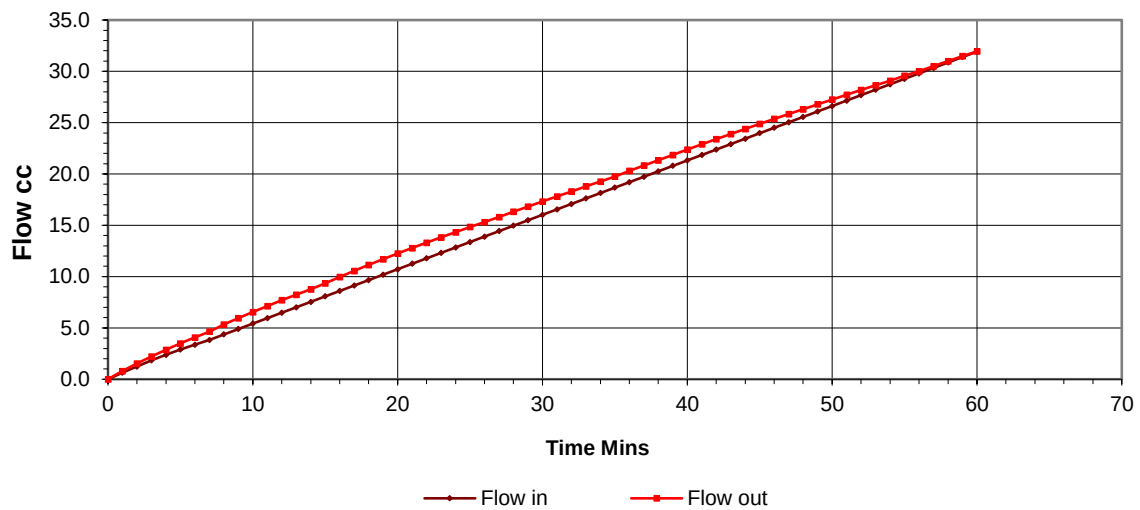
SATURATION STAGE



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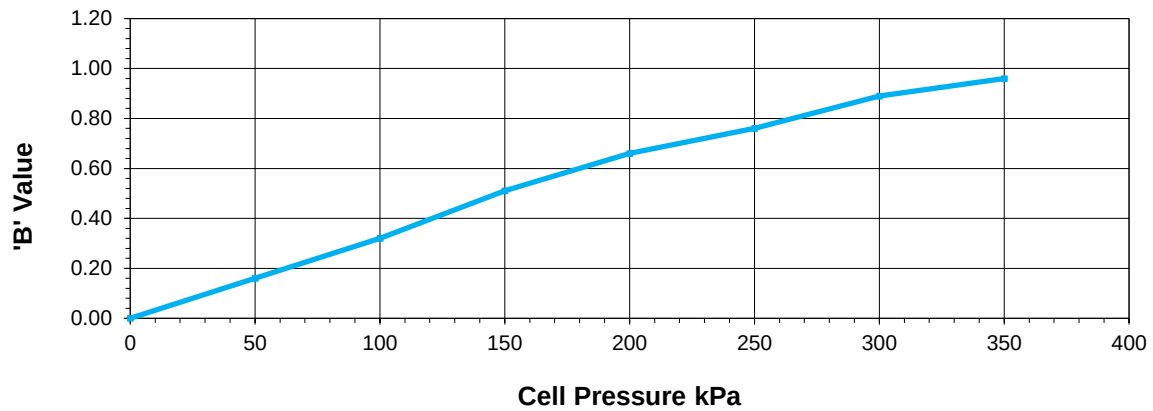
PERMEABILITY STAGE



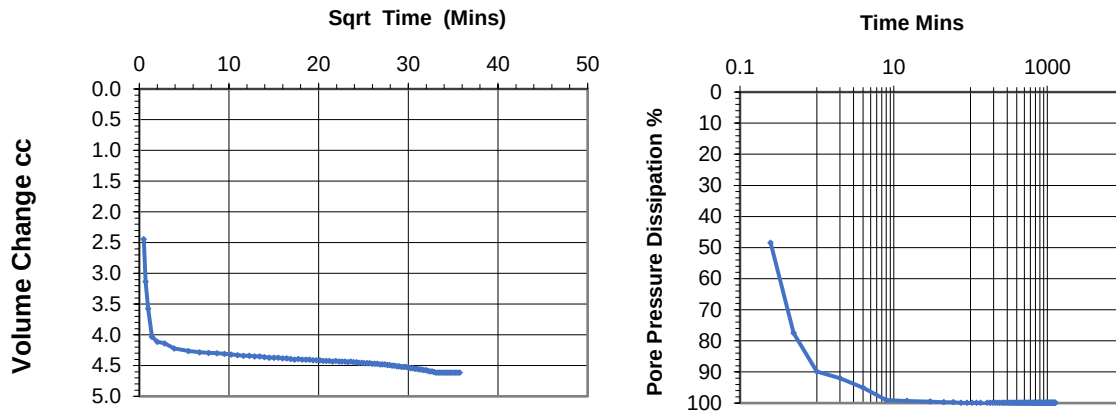
NM TL Ltd	Constant Head Triaxial Permeability Test			Project No.	NMTL-3486
	Test Method : BS 1377 : Part 6 : 1990			BH/TP	TPS
	Project:	Seven Hills WF		Sample No.	D20
		Tested-Tch		Depth.	1.40m
		Checked-Bc	14/02/2022		

SUMMARY OF TEST RESULTS						
		Initial			Initial	Final
Specimen Length	mm	115.00	Bulk Density	Mg/m3	2.225	2.252
Specimen Diameter	mm	105.24	Dry Density	Mg/m3	2.024	2.024
Area	mm2	8698.64	Moisture	%	10.0	11.3
Volume	cc	1000.34	Saturation	%	85.31	96.72
Saturation Stage			Voids Ratio		0.3094	0.3094
Test Stage	Cell Pressure (kPa)		Particle Density	Assumed	2.65	
			Pore Pressure Parameter 'B'			
			Base			
Initial	0		0			
1	50		0.16			
2	100		0.32			
3	150		0.51			
4	200		0.66			
5	250		0.76			
7	300		0.89			
8	350		0.96			
Isotropic Consolidation Stage						
Cell Pressure		350	kPa			
Back Pressure		300	kPa			
Radial Effective stress		50	kPa			
Test Temperature ° C		20				
Final Height Hf		114.85	mm			
Coef. Of Consolidation Cv		8250.00	m2/year			
Coef. Of Vol. Compressibility mv		0.109	m2/MN			
Permeability		2.7863E-07	m/sec			
PERMEABILITY RESULTS						
Cell Pressure		350	kPa			
Top Pressure		310	kPa			
Base Pressure		300	kPa			
Mean Effective Stress		45.0	kPa			
Moisture Content		11.3	%			
Dry Density		2.024	Mg/m3			
Voids ratio		0.3094				
Deg of Saturation		96.72	%			
Hydraulic Gradient	i	8.881				
Mean Flow Rate q	Flow in	1.605000	mL/min			
Permeability Kv	Flow in	3.465E-07	m/sec			
Permeability Kv	Flow out	3.276E-07	m/sec			
Test Temperature		20°C				
Notes	1 Direction of flow is down					
Sample Description	Grey/brown slightly silty sandy GRAVEL.					
NM TL Ltd	Constant Head Triaxial Permeability Test			Project No.	NMTL-3486	
	Test Method : BS 1377 : Part 6 : 1990			BH/TP	TPS	
	Project:		Tested-Tch	Sample No.	D22	
	Seven Hills WF		Checked-Bc	14/02/2022	Depth.	0.80m

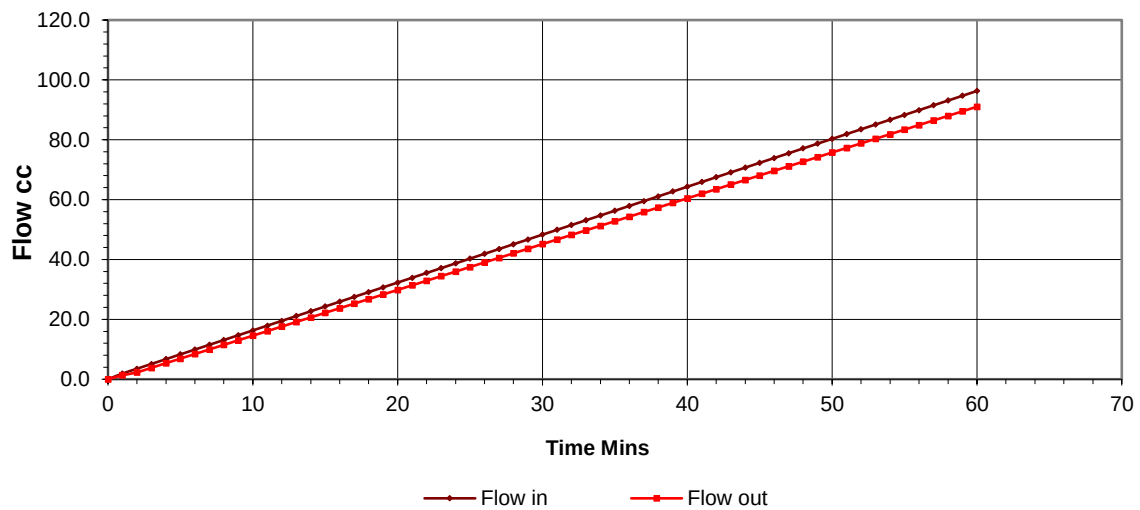
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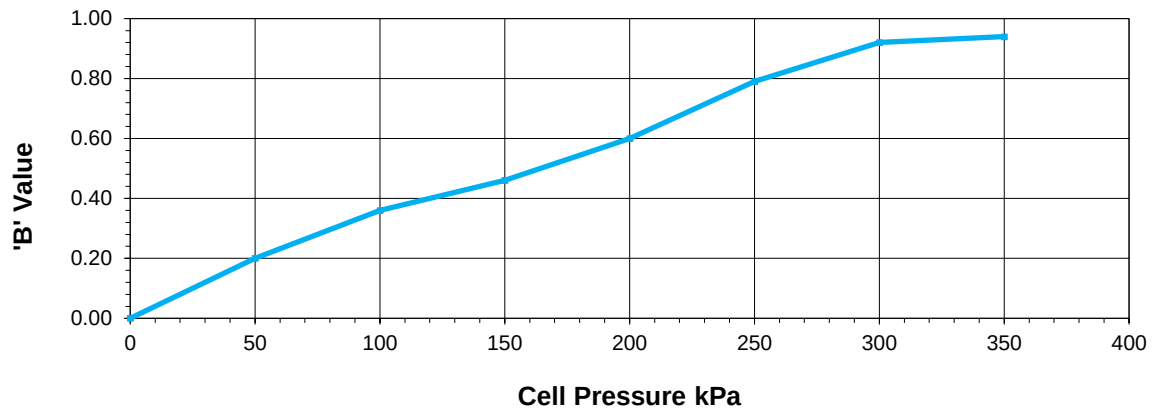
PERMEABILITY STAGE



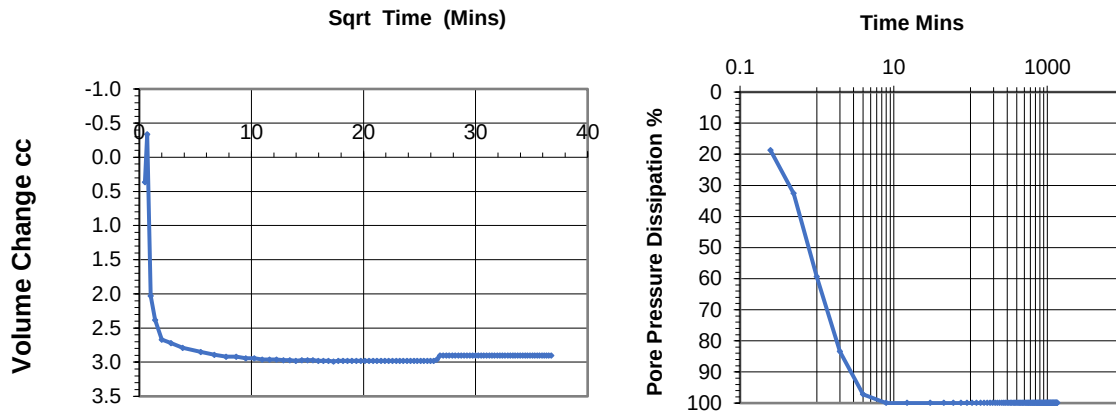
NM TL Ltd	Constant Head Triaxial Permeability Test			Project No.	NMTL-3486
	Test Method : BS 1377 : Part 6 : 1990			BH/TP	TPS
	Project:	Seven Hills WF	Tested-Tch	Sample No.	D22
			Checked-Bc		
				Depth.	0.80m

SUMMARY OF TEST RESULTS						
		Initial			Initial	Final
Specimen Length	mm	115.00	Bulk Density	Mg/m3	2.296	2.317
Specimen Diameter	mm	105.23	Dry Density	Mg/m3	2.102	2.108
Area	mm2	8696.99	Moisture	%	9.2	9.9
Volume	cc	1000.15	Saturation	%	93.71	101.95
Saturation Stage			Voids Ratio		0.2606	0.2570
Test Stage	Cell Pressure (kPa)		Particle Density	Assumed	2.65	
			Pore Pressure Parameter 'B'			
			Base			
Initial	0		0			
1	50		0.20			
2	100		0.36			
3	150		0.46			
4	200		0.60			
5	250		0.79			
6	300		0.92			
7	350		0.94			
Isotropic Consolidation Stage						
Cell Pressure		350	kPa			
Back Pressure		300	kPa			
Radial Effective stress		50	kPa			
Test Temperature ° C		20				
Final Height Hf		114.90	mm			
Coef. Of Consolidation Cv		8250.00	m2/year			
Coef. Of Vol. Compressibility mv		0.080	m2/MN			
Permeability		2.0485E-07	m/sec			
PERMEABILITY RESULTS						
Cell Pressure		350	kPa			
Top Pressure		310	kPa			
Base Pressure		300	kPa			
Mean Effective Stress		45.0	kPa			
Moisture Content		9.9	%			
Dry Density		2.108	Mg/m3			
Voids ratio		0.2570				
Deg of Saturation		101.95	%			
Hydraulic Gradient	i	8.877				
Mean Flow Rate q	Flow in	0.364306	mL/min			
Permeability Kv	Flow in	7.862E-08	m/sec			
Permeability Kv	Flow out	7.259E-08	m/sec			
Test Temperature		21°C				
Notes	1 Direction of flow is down					
Sample Description	Brown silty very sandy GRAVEL.					
NM TL Ltd	Constant Head Triaxial Permeability Test			Project No.	NMTL-3486	
	Test Method : BS 1377 : Part 6 : 1990			BH/TP	TPS	
	Project:		Tested-Tch	Sample No.	D25	
	Seven Hills WF		Checked-Bc	07/02/2022	Depth.	1.20m

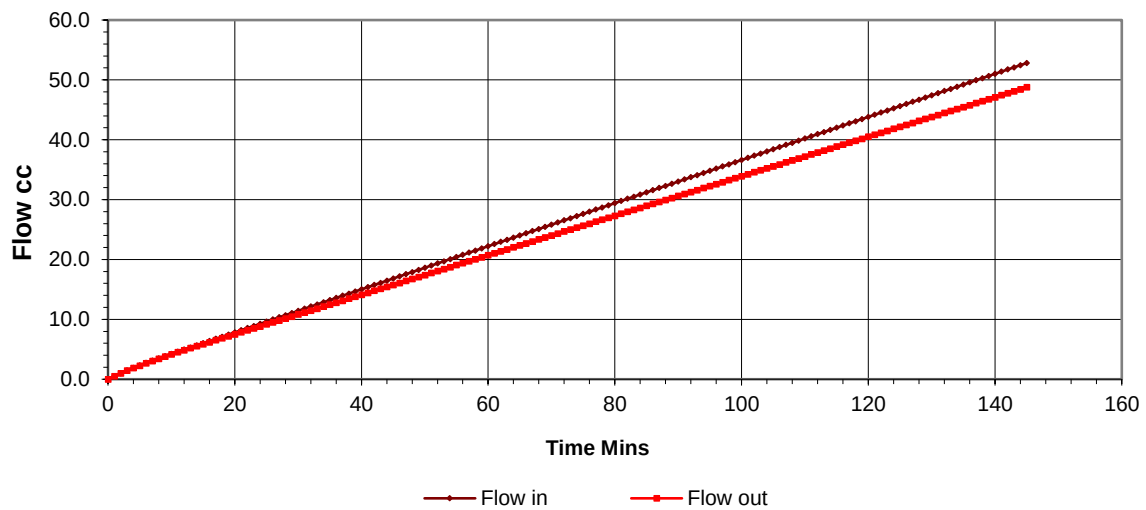
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PERMEABILITY STAGE



NM TL Ltd	Constant Head Triaxial Permeability Test			Project No.	NMTL-3486
	Test Method : BS 1377 : Part 6 : 1990			BH/TP	TPS
	Project:	Seven Hills WF		Sample No.	D25
		Tested-Tch		Depth.	1.20m
		Checked-Bc	07/02/2022		

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