New Fire Station at Manorhamilton, Co Leitrim

On behalf of **Leitrim County Council**

Civil / Structural Engineer's Stage 2a Report

Prepared by

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Civil
Structural
Traffic

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Document History

Revision History:	R0	R1	R2	R3	R4		
Purpose of Issue: P=Preliminary C=Comment I=Information FC=Fire Cert PL=Planning T=Tender CT=Contract CN=Construction	I	PL	PL	PL	PL		
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Checked By:	SS	SS	SS	SS	SS		
Approved By:	COC	COC	COC	COC	COC		

Approved By: 

Cathal O'Connell
Chartered Engineer

Date: 22nd March 2022

1. Introduction

In October 2019 CST Group Chartered Consulting Engineers was appointed by Leitrim County Council, as part of a Rhatigan Architects led Design Team, to provide Civil and Structural Engineering services for the proposed construction of a new Fire Station at Manorhamilton, Co Leitrim. This document is a brief overview to summarise the Civil and Structural Engineering issues for the site and the works carried out to date.

2. Surveys

Rhatigan Architects tendered a site-specific ground penetrating radar and topographical survey of the site and surrounding area. Rhatigan Architects appointed Malcolm Gerry Surveyor on behalf of Leitrim County Council. Both surveys are contained in Rhatigan Architects section of this report. CST Group also contacted Nicholas O'Dwyer Consulting Engineers who designed and monitored upgrade works to Manorhamilton Sewage Treatment Works which is adjacent to the site. Nicholas O'Dwyer forwarded some as-built information on the Sewage Treatment Plant which CST Group reviewed in relation to getting a direct connection for foul water disposal for the proposed new Fire Station.

In August 2021 further levels of the inlet works to the treatment plant were taken by Malcolm Gerry Surveyor to assist in designing the foul water package pumping station.

It was decided to carry out some initial site investigation to assess the ground conditions on the site. Leitrim County Council organised for trial holes to be opened using one of their excavators and operatives under the supervision of CST Group. The findings of the trial holes were not conclusive therefore the Local Authority agreed to commission a site investigation contractor (Site Investigation Ltd.) to carry out more detailed examination of the ground. The findings of the Site Investigation Ltd. report are discussed under Section 3 of this report..

3. Ground Conditions

(Refer to Appendix A for Site Investigation Ltd's report)

The initial trial holes carried out indicated that variable ground conditions exist on the site. The more detailed site investigation established that a soft layer of clay (1m to 1.4m deep)with a safe bearing pressure of approximately 55 KN / sqm overlays softer clay strata which extend down to bedrock found at 6.3m to 7.1m below ground level

The presence of deep layers of soft to very soft layers will require the use of piled foundations for the Fire Station building and drill tower structure. The piling will be designed by a specialist Contractor using the results and data presented in the site investigation report – see Appendix A. It is anticipated that the piles will be end bearing piles that will extend down to bedrock level 6.3m to 7.1m below ground level.

The top layer of clay below the topsoil has adequate strength to support the carpark / yard area finishes and anticipated traffic loading. On the drawings in Appendix C, we have indicated our recommended specifications for the various areas. We have recommended a higher specification for the Drill Yard area which will be required to deal with the heavy fire tenders carrying out turning movements in this area. The carpark is a typical specification for light vehicles. Due to the varying ground conditions identified and the underlaying layer of soft silty material, we suggest that a layer of geogrid geotextile is incorporated within the pavement construction.

The site investigation report concluded that a perched water table was encountered. Site Investigations Ltd anticipate that the ingress of ground water into any excavations to depths down to 2m below ground level will be slow to medium. Any ingress of water into excavations will need to be removed using a mechanical pump from sumps formed in excavations.

Site Investigations Ltd confirmed that based on testing carried out on samples taken during the site investigation that the material can be classified as non-hazardous. Nickel levels exceeded that the inert waste threshold for samples taken from Borehole 5. Site investigation Ltd recommend that an environmental engineer should be consulted before removal of any soil from the site.

A low acidic level was recorded for a soil sample taken from 2m below ground level in borehole 5 due to the high organic content of the soil. Site investigations Ltd recommend that some protection of concrete is recommended to BRE guidelines. It would be important that an allowance is made for this in the design of the piles which will pass through the organic clay layer.

4. Structural Engineering

(Refer to Appendix B for Stage 2a Structural Engineering drawings / mark-ups)

The structural option considered most suitable for the proposed Fire Station is traditional load bearing masonry founded on reinforced concrete raft foundations.

A number of reinforced concrete wind posts and ring beams will be provided to tie the structure together, provide lateral stability to blockwork and to support the floor and roof structure over openings. We envisage that the roof will be formed with a combination of steel rafters supporting cold formed multi-beam purlins which in-turn will support a metal deck roof. 2 no. RC columns will be required to support a steel valley beam which in turn will support the steel rafters.

The 1st floor areas will be formed with a combination of 200mm and 150mm deep precast units supported on 215mm thick loadbearing walls. A 75mm deep reinforced concrete screed will be placed on the precast slabs to tie all units together to satisfy Building Regulations in relation to disproportionate collapse. It is envisaged that two separate precast concrete stairs will be installed to gain access to the 1st floor areas.

It is envisaged that the internal blockwork will be fair-faced which will mean that collar – jointed walls will be required. U-Block band beams will be used over window and door openings where the underside of the reinforced concrete band beams do not coincide with window/ door head levels.

It is envisaged that the training tower will be constructed using a precast concrete frame and floor slabs all constructed off a raft foundation. Alternatively, if more cost effective, a braced steel frame could be used to form the tower with metal deck floors filled with in-situ concrete and reinforcement.

5. Civil Engineering

(Refer to Appendix C for Stage 2a Civil Engineering drawings)

5.1 Water Supply - Existing System and Proposals

There is an existing water main in the N16 National grade road which was identified on the GPR survey. CST Group lodged a pre-connection enquiry to Irish Water to assess the feasibility of a new connection to the site and Irish Water confirmed that this was feasible – see Appendix D. It is intended to install a new hydrant in the drill yard area which will be used for training purposes. It is also intended to install an underground water storage tank. The underground tank in the drill yard should have a minimum capacity of 9000 litres. This will provide the onsite capacity for carrying out pump tests and negate the risk of travelling to and accessing unsafe water sources . An internal water connection will supply water to the underground tank and it is also intended that the runoff water from the roofs will be harvested and connected to the tank also. An overflow pipe will need to be installed on the tank and this should be connected to the open attenuation lagoon. . An internal connection (25mm diameter) will also need to be made to provide water supply to foul water pump station for wash down purposes.

5.2 Flood Risk Screening

In order to ensure flooding of the site is not a risk reference to the OPW Flood Maps was undertaken. Figure 5.1 extracted from the Flood Maps portal indicated the site is outside the zone of Low Probability. The proposed development levels do not involve any lowering of the lands to any extend that will impact on the probability of flooding. To ensure the developed site does not have a detrimental impact on the downstream areas that are indicated on the Flood Maps, the surface water run-off should be controlled to match the existing Green field run-off rates.

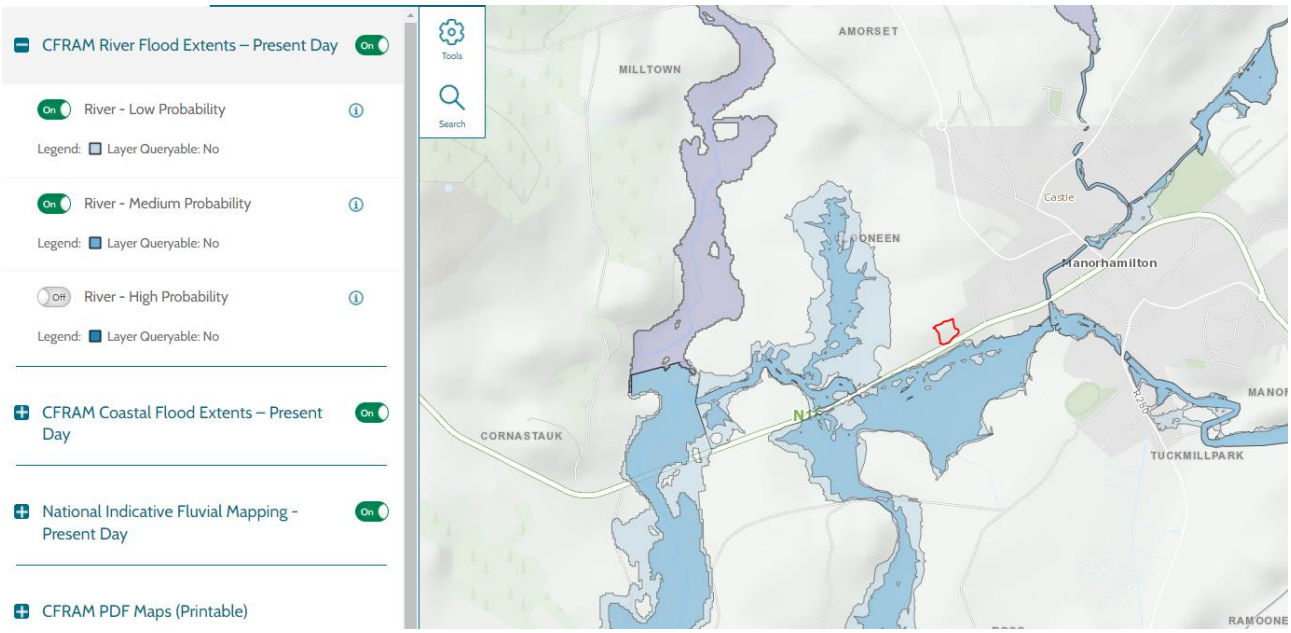


Figure 5.1 Flood Maps Extract

5.3 Surface Water Drainage - Existing System and Proposals

Surface water (rainfall) from the hardstanding areas surrounding the proposed building will be collected by a series of gullies connecting to a below ground drainage network. This network will discharge to an existing open drain that is located to the south-west of the development lands. This open drain currently picks up storm water from the gullies in the National Road. A Hydrobrake vortex flow control on the line will limit discharge rates to equivalent of green field run-off. Flow that is prevented from free discharge by this Hydrobake will back-up to an open attenuation lagoon for temporary storage. As the peak of the storm passes the attenuated flow will be released to the same open drain.

A petrol interceptor will be required on the line prior to discharge into the existing open drain. Concrete headwalls will be required in both the lagoon and at the discharge point into the open drain.

It is envisaged that the existing open drain along the Sligo Road will need to be piped over the full width of the site.

During the construction stage a silt sock will be fitted in the existing open drain to alleviate the risk of downstream pollution from silt-laden run-off from the site.

5.4 Foul Water Drainage - Existing System and Proposals

CST Group lodged a pre-connection enquiry with Irish Water to explore the feasibility of a foul water connection to the public sewage treatment plant which is located adjacent to the site. Irish Water subsequently confirmed their acceptance of this proposal – see Appendix D. A foul water pumping station will need to be installed on the development site to pump foul effluent and the discharge from the fire tender wash down area to the outfall which is located to a higher elevation. We understand, from liaising with Coffey Water Ltd (current operators of the plant), that there is a blank flange mounted on the wall of the inlet works that could be used to connect proposed rising main.

5.5 Rainwater Harvesting

It is envisaged that the rainwater drainage system will consist of a ring of drainage around the perimeter of the proposed building which will collect the roof run-off only and connect to a rainwater harvesting tank with an overflow to the main storm system.

CST Group, in conjunction with the Building Services Engineer, will develop a design of a rainwater harvesting system. It is hoped that the rainwater harvesting system can be connected to the proposed 9000 litre capacity tank referred to in 5.1.

6. Traffic Management

A Stage 1 Road Safety Audit has been undertaken by a team independent to the design team – refer to Appendix E. The recommendations of this report have been taken on board in relation to the design of the entrance and associated public areas. The proposed alterations to the scheme have now been agreed with the Road Safety Audit team.

It is suggested a Stage 2 Road Safety Audit is undertaken prior to tendering the project and a Stage 3 Road Safety Audit upon completion of the works.

APPENDIX A Site Investigation – Report

S.I. Ltd Contract No: 5911

Client: Leitrim County Council
Engineer: CST Group
Contractor: Site Investigations Ltd

Manorhamilton Fire Station, Manorhamilton, Co. Leitrim Site Investigation Report

Prepared by:

.....
Stephen Letch

Issue Date:	28/01/2022
Status	Final
Revision	1

Contents:

Appendices:

1. Introduction

On the instructions of CST Group, Site Investigations Ltd (SIL) was appointed to complete a ground investigation at Manorhamilton, Co. Leitrim. The investigation was completed for a new fire station in the town on behalf of the Client, Leitrim County Council. The investigation was completed in December 2021.

This report presents the factual geotechnical data obtained from the field and laboratory testing with interpretation of the ground conditions discussed.

2. Site Location

The site is located in to the west of Manorhamilton town centre on the N16 road. Manorhamilton is in north Leitrim to the east of Sligo. The map of the north west of Ireland shows the location of Manorhamilton and the second map shows the location of the site to the west of the town centre.

3. Fieldwork

The fieldworks comprised a programme of cable percussive boreholes and rotary coreholes. All fieldwork was carried out in accordance with BS 5930:2015, Engineers Ireland GI Specification and Related Document 2nd Edition 2016 and Eurocode 7: Geotechnical Design. The fieldworks comprised of the following:

- 6 No. cable percussive boreholes with 2 No. rotary coreholes

3.1. Cable Percussive Boreholes with Rotary Coreholes

Cable percussion boring was undertaken at 6 No. locations using a Dando 150 rig and constructed 200mm diameter boreholes. The boreholes terminated at depths ranging from 4.00mbgl (BH02) to 5.90mbgl (BH05). Bulk disturbed samples were recovered at regular intervals as the boreholes advanced.

To test the strength of the stratum, Standard Penetration Tests (SPT's) were performed at 1.00m intervals in accordance with BS 1377 (1990). In soils with high gravel and cobble content it is appropriate to use a solid cone (60°) (CPT) instead of the split spoon and this was used throughout the testing. The test is completed over 450mm and the cone is driven 150mm into the stratum to ensure that the test is conducted over an undisturbed zone. The cone is then driven the remaining 300mm and the blows recorded to report the N-Value. The report shows the N-Value with the 75mm incremental blows listed in brackets (e.g., BH01 at 1.00mbgl where N=5-(1,2/1,1,2,1)). Where refusal of 50 blows across the test zone was encountered was achieved during testing, the penetration depth is also reported (e.g., BH01 at 4.00mbgl where N=50-(25 for 90mm/50 for 10mm)).

At BH05, a groundwater monitoring standpipe was installed in the borehole and consisted of slotted pipe surrounded by a gravel response zone with bentonite seals.

At BH01 and BH03, rotary coreholes were completed adjacent to the cable percussive boreholes to investigate the depth of bedrock. The rotary drilling was carried out using a Sondeq SS71 top drive rig and open hole drilling techniques were used to advance through the overburden. The coreholes encountered bedrock at 7.10mbgl and 6.30mbgl respectively and were then terminated when 3m of core was recovered. This was returned to SIL, where they were logged and photographed by a SIL geotechnical engineer.

Provided on the logs are engineering geological descriptions of the rock cores with details of the bedding/discontinuities and mechanical indices for each core run, i.e., TCR, SCR, RQD and Fracture Index.

The combined cable percussive borehole and rotary corehole logs are presented in Appendix 1 along with the core photographs.

3.2. Surveying

Following completion of all the fieldworks, a survey of the exploratory hole locations was completed using a GeoMax GPS Rover. The data is supplied on each individual log and along with a site plan in Appendix 5.

4. Laboratory Testing

Geotechnical laboratory testing was completed on representative soil samples in accordance with BS 1377 (1990). Testing included:

- 12 No. Moisture contents
- 12 No. Atterberg limits
- 12 No. Particle size gradings
- 6 No. pH and sulphate content

Environmental testing was completed by ALS Environmental Ltd. and consists of the following:

- 6 No. Suite I analysis

The geotechnical laboratory test results are presented in Appendix 2 with the environmental tests reported and Waste Classification Report in Appendix 3 and 4 respectively.

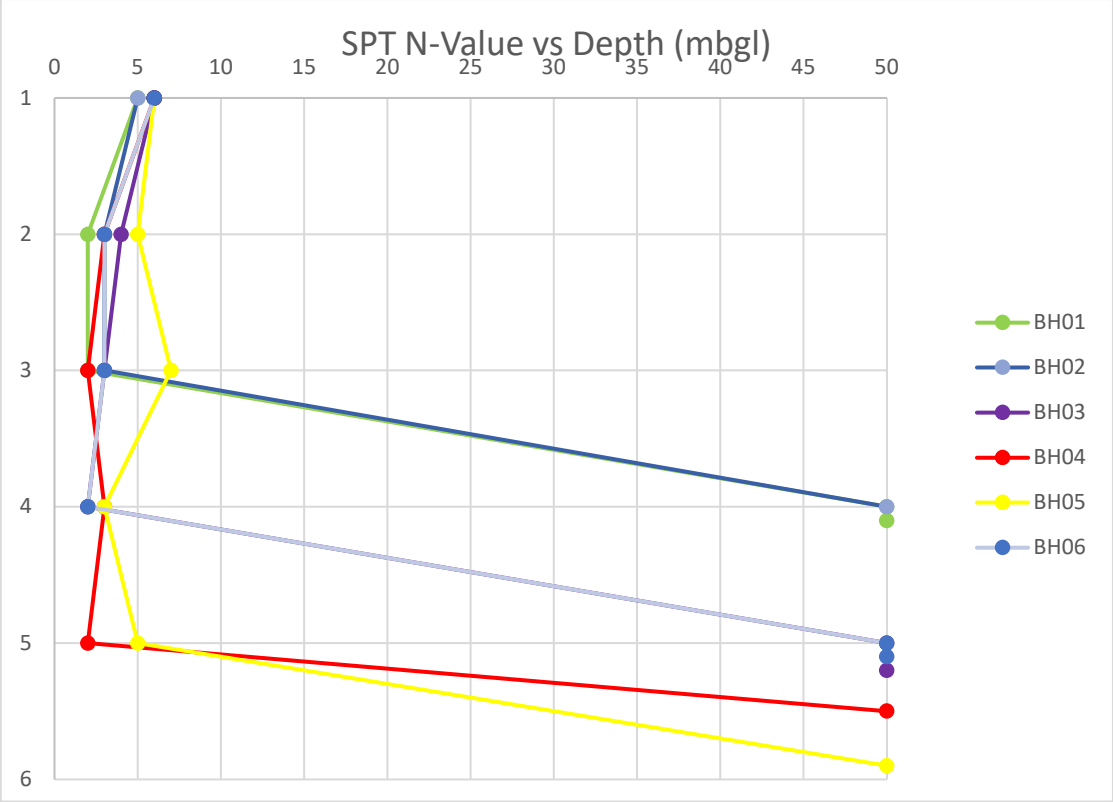
5. Ground Conditions

5.1. Overburden

The natural ground conditions are consistent with cohesive soils encountered across the site. This includes light brown overlying light grey sandy slightly gravelly silty CLAY. BH03 to BH06 also recorded a CLAY soil with high organic matter content between the light brown and light grey layers.

The SPT N-values at 1.00mbgl range from 5 to 6 and decrease to 2 to 5 ay 2.00mbgl indicating soft soils. The N-values remain low throughout as the boreholes progress until refusal at the base of the boreholes. The graph overleaf presents the N-values vs depth.

Laboratory tests of the shallow cohesive soils confirm that CLAY soils dominate the site, although SILT soils were recorded in two locations, with low to intermediate plasticity indexes of 11% to 26% recorded in the CLAY and 4% to 8% in the SILT. The particle size distribution curves were poorly sorted straight-line curves with 32% to 47% fines content.



5.2. Bedrock

Bedrock was encountered between 6.30mbgl to 7.10mbgl and consisted of strong, dark grey with pink veining, coarse grained GNEISS. The weathering state was fresh to slightly weathered. Gneiss is a metamorphic type of rock and is recorded across the region. The discontinuities are rough, planar, tight to open, with 30-60° dip and the surfaces are clean with occasional brown staining.

5.3. Groundwater

Groundwater details in the boreholes during the fieldworks are noted on the logs in Appendix 1. Groundwater ingresses were recorded in the boreholes at depths ranging from 2.50mbgl (BH03) to 3.20mbgl (BH04 and BH06). The groundwater was then sealed off by the borehole casings between 3.00mbgl and 4.00mbgl and therefore, suggests that this is a perched water table as the boreholes were dry at the end of the drilling process.

6. Recommendations and Conclusions

Please note the following caveats:

The recommendations given, and opinions expressed in this report are based on the findings as detailed in the exploratory hole records. Where an opinion is expressed on the material between the exploratory hole locations or below the final level of excavation, this is for guidance only and no liability can be accepted for its accuracy. No responsibility can be accepted for

adjacent unexpected conditions that have not been revealed by the exploratory holes. It is further recommended that all bearing surfaces when excavated should be inspected by a suitably qualified Engineer to verify the information given in this report.

Excavated surfaces in clay strata should be kept dry to avoid softening prior to foundation placement. Foundations should always be taken to a minimum depth of 0.50mBGL to avoid the effects of frost action and possible seasonal shrinkage/swelling.

If it is intended that on-site materials are to be used as fill, then the necessary laboratory testing should be specified by the Client to confirm the suitability. Also, relevant lab testing should be specified where stability of side slopes to excavations is a concern, or where contamination may be an issue.

6.1. Shallow Foundations

Due to the unknown depth of foundation and no longer-term groundwater information, this analysis assumes the groundwater will not influence the construction or performance of these foundations.

Due to the soft soils encountered across the site with SPT N-values of 5 to 6 at 1.00mbgl and then reducing to 2 to 5 at 2.00mbgl, the soils are too soft for shallow foundations and it would be recommended that pile foundations are used to support the structure. Although the boreholes terminated at depths ranging from 4.00mbgl to 5.90mbgl, the bedrock was recorded at 6.30mbgl and 7.10mbgl and this should be taken into account with the pile design. A suitably qualified pile designer should be consulted to ensure that the most suitable method for the piles is utilised.

6.2. Groundwater

The caveats below relating to interpretation of groundwater levels should be noted:
There is always considerable uncertainty as to the likely rates of water ingress into excavations in clayey soil sites due to the possibility of localised unforeseen sand and gravel lenses acting as permeable conduits for unknown volumes of water.

Furthermore, water levels noted on the borehole and trial pit logs do not generally give an accurate indication of the actual groundwater conditions as the borehole or trial pit is rarely left open for sufficient time for the water level to reach equilibrium.

Also, during boring procedures, a permeable stratum may have been sealed off by the borehole casing, or water may have been added to aid drilling. Therefore, an extended period of groundwater monitoring using any constructed standpipes is required to provide more accurate

information regarding groundwater conditions. Finally, groundwater levels vary with time of year, rainfall, nearby construction and tides.

Pumping tests would be required to determine likely seepage rates and persistence into excavations taken below the groundwater level. Deep trial pits also aid estimation of seepage rates.

As discussed previously, groundwater was encountered in the boreholes but these appear to be a perched water table as the strikes were sealed off as the boreholes progressed.

There is always considerable uncertainty as to the likely rates of water ingress into excavations in cohesive soil sites due to the possibility of localised unforeseen sand and gravel lenses acting as permeable conduits for unknown volumes of water. Based on this information at the exploratory hole locations to date, it is considered likely that any shallow ingress (less than 2.00mbgl) into excavations of the CLAY will be slow to medium. If granular soils are encountered in shallow excavations, then the possibility of water ingressing into an excavation increase.

If groundwater is encountered during excavations then mechanical pumps will be required to remove the groundwater from sumps. Sumps should be carefully located and constructed to ensure that groundwater is efficiently removed from excavations and trenches.

6.3. Contamination

Environmental testing was carried out on six samples from the investigation and the results are shown in Appendix 3. For material to be removed from site, Suite I testing was carried out to determine if the material is hazardous or non-hazardous and then the leachate results were compared with the published waste acceptance limits of BS EN 12457-2 to determine whether the material on the site could be accepted as 'inert material' by an Irish landfill.

The Waste Classification report created using HazWasteOnline™ software shows that the material tested can be classified as non-hazardous material.

Following this analysis of the solid test results, the leachate disposal suite results are generally below the inert thresholds but BH04 did record elevated nickel level exceeding the inert waste threshold. It would be recommended that an environmental engineer is consulted before the removal of any soil from site.

Six samples were tested for analysis but it cannot be discounted that any localised contamination may have been missed. Any MADE GROUND excavated on site should be stockpiled separately to natural soils to avoid any potential cross contamination of the soils.

Additional testing of these soils may be requested by the individual landfill before acceptance and a testing regime designed by an environmental engineer would be recommended to satisfy the landfill.

6.4. Aggressive Ground Conditions

The chemical test results in Appendix 2 recorded 5 No. pH value between 6.39 and 7.13, which is close to neutral and below the level of 9, therefore no special precautions are required. However, the sample from 2.00mbgl at BH05 recorded a low, acidic value of 3.77 due to the high organic content of the soils and therefore, some protection of concrete is recommended as per the BRE guidelines.

The maximum value obtained for water soluble sulphate was 123mg/l as SO_3. The BRE Special Digest 1:2005 – '*Concrete in Aggressive Ground*' guidelines require SO_4 values and after conversion ($SO_4 = SO_3 \times 1.2$), the maximum value of 148mg/l shows Class 1 conditions and no special precautions are required.

Appendix 1
Cable Percussive Borehole and Rotary Corehole Logs
And Photographs

Contract No: 5911	**Cable Percussion and Rotary Corehole Log**			Corehole No: **BH01**
Contract:	Manorhamilton Fire Station	Easting:	587876.348	Date Started: 14/12/2021
Location:	Manorhamilton, Co. Leitrim	Northing:	839281.562	Date Completed: 14/12/2021
Client:	Leitrim County Council	Elevation:	42.67	Drilled By: D. McEoin
Engineer:	CST Group	Rig Type:	Dando 150	Status: FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples	Rock Indices TCR/%	SCR/%	RQD/%	FI/m	Backfill
	0.20	TOPSOIL.		42.5	42.47						
		Soft light brown sandy slightly gravelly silty CLAY.		42.0							
0.5											
1.0				41.5		N=5 (1,2/1,1,2,1) B / 1.00					
1.5	1.60			41.0	41.07						
		Soft light grey sandy slightly gravelly silty CLAY.									
2.0				40.5		N=2 (1,0/0,0,1,1) B / 2.00					
2.5				40.0							
3.0				39.5		N=2 (0,1/1,0,0,1) B / 3.00					
3.5				39.0							
4.0	4.10			38.5	38.57	50 (25 for 90mm/50 for 10mm) B / 4.00					
	4.20	Obstruction - boulders.			38.47						
4.5		Open hole drilling: driller reports returns of fine material.		38.0		50 (25 for 5mm/50 for 0mm)					
5.0				37.5							
5.5				37.0							
6.0				36.5							
6.5				36.0							
7.0	7.10			35.5	35.57					NI	
		Stong dark grey with pink veining coarse grained GNEISS. Fresh to slightly weathered.				7.10 - 8.10	99	74	54	8	
7.5		*Discontinuities - rough, planar, tight to open, 30-60° dip, clean with occasional brown staining.*		35.0							
8.0				34.5						NI	
8.5				34.0		8.10 - 9.10	97	87	50	5	
9.0				33.5							
9.5				33.0		9.10 - 10.10	96	43	33	NI	
10.0	10.10				32.57					13	
		End of Corehole at 10.10m		32.5							
10.5				32.0							

Chiselling: From:	To:	Time:	Water Strikes: Strike:	Rose:	Sealed:	Water Details: Date:	Hole Depth:	Water Depth:	Installations: From:	To:	Pipe:	Backfill: From:	To:	Type:	Remarks:
4.10	4.20	01:00	3.00	2.80	3.50	14/12	4.20	Dry				0.00	10.10	Arisings	-

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water

Contract No: 5911	**Cable Percussion and Rotary Corehole Log**			Corehole No: **BH02**
Contract:	Manorhamilton Fire Station	Easting:	587862.666	Date Started: 13/12/2021
Location:	Manorhamilton, Co. Leitrim	Northing:	839288.471	Date Completed: 13/12/2021
Client:	Leitrim County Council	Elevation:	42.49	Drilled By: D. McEoin
Engineer:	CST Group	Rig Type:	Dando 150	Status: FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples	Rock Indices TCR/%	SCR/%	RQD/%	FI/m	Backfill
	0.20	TOPSOIL.			42.29						
		Soft light brown sandy slightly gravelly silty CLAY.		42.0							
0.5											
1.0				41.5		N=5 (1,1/0,2,2,1) B / 1.00					
	1.40				41.09						
1.5		Soft light grey sandy slightly gravelly silty CLAY.		41.0							
2.0				40.5		N=3 (1,0/1,1,0,1) B / 2.00					
2.5				40.0							
3.0				39.5		N=3 (0,0/1,0,1,1) B / 3.00					
3.5				39.0							
	3.90				38.59						
4.0	4.00	Obstruction - possible boulders.		38.5	38.49	50 (25 for 5mm/50 for 5mm)					
		End of Corehole at 4.00m									
4.5				38.0							
5.0				37.5							
5.5				37.0							
6.0				36.5							
6.5				36.0							
7.0				35.5							
7.5				35.0							
8.0				34.5							
8.5				34.0							
9.0				33.5							
9.5				33.0							
10.0				32.5							
10.5				32.0							

Chiselling:

From:	To:	Time:
3.90	4.00	01:30

Water Strikes:

Strike:	Rose:	Sealed:
2.70	2.60	3.00

Water Details:

Date:	Hole Depth:	Water Depth:
13/12	4.00	Dry

Installations:

From:	To:	Pipe:

Backfill:

From:	To:	Type:
0.00	4.00	Arisings

Remarks:

Borehole terminated due to obstruction.
No rotary corehole scheduled.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water

Contract No: 5911	**Cable Percussion and Rotary Corehole Log**		Corehole No: **BH03**

Contract:	Manorhamilton Fire Station	Easting:	587846.700	Date Started:	09/12/2021
Location:	Manorhamilton, Co. Leitrim	Northing:	839293.483	Date Completed:	09/12/2021
Client:	Leitrim County Council	Elevation:	41.87	Drilled By:	D. McEoin
Engineer:	CST Group	Rig Type:	Dando 150	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples	Rock Indices TCR/%	SCR/%	RQD/%	FI/m	Backfill
	0.20	TOPSOIL.			41.67						
		Soft light brown sandy slightly gravelly silty CLAY.		41.5							
0.5											
1.0				41.0		N=6 (1,1/2,2,1,1) B / 1.00					
	1.30				40.57						
		Soft dark brown sandy slightly gravelly organic silty CLAY.		40.5							
1.5											
2.0				40.0		N=4 (1,1/0,2,1,1) B / 2.00					
2.5				39.5							
	2.60				39.27						
		Soft light grey sandy clayey SILT.		39.0							
3.0						N=3 (0,0/1,1,0,1) B / 3.00					
3.5				38.5							
4.0				38.0		N=2 (1,1/0,0,1,1) B / 4.00					
4.5				37.5							
5.0				37.0							
	5.20				36.67	50 (1,0/50 for 50mm) B / 5.00					
		Obstruction - boulders.		36.5		50 (25 for 5mm/50 for 0mm)					
5.5		Open hole drilling: driller reports returns of fine material.									
6.0				36.0							
	6.30				35.57						
6.5		Stong dark grey with pink veining coarse grained GNEISS. Fresh to slightly weathered.		35.5		6.30 - 7.30	97	97	91	5	
		Discontinuities - rough, planar, tight to open, 30-60° dip, clean with occasional brown staining.		35.0							
7.0											
7.5				34.5		7.30 - 8.30	90	11	0	NI	
8.0				34.0							
8.5				33.5						20	
						8.30 - 9.30	95	64	36	3	
9.0				33.0						20	
	9.30				32.57						
		End of Corehole at 9.30m		32.5							
9.5											
10.0				32.0							
10.5				31.5							
				31.0							

Chiselling: From:	To:	Time:	Water Strikes: Strike:	Rose:	Sealed:	Water Details: Date:	Hole Depth:	Water Depth:	Installations: From:	To:	Pipe:	Backfill: From:	To:	Type:	Remarks:
5.20	5.20	01:30	2.50	2.20	3.00	09/12	5.20	Dry				0.00	9.30	Arisings	-

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water

Contract No: 5911	**Cable Percussion and Rotary Corehole Log**				Corehole No: **BH04**
Contract:	Manorhamilton Fire Station	Easting:	587836.778	Date Started:	08/12/2021
Location:	Manorhamilton, Co. Leitrim	Northing:	839276.859	Date Completed:	08/12/2021
Client:	Leitrim County Council	Elevation:	41.44	Drilled By:	D. McEoin
Engineer:	CST Group	Rig Type:	Dando 150	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples	Rock Indices TCR/%	SCR/%	RQD/%	FI/m	Backfill
	0.20	TOPSOIL.			41.24						
		Soft light brown sandy slightly gravelly silty CLAY.		41.0							
0.5											
1.0				40.5		N=6 (1,1/1,2,1,2) B / 1.00					
	1.30	Soft dark brown organic silty CLAY.			40.14						
1.5				40.0							
2.0	2.00	Soft light grey sandy slightly gravelly clayey SILT.		39.5	39.44	N=3 (1,0/0,1,1,1) B / 2.00					
2.5				39.0							
3.0				38.5		N=2 (2,1/0,1,0,1) B / 3.00					
3.5				38.0							
4.0				37.5		N=3 (1,0/0,1,1,1) B / 4.00					
4.5				37.0							
5.0				36.5		N=2 (1,1/1,0,0,1) B / 5.00					
5.5	5.50	Obstruction - possible boulders.		36.0	35.94	50 (25 for 5mm/50 for 0mm)					
		End of Corehole at 5.60m									
6.0				35.5							
6.5				35.0							
7.0				34.5							
7.5				34.0							
8.0				33.5							
8.5				33.0							
9.0				32.5							
9.5				32.0							
10.0				31.5							
10.5				31.0							
				30.5							

Chiselling:

From:	To:	Time:
5.50	5.60	01:00

Water Strikes:

Strike:	Rose:	Sealed:
3.20	3.00	3.50

Water Details:

Date:	Hole Depth:	Water Depth:
08/12	5.60	Dry

Installations:

From:	To:	Pipe:

Backfill:

From:	To:	Type:
0.00	5.60	Arisings

Remarks:

Borehole terminated due to obstruction.
No rotary corehole scheduled.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water

Contract No: 5911	**Cable Percussion and Rotary Corehole Log**				Corehole No: **BH05**
Contract:	Manorhamilton Fire Station	Easting:	587823.204	Date Started:	07/12/2021
Location:	Manorhamilton, Co. Leitrim	Northing:	839299.188	Date Completed:	07/12/2021
Client:	Leitrim County Council	Elevation:	41.35	Drilled By:	D. McEoin
Engineer:	CST Group	Rig Type:	Dando 150	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples	Rock Indices TCR/%	SCR/%	RQD/%	FI/m	Backfill
	0.20	TOPSOIL.			41.15						
		Soft light brown sandy slightly gravelly silty CLAY.		41.0							
0.5											
1.0				40.5		N=6 (1,2/2,1,1,2) B / 1.00					
1.5	1.50			40.0	39.85						
		Soft dark brown slightly sandy slightly gravelly organic silty CLAY.		39.5		N=5 (1,0/1,1,1,2) B / 2.00					
2.0											
	2.40			39.0	38.95						
2.5		Soft light grey sandy slightly gravelly clayey SILT.									
3.0				38.5		N=7 (1,1/2,1,2,2) B / 3.00					
3.5				38.0							
4.0				37.5		N=3 (1,0/1,1,0,1) B / 4.00					
4.5				37.0							
5.0				36.5		N=5 (1,3/1,1,1,2) B / 5.00					
5.5				36.0							
	5.90			35.5	35.45	50 (25 for 5mm/50 for 5mm)					
6.0		Obstruction - possible boulders.									
		End of Corehole at 5.90m		35.0							
6.5				34.5							
7.0				34.0							
7.5				33.5							
8.0				33.0							
8.5				32.5							
9.0				32.0							
9.5				31.5							
10.0				31.0							
10.5				30.5							

Chiselling:

From:	To:	Time:
5.90	5.90	01:00

Water Strikes:

Strike:	Rose:	Sealed:
3.00	2.80	3.50

Water Details:

Date:	Hole Depth:	Water Depth:
07/12	5.90	Dry

Installations:

From:	To:	Pipe:
0.00	3.00	Solid
3.00	5.90	Slotted

Backfill:

From:	To:	Type:
0.00	1.00	Bentonite
1.00	5.90	Gravel

Remarks:

Borehole terminated due to obstruction.
No rotary corehole scheduled.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water

Contract No: 5911	**Cable Percussion and Rotary Corehole Log**				Corehole No: **BH06**
Contract:	Manorhamilton Fire Station	Easting:	587851.354	Date Started:	10/12/2021
Location:	Manorhamilton, Co. Leitrim	Northing:	839308.963	Date Completed:	10/12/2021
Client:	Leitrim County Council	Elevation:	42.01	Drilled By:	D. McEoin
Engineer:	CST Group	Rig Type:	Dando 150	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples	Rock Indices TCR/%	SCR/%	RQD/%	FI/m	Backfill
0	0.20	TOPSOIL.		41.5	41.81						
		Soft light brown sandy slightly gravelly silty CLAY.									
1.0				41.0		N=6 (1,0/1,2,2,1) B / 1.00					
	1.20	Soft dark brown organic silty CLAY.			40.81						
1.5				40.5							
	1.80	Soft light grey sandy slightly gravelly silty CLAY.			40.21						
2.0				40.0		N=3 (0,0/1,1,0,1) B / 2.00					
2.5				39.5							
3.0				39.0		N=3 (1,1/0,1,1,1) B / 3.00					
3.5				38.5							
4.0				38.0		N=2 (1,0/1,0,0,1) B / 4.00					
4.5				37.5							
5.0	5.10	Obstruction - possible boulders.		37.0	36.91	50 (25 for 85mm/50 for 5mm) B / 5.00					
		End of Corehole at 5.10m				50 (25 for 5mm/50 for 0mm)					
5.5				36.5							
6.0				36.0							
6.5				35.5							
7.0				35.0							
7.5				34.5							
8.0				34.0							
8.5				33.5							
9.0				33.0							
9.5				32.5							
10.0				32.0							
10.5				31.5							

Chiselling:

From:	To:	Time:
5.10	5.10	01:00

Water Strikes:

Strike:	Rose:	Sealed:
3.20	3.00	4.00

Water Details:

Date:	Hole Depth:	Water Depth:
10/12	5.10	Dry

Installations:

From:	To:	Pipe:

Backfill:

From:	To:	Type:
0.00	5.10	Arisings

Remarks:

Borehole terminated due to obstruction.
No rotary corehole scheduled.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water

BH01 Box 1 of 1

BH03 Box 1 of 1

Appendix 2

Geotechnical Laboratory Test Results

Classification Tests
In accordance with BS 1377: Part 2

Client	Leitrim County Council
Site	Manorhamilton Fire Station
S.I. File No	5911 / 21
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email:info@siteinvestigations.ie
Report Date	10th January 2022

Hole ID	Depth	Sample No	Lab Ref No.	Sample Type	Natural Moisture Content %	Liquid Limit %	Plastic Limit %	Plastic Index %	Min. Dry Density Mg/m^3	Particle Density Mg/m^3	% passing 425um	Comments	**Remarks** **C**=Clay; **M**=Silt **Plasticity**: **L**=Low; **I**=Intermediate; **H**=High; **V**=Very High; **E**=Extremely High
BH01	1.00	DM24	21/1412	B	30.3	37	20	17			72.4		CI
BH01	3.00	DM26	21/1413	B	25.2	34	19	15			64.2		CL
BH02	1.00	DM21	21/1414	B	27.1	36	19	17			70.9		CI
BH02	2.00	DM22	21/1415	B	23.0	33	19	14			66.4		CL
BH03	1.00	DM11	21/1416	B	40.4	36	19	17			64.0		CI
BH03	2.00	DM12	21/1417	B	38.1	36	25	11			62.1		CI/MI
BH04	1.00	DM06	21/1418	B	25.7	34	19	15			63.8		CL
BH04	3.00	DM08	21/1419	B	35.8	37	29	8			88.5		MI
BH05	2.00	DM02	21/1420	B	88.3	53	27	26			55.3		CH (low density clay with organic matter)
BH05	3.00	DM03	21/1421	B	40.9	29	25	4			83.0		MI
BH06	1.00	DM16	21/1422	B	26.0	33	20	13			66.1		CL
BH06	3.00	DM18	21/1423	B	18.5	37	21	16			64.0		CI

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BS 1377 Particle Size Analysis

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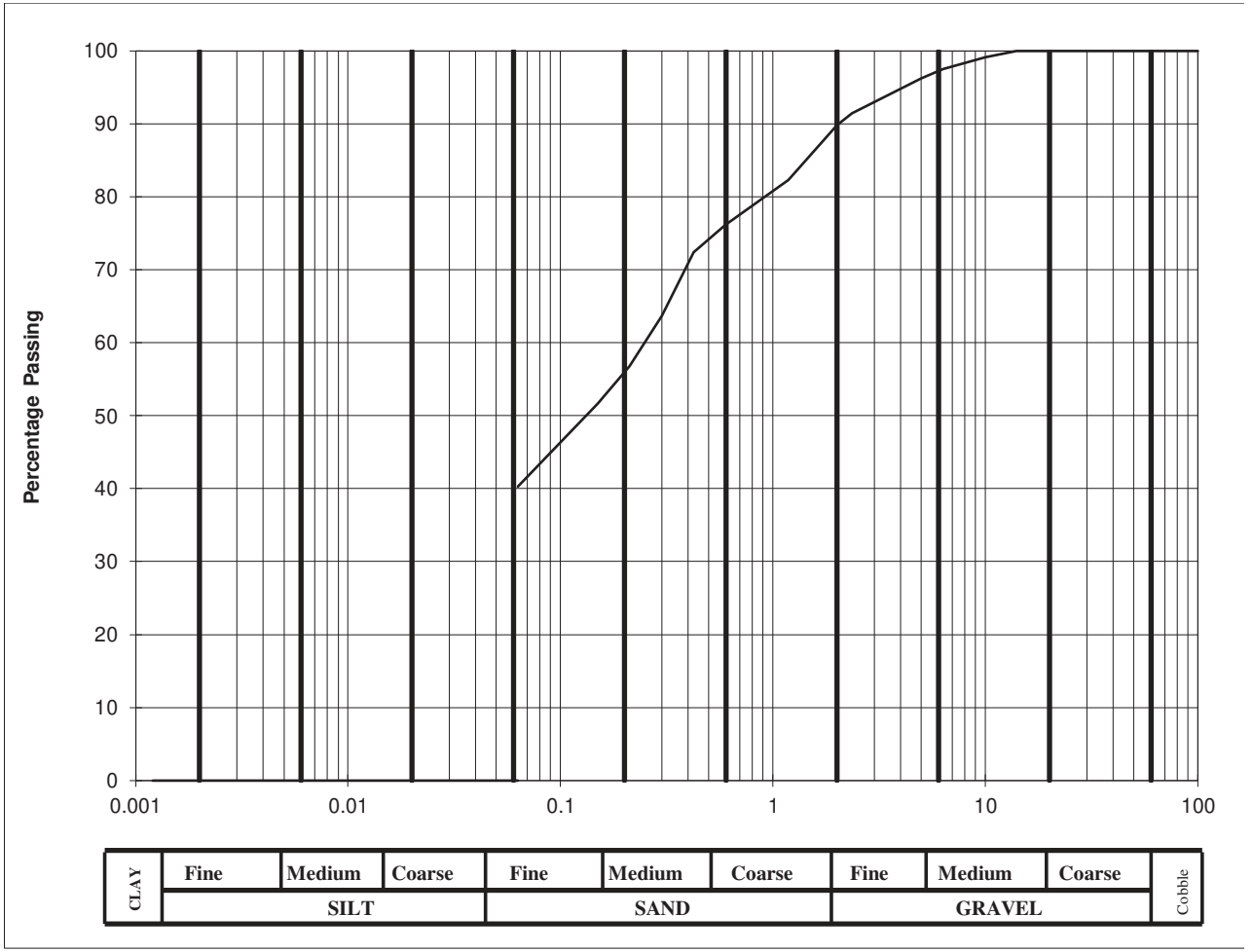
BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	99.1		
6.3	97.5		
5.0	96.2		
2.36	91.4		
2.00	89.8		
1.18	82.3		
0.600	76.1		
0.425	72.4		
0.300	63.7		
0.212	56.8		
0.150	51.6		
0.063	40		

Cobbles, %	0
Gravel, %	10
Sand, %	50
Clay / Silt, %	40



Client :	Leitrim County Council
Project :	Manorhamilton Fire Station

Lab. No :	21/1412
Sample No :	DM24

Hole ID :	BH 01
Depth, m :	1.00

Material description :	sandy slightly gravelly silty CLAY
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

File No: 5502
Printed 28/01/2022

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BS 1377 Particle Size Analysis

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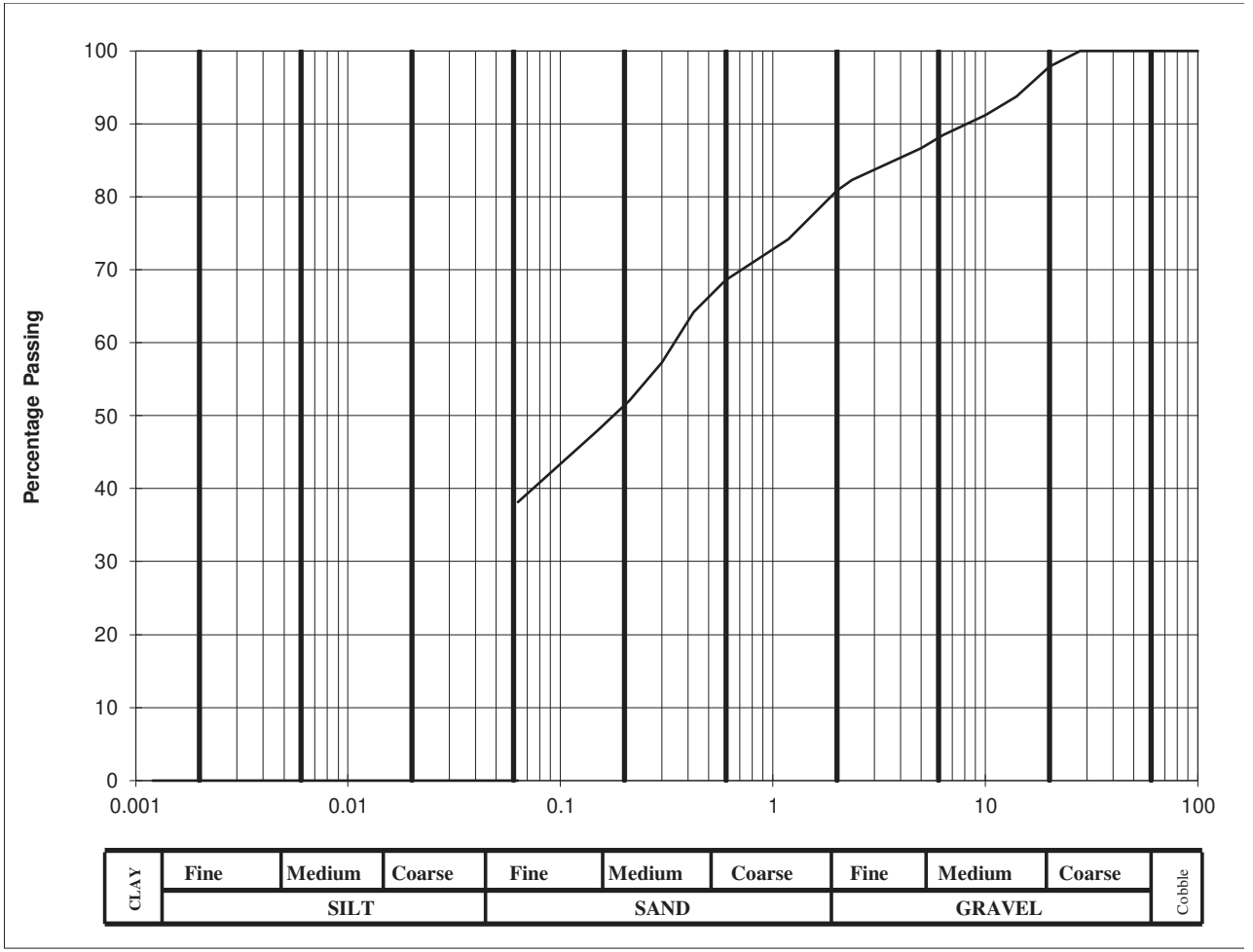
BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	100		
20	97.8		
14	93.7		
10	91.2		
6.3	88.4		
5.0	86.6		
2.36	82.3		
2.00	80.8		
1.18	74.2		
0.600	68.5		
0.425	64.2		
0.300	57.3		
0.212	52.1		
0.150	48		
0.063	38		

Cobbles, %	0
Gravel, %	19
Sand, %	43
Clay / Silt, %	38



Client :	Leitrim County Council
Project :	Manorhamilton Fire Station

Lab. No :	21/1413
Sample No :	DM26

Hole ID :	BH 01
Depth, m :	3.00

Material description :	sandy slightly gravelly silty CLAY
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

File No: 5502
Printed 28/01/2022

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BS 1377 Particle Size Analysis

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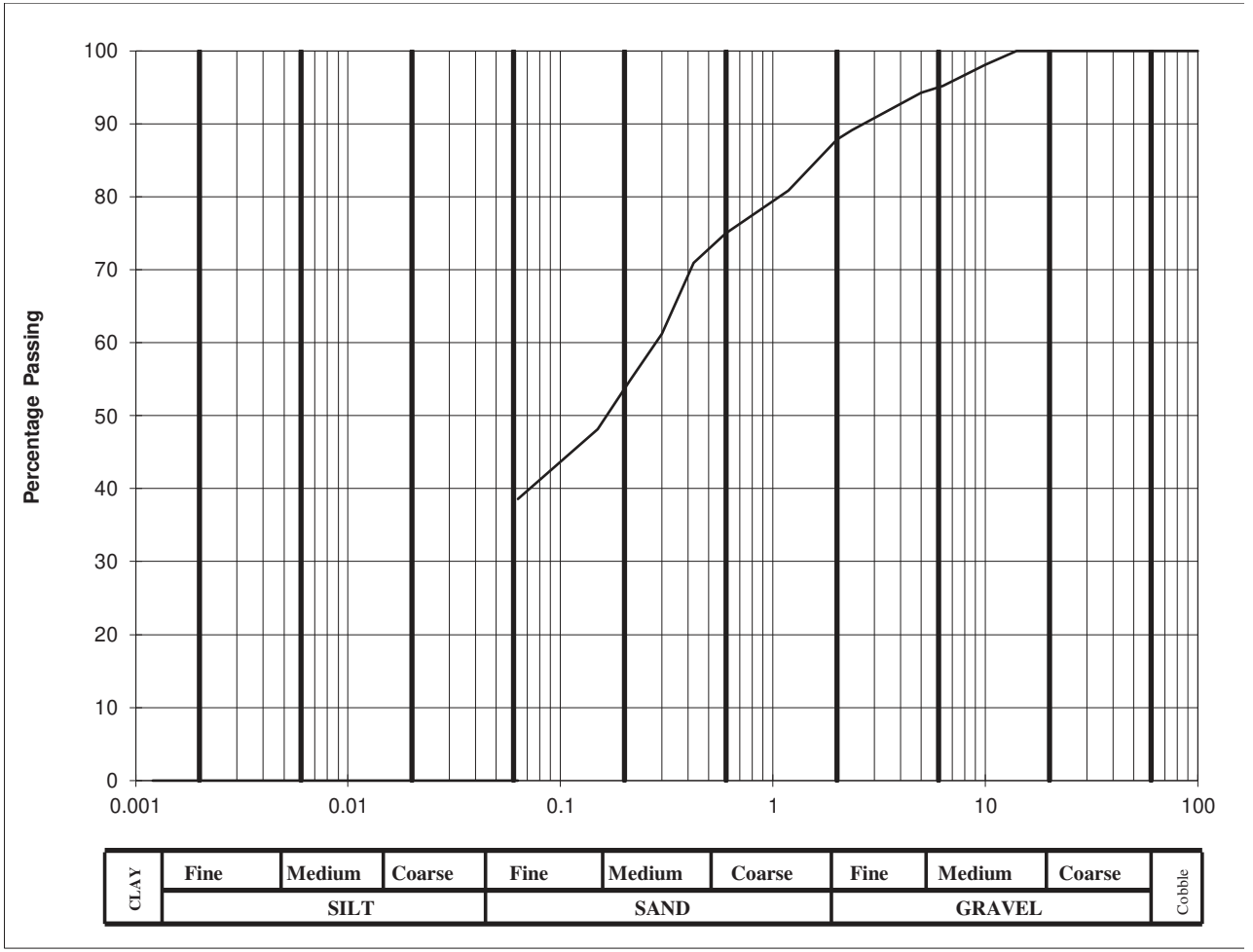
BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	98.1		
6.3	95.2		
5.0	94.2		
2.36	89.1		
2.00	87.8		
1.18	80.8		
0.600	74.9		
0.425	70.9		
0.300	61.2		
0.212	54.7		
0.150	48.1		
0.063	39		

Cobbles, %	0
Gravel, %	12
Sand, %	49
Clay / Silt, %	39



Client :	Leitrim County Council
Project :	Manorhamilton Fire Station

Lab. No :	21/1414
Sample No :	DM21

Hole ID :	BH 02
Depth, m :	1.00

Material description :	sandy slightly gravelly silty CLAY
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

File No: 5502
Printed 28/01/2022

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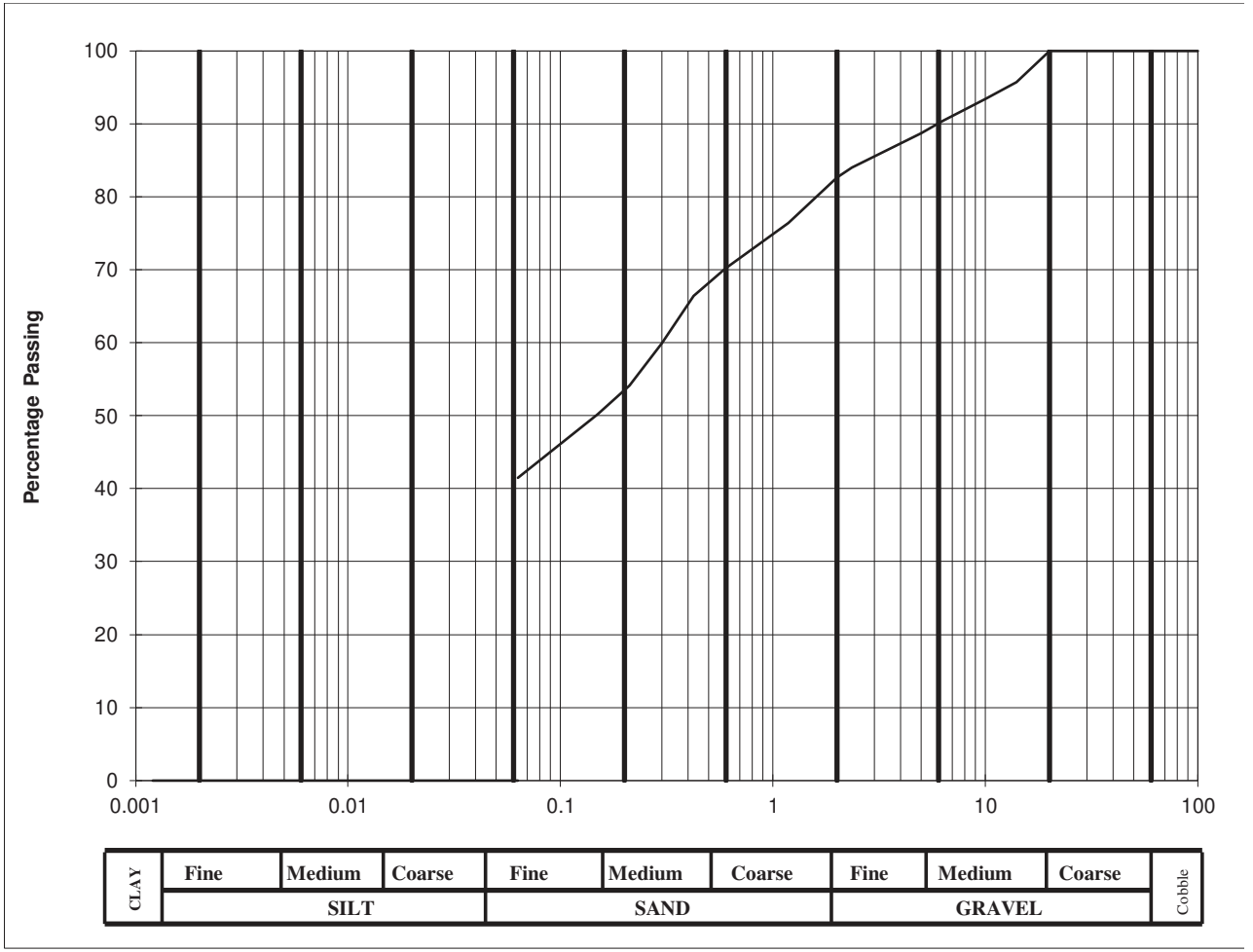
BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	100		
20	100		
14	95.7		
10	93.4		
6.3	90.4		
5.0	88.7		
2.36	84		
2.00	82.6		
1.18	76.4		
0.600	70.2		
0.425	66.4		
0.300	59.9		
0.212	54.1		
0.150	50.2		
0.063	42		

Cobbles, %	0
Gravel, %	17
Sand, %	41
Clay / Silt, %	42



Client :	Leitrim County Council
Project :	Manorhamilton Fire Station

Lab. No :	21/1415
Sample No :	DM22

Hole ID :	BH 02
Depth, m :	2.00

Material description :	sandy slightly gravelly silty CLAY
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

File No: 5502
Printed 28/01/2022

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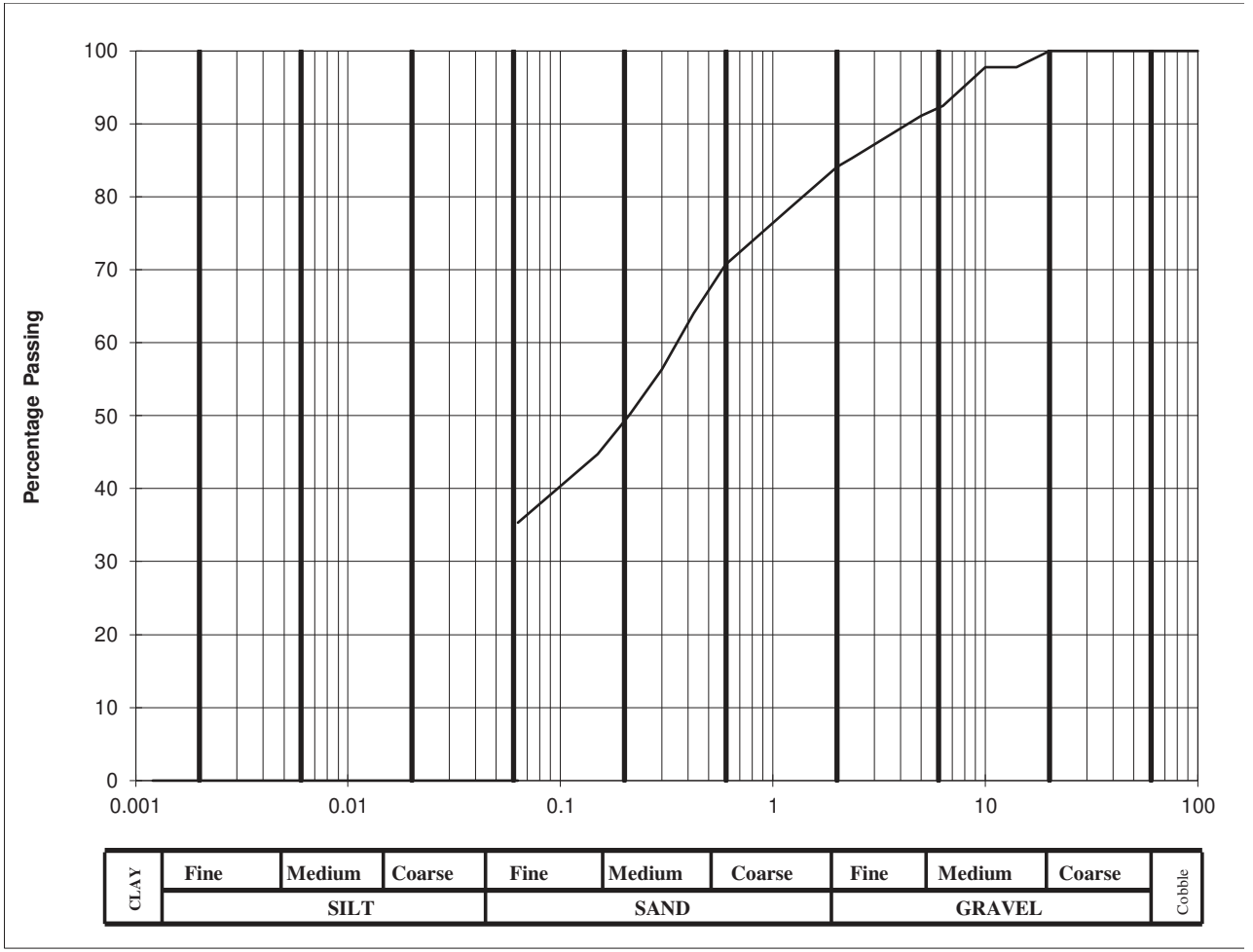
BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	100		
20	100		
14	97.7		
10	97.7		
6.3	92.4		
5.0	91.1		
2.36	85.3		
2.00	84.1		
1.18	78.3		
0.600	70.7		
0.425	64		
0.300	56.3		
0.212	50.1		
0.150	44.7		
0.063	35		

Cobbles, %	0
Gravel, %	16
Sand, %	49
Clay / Silt, %	35



Client :	Leitrim County Council
Project :	Manorhamilton Fire Station

Lab. No :	21/1416
Sample No :	DM11

Hole ID :	BH 03
Depth, m :	1.00

Material description :	sandy slightly gravelly silty CLAY
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

File No: 5502
Printed 28/01/2022

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BS 1377 Particle Size Analysis

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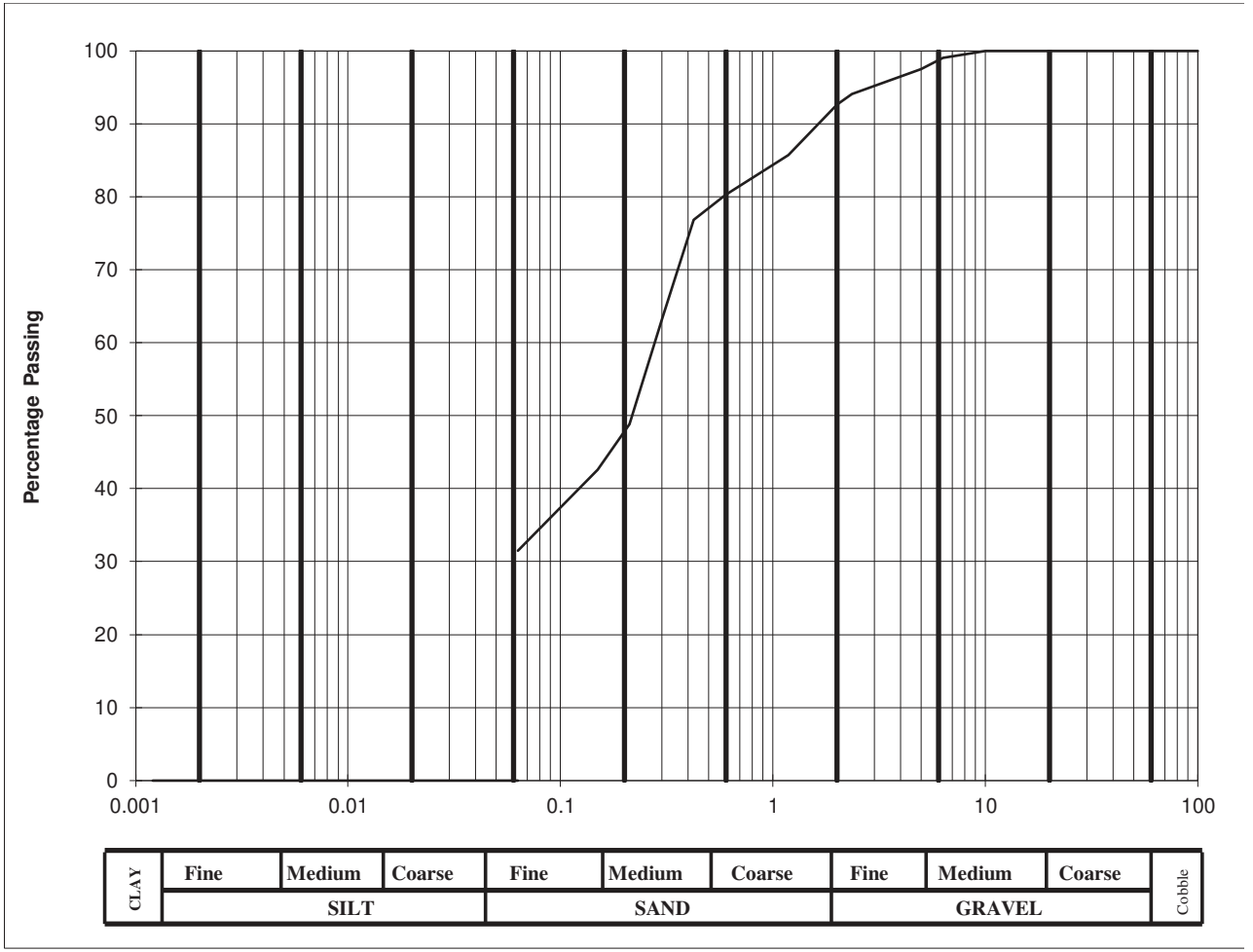
BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	99		
5.0	97.5		
2.36	94.1		
2.00	92.6		
1.18	85.7		
0.600	80.2		
0.425	76.8		
0.300	63.2		
0.212	48.8		
0.150	42.6		
0.063	32		

Cobbles, %	0
Gravel, %	7
Sand, %	61
Clay / Silt, %	32



Client :	Leitrim County Council
Project :	Manorhamilton Fire Station

Lab. No :	21/1417
Sample No :	DM12

Hole ID :	BH 03
Depth, m :	2.00

Material description :	sandy slightly gravelly SILT/CLAY
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

File No: 5502
Printed 28/01/2022

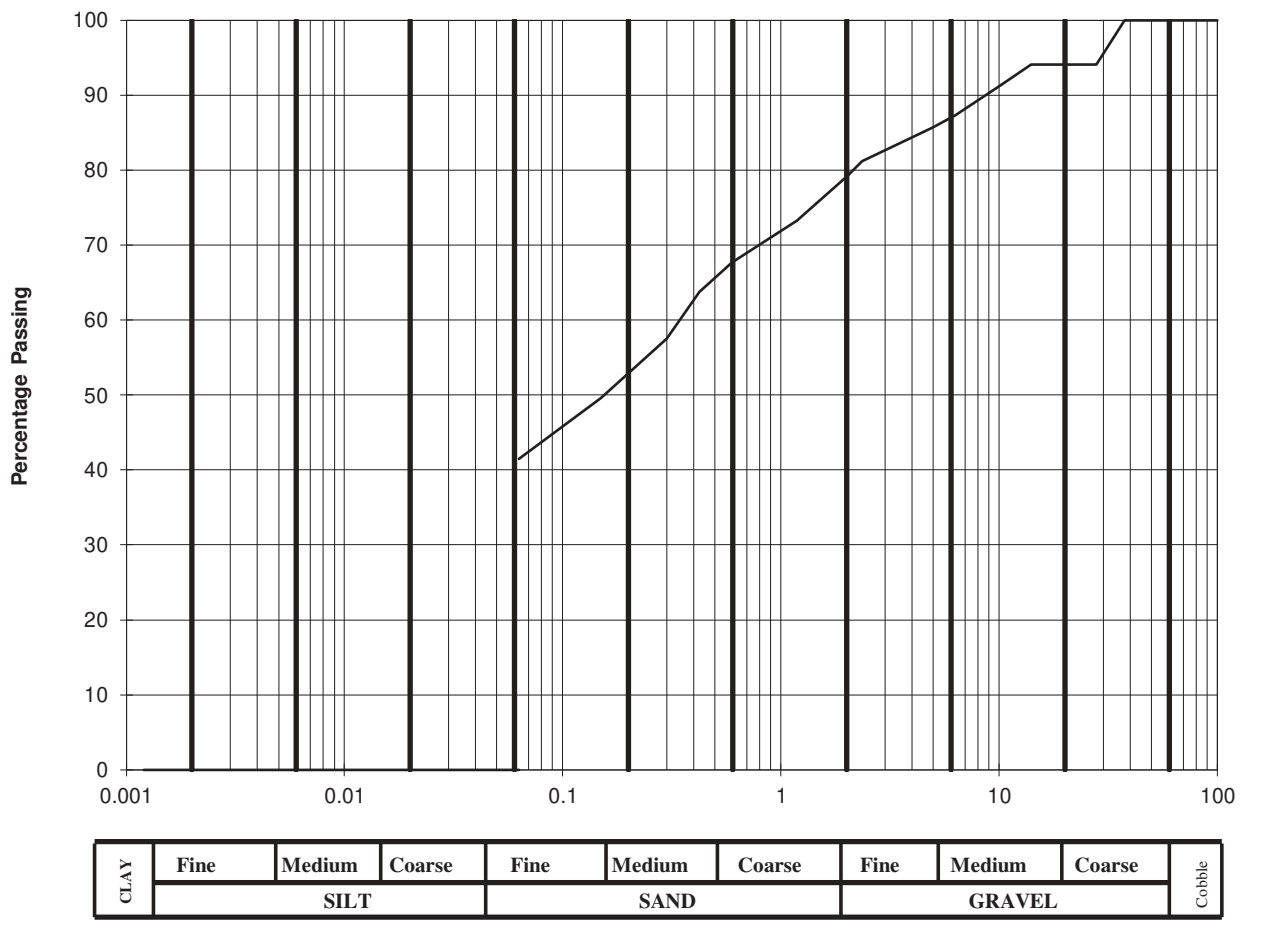
_____Paddy McGonagle
Site Investigations Ltd

BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	94.1		
20	94.1		
14	94.1		
10	91.2		
6.3	87.3		
5.0	85.7		
2.36	81.2		
2.00	79.1		
1.18	73.2		
0.600	67.7		
0.425	63.8		
0.300	57.5		
0.212	53.5		
0.150	49.6		
0.063	42		

Cobbles, %	0
Gravel, %	21
Sand, %	37
Clay / Silt, %	42



Client :	Leitrim County Council
Project :	Manorhamilton Fire Station

Lab. No :	21/1418
Sample No :	DM06

Hole ID :	BH 04
Depth, m :	1.00

Material description :	sandy slightly gravelly silty CLAY
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

File No: 5502
Printed 28/01/2022

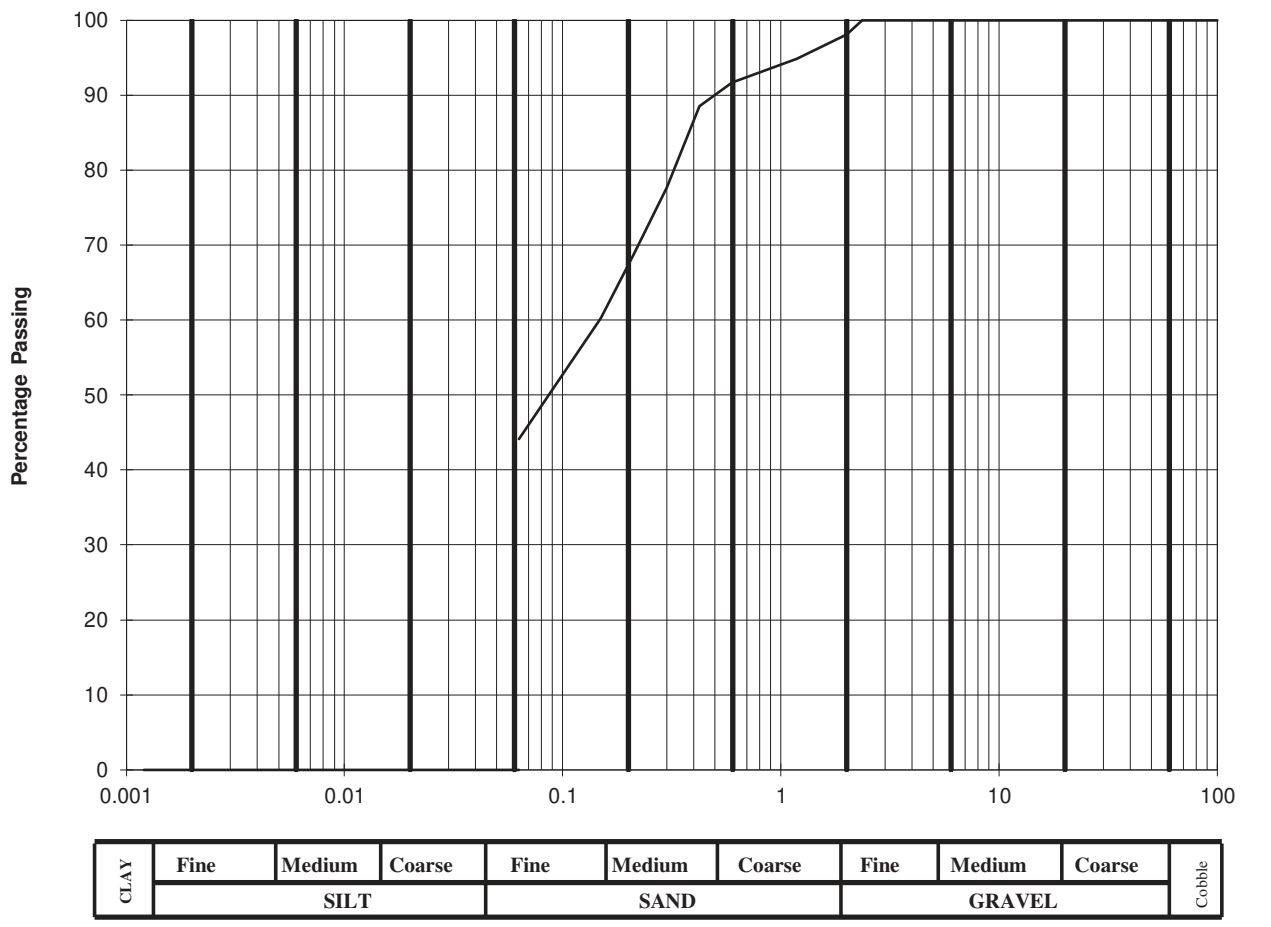
_____Paddy McGonagle
Site Investigations Ltd

BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5.0	100		
2.36	100		
2.00	98.1		
1.18	94.8		
0.600	91.7		
0.425	88.5		
0.300	77.7		
0.212	68.7		
0.150	60.3		
0.063	44		

Cobbles, %	0
Gravel, %	2
Sand, %	54
Clay / Silt, %	44



Client :	Leitrim County Council
Project :	Manorhamilton Fire Station

Lab. No :	21/1419
Sample No :	DM08

Hole ID :	BH 04
Depth, m :	3.00

Material description :	sandy slightly gravelly clayey SILT
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

File No: 5502
Printed 28/01/2022

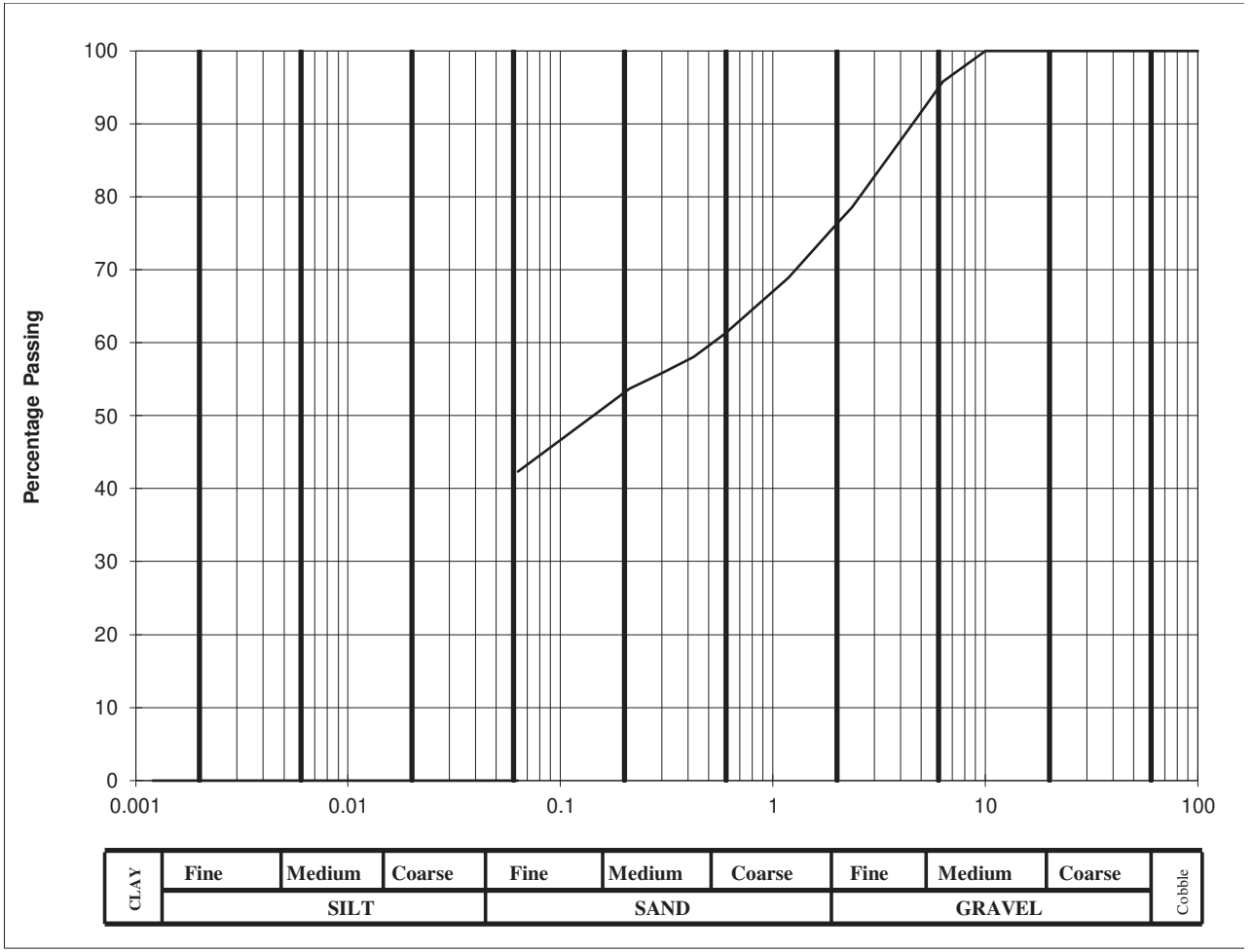
_____Paddy McGonagle
Site Investigations Ltd

BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	95.8		
5.0	91.6		
2.36	78.5		
2.00	76.3		
1.18	68.9		
0.600	61.3		
0.425	58		
0.300	55.8		
0.212	53.7		
0.150	50.4		
0.063	42		

Cobbles, %	0
Gravel, %	24
Sand, %	34
Clay / Silt, %	42



Client :	Leitrim County Council
Project :	Manorhamilton Fire Station

Lab. No :	21/1420
Sample No :	DM02

Hole ID :	BH 05
Depth, m :	2.00

Material description :	slightly sandy slightly gravelly silty CLAY with organic matter
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

File No: 5502
Printed 28/01/2022

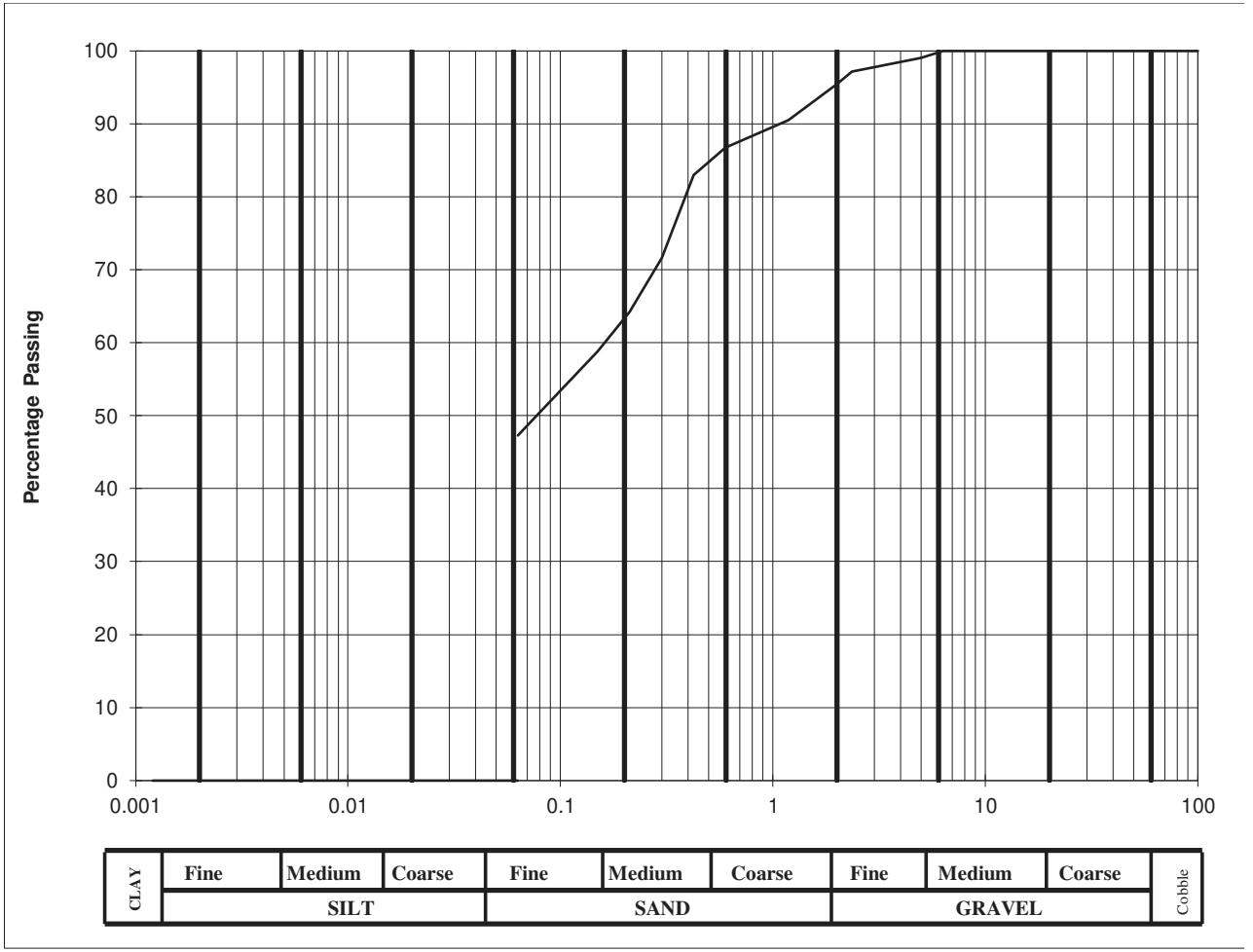
_____Paddy McGonagle
Site Investigations Ltd

BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5.0	99		
2.36	97.1		
2.00	95.4		
1.18	90.5		
0.600	86.7		
0.425	83		
0.300	71.6		
0.212	64.2		
0.150	58.8		
0.063	47		

Cobbles, %	0
Gravel, %	5
Sand, %	48
Clay / Silt, %	47



Client :	Leitrim County Council
Project :	Manorhamilton Fire Station

Lab. No :	21/1421
Sample No :	DM03

Hole ID :	BH 05
Depth, m :	3.00

Material description :	sandy slightly gravelly clayey SILT
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

File No: 5502
Printed 28/01/2022

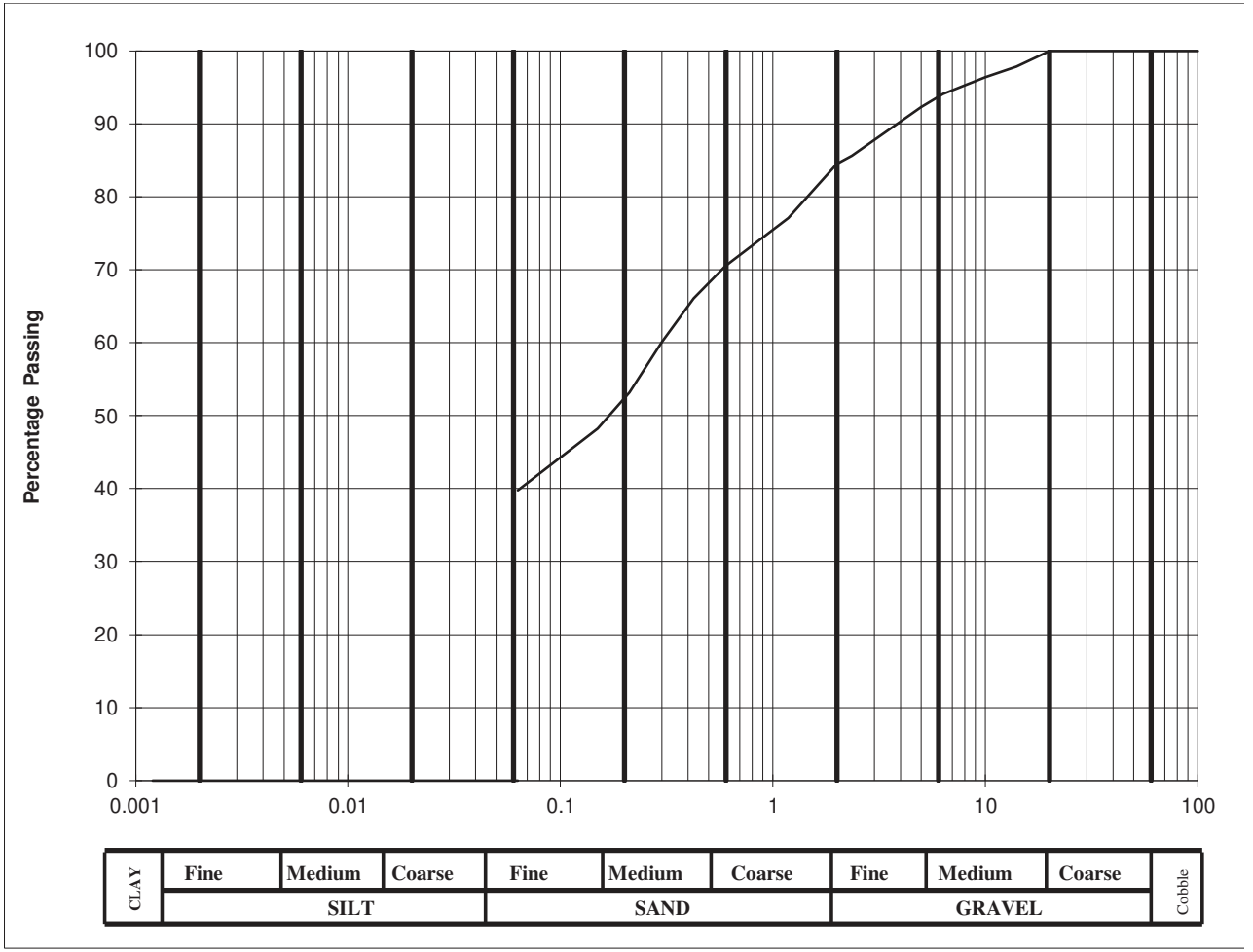
_____Paddy McGonagle
Site Investigations Ltd

BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	100		
20	100		
14	97.8		
10	96.4		
6.3	94.1		
5.0	92.3		
2.36	85.6		
2.00	84.5		
1.18	77.1		
0.600	70.5		
0.425	66.1		
0.300	60.1		
0.212	53.2		
0.150	48.2		
0.063	40		

Cobbles, %	0
Gravel, %	16
Sand, %	45
Clay / Silt, %	40



Client :	Leitrim County Council
Project :	Manorhamilton Fire Station

Lab. No :	21/1422
Sample No :	DM16

Hole ID :	BH 06
Depth, m :	1.00

Material description :	sandy slightly gravelly silty CLAY
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

File No: 5502
Printed 28/01/2022

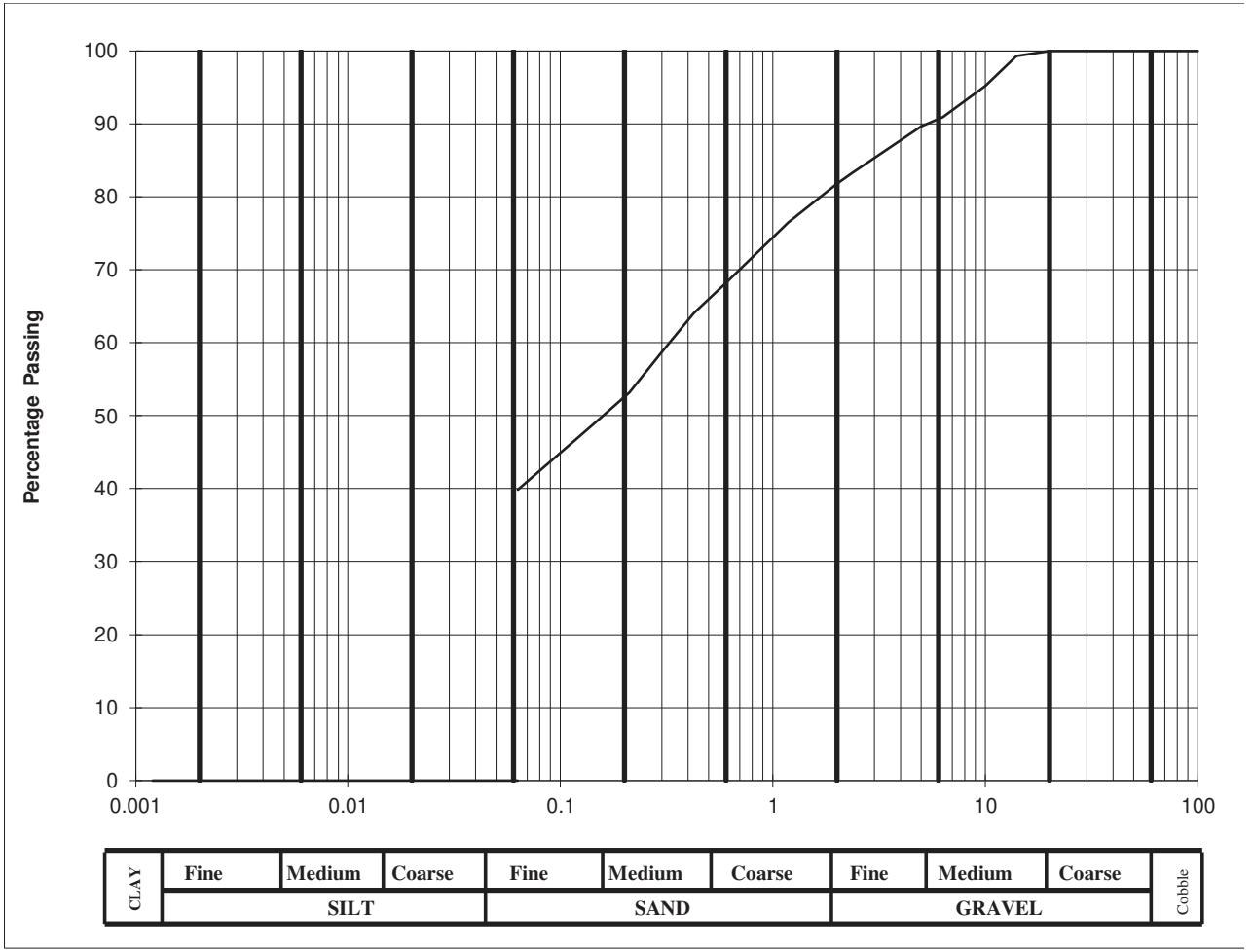
_____Paddy McGonagle
Site Investigations Ltd

BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	100		
20	100		
14	99.3		
10	95.2		
6.3	90.9		
5.0	89.6		
2.36	83.2		
2.00	81.8		
1.18	76.5		
0.600	68.1		
0.425	64		
0.300	58.7		
0.212	53.2		
0.150	49.3		
0.063	40		

Cobbles, %	0
Gravel, %	18
Sand, %	42
Clay / Silt, %	40



Client :	Leitrim County Council
Project :	Manorhamilton Fire Station

Lab. No :	21/1423
Sample No :	DM18

Hole ID :	BH 06
Depth, m :	3.00

Material description :	sandy slightly gravelly silty CLAY
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

File No: 5502
Printed 28/01/2022

_____Paddy McGonagle
Site Investigations Ltd

Chemical Testing
In accordance with BS 1377: Part 3

Client	Leitrim County Council
Site	Manorhamilton Fire Station
S.I. File No	5911 / 22
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email:info@siteinvestigations.ie
Report Date	10th January 2022

Hole Id	Depth (mBGL)	Sample No	Lab Ref	pH Value	Water Soluble Sulphate Content (2:1 Water-soil extract) (SO_3) g/L	Water Soluble Sulphate Content (2:1 Water-soil extract) (SO_3) %	Loss on Ignition (Organic Content) %	Chloride ion Content (water:soil ratio 2:1) %	% passing 2mm	Remarks
BH01	1.00	DM24	21/1412	7.13	0.123	0.110			89.8	
BH02	1.00	DM21	21/1414	7.03	0.122	0.107			87.8	
BH03	1.00	DM11	21/1416	6.69	0.116	0.098			84.1	
BH04	1.00	DM06	21/1418	6.18	0.117	0.093			79.1	
BH05	2.00	DM02	21/1420	3.77	0.113	0.086			76.3	
BH06	1.00	DM16	21/1422	6.39	0.119	0.100			84.5	

Printed 28/01/2022

_____Paddy McGonagle
Site Investigations Ltd.

Appendix 3

Environmental Laboratory Test Results

Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528700
Fax: (01244) 528701
email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

Site Investigations Ltd
The Grange
Carhugar
12th Lock Road
Lucan
Co. Dublin

Attention: Stephen Letch

CERTIFICATE OF ANALYSIS

Date of report Generation:	09 January 2022
Customer:	Site Investigations Ltd
Sample Delivery Group (SDG):	211216-94
Your Reference:	5911
Location:	Manorhamilton Fire Station
Report No:	628771
Order Number:	76/A/21

We received 6 samples on Wednesday December 15, 2021 and 6 of these samples were scheduled for analysis which was completed on Sunday January 09, 2022. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.
Incorrect sampling dates and/or sample information will affect the validity of results.

Approved By:

Sonia McWhan

Operations Manager

CERTIFICATE OF ANALYSIS

SDG: 211216-94 **Report Number:** 628771 **Superseded Report:**
Client Ref.: 5911 **Location:** Manorhamilton Fire Station

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
25539633	BH01		0.50 - 0.50	13/12/2021
25539634	BH02		0.50 - 0.50	13/12/2021
25539635	BH03		0.50 - 0.50	13/12/2021
25539636	BH04		0.50 - 0.50	13/12/2021
25539638	BH05		0.50 - 0.50	13/12/2021
25539639	BH06		0.50 - 0.50	13/12/2021

Only received samples which have had analysis scheduled will be shown on the following pages.

CERTIFICATE OF ANALYSIS

SDG: 211216-94 **Report Number:** 628771 **Superseded Report:**
Client Ref.: 5911 **Location:** Manorhamilton Fire Station

Results Legend

X Test

N No Determination Possible

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

			Lab Sample No(s)																	
			25539633			25539634			25539635			25539636			25539638			25539639		
			Customer Sample Reference																	
			BH01			BH02			BH03			BH04			BH05			BH06		
			AGS Reference																	
			Depth (m)																	
			0.50 - 0.50			0.50 - 0.50			0.50 - 0.50			0.50 - 0.50			0.50 - 0.50			0.50 - 0.50		
			Container																	
			1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB with Handle (ALE260)	60g VOC (ALE215)	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)
			Sample Type																	
			S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Anions by Kone (w)	All	NDPs: 0 Tests: 6	X			X		X			X			X			X		
CEN Readings	All	NDPs: 0 Tests: 6	X			X		X			X			X			X		
Chromium III	All	NDPs: 0 Tests: 6		X		X			X			X			X			X		
Coronene	All	NDPs: 0 Tests: 6		X		X			X			X			X			X		
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 6	X			X		X			X			X			X		
Dissolved Organic/Inorganic Carbon	All	NDPs: 0 Tests: 6	X			X		X			X			X			X		
EPH by GCxGC-FID	All	NDPs: 0 Tests: 6		X		X			X			X			X			X		
EPH CWG GC (S)	All	NDPs: 0 Tests: 6		X		X			X			X			X			X		
Fluoride	All	NDPs: 0 Tests: 6	X			X		X			X			X			X		
GRO by GC-FID (S)	All	NDPs: 0 Tests: 6			X		X			X			X			X			X	
Hexavalent Chromium (s)	All	NDPs: 0 Tests: 6		X		X			X			X			X			X		
Loss on Ignition in soils	All	NDPs: 0 Tests: 6		X		X			X			X			X			X		
Mercury Dissolved	All	NDPs: 0 Tests: 6	X			X		X			X			X			X		
Metals in solid samples by OES	All	NDPs: 0 Tests: 6		X		X			X			X			X			X		
PAH 16 & 17 Calc	All	NDPs: 0 Tests: 6		X		X			X			X			X			X		

Validated

CERTIFICATE OF ANALYSIS

SDG: 211216-94 **Report Number:** 628771 **Superseded Report:**
Client Ref.: 5911 **Location:** Manorhamilton Fire Station

Results Legend

X Test

N No Determination Possible

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

			Lab Sample No(s)																	
			25539633			25539634			25539635			25539636			25539638			25539639		
			Customer Sample Reference			BH01			BH02			BH03			BH04			BH05			BH06	
			AGS Reference																			
			Depth (m)			0.50 - 0.50			0.50 - 0.50			0.50 - 0.50			0.50 - 0.50			0.50 - 0.50			0.50 - 0.50	
			Container	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)
			Sample Type	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
PAH by GCMS	All	NDPs: 0 Tests: 6		X		X		X			X			X			X			X	
PCBs by GCMS	All	NDPs: 0 Tests: 6		X		X		X			X			X			X			X	
pH	All	NDPs: 0 Tests: 6		X		X		X			X			X			X			X	
Phenols by HPLC (W)	All	NDPs: 0 Tests: 6	X			X		X			X			X			X				
Sample description	All	NDPs: 0 Tests: 6		X		X		X			X			X			X			X	
Total Dissolved Solids on Leachates	All	NDPs: 0 Tests: 6	X			X		X			X			X			X				
Total Organic Carbon	All	NDPs: 0 Tests: 6		X		X		X			X			X			X			X	
TPH CWG GC (S)	All	NDPs: 0 Tests: 6		X		X		X			X			X			X			X	
VOC MS (S)	All	NDPs: 0 Tests: 6			X		X			X			X			X			X		

CERTIFICATE OF ANALYSIS

SDG: 211216-94 **Report Number:** 628771 **Superseded Report:**
Client Ref.: 5911 **Location:** Manorhamilton Fire Station

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Inclusions	Inclusions 2
25539633	BH01	0.50 - 0.50	Dark Brown	Sandy Clay Loam	Vegetation	Stones
25539634	BH02	0.50 - 0.50	Dark Brown	Sandy Loam	Vegetation	Stones
25539635	BH03	0.50 - 0.50	Light Brown	Sandy Clay Loam	Stones	Vegetation
25539636	BH04	0.50 - 0.50	Light Brown	Sandy Clay Loam	Stones	None
25539638	BH05	0.50 - 0.50	Light Brown	Silty Clay Loam	Vegetation	Stones
25539639	BH06	0.50 - 0.50	Dark Brown	Sandy Clay Loam	Stones	Vegetation

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally ocurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

CERTIFICATE OF ANALYSIS

SDG: 211216-94 **Report Number:** 628771 **Superseded Report:**
Client Ref.: 5911 **Location:** Manorhamilton Fire Station

Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-4+§@	Sample deviation (see appendix)

Component	LOD/Units	Method	BH01	BH02	BH03	BH04	BH05	BH06
Customer Sample Ref.								
Depth (m)			0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50
Sample Type			Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Date Sampled			13/12/2021 -	13/12/2021 -	13/12/2021 -	13/12/2021 -	13/12/2021 -	13/12/2021 -
Date Received			15/12/2021	15/12/2021	15/12/2021	15/12/2021	15/12/2021	15/12/2021
SDG Ref			211216-94	211216-94	211216-94	211216-94	211216-94	211216-94
Lab Sample No.(s)			25539633	25539634	25539635	25539636	25539638	25539639
AGS Reference								
Moisture Content Ratio (% of as received sample)	%	PM024	20	19	18	17	23	18
Loss on ignition	<0.7 %	TM018	3.57 M	6.47 M	3.59 M	4.26 M	4.43 M	3.66 M
Organic Carbon, Total	<0.2 %	TM132	0.337 M	0.73 M	0.29 M	0.259 M	0.707 M	0.254 M
pH	1 pH Units	TM133	7.77 M	7.72 M	7.92 M	7.92 M	7.83 M	7.76 M
Chromium, Hexavalent	<0.6 mg/kg	TM151	<0.6 #	<0.6 #	<0.6 #	<0.6 #	<0.6 #	<0.6 #
PCB congener 28	<3 µg/kg	TM168	<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 52	<3 µg/kg	TM168	<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 101	<3 µg/kg	TM168	<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 118	<3 µg/kg	TM168	<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 138	<3 µg/kg	TM168	<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 153	<3 µg/kg	TM168	<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 180	<3 µg/kg	TM168	<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
Sum of detected PCB 7 Congeners	<21 µg/kg	TM168	<21	<21	<21	<21	<21	<21
Chromium, Trivalent	<0.9 mg/kg	TM181	9.58	10.2	11.8	8.91	8.4	9.75
Antimony	<0.6 mg/kg	TM181	1.82 #	1.6 #	1.94 #	1.67 #	1.48 #	2.22 #
Arsenic	<0.6 mg/kg	TM181	16.9 M	17.3 M	17.1 M	16.6 M	16.1 M	20.6 M
Barium	<0.6 mg/kg	TM181	65.2 #	49 #	60.3 #	49.6 #	55.1 #	55.5 #
Cadmium	<0.02 mg/kg	TM181	0.527 M	0.679 M	0.365 M	0.269 M	0.343 M	0.242 M
Chromium	<0.9 mg/kg	TM181	9.58 M	10.2 M	11.8 M	8.91 M	8.4 M	9.75 M
Copper	<1.4 mg/kg	TM181	38.6 M	45.4 M	40.6 M	37.6 M	37 M	34.7 M
Lead	<0.7 mg/kg	TM181	19.3 M	18.3 M	17.2 M	17.6 M	15.8 M	17.1 M
Mercury	<0.1 mg/kg	TM181	<0.1 M	<0.1 M	<0.1 M	<0.1 M	<0.1 M	<0.1 M
Molybdenum	<0.1 mg/kg	TM181	0.696 #	0.823 #	0.607 #	0.582 #	0.902 #	0.564 #
Nickel	<0.2 mg/kg	TM181	41.9 M	35.2 M	40.9 M	37.2 M	32.3 M	35.8 M
Selenium	<1 mg/kg	TM181	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Zinc	<1.9 mg/kg	TM181	51.3 M	57.5 M	51.3 M	48.9 M	67.7 M	51.2 M
PAH Total 17 (inc Coronene) Moisture Corrected	<10 mg/kg	TM410	<10	<10	<10	<10	<10	<10
Coronene	<200 µg/kg	TM410	<200	<200	<200	<200	<200	<200
Mineral Oil >C10-C40 (EH_2D_AL)	<5 mg/kg	TM415	<5	<5	<5	<5	<5	<5

CERTIFICATE OF ANALYSIS

SDG: 211216-94 **Report Number:** 628771 **Superseded Report:**
Client Ref.: 5911 **Location:** Manorhamilton Fire Station

PAH by GCMS

Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-4+§@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	BH01	BH02	BH03	BH04	BH05	BH06
			Depth (m)	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50
			Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
			Date Sampled	13/12/2021	13/12/2021	13/12/2021	13/12/2021	13/12/2021	13/12/2021
			Sample Time	-	-	-	-	-	-
			Date Received	15/12/2021	15/12/2021	15/12/2021	15/12/2021	15/12/2021	15/12/2021
			SDG Ref	211216-94	211216-94	211216-94	211216-94	211216-94	211216-94
			Lab Sample No.(s)	25539633	25539634	25539635	25539636	25539638	25539639
			AGS Reference						
Naphthalene	<9 µg/kg	TM218		<9 M	<9 M	<9 M	<9 M	<9 M	<9 M
Acenaphthylene	<12 µg/kg	TM218		<12 M	<12 M	<12 M	<12 M	<12 M	<12 M
Acenaphthene	<8 µg/kg	TM218		<8 M	<8 M	<8 M	<8 M	<8 M	<8 M
Fluorene	<10 µg/kg	TM218		<10 M	<10 M	<10 M	<10 M	<10 M	<10 M
Phenanthrene	<15 µg/kg	TM218		<15 M	<15 M	<15 M	<15 M	<15 M	<15 M
Anthracene	<16 µg/kg	TM218		<16 M	<16 M	<16 M	<16 M	<16 M	<16 M
Fluoranthene	<17 µg/kg	TM218		<17 M	<17 M	<17 M	<17 M	<17 M	<17 M
Pyrene	<15 µg/kg	TM218		<15 M	<15 M	<15 M	<15 M	<15 M	<15 M
Benz(a)anthracene	<14 µg/kg	TM218		<14 M	<14 M	<14 M	<14 M	<14 M	<14 M
Chrysene	<10 µg/kg	TM218		<10 M	<10 M	<10 M	<10 M	<10 M	<10 M
Benzo(b)fluoranthene	<15 µg/kg	TM218		<15 M	<15 M	<15 M	<15 M	<15 M	<15 M
Benzo(k)fluoranthene	<14 µg/kg	TM218		<14 M	<14 M	<14 M	<14 M	<14 M	<14 M
Benzo(a)pyrene	<15 µg/kg	TM218		<15 M	<15 M	<15 M	<15 M	<15 M	<15 M
Indeno(1,2,3-cd)pyrene	<18 µg/kg	TM218		<18 M	<18 M	<18 M	<18 M	<18 M	<18 M
Dibenzo(a,h)anthracene	<23 µg/kg	TM218		<23 M	<23 M	<23 M	<23 M	<23 M	<23 M
Benzo(g,h,i)perylene	<24 µg/kg	TM218		<24 M	<24 M	<24 M	<24 M	<24 M	<24 M
PAH, Total Detected USEPA 16	<118 µg/kg	TM218		<118	<118	<118	<118	<118	<118

Validated

CERTIFICATE OF ANALYSIS

SDG: 211216-94 **Report Number:** 628771 **Superseded Report:**
Client Ref.: 5911 **Location:** Manorhamilton Fire Station

TPH CWG (S)

Results Legend
- # ISO17025 accredited.
- M mCERTS accredited.
- aq Aqueous / settled sample.
- diss.filt Dissolved / filtered sample.
- tot.unfilt Total / unfiltered sample.
- * Subcontracted - refer to subcontractor report for accreditation status.
- ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
- (F) Trigger breach confirmed
- 1-4+$@ Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	BH01	BH02	BH03	BH04	BH05	BH06
			Depth (m)	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50
			Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
			Date Sampled	13/12/2021	13/12/2021	13/12/2021	13/12/2021	13/12/2021	13/12/2021
			Sample Time	-	-	-	-	-	-
			Date Received	15/12/2021	15/12/2021	15/12/2021	15/12/2021	15/12/2021	15/12/2021
			SDG Ref	211216-94	211216-94	211216-94	211216-94	211216-94	211216-94
			Lab Sample No.(s)	25539633	25539634	25539635	25539636	25539638	25539639
			AGS Reference						
GRO Surrogate % recovery**	%	TM089		97.9 @	95.5 @	87.1 @	111 @	83.2 @	92.7 @
Aliphatics >C5-C6 (HS_1D_AL)	<10 µg/kg	TM089		<10 @	<10 @	<10 @	<10 @	<10 @	<10 @
Aliphatics >C6-C8 (HS_1D_AL)	<10 µg/kg	TM089		<10 @	<10 @	<10 @	<10 @	<10 @	<10 @
Aliphatics >C8-C10 (HS_1D_AL)	<10 µg/kg	TM089		<10 @	<10 @	<10 @	<10 @	<10 @	<10 @
Aliphatics >C10-C12 (EH_2D_AL_#1)	<1000 µg/kg	TM414		<1000 #	<1000 #	<1000 #	<1000 #	<1000 #	<1000 #
Aliphatics >C12-C16 (EH_2D_AL_#1)	<1000 µg/kg	TM414		<1000 #	<1000 #	<1000 #	<1000 #	<1000 #	<1000 #
Aliphatics >C16-C21 (EH_2D_AL_#1)	<1000 µg/kg	TM414		<1000 #	<1000 #	<1000 #	<1000 #	<1000 #	<1000 #
Aliphatics >C21-C35 (EH_2D_AL_#1)	<1000 µg/kg	TM414		<1000 #	<1000 #	<1000 #	<1000 #	1020 #	<1000 #
Aliphatics >C35-C44 (EH_2D_AL_#1)	<1000 µg/kg	TM414		<1000	<1000	<1000	<1000	<1000	<1000
Total Aliphatics >C10-C44 (EH_2D_AR_#1)	<5000 µg/kg	TM414		<5000	<5000	<5000	<5000	<5000	<5000
Total Aliphatics & Aromatics >C10-C44 (EH_2D_Total_#1)	<10000 µg/kg	TM414		<10000	<10000	<10000	<10000	<10000	<10000
Aromatics >EC5-EC7 (HS_1D_AR)	<10 µg/kg	TM089		<10 @	<10 @	<10 @	<10 @	<10 @	<10 @
Aromatics >EC7-EC8 (HS_1D_AR)	<10 µg/kg	TM089		<10 @	<10 @	<10 @	<10 @	<10 @	<10 @
Aromatics >EC8-EC10 (HS_1D_AR)	<10 µg/kg	TM089		<10 @	<10 @	<10 @	<10 @	<10 @	<10 @
Aromatics > EC10-EC12 (EH_2D_AR_#1)	<1000 µg/kg	TM414		<1000 #	<1000 #	<1000 #	<1000 #	<1000 #	<1000 #
Aromatics > EC12-EC16 (EH_2D_AR_#1)	<1000 µg/kg	TM414		<1000 #	<1000 #	<1000 #	<1000 #	<1000 #	<1000 #
Aromatics > EC16-EC21 (EH_2D_AR_#1)	<1000 µg/kg	TM414		<1000 #	<1000 #	<1000 #	<1000 #	<1000 #	<1000 #
Aromatics > EC21-EC35 (EH_2D_AR_#1)	<1000 µg/kg	TM414		<1000 #	2330 #	<1000 #	<1000 #	<1000 #	<1000 #
Aromatics >EC35-EC44 (EH_2D_AR_#1)	<1000 µg/kg	TM414		<1000	<1000	<1000	<1000	<1000	<1000
Aromatics > EC40-EC44 (EH_2D_AR_#1)	<1000 µg/kg	TM414		<1000	<1000	<1000	<1000	<1000	<1000
Total Aromatics > EC10-EC44 (EH_2D_AR_#1)	<5000 µg/kg	TM414		<5000	<5000	<5000	<5000	<5000	<5000
Total Aliphatics & Aromatics >C5-C44 (EH_2D_Total_#1+HS_1D_Total)	<10000 µg/kg	TM414		<10000	<10000	<10000	<10000	<10000	<10000
GRO >C5-C6 (HS_1D)	<20 µg/kg	TM089		<20 @	<20 @	<20 @	<20 @	<20 @	<20 @
GRO >C6-C7 (HS_1D)	<20 µg/kg	TM089		<20 @	<20 @	<20 @	<20 @	<20 @	<20 @
GRO >C7-C8 (HS_1D)	<20 µg/kg	TM089		<20 @	<20 @	<20 @	<20 @	<20 @	<20 @
GRO >C8-C10 (HS_1D)	<20 µg/kg	TM089		<20 @	<20 @	<20 @	<20 @	<20 @	<20 @
GRO >C10-C12 (HS_1D)	<20 µg/kg	TM089		<20 @	<20 @	<20 @	<20 @	<20 @	<20 @
Total Aliphatics >C5-C10 (HS_1D_AL_TOTAL)	<50 µg/kg	TM089		<50 @	<50 @	<50 @	<50 @	<50 @	<50 @
Total Aromatics >EC5-EC10 (HS_1D_AR_TOTAL)	<50 µg/kg	TM089		<50 @	<50 @	<50 @	<50 @	<50 @	<50 @
GRO >C5-C10 (HS_1D_TOTAL)	<20 µg/kg	TM089		<20 @	<20 @	<20 @	<20 @	<20 @	<20 @

Validated

CERTIFICATE OF ANALYSIS

SDG: 211216-94 **Report Number:** 628771 **Superseded Report:**
Client Ref.: 5911 **Location:** Manorhamilton Fire Station

VOC MS (S)

Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-4+§@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	BH01	BH02	BH03	BH04	BH05	BH06
			Depth (m)	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50
			Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
			Date Sampled	13/12/2021	13/12/2021	13/12/2021	13/12/2021	13/12/2021	13/12/2021
			Sample Time	-	-	-	-	-	-
			Date Received	15/12/2021	15/12/2021	15/12/2021	15/12/2021	15/12/2021	15/12/2021
			SDG Ref	211216-94	211216-94	211216-94	211216-94	211216-94	211216-94
			Lab Sample No.(s)	25539633	25539634	25539635	25539636	25539638	25539639
			AGS Reference						
Dibromofluoromethane**	%	TM116		122 @	121 @	130 @	116 @	126 @	130 @
Toluene-d8**	%	TM116		96.9 @	97.2 @	99.1 @	99.4 @	97.7 @	98 @
4-Bromofluorobenzene**	%	TM116		88 @	87.1 @	82.8 @	87.8 @	75.4 @	90 @
Methyl Tertiary Butyl Ether	<10 µg/kg	TM116		<10 @ M	<10 @ M	<10 @ M	<10 @ M	<10 @ M	<10 @ M
Benzene	<9 µg/kg	TM116		<9 @ M	<9 @ M	<9 @ M	<9 @ M	<9 @ M	<9 @ M
Toluene	<7 µg/kg	TM116		<7 @ M	<7 @ M	<7 @ M	<7 @ M	<7 @ M	<7 @ M
Ethylbenzene	<4 µg/kg	TM116		<4 @ M	<4 @ M	<4 @ M	<4 @ M	<4 @ M	<4 @ M
p/m-Xylene	<10 µg/kg	TM116		<10 @ #	<10 @ #	<10 @ #	<10 @ #	<10 @ #	<10 @ #
o-Xylene	<10 µg/kg	TM116		<10 @ M	<10 @ M	<10 @ M	<10 @ M	<10 @ M	<10 @ M

Validated

CERTIFICATE OF ANALYSIS

SDG: 211216-94 **Report Number:** 628771 **Superseded Report:**
Client Ref.: 5911 **Location:** Manorhamilton Fire Station

CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference		**Site Location**	Manorhamilton Fire Station
Mass Sample taken (kg)	0.117	**Natural Moisture Content (%)**	30.4
Mass of dry sample (kg)	0.090	**Dry Matter Content (%)**	76.7
Particle Size <4mm	>95%		

Case	
SDG	211216-94
Lab Sample Number(s)	25539633
Sampled Date	13-Dec-2021
Customer Sample Ref.	BH01
Depth (m)	0.50 - 0.50

Solid Waste Analysis	**Result**	**Landfill Waste Acceptance Criteria Limits**		
		Inert Waste Landfill	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon (%)	0.337	3	5	6
Loss on Ignition (%)	3.57	-	-	10
Sum of BTEX (mg/kg)	-	-	-	-
Sum of 7 PCBs (mg/kg)	<0.021	1	-	-
Mineral Oil (mg/kg) (EH_2D_AL)	<5	500	-	-
PAH Sum of 17 (mg/kg)	<10	100	-	-
pH (pH Units)	7.77	-	>6	-
ANC to pH 6 (mol/kg)	-	-	-	-
ANC to pH 4 (mol/kg)	-	-	-	-

Eluate Analysis	**C_2** Concⁿ in 10:1 eluate (mg/l)		**A_2** 10:1 concⁿ leached (mg/kg)		**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg**		
	Result	**Limit of Detection**	**Result**	**Limit of Detection**			
Arsenic	<0.0005	<0.0005	<0.005	<0.005	0.5	2	25
Barium	0.00139	<0.0002	0.0139	<0.002	20	100	300
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	0.04	1	5
Chromium	<0.001	<0.001	<0.01	<0.01	0.5	10	70
Copper	0.000373	<0.0003	0.00373	<0.003	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2
Molybdenum	<0.003	<0.003	<0.03	<0.03	0.5	10	30
Nickel	<0.0004	<0.0004	<0.004	<0.004	0.4	10	40
Lead	<0.0002	<0.0002	<0.002	<0.002	0.5	10	50
Antimony	<0.001	<0.001	<0.01	<0.01	0.06	0.7	5
Selenium	<0.001	<0.001	<0.01	<0.01	0.1	0.5	7
Zinc	0.00149	<0.001	0.0149	<0.01	4	50	200
Chloride	<2	<2	<20	<20	800	15000	25000
Fluoride	<0.5	<0.5	<5	<5	10	150	500
Sulphate (soluble)	<2	<2	<20	<20	1000	20000	50000
Total Dissolved Solids	144	<10	1440	<100	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	6.41	<3	64.1	<30	500	800	1000

Leach Test Information

Date Prepared	17-Dec-2021
pH (pH Units)	8.19
Conductivity (µS/cm)	184.00
Temperature (°C)	19.70
Volume Leachant (Litres)	0.873

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and ALS Environmental cannot be held responsible for any discrepancies with current legislation

09/01/2022 11:19:14

Validated

CERTIFICATE OF ANALYSIS

SDG: 211216-94 **Report Number:** 628771 **Superseded Report:**
Client Ref.: 5911 **Location:** Manorhamilton Fire Station

CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference		**Site Location**	Manorhamilton Fire Station
Mass Sample taken (kg)	0.114	**Natural Moisture Content (%)**	25.9
Mass of dry sample (kg)	0.090	**Dry Matter Content (%)**	79.4
Particle Size <4mm	>95%		

Case	
SDG	211216-94
Lab Sample Number(s)	25539634
Sampled Date	13-Dec-2021
Customer Sample Ref.	BH02
Depth (m)	0.50 - 0.50

Solid Waste Analysis	**Result**	**Landfill Waste Acceptance Criteria Limits**		
		Inert Waste Landfill	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon (%)	0.73	3	5	6
Loss on Ignition (%)	6.47	-	-	10
Sum of BTEX (mg/kg)	-	-	-	-
Sum of 7 PCBs (mg/kg)	<0.021	1	-	-
Mineral Oil (mg/kg) (EH_2D_AL)	<5	500	-	-
PAH Sum of 17 (mg/kg)	<10	100	-	-
pH (pH Units)	7.72	-	>6	-
ANC to pH 6 (mol/kg)	-	-	-	-
ANC to pH 4 (mol/kg)	-	-	-	-

Eluate Analysis	**C_2** Concⁿ in 10:1 eluate (mg/l)		**A_2** 10:1 concⁿ leached (mg/kg)		**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg**		
	Result	**Limit of Detection**	**Result**	**Limit of Detection**			
Arsenic	0.000614	<0.0005	0.00614	<0.005	0.5	2	25
Barium	0.0142	<0.0002	0.142	<0.002	20	100	300
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	0.04	1	5
Chromium	<0.001	<0.001	<0.01	<0.01	0.5	10	70
Copper	0.00132	<0.0003	0.0132	<0.003	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2
Molybdenum	0.0129	<0.003	0.129	<0.03	0.5	10	30
Nickel	0.000459	<0.0004	0.00459	<0.004	0.4	10	40
Lead	<0.0002	<0.0002	<0.002	<0.002	0.5	10	50
Antimony	0.00125	<0.001	0.0125	<0.01	0.06	0.7	5
Selenium	<0.001	<0.001	<0.01	<0.01	0.1	0.5	7
Zinc	0.00291	<0.001	0.0291	<0.01	4	50	200
Chloride	<2	<2	<20	<20	800	15000	25000
Fluoride	<0.5	<0.5	<5	<5	10	150	500
Sulphate (soluble)	<2	<2	<20	<20	1000	20000	50000
Total Dissolved Solids	112	<10	1120	<100	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	5.68	<3	56.8	<30	500	800	1000

Leach Test Information

Date Prepared	17-Dec-2021
pH (pH Units)	8.14
Conductivity (µS/cm)	151.00
Temperature (°C)	19.70
Volume Leachant (Litres)	0.876

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and ALS Environmental cannot be held responsible for any discrepancies with current legislation

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Validated

CERTIFICATE OF ANALYSIS

SDG: 211216-94 **Report Number:** 628771 **Superseded Report:**
Client Ref.: 5911 **Location:** Manorhamilton Fire Station

CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference		**Site Location**	Manorhamilton Fire Station
Mass Sample taken (kg)	0.115	**Natural Moisture Content (%)**	27.5
Mass of dry sample (kg)	0.090	**Dry Matter Content (%)**	78.4
Particle Size <4mm	>95%		

Case	
SDG	211216-94
Lab Sample Number(s)	25539635
Sampled Date	13-Dec-2021
Customer Sample Ref.	BH03
Depth (m)	0.50 - 0.50

Solid Waste Analysis	**Result**	**Landfill Waste Acceptance Criteria Limits**		
		Inert Waste Landfill	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon (%)	0.29	3	5	6
Loss on Ignition (%)	3.59	-	-	10
Sum of BTEX (mg/kg)	-	-	-	-
Sum of 7 PCBs (mg/kg)	<0.021	1	-	-
Mineral Oil (mg/kg) (EH_2D_AL)	<5	500	-	-
PAH Sum of 17 (mg/kg)	<10	100	-	-
pH (pH Units)	7.92	-	>6	-
ANC to pH 6 (mol/kg)	-	-	-	-
ANC to pH 4 (mol/kg)	-	-	-	-

Eluate Analysis	**C_2** Concⁿ in 10:1 eluate (mg/l)		**A_2** 10:1 concⁿ leached (mg/kg)		**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg**		
	Result	**Limit of Detection**	**Result**	**Limit of Detection**			
Arsenic	0.00204	<0.0005	0.0204	<0.005	0.5	2	25
Barium	0.0341	<0.0002	0.341	<0.002	20	100	300
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	0.04	1	5
Chromium	<0.001	<0.001	<0.01	<0.01	0.5	10	70
Copper	0.00505	<0.0003	0.0505	<0.003	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2
Molybdenum	0.00697	<0.003	0.0697	<0.03	0.5	10	30
Nickel	0.0038	<0.0004	0.038	<0.004	0.4	10	40
Lead	<0.0002	<0.0002	<0.002	<0.002	0.5	10	50
Antimony	0.00308	<0.001	0.0308	<0.01	0.06	0.7	5
Selenium	<0.001	<0.001	<0.01	<0.01	0.1	0.5	7
Zinc	0.00122	<0.001	0.0122	<0.01	4	50	200
Chloride	<2	<2	<20	<20	800	15000	25000
Fluoride	<0.5	<0.5	<5	<5	10	150	500
Sulphate (soluble)	<2	<2	<20	<20	1000	20000	50000
Total Dissolved Solids	136	<10	1360	<100	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	6.21	<3	62.1	<30	500	800	1000

Leach Test Information

Date Prepared	17-Dec-2021
pH (pH Units)	7.93
Conductivity (µS/cm)	178.00
Temperature (°C)	19.60
Volume Leachant (Litres)	0.875

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and ALS Environmental cannot be held responsible for any discrepancies with current legislation

09/01/2022 11:19:14

Validated

CERTIFICATE OF ANALYSIS

SDG: 211216-94 **Report Number:** 628771 **Superseded Report:**
Client Ref.: 5911 **Location:** Manorhamilton Fire Station

CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference		**Site Location**	Manorhamilton Fire Station
Mass Sample taken (kg)	0.113	**Natural Moisture Content (%)**	25.1
Mass of dry sample (kg)	0.090	**Dry Matter Content (%)**	80
Particle Size <4mm	>95%		

Case	
SDG	211216-94
Lab Sample Number(s)	25539636
Sampled Date	13-Dec-2021
Customer Sample Ref.	BH04
Depth (m)	0.50 - 0.50

Solid Waste Analysis	**Result**	**Landfill Waste Acceptance Criteria Limits**		
		Inert Waste Landfill	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon (%)	0.259	3	5	6
Loss on Ignition (%)	4.26	-	-	10
Sum of BTEX (mg/kg)	-	-	-	-
Sum of 7 PCBs (mg/kg)	<0.021	1	-	-
Mineral Oil (mg/kg) (EH_2D_AL)	<5	500	-	-
PAH Sum of 17 (mg/kg)	<10	100	-	-
pH (pH Units)	7.92	-	>6	-
ANC to pH 6 (mol/kg)	-	-	-	-
ANC to pH 4 (mol/kg)	-	-	-	-

Eluate Analysis	**C_2** Concⁿ in 10:1 eluate (mg/l)		**A_2** 10:1 concⁿ leached (mg/kg)		**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg**		
	Result	**Limit of Detection**	**Result**	**Limit of Detection**			
Arsenic	<0.0005	<0.0005	<0.005	<0.005	0.5	2	25
Barium	0.0735	<0.0002	0.735	<0.002	20	100	300
Cadmium	0.000211	<0.00008	0.00211	<0.0008	0.04	1	5
Chromium	<0.001	<0.001	<0.01	<0.01	0.5	10	70
Copper	0.000672	<0.0003	0.00672	<0.003	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2
Molybdenum	<0.003	<0.003	<0.03	<0.03	0.5	10	30
Nickel	0.154	<0.0004	1.54	<0.004	0.4	10	40
Lead	<0.0002	<0.0002	<0.002	<0.002	0.5	10	50
Antimony	<0.001	<0.001	<0.01	<0.01	0.06	0.7	5
Selenium	<0.001	<0.001	<0.01	<0.01	0.1	0.5	7
Zinc	0.313	<0.001	3.13	<0.01	4	50	200
Chloride	<2	<2	<20	<20	800	15000	25000
Fluoride	<0.5	<0.5	<5	<5	10	150	500
Sulphate (soluble)	<2	<2	<20	<20	1000	20000	50000
Total Dissolved Solids	133	<10	1330	<100	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	3.92	<3	39.2	<30	500	800	1000

Leach Test Information

Date Prepared	17-Dec-2021
pH (pH Units)	6.98
Conductivity (µS/cm)	149.00
Temperature (°C)	10.90
Volume Leachant (Litres)	0.878

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and ALS Environmental cannot be held responsible for any discrepancies with current legislation

09/01/2022 11:19:14

Validated

CERTIFICATE OF ANALYSIS

SDG: 211216-94 **Report Number:** 628771 **Superseded Report:**
Client Ref.: 5911 **Location:** Manorhamilton Fire Station

CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference		**Site Location**	Manorhamilton Fire Station
Mass Sample taken (kg)	0.114	**Natural Moisture Content (%)**	27.1
Mass of dry sample (kg)	0.090	**Dry Matter Content (%)**	78.7
Particle Size <4mm	>95%		

Case	
SDG	211216-94
Lab Sample Number(s)	25539638
Sampled Date	13-Dec-2021
Customer Sample Ref.	BH05
Depth (m)	0.50 - 0.50

Solid Waste Analysis	**Result**	**Landfill Waste Acceptance Criteria Limits**		
		Inert Waste Landfill	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon (%)	0.707	3	5	6
Loss on Ignition (%)	4.43	-	-	10
Sum of BTEX (mg/kg)	-	-	-	-
Sum of 7 PCBs (mg/kg)	<0.021	1	-	-
Mineral Oil (mg/kg) (EH_2D_AL)	<5	500	-	-
PAH Sum of 17 (mg/kg)	<10	100	-	-
pH (pH Units)	7.83	-	>6	-
ANC to pH 6 (mol/kg)	-	-	-	-
ANC to pH 4 (mol/kg)	-	-	-	-

Eluate Analysis	**C_2** Concⁿ in 10:1 eluate (mg/l)		**A_2** 10:1 concⁿ leached (mg/kg)		**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg**		
	Result	**Limit of Detection**	**Result**	**Limit of Detection**			
Arsenic	<0.0005	<0.0005	<0.005	<0.005	0.5	2	25
Barium	0.0155	<0.0002	0.155	<0.002	20	100	300
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	0.04	1	5
Chromium	<0.001	<0.001	<0.01	<0.01	0.5	10	70
Copper	<0.0003	<0.0003	<0.003	<0.003	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2
Molybdenum	<0.003	<0.003	<0.03	<0.03	0.5	10	30
Nickel	0.000499	<0.0004	0.00499	<0.004	0.4	10	40
Lead	<0.0002	<0.0002	<0.002	<0.002	0.5	10	50
Antimony	<0.001	<0.001	<0.01	<0.01	0.06	0.7	5
Selenium	<0.001	<0.001	<0.01	<0.01	0.1	0.5	7
Zinc	0.00199	<0.001	0.0199	<0.01	4	50	200
Chloride	<2	<2	<20	<20	800	15000	25000
Fluoride	<0.5	<0.5	<5	<5	10	150	500
Sulphate (soluble)	<2	<2	<20	<20	1000	20000	50000
Total Dissolved Solids	162	<10	1620	<100	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	6.93	<3	69.3	<30	500	800	1000

Leach Test Information

Date Prepared	17-Dec-2021
pH (pH Units)	8.04
Conductivity (µS/cm)	223.00
Temperature (°C)	7.80
Volume Leachant (Litres)	0.876

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and ALS Environmental cannot be held responsible for any discrepancies with current legislation

09/01/2022 11:19:14

Validated

CERTIFICATE OF ANALYSIS

SDG: 211216-94 **Report Number:** 628771 **Superseded Report:**
Client Ref.: 5911 **Location:** Manorhamilton Fire Station

CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference		**Site Location**	Manorhamilton Fire Station
Mass Sample taken (kg)	0.111	**Natural Moisture Content (%)**	23.4
Mass of dry sample (kg)	0.090	**Dry Matter Content (%)**	81
Particle Size <4mm	>95%		

Case	
SDG	211216-94
Lab Sample Number(s)	25539639
Sampled Date	13-Dec-2021
Customer Sample Ref.	BH06
Depth (m)	0.50 - 0.50

Solid Waste Analysis	**Result**	**Landfill Waste Acceptance Criteria Limits**		
		Inert Waste Landfill	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon (%)	0.254	3	5	6
Loss on Ignition (%)	3.66	-	-	10
Sum of BTEX (mg/kg)	-	-	-	-
Sum of 7 PCBs (mg/kg)	<0.021	1	-	-
Mineral Oil (mg/kg) (EH_2D_AL)	<5	500	-	-
PAH Sum of 17 (mg/kg)	<10	100	-	-
pH (pH Units)	7.76	-	>6	-
ANC to pH 6 (mol/kg)	-	-	-	-
ANC to pH 4 (mol/kg)	-	-	-	-

Eluate Analysis	**C_2** Concⁿ in 10:1 eluate (mg/l)		**A_2** 10:1 concⁿ leached (mg/kg)		**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg**		
	Result	**Limit of Detection**	**Result**	**Limit of Detection**			
Arsenic	0.00166	<0.0005	0.0166	<0.005	0.5	2	25
Barium	0.00276	<0.0002	0.0276	<0.002	20	100	300
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	0.04	1	5
Chromium	<0.001	<0.001	<0.01	<0.01	0.5	10	70
Copper	0.00418	<0.0003	0.0418	<0.003	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2
Molybdenum	<0.003	<0.003	<0.03	<0.03	0.5	10	30
Nickel	<0.0004	<0.0004	<0.004	<0.004	0.4	10	40
Lead	<0.0002	<0.0002	<0.002	<0.002	0.5	10	50
Antimony	<0.001	<0.001	<0.01	<0.01	0.06	0.7	5
Selenium	<0.001	<0.001	<0.01	<0.01	0.1	0.5	7
Zinc	<0.001	<0.001	<0.01	<0.01	4	50	200
Chloride	<2	<2	<20	<20	800	15000	25000
Fluoride	<0.5	<0.5	<5	<5	10	150	500
Sulphate (soluble)	2.7	<2	27	<20	1000	20000	50000
Total Dissolved Solids	135	<10	1350	<100	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	3.6	<3	36	<30	500	800	1000

Leach Test Information

Date Prepared	17-Dec-2021
pH (pH Units)	8.38
Conductivity (µS/cm)	178.00
Temperature (°C)	10.60
Volume Leachant (Litres)	0.879

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and ALS Environmental cannot be held responsible for any discrepancies with current legislation

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Table of Results - Appendix

Method No	Reference	Description
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material
PM115		Leaching Procedure for CEN One Stage Leach Test 2:1 & 10:1 1 Step
TM018	BS 1377: Part 3 1990	Determination of Loss on Ignition
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) by Headspace GC-FID (C4-C12)
TM090	Method 5310, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 415.1 & 9060	Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water
TM104	Method 4500F, AWWA/APHA, 20th Ed., 1999	Determination of Fluoride using the Kone Analyser
TM116	Modified: US EPA Method 8260, 8120, 8020, 624, 610 & 602	Determination of Volatile Organic Compounds by Headspace / GC-MS
TM123	BS 2690: Part 121:1981	The Determination of Total Dissolved Solids in Water
TM132	In - house Method	ELTRA CS800 Operators Guide
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter
TM151	Method 3500D, AWWA/APHA, 20th Ed., 1999	Determination of Hexavalent Chromium using Kone analyser
TM152	ISO 17294-2:2016 Water quality - Application of inductively coupled plasma mass spectrometry (ICP-MS)	Analysis of Aqueous Samples by ICP-MS
TM168	EPA Method 8082, Polychlorinated Biphenyls by Gas Chromatography	Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Soils
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES
TM183	BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM218	Shaker extraction - EPA method 3546.	The determination of PAH in soil samples by GC-MS
TM259	by HPLC	Determination of Phenols in Waters and Leachates by HPLC
TM410	Shaker extraction-In house coronene method	Determination of Coronene in soils by GCMS
TM414	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GCxGC-FID
TM415	Analysis of Petroleum Hydrocarbons in Environmental Media.	Determination of Extractable Petroleum Hydrocarbons in Soils by GCxGC-FID

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.

CERTIFICATE OF ANALYSIS

SDG: 211216-94 **Report Number:** 628771 **Superseded Report:**
Client Ref.: 5911 **Location:** Manorhamilton Fire Station

Test Completion Dates

Lab Sample No(s)	25539633	25539634	25539635	25539636	25539638	25539639
Customer Sample Ref.	BH01	BH02	BH03	BH04	BH05	BH06
AGS Ref.						
Depth	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50
Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Anions by Kone (w)	22-Dec-2021	22-Dec-2021	22-Dec-2021	23-Dec-2021	23-Dec-2021	23-Dec-2021
CEN 10:1 Leachate (1 Stage)	18-Dec-2021	18-Dec-2021	18-Dec-2021	20-Dec-2021	20-Dec-2021	20-Dec-2021
CEN Readings	22-Dec-2021	22-Dec-2021	22-Dec-2021	22-Dec-2021	22-Dec-2021	22-Dec-2021
Chromium III	22-Dec-2021	23-Dec-2021	22-Dec-2021	22-Dec-2021	22-Dec-2021	22-Dec-2021
Coronene	21-Dec-2021	22-Dec-2021	21-Dec-2021	21-Dec-2021	21-Dec-2021	21-Dec-2021
Dissolved Metals by ICP-MS	23-Dec-2021	23-Dec-2021	23-Dec-2021	23-Dec-2021	23-Dec-2021	23-Dec-2021
Dissolved Organic/Inorganic Carbon	09-Jan-2022	24-Dec-2021	09-Jan-2022	09-Jan-2022	09-Jan-2022	09-Jan-2022
EPH by GCxGC-FID	22-Dec-2021	23-Dec-2021	22-Dec-2021	22-Dec-2021	22-Dec-2021	22-Dec-2021
EPH CWG GC (S)	22-Dec-2021	23-Dec-2021	22-Dec-2021	23-Dec-2021	22-Dec-2021	22-Dec-2021
Fluoride	22-Dec-2021	22-Dec-2021	22-Dec-2021	23-Dec-2021	23-Dec-2021	23-Dec-2021
GRO by GC-FID (S)	30-Dec-2021	30-Dec-2021	30-Dec-2021	04-Jan-2022	30-Dec-2021	30-Dec-2021
Hexavalent Chromium (s)	22-Dec-2021	23-Dec-2021	22-Dec-2021	22-Dec-2021	22-Dec-2021	22-Dec-2021
Loss on Ignition in soils	21-Dec-2021	23-Dec-2021	21-Dec-2021	21-Dec-2021	21-Dec-2021	21-Dec-2021
Mercury Dissolved	29-Dec-2021	29-Dec-2021	29-Dec-2021	29-Dec-2021	29-Dec-2021	29-Dec-2021
Metals in solid samples by OES	21-Dec-2021	23-Dec-2021	21-Dec-2021	21-Dec-2021	21-Dec-2021	21-Dec-2021
Moisture at 105C	17-Dec-2021	17-Dec-2021	17-Dec-2021	17-Dec-2021	17-Dec-2021	17-Dec-2021
PAH 16 & 17 Calc	21-Dec-2021	23-Dec-2021	21-Dec-2021	21-Dec-2021	21-Dec-2021	21-Dec-2021
PAH by GCMS	21-Dec-2021	23-Dec-2021	21-Dec-2021	21-Dec-2021	21-Dec-2021	21-Dec-2021
PCBs by GCMS	22-Dec-2021	24-Dec-2021	22-Dec-2021	22-Dec-2021	22-Dec-2021	22-Dec-2021
pH	21-Dec-2021	22-Dec-2021	21-Dec-2021	21-Dec-2021	21-Dec-2021	21-Dec-2021
Phenols by HPLC (W)	23-Dec-2021	23-Dec-2021	23-Dec-2021	23-Dec-2021	23-Dec-2021	23-Dec-2021
Sample description	16-Dec-2021	21-Dec-2021	16-Dec-2021	16-Dec-2021	16-Dec-2021	16-Dec-2021
Total Dissolved Solids on Leachates	21-Dec-2021	21-Dec-2021	21-Dec-2021	23-Dec-2021	23-Dec-2021	23-Dec-2021
Total Organic Carbon	22-Dec-2021	23-Dec-2021	22-Dec-2021	22-Dec-2021	22-Dec-2021	22-Dec-2021
TPH CWG GC (S)	30-Dec-2021	30-Dec-2021	30-Dec-2021	04-Jan-2022	30-Dec-2021	30-Dec-2021
VOC MS (S)	29-Dec-2021	29-Dec-2021	29-Dec-2021	30-Dec-2021	30-Dec-2021	30-Dec-2021

Appendix General

1. Results are expressed on a dry weight basis (dried at 35ºC) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. **Sample Deviations**

If a sample is classed as deviated then the associated results may be compromised.

1	**Container with Headspace provided for volatiles analysis**
2	**Incorrect container received**
3	**Deviation from method**
4	**Matrix interference**
♦	**Sample holding time exceeded in laboratory**
@	**Sample holding time exceeded due to late arrival of instructions or samples**
§	**Sampled on date not provided**

20. **Asbestos**

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

Appendix 4

Waste Classification Report

HazWasteOnline™

Waste Classification Report

HazWasteOnline™ classifies waste as either **hazardous** or **non-hazardous** based on its chemical composition, related legislation and the rules and data defined in the current UK or EU technical guidance (Appendix C) (note that HP 9 Infectious is not assessed). It is the responsibility of the classifier named below to:

a) understand the origin of the waste
b) select the correct List of Waste code(s)
c) confirm that the list of determinands, results and sampling plan are fit for purpose
d) select and justify the chosen metal species (Appendix B)
e) correctly apply moisture correction and other available corrections
f) add the meta data for their user-defined substances (Appendix A)
g) check that the classification engine is suitable with respect to the national destination of the waste (Appendix C)

To aid the reviewer, the laboratory results, assumptions and justifications managed by the classifier are highlighted in pale yellow.

Y9FKQ-NVW06-8NDNU

Job name

5911

Description/Comments

Client: Leitrim County Council
Engineer: CST Group

Project

Manorhamilton Fire Station

Site

Manorhamilton, Co. Leitrim

Classified by

Name:
Stephen Letch
Company:
Site Investigations Ltd
Date:
12 Jan 2022 16:51 GMT
Telephone:
00353 86817 9449

HazWasteOnline™ provides a two day, hazardous waste classification course that covers the use of the software and both basic and advanced waste classification techniques. Certification has to be renewed every 3 years.

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Course	Date
Hazardous Waste Classification	09 Oct 2019

Next 3 year Refresher due by Oct 2022

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	WAC Results		Page
					Inert	Non Haz	
1	BH01-0.50	0.50	Non Hazardous		Pass	Pass	2
2	BH02-0.50	0.50	Non Hazardous		Pass	Pass	6
3	BH03-0.50	0.50	Non Hazardous		Pass	Pass	10
4	BH04-0.50	0.50	Non Hazardous		Fail	Pass	14
5	BH05-0.50	0.50	Non Hazardous		Pass	Pass	18
6	BH06-0.50	0.50	Non Hazardous		Pass	Pass	22

Related documents

#	Name	Description
1	211216-94.hwol	.hwol file used to create the Job
2	Rilta Suite NEW	waste stream template used to create this Job

WAC results

WAC Settings: samples in this Job constitute a single population.

WAC limits used to evaluate the samples in this Job: "Ireland"
The WAC used in this report are the WAC defined for the inert and non-hazardous classes of landfill in the Republic of Ireland. You should check the actual acceptance criteria when the disposal site is identified as they may differ from the generic WAC used in this report.

Report

Created by: Stephen Letch
Created date: 12 Jan 2022 16:51 GMT

Classification of sample: BH01-0.50

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
BH01-0.50
Sample Depth:
0.50 m
Moisture content:
20%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 20% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	TPH (C6 to C40) petroleum group			TPH		<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
2	confirm TPH has NOT arisen from diesel or petrol					☑					
3	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		1.82 mg/kg	1.197	1.743 mg/kg	0.000174 %	✓	
4	arsenic { arsenic pentoxide }	033-004-00-6	215-116-9	1303-28-2		16.9 mg/kg	1.534	20.738 mg/kg	0.00207 %	✓	
5	barium { barium sulphide }	016-002-00-X	244-214-4	21109-95-5		65.2 mg/kg	1.233	64.339 mg/kg	0.00643 %	✓	
6	cadmium { cadmium sulfate }	048-009-00-9	233-331-6	10124-36-4		0.527 mg/kg	1.855	0.782 mg/kg	0.0000782 %	✓	
7	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		38.6 mg/kg	1.126	34.767 mg/kg	0.00348 %	✓	
8	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	19.3 mg/kg		15.44 mg/kg	0.00154 %	✓	
9	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
10	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		0.696 mg/kg	1.5	0.835 mg/kg	0.0000835 %	✓	
11	nickel { nickel sulfate }	028-009-00-5	232-104-9	7786-81-4		41.9 mg/kg	2.637	88.382 mg/kg	0.00884 %	✓	
12	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %		<LOD
13	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		51.3 mg/kg	2.469	101.34 mg/kg	0.0101 %	✓	
14	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		9.58 mg/kg	1.462	11.201 mg/kg	0.00112 %	✓	

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
15		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.6	mg/kg	1.923	<1.154	mg/kg	<0.000115 %		<LOD
16		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
17		acenaphthylene		205-917-1	208-96-8		<0.012	mg/kg		<0.012	mg/kg	<0.0000012 %		<LOD
18		acenaphthene		201-469-6	83-32-9		<0.008	mg/kg		<0.008	mg/kg	<0.0000008 %		<LOD
19		fluorene		201-695-5	86-73-7		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
20		phenanthrene		201-581-5	85-01-8		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
21		anthracene		204-371-1	120-12-7		<0.016	mg/kg		<0.016	mg/kg	<0.0000016 %		<LOD
22		fluoranthene		205-912-4	206-44-0		<0.017	mg/kg		<0.017	mg/kg	<0.0000017 %		<LOD
23		pyrene		204-927-3	129-00-0		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
24		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
25		chrysene	601-048-00-0	205-923-4	218-01-9		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
26		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
27		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
28		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
29		indeno[123-cd]pyrene		205-893-2	193-39-5		<0.018	mg/kg		<0.018	mg/kg	<0.0000018 %		<LOD
30		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.023	mg/kg		<0.023	mg/kg	<0.0000023 %		<LOD
31		benzo[ghi]perylene		205-883-8	191-24-2		<0.024	mg/kg		<0.024	mg/kg	<0.0000024 %		<LOD
32		polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.021	mg/kg		<0.021	mg/kg	<0.0000021 %		<LOD
33		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
34		benzene	601-020-00-8	200-753-7	71-43-2		<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
35		toluene	601-021-00-3	203-625-9	108-88-3		<0.007	mg/kg		<0.007	mg/kg	<0.0000007 %		<LOD
36		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.004	mg/kg		<0.004	mg/kg	<0.0000004 %		<LOD
37		coronene		205-881-7	191-07-1		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
38		pH			PH		7.77	pH		7.77	pH	7.77 pH		
39		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
											Total:	0.0353 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

WAC results for sample: BH01-0.50

WAC Settings: samples in this Job constitute a single population.

WAC limits used to evaluate this sample: "Ireland"
The WAC used in this report are the WAC defined for the inert and non-hazardous classes of landfill in the Republic of Ireland. You should check the actual acceptance criteria when the disposal site is identified as they may differ from the generic WAC used in this report.

The sample PASSES the Inert (Inert waste landfill) criteria.

The sample PASSES the Non Haz (Non hazardous waste landfill) criteria.

WAC Determinands

Solid Waste Analysis				Landfill Waste Acceptance Criteria Limits	
#	Determinand		User entered data	Inert waste landfill	Non hazardous waste landfill
1	TOC (total organic carbon)	%	0.337	3	5
2	LOI (loss on ignition)	%	3.57	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.04	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.021	1	-
5	Mineral oil (C10 to C40)	mg/kg	<5	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<10	100	-
7	pH	pH	7.77	-	>6
8	ANC (acid neutralisation capacity)	mol/kg		-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	<0.005	0.5	2
10	barium	mg/kg	0.0139	20	100
11	cadmium	mg/kg	<0.0008	0.04	1
12	chromium	mg/kg	<0.01	0.5	10
13	copper	mg/kg	0.0037	2	50
14	mercury	mg/kg	<0.0001	0.01	0.2
15	molybdenum	mg/kg	<0.03	0.5	10
16	nickel	mg/kg	<0.004	0.4	10
17	lead	mg/kg	<0.002	0.5	10
18	antimony	mg/kg	<0.01	0.06	0.7
19	selenium	mg/kg	<0.01	0.1	0.5
20	zinc	mg/kg	0.0149	4	50
21	chloride	mg/kg	<20	800	15,000
22	fluoride	mg/kg	<5	10	150
23	sulphate	mg/kg	<20	1,000	20,000
24	phenol index	mg/kg	<0.16	1	-
25	DOC (dissolved organic carbon)	mg/kg	64.1	500	800
26	TDS (total dissolved solids)	mg/kg	1440	4,000	60,000

Key

User supplied data

Classification of sample: BH02-0.50

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
BH02-0.50
Sample Depth:
0.50 m
Moisture content:
19%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 19% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	TPH (C6 to C40) petroleum group			TPH		<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
2	confirm TPH has NOT arisen from diesel or petrol					☑					
3	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		1.6 mg/kg	1.197	1.551 mg/kg	0.000155 %	✓	
4	arsenic { arsenic pentoxide }	033-004-00-6	215-116-9	1303-28-2		17.3 mg/kg	1.534	21.494 mg/kg	0.00215 %	✓	
5	barium { barium sulphide }	016-002-00-X	244-214-4	21109-95-5		49 mg/kg	1.233	48.957 mg/kg	0.0049 %	✓	
6	cadmium { cadmium sulfate }	048-009-00-9	233-331-6	10124-36-4		0.679 mg/kg	1.855	1.02 mg/kg	0.000102 %	✓	
7	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		45.4 mg/kg	1.126	41.403 mg/kg	0.00414 %	✓	
8	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	18.3 mg/kg		14.823 mg/kg	0.00148 %	✓	
9	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
10	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		0.823 mg/kg	1.5	1 mg/kg	0.0001 %	✓	
11	nickel { nickel sulfate }	028-009-00-5	232-104-9	7786-81-4		35.2 mg/kg	2.637	75.177 mg/kg	0.00752 %	✓	
12	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %		<LOD
13	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		57.5 mg/kg	2.469	115.007 mg/kg	0.0115 %	✓	
14	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		10.2 mg/kg	1.462	12.075 mg/kg	0.00121 %	✓	

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
15		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.6	mg/kg	1.923	<1.154	mg/kg	<0.000115 %		<LOD
16		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
17		acenaphthylene		205-917-1	208-96-8		<0.012	mg/kg		<0.012	mg/kg	<0.0000012 %		<LOD
18		acenaphthene		201-469-6	83-32-9		<0.008	mg/kg		<0.008	mg/kg	<0.0000008 %		<LOD
19		fluorene		201-695-5	86-73-7		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
20		phenanthrene		201-581-5	85-01-8		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
21		anthracene		204-371-1	120-12-7		<0.016	mg/kg		<0.016	mg/kg	<0.0000016 %		<LOD
22		fluoranthene		205-912-4	206-44-0		<0.017	mg/kg		<0.017	mg/kg	<0.0000017 %		<LOD
23		pyrene		204-927-3	129-00-0		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
24		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
25		chrysene	601-048-00-0	205-923-4	218-01-9		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
26		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
27		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
28		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
29		indeno[123-cd]pyrene		205-893-2	193-39-5		<0.018	mg/kg		<0.018	mg/kg	<0.0000018 %		<LOD
30		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.023	mg/kg		<0.023	mg/kg	<0.0000023 %		<LOD
31		benzo[ghi]perylene		205-883-8	191-24-2		<0.024	mg/kg		<0.024	mg/kg	<0.0000024 %		<LOD
32		polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.021	mg/kg		<0.021	mg/kg	<0.0000021 %		<LOD
33		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
34		benzene	601-020-00-8	200-753-7	71-43-2		<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
35		toluene	601-021-00-3	203-625-9	108-88-3		<0.007	mg/kg		<0.007	mg/kg	<0.0000007 %		<LOD
36		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.004	mg/kg		<0.004	mg/kg	<0.0000004 %		<LOD
37		coronene		205-881-7	191-07-1		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
38		pH			PH		7.72	pH		7.72	pH	7.72 pH		
39		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
											Total:	0.0346 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

WAC results for sample: BH02-0.50

WAC Settings: samples in this Job constitute a single population.

WAC limits used to evaluate this sample: "Ireland"
The WAC used in this report are the WAC defined for the inert and non-hazardous classes of landfill in the Republic of Ireland. You should check the actual acceptance criteria when the disposal site is identified as they may differ from the generic WAC used in this report.

The sample PASSES the Inert (Inert waste landfill) criteria.

The sample PASSES the Non Haz (Non hazardous waste landfill) criteria.

WAC Determinands

Solid Waste Analysis				Landfill Waste Acceptance Criteria Limits	
#	Determinand		User entered data	Inert waste landfill	Non hazardous waste landfill
1	TOC (total organic carbon)	%	0.73	3	5
2	LOI (loss on ignition)	%	6.47	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.04	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.021	1	-
5	Mineral oil (C10 to C40)	mg/kg	<5	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<10	100	-
7	pH	pH	7.72	-	>6
8	ANC (acid neutralisation capacity)	mol/kg		-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	0.0061	0.5	2
10	barium	mg/kg	0.142	20	100
11	cadmium	mg/kg	<0.0008	0.04	1
12	chromium	mg/kg	<0.01	0.5	10
13	copper	mg/kg	0.0132	2	50
14	mercury	mg/kg	<0.0001	0.01	0.2
15	molybdenum	mg/kg	0.129	0.5	10
16	nickel	mg/kg	0.0045	0.4	10
17	lead	mg/kg	<0.002	0.5	10
18	antimony	mg/kg	0.0125	0.06	0.7
19	selenium	mg/kg	<0.01	0.1	0.5
20	zinc	mg/kg	0.0291	4	50
21	chloride	mg/kg	<20	800	15,000
22	fluoride	mg/kg	<5	10	150
23	sulphate	mg/kg	<20	1,000	20,000
24	phenol index	mg/kg	<0.16	1	-
25	DOC (dissolved organic carbon)	mg/kg	56.8	500	800
26	TDS (total dissolved solids)	mg/kg	1120	4,000	60,000

Key

User supplied data

Classification of sample: BH03-0.50

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
BH03-0.50
Sample Depth:
0.50 m
Moisture content:
18%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 18% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	TPH (C6 to C40) petroleum group			TPH		<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
2	confirm TPH has NOT arisen from diesel or petrol					☑					
3	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		1.94 mg/kg	1.197	1.904 mg/kg	0.00019 %	✓	
4	arsenic { arsenic pentoxide }	033-004-00-6	215-116-9	1303-28-2		17.1 mg/kg	1.534	21.508 mg/kg	0.00215 %	✓	
5	barium { barium sulphide }	016-002-00-X	244-214-4	21109-95-5		60.3 mg/kg	1.233	60.991 mg/kg	0.0061 %	✓	
6	cadmium { cadmium sulfate }	048-009-00-9	233-331-6	10124-36-4		0.365 mg/kg	1.855	0.555 mg/kg	0.0000555 %	✓	
7	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		40.6 mg/kg	1.126	37.483 mg/kg	0.00375 %	✓	
8	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	17.2 mg/kg		14.104 mg/kg	0.00141 %	✓	
9	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
10	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		0.607 mg/kg	1.5	0.747 mg/kg	0.0000747 %	✓	
11	nickel { nickel sulfate }	028-009-00-5	232-104-9	7786-81-4		40.9 mg/kg	2.637	88.429 mg/kg	0.00884 %	✓	
12	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %		<LOD
13	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		51.3 mg/kg	2.469	103.873 mg/kg	0.0104 %	✓	
14	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		11.8 mg/kg	1.462	14.142 mg/kg	0.00141 %	✓	

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
15		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.6	mg/kg	1.923	<1.154	mg/kg	<0.000115 %		<LOD
16		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
17		acenaphthylene		205-917-1	208-96-8		<0.012	mg/kg		<0.012	mg/kg	<0.0000012 %		<LOD
18		acenaphthene		201-469-6	83-32-9		<0.008	mg/kg		<0.008	mg/kg	<0.0000008 %		<LOD
19		fluorene		201-695-5	86-73-7		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
20		phenanthrene		201-581-5	85-01-8		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
21		anthracene		204-371-1	120-12-7		<0.016	mg/kg		<0.016	mg/kg	<0.0000016 %		<LOD
22		fluoranthene		205-912-4	206-44-0		<0.017	mg/kg		<0.017	mg/kg	<0.0000017 %		<LOD
23		pyrene		204-927-3	129-00-0		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
24		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
25		chrysene	601-048-00-0	205-923-4	218-01-9		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
26		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
27		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
28		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
29		indeno[123-cd]pyrene		205-893-2	193-39-5		<0.018	mg/kg		<0.018	mg/kg	<0.0000018 %		<LOD
30		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.023	mg/kg		<0.023	mg/kg	<0.0000023 %		<LOD
31		benzo[ghi]perylene		205-883-8	191-24-2		<0.024	mg/kg		<0.024	mg/kg	<0.0000024 %		<LOD
32		polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.021	mg/kg		<0.021	mg/kg	<0.0000021 %		<LOD
33		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
34		benzene	601-020-00-8	200-753-7	71-43-2		<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
35		toluene	601-021-00-3	203-625-9	108-88-3		<0.007	mg/kg		<0.007	mg/kg	<0.0000007 %		<LOD
36		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.004	mg/kg		<0.004	mg/kg	<0.0000004 %		<LOD
37		coronene		205-881-7	191-07-1		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
38		pH			PH		7.92	pH		7.92	pH	7.92 pH		
39		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
											Total:	0.0357 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

WAC results for sample: BH03-0.50

WAC Settings: samples in this Job constitute a single population.

WAC limits used to evaluate this sample: "Ireland"
The WAC used in this report are the WAC defined for the inert and non-hazardous classes of landfill in the Republic of Ireland. You should check the actual acceptance criteria when the disposal site is identified as they may differ from the generic WAC used in this report.

The sample PASSES the Inert (Inert waste landfill) criteria.

The sample PASSES the Non Haz (Non hazardous waste landfill) criteria.

WAC Determinands

Solid Waste Analysis				Landfill Waste Acceptance Criteria Limits	
#	Determinand		User entered data	Inert waste landfill	Non hazardous waste landfill
1	TOC (total organic carbon)	%	0.29	3	5
2	LOI (loss on ignition)	%	3.59	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.04	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.021	1	-
5	Mineral oil (C10 to C40)	mg/kg	<5	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<10	100	-
7	pH	pH	7.92	-	>6
8	ANC (acid neutralisation capacity)	mol/kg		-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	0.0204	0.5	2
10	barium	mg/kg	0.341	20	100
11	cadmium	mg/kg	<0.0008	0.04	1
12	chromium	mg/kg	<0.01	0.5	10
13	copper	mg/kg	0.0505	2	50
14	mercury	mg/kg	<0.0001	0.01	0.2
15	molybdenum	mg/kg	0.0697	0.5	10
16	nickel	mg/kg	0.038	0.4	10
17	lead	mg/kg	<0.002	0.5	10
18	antimony	mg/kg	0.0308	0.06	0.7
19	selenium	mg/kg	<0.01	0.1	0.5
20	zinc	mg/kg	0.0122	4	50
21	chloride	mg/kg	<20	800	15,000
22	fluoride	mg/kg	<5	10	150
23	sulphate	mg/kg	<20	1,000	20,000
24	phenol index	mg/kg	<0.16	1	-
25	DOC (dissolved organic carbon)	mg/kg	62.1	500	800
26	TDS (total dissolved solids)	mg/kg	1360	4,000	60,000

Key

User supplied data

Classification of sample: BH04-0.50

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
BH04-0.50
Sample Depth:
0.50 m
Moisture content:
17%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 17% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	TPH (C6 to C40) petroleum group			TPH		<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
2	confirm TPH has NOT arisen from diesel or petrol					☑					
3	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		1.67 mg/kg	1.197	1.659 mg/kg	0.000166 %	✓	
4	arsenic { arsenic pentoxide }	033-004-00-6	215-116-9	1303-28-2		16.6 mg/kg	1.534	21.134 mg/kg	0.00211 %	✓	
5	barium { barium sulphide }	016-002-00-X	244-214-4	21109-95-5		49.6 mg/kg	1.233	50.78 mg/kg	0.00508 %	✓	
6	cadmium { cadmium sulfate }	048-009-00-9	233-331-6	10124-36-4		0.269 mg/kg	1.855	0.414 mg/kg	0.0000414 %	✓	
7	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		37.6 mg/kg	1.126	35.137 mg/kg	0.00351 %	✓	
8	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	17.6 mg/kg		14.608 mg/kg	0.00146 %	✓	
9	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
10	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		0.582 mg/kg	1.5	0.725 mg/kg	0.0000725 %	✓	
11	nickel { nickel sulfate }	028-009-00-5	232-104-9	7786-81-4		37.2 mg/kg	2.637	81.41 mg/kg	0.00814 %	✓	
12	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %		<LOD
13	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		48.9 mg/kg	2.469	100.221 mg/kg	0.01 %	✓	
14	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		8.91 mg/kg	1.462	10.809 mg/kg	0.00108 %	✓	

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
15		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.6	mg/kg	1.923	<1.154	mg/kg	<0.000115 %		<LOD
16		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
17		acenaphthylene		205-917-1	208-96-8		<0.012	mg/kg		<0.012	mg/kg	<0.0000012 %		<LOD
18		acenaphthene		201-469-6	83-32-9		<0.008	mg/kg		<0.008	mg/kg	<0.0000008 %		<LOD
19		fluorene		201-695-5	86-73-7		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
20		phenanthrene		201-581-5	85-01-8		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
21		anthracene		204-371-1	120-12-7		<0.016	mg/kg		<0.016	mg/kg	<0.0000016 %		<LOD
22		fluoranthene		205-912-4	206-44-0		<0.017	mg/kg		<0.017	mg/kg	<0.0000017 %		<LOD
23		pyrene		204-927-3	129-00-0		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
24		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
25		chrysene	601-048-00-0	205-923-4	218-01-9		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
26		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
27		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
28		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
29		indeno[123-cd]pyrene		205-893-2	193-39-5		<0.018	mg/kg		<0.018	mg/kg	<0.0000018 %		<LOD
30		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.023	mg/kg		<0.023	mg/kg	<0.0000023 %		<LOD
31		benzo[ghi]perylene		205-883-8	191-24-2		<0.024	mg/kg		<0.024	mg/kg	<0.0000024 %		<LOD
32		polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.021	mg/kg		<0.021	mg/kg	<0.0000021 %		<LOD
33		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
34		benzene	601-020-00-8	200-753-7	71-43-2		<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
35		toluene	601-021-00-3	203-625-9	108-88-3		<0.007	mg/kg		<0.007	mg/kg	<0.0000007 %		<LOD
36		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.004	mg/kg		<0.004	mg/kg	<0.0000004 %		<LOD
37		coronene		205-881-7	191-07-1		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
38		pH			PH		7.92	pH		7.92	pH	7.92 pH		
39		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
											Total:	0.033 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

WAC results for sample: BH04-0.50

WAC Settings: samples in this Job constitute a single population.

WAC limits used to evaluate this sample: "Ireland"
The WAC used in this report are the WAC defined for the inert and non-hazardous classes of landfill in the Republic of Ireland. You should check the actual acceptance criteria when the disposal site is identified as they may differ from the generic WAC used in this report.

The sample FAILS the Inert (Inert waste landfill) criteria.

The sample PASSES the Non Haz (Non hazardous waste landfill) criteria.

WAC Determinands

Solid Waste Analysis				Landfill Waste Acceptance Criteria Limits	
#	Determinand		User entered data	Inert waste landfill	Non hazardous waste landfill
1	TOC (total organic carbon)	%	0.259	3	5
2	LOI (loss on ignition)	%	4.26	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.04	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.021	1	-
5	Mineral oil (C10 to C40)	mg/kg	<5	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<10	100	-
7	pH	pH	7.92	-	>6
8	ANC (acid neutralisation capacity)	mol/kg		-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	<0.005	0.5	2
10	barium	mg/kg	0.735	20	100
11	cadmium	mg/kg	0.0021	0.04	1
12	chromium	mg/kg	<0.01	0.5	10
13	copper	mg/kg	0.0067	2	50
14	mercury	mg/kg	<0.0001	0.01	0.2
15	molybdenum	mg/kg	<0.03	0.5	10
16	nickel	mg/kg	1.54	0.4	10
17	lead	mg/kg	<0.002	0.5	10
18	antimony	mg/kg	<0.01	0.06	0.7
19	selenium	mg/kg	<0.01	0.1	0.5
20	zinc	mg/kg	3.13	4	50
21	chloride	mg/kg	<20	800	15,000
22	fluoride	mg/kg	<5	10	150
23	sulphate	mg/kg	<20	1,000	20,000
24	phenol index	mg/kg	<0.16	1	-
25	DOC (dissolved organic carbon)	mg/kg	39.2	500	800
26	TDS (total dissolved solids)	mg/kg	1330	4,000	60,000

Key

	User supplied data
	Inert WAC criteria fail

Classification of sample: BH05-0.50

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
BH05-0.50
Sample Depth:
0.50 m
Moisture content:
23%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 23% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	TPH (C6 to C40) petroleum group			TPH		<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
2	confirm TPH has NOT arisen from diesel or petrol					☑					
3	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		1.48 mg/kg	1.197	1.364 mg/kg	0.000136 %	✓	
4	arsenic { arsenic pentoxide }	033-004-00-6	215-116-9	1303-28-2		16.1 mg/kg	1.534	19.015 mg/kg	0.0019 %	✓	
5	barium { barium sulphide }	016-002-00-X	244-214-4	21109-95-5		55.1 mg/kg	1.233	52.333 mg/kg	0.00523 %	✓	
6	cadmium { cadmium sulfate }	048-009-00-9	233-331-6	10124-36-4		0.343 mg/kg	1.855	0.49 mg/kg	0.000049 %	✓	
7	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		37 mg/kg	1.126	32.077 mg/kg	0.00321 %	✓	
8	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	15.8 mg/kg		12.166 mg/kg	0.00122 %	✓	
9	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
10	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		0.902 mg/kg	1.5	1.042 mg/kg	0.000104 %	✓	
11	nickel { nickel sulfate }	028-009-00-5	232-104-9	7786-81-4		32.3 mg/kg	2.637	65.577 mg/kg	0.00656 %	✓	
12	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %		<LOD
13	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		67.7 mg/kg	2.469	128.722 mg/kg	0.0129 %	✓	
14	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		8.4 mg/kg	1.462	9.453 mg/kg	0.000945 %	✓	

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
15		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.6	mg/kg	1.923	<1.154	mg/kg	<0.000115 %		<LOD
16		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
17		acenaphthylene		205-917-1	208-96-8		<0.012	mg/kg		<0.012	mg/kg	<0.0000012 %		<LOD
18		acenaphthene		201-469-6	83-32-9		<0.008	mg/kg		<0.008	mg/kg	<0.0000008 %		<LOD
19		fluorene		201-695-5	86-73-7		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
20		phenanthrene		201-581-5	85-01-8		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
21		anthracene		204-371-1	120-12-7		<0.016	mg/kg		<0.016	mg/kg	<0.0000016 %		<LOD
22		fluoranthene		205-912-4	206-44-0		<0.017	mg/kg		<0.017	mg/kg	<0.0000017 %		<LOD
23		pyrene		204-927-3	129-00-0		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
24		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
25		chrysene	601-048-00-0	205-923-4	218-01-9		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
26		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
27		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
28		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
29		indeno[123-cd]pyrene		205-893-2	193-39-5		<0.018	mg/kg		<0.018	mg/kg	<0.0000018 %		<LOD
30		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.023	mg/kg		<0.023	mg/kg	<0.0000023 %		<LOD
31		benzo[ghi]perylene		205-883-8	191-24-2		<0.024	mg/kg		<0.024	mg/kg	<0.0000024 %		<LOD
32		polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.021	mg/kg		<0.021	mg/kg	<0.0000021 %		<LOD
33		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
34		benzene	601-020-00-8	200-753-7	71-43-2		<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
35		toluene	601-021-00-3	203-625-9	108-88-3		<0.007	mg/kg		<0.007	mg/kg	<0.0000007 %		<LOD
36		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.004	mg/kg		<0.004	mg/kg	<0.0000004 %		<LOD
37		coronene		205-881-7	191-07-1		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
38		pH			PH		7.83	pH		7.83	pH	7.83 pH		
39		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
											Total:	0.0335 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

WAC results for sample: BH05-0.50

WAC Settings: samples in this Job constitute a single population.

WAC limits used to evaluate this sample: "Ireland"
The WAC used in this report are the WAC defined for the inert and non-hazardous classes of landfill in the Republic of Ireland. You should check the actual acceptance criteria when the disposal site is identified as they may differ from the generic WAC used in this report.

The sample PASSES the Inert (Inert waste landfill) criteria.

The sample PASSES the Non Haz (Non hazardous waste landfill) criteria.

WAC Determinands

Solid Waste Analysis				Landfill Waste Acceptance Criteria Limits	
#	Determinand		User entered data	Inert waste landfill	Non hazardous waste landfill
1	TOC (total organic carbon)	%	0.707	3	5
2	LOI (loss on ignition)	%	4.43	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.04	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.021	1	-
5	Mineral oil (C10 to C40)	mg/kg	<5	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<10	100	-
7	pH	pH	7.83	-	>6
8	ANC (acid neutralisation capacity)	mol/kg		-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	<0.005	0.5	2
10	barium	mg/kg	0.155	20	100
11	cadmium	mg/kg	<0.0008	0.04	1
12	chromium	mg/kg	<0.01	0.5	10
13	copper	mg/kg	<0.003	2	50
14	mercury	mg/kg	<0.0001	0.01	0.2
15	molybdenum	mg/kg	<0.03	0.5	10
16	nickel	mg/kg	0.0049	0.4	10
17	lead	mg/kg	<0.002	0.5	10
18	antimony	mg/kg	<0.01	0.06	0.7
19	selenium	mg/kg	<0.01	0.1	0.5
20	zinc	mg/kg	0.0199	4	50
21	chloride	mg/kg	<20	800	15,000
22	fluoride	mg/kg	<5	10	150
23	sulphate	mg/kg	<20	1,000	20,000
24	phenol index	mg/kg	<0.16	1	-
25	DOC (dissolved organic carbon)	mg/kg	69.3	500	800
26	TDS (total dissolved solids)	mg/kg	1620	4,000	60,000

Key

User supplied data

Classification of sample: BH06-0.50

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
BH06-0.50
Sample Depth:
0.50 m
Moisture content:
18%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 18% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	TPH (C6 to C40) petroleum group			TPH		<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
2	confirm TPH has NOT arisen from diesel or petrol					☑					
3	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		2.22 mg/kg	1.197	2.179 mg/kg	0.000218 %	✓	
4	arsenic { arsenic pentoxide }	033-004-00-6	215-116-9	1303-28-2		20.6 mg/kg	1.534	25.91 mg/kg	0.00259 %	✓	
5	barium { barium sulphide }	016-002-00-X	244-214-4	21109-95-5		55.5 mg/kg	1.233	56.136 mg/kg	0.00561 %	✓	
6	cadmium { cadmium sulfate }	048-009-00-9	233-331-6	10124-36-4		0.242 mg/kg	1.855	0.368 mg/kg	0.0000368 %	✓	
7	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		34.7 mg/kg	1.126	32.036 mg/kg	0.0032 %	✓	
8	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	17.1 mg/kg		14.022 mg/kg	0.0014 %	✓	
9	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
10	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		0.564 mg/kg	1.5	0.694 mg/kg	0.0000694 %	✓	
11	nickel { nickel sulfate }	028-009-00-5	232-104-9	7786-81-4		35.8 mg/kg	2.637	77.403 mg/kg	0.00774 %	✓	
12	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %		<LOD
13	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		51.2 mg/kg	2.469	103.671 mg/kg	0.0104 %	✓	
14	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		9.75 mg/kg	1.462	11.685 mg/kg	0.00117 %	✓	

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
15		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.6	mg/kg	1.923	<1.154	mg/kg	<0.000115 %		<LOD
16		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
17		acenaphthylene		205-917-1	208-96-8		<0.012	mg/kg		<0.012	mg/kg	<0.0000012 %		<LOD
18		acenaphthene		201-469-6	83-32-9		<0.008	mg/kg		<0.008	mg/kg	<0.0000008 %		<LOD
19		fluorene		201-695-5	86-73-7		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
20		phenanthrene		201-581-5	85-01-8		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
21		anthracene		204-371-1	120-12-7		<0.016	mg/kg		<0.016	mg/kg	<0.0000016 %		<LOD
22		fluoranthene		205-912-4	206-44-0		<0.017	mg/kg		<0.017	mg/kg	<0.0000017 %		<LOD
23		pyrene		204-927-3	129-00-0		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
24		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
25		chrysene	601-048-00-0	205-923-4	218-01-9		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
26		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
27		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
28		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
29		indeno[123-cd]pyrene		205-893-2	193-39-5		<0.018	mg/kg		<0.018	mg/kg	<0.0000018 %		<LOD
30		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.023	mg/kg		<0.023	mg/kg	<0.0000023 %		<LOD
31		benzo[ghi]perylene		205-883-8	191-24-2		<0.024	mg/kg		<0.024	mg/kg	<0.0000024 %		<LOD
32		polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.021	mg/kg		<0.021	mg/kg	<0.0000021 %		<LOD
33		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
34		benzene	601-020-00-8	200-753-7	71-43-2		<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
35		toluene	601-021-00-3	203-625-9	108-88-3		<0.007	mg/kg		<0.007	mg/kg	<0.0000007 %		<LOD
36		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.004	mg/kg		<0.004	mg/kg	<0.0000004 %		<LOD
37		coronene		205-881-7	191-07-1		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
38		pH			PH		7.76	pH		7.76	pH	7.76 pH		
39		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
											Total:	0.0337 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

WAC results for sample: BH06-0.50

WAC Settings: samples in this Job constitute a single population.

WAC limits used to evaluate this sample: "Ireland"
The WAC used in this report are the WAC defined for the inert and non-hazardous classes of landfill in the Republic of Ireland. You should check the actual acceptance criteria when the disposal site is identified as they may differ from the generic WAC used in this report.

The sample PASSES the Inert (Inert waste landfill) criteria.

The sample PASSES the Non Haz (Non hazardous waste landfill) criteria.

WAC Determinands

Solid Waste Analysis				Landfill Waste Acceptance Criteria Limits	
#	Determinand		User entered data	Inert waste landfill	Non hazardous waste landfill
1	TOC (total organic carbon)	%	0.254	3	5
2	LOI (loss on ignition)	%	3.66	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.04	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.021	1	-
5	Mineral oil (C10 to C40)	mg/kg	<5	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<10	100	-
7	pH	pH	7.76	-	>6
8	ANC (acid neutralisation capacity)	mol/kg		-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	0.0166	0.5	2
10	barium	mg/kg	0.0276	20	100
11	cadmium	mg/kg	<0.0008	0.04	1
12	chromium	mg/kg	<0.01	0.5	10
13	copper	mg/kg	0.0418	2	50
14	mercury	mg/kg	<0.0001	0.01	0.2
15	molybdenum	mg/kg	<0.03	0.5	10
16	nickel	mg/kg	<0.004	0.4	10
17	lead	mg/kg	<0.002	0.5	10
18	antimony	mg/kg	<0.01	0.06	0.7
19	selenium	mg/kg	<0.01	0.1	0.5
20	zinc	mg/kg	<0.01	4	50
21	chloride	mg/kg	<20	800	15,000
22	fluoride	mg/kg	<5	10	150
23	sulphate	mg/kg	27	1,000	20,000
24	phenol index	mg/kg	<0.16	1	-
25	DOC (dissolved organic carbon)	mg/kg	36	500	800
26	TDS (total dissolved solids)	mg/kg	1350	4,000	60,000

Key

User supplied data

Appendix A: Classifier defined and non EU CLP determinands

- **TPH (C6 to C40) petroleum group** (CAS Number: TPH)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: Flam. Liq. 3; H226 , Asp. Tox. 1; H304 , STOT RE 2; H373 , Muta. 1B; H340 , Carc. 1B; H350 , Repr. 2; H361d , Aquatic Chronic 2; H411

- **confirm TPH has NOT arisen from diesel or petrol**

Description/Comments: Chapter 3, section 4b requires a positive confirmation for benzo[a]pyrene to be used as a marker in evaluating Carc. 1B; H350 (HP 7) and Muta. 1B; H340 (HP 11)
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: None.

- **barium sulphide** (EC Number: 244-214-4, CAS Number: 21109-95-5)

EU CLP index number: 016-002-00-X
Description/Comments:
Additional Hazard Statement(s): EUH031 >= 0.8 %
Reason for additional Hazards Statement(s):
14 Dec 2015 - EUH031 >= 0.8 % hazard statement sourced from: WM3, Table C12.2

- **lead compounds with the exception of those specified elsewhere in this Annex (worst case)**

EU CLP index number: 082-001-00-6
Description/Comments: Worst Case: IARC considers lead compounds Group 2A; Probably carcinogenic to humans; Lead REACH Consortium, following CLP protocols, considers lead compounds from smelting industries, flue dust and similar to be Carcinogenic category 1A
Additional Hazard Statement(s): Carc. 1A; H350
Reason for additional Hazards Statement(s):
03 Jun 2015 - Carc. 1A; H350 hazard statement sourced from: IARC Group 2A (Sup 7, 87) 2006; Lead REACH Consortium www.reach-lead.eu/substanceinformation.html (worst case lead compounds). Review date 29/09/2015

- **chromium(III) oxide (worst case)** (EC Number: 215-160-9, CAS Number: 1308-38-9)

Description/Comments: Data from C&L Inventory Database
Data source: https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4; H332 , Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Resp. Sens. 1; H334 , Skin Sens. 1; H317 , Repr. 1B; H360FD , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

- **acenaphthylene** (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 1; H330 , Acute Tox. 1; H310 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315

- **acenaphthene** (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Aquatic Chronic 2; H411

- **fluorene** (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

- **phenanthrene** (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Carc. 2; H351 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Skin Irrit. 2; H315

anthracene (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

fluoranthene (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Acute Tox. 4; H302 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

pyrene (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

indeno[123-cd]pyrene (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Carc. 2; H351

benzo[ghi]perylene (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 23 Jul 2015
Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

polychlorobiphenyls; PCB (EC Number: 215-648-1, CAS Number: 1336-36-3)

EU CLP index number: 602-039-00-4
Description/Comments: Worst Case: IARC considers PCB Group 1; Carcinogenic to humans; POP specific threshold from ATP1 (Regulation 756/2010/EU) to POPs Regulation (Regulation 850/2004/EC). Where applicable, the calculation method laid down in European standards EN 12766-1 and EN 12766-2 shall be applied.
Additional Hazard Statement(s): Carc. 1A; H350
Reason for additional Hazards Statement(s):
29 Sep 2015 - Carc. 1A; H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

ethylbenzene (EC Number: 202-849-4, CAS Number: 100-41-4)

EU CLP index number: 601-023-00-4
Description/Comments:
Additional Hazard Statement(s): Carc. 2; H351
Reason for additional Hazards Statement(s):
03 Jun 2015 - Carc. 2; H351 hazard statement sourced from: IARC Group 2B (77) 2000

coronene (EC Number: 205-881-7, CAS Number: 191-07-1)

Description/Comments: Data from C&L Inventory Database; no entries in Registered Substances or Pesticides Properties databases; SDS: Sigma Aldrich, 1907/2006 compliant, dated 2012 - no entries; IARC – Group 3, not carcinogenic.
Data source: http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=17010&HarmOnly=no?fc=true&lang=en
Data source date: 16 Jun 2014
Hazard Statements: STOT SE 2; H371

pH (CAS Number: PH)

Description/Comments: Appendix C4
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: None.

Appendix B: Rationale for selection of metal species

antimony {antimony trioxide}

Worst case scenario.

arsenic {arsenic pentoxide}

Arsenic pentoxide used as most hazardous species.

barium {barium sulphide}

Chromium VII at limits of detection. Barium sulphide used as the next most hazardous species. No chromate present.

cadmium {cadmium sulfate}

Cadmium sulphate used as the most hazardous species.

copper {dicopper oxide; copper (I) oxide}

Reasonable case CLP species based on hazard statements/molecular weight and insolubility in water. Worse case copper sulphate is very soluble and likely to have been leached away if ever present and/or not enough soluble sulphate detected.

lead {lead compounds with the exception of those specified elsewhere in this Annex (worst case)}

Chromium VII at limits of detection. Lead compounds used as the next most hazardous species. No chromate present.

mercury {mercury dichloride}

Worst case CLP species based on hazard statements/molecular weight

molybdenum {molybdenum(VI) oxide}

Worst case CLP species based on hazard statements/molecular weight.

nickel {nickel sulfate}

Chromium VII at limits of detection. Nickel sulphate used as the next most hazardous species. No chromate present.

selenium {selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex}

Harmonised group entry used as most reasonable case. Pigment cadmium sulphoselenide not likely to be present in this soil. No evidence for the other CLP entries: sodium selenite, nickel II selenite and nickel selenide, to be present in this soil.

zinc {zinc sulphate}

Chromium VII at limits of detection. Zinc sulphate used as the next most hazardous species. No chromate present.

chromium in chromium(III) compounds {chromium(III) oxide (worst case)}

Reasonable case species based on hazard statements/molecular weight. Industrial sources include: tanning, pigment in paint, inks and glass

chromium in chromium(VI) compounds {chromium(VI) oxide}

Worst case CLP species based on hazard statements/molecular weight. Industrial sources include: production stainless steel, electroplating, wood preservation, anti-corrosion agents or coatings, pigments.

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.1.NI - Jan 2021
HazWasteOnline Classification Engine Version: 2022.11.4970.9430 (11 Jan 2022)
HazWasteOnline Database: 2022.4.4967.9426 (04 Jan 2022)

This classification utilises the following guidance and legislation:
WM3 v1.1.NI - Waste Classification - 1st Edition v1.1.NI - Jan 2021
CLP Regulation - Regulation 1272/2008/EC of 16 December 2008
1st ATP - Regulation 790/2009/EC of 10 August 2009
2nd ATP - Regulation 286/2011/EC of 10 March 2011
3rd ATP - Regulation 618/2012/EU of 10 July 2012
4th ATP - Regulation 487/2013/EU of 8 May 2013
Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013
5th ATP - Regulation 944/2013/EU of 2 October 2013
6th ATP - Regulation 605/2014/EU of 5 June 2014
WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014
Revised List of Waste 2014 - Decision 2014/955/EU of 18 December 2014
7th ATP - Regulation 2015/1221/EU of 24 July 2015
8th ATP - Regulation (EU) 2016/918 of 19 May 2016
9th ATP - Regulation (EU) 2016/1179 of 19 July 2016
10th ATP - Regulation (EU) 2017/776 of 4 May 2017
HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017
13th ATP - Regulation (EU) 2018/1480 of 4 October 2018
14th ATP - Regulation (EU) 2020/217 of 4 October 2019
15th ATP - Regulation (EU) 2020/1182 of 19 May 2020
The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1567 of 16th December 2020
The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1540 of 16th December 2020
17th ATP - Regulation (EU) 2021/849 of 11 March 2021

Appendix 5

Survey Data

Survey Data

Location	Irish Transverse Mercator		Elevation	Irish National Grid	
	Easting	Northing		Easting	Northing
Boreholes					
BH01	587876.348	839281.562	42.67	187922.373	339277.136
BH02	587862.666	839288.471	42.49	187908.688	339284.046
BH03	587846.700	839293.483	41.87	187892.719	339289.059
BH04	587836.778	839276.859	41.44	187882.795	339272.431
BH05	587823.204	839299.188	41.35	187869.218	339294.765
BH06	587851.354	839308.963	42.01	187897.373	339304.542

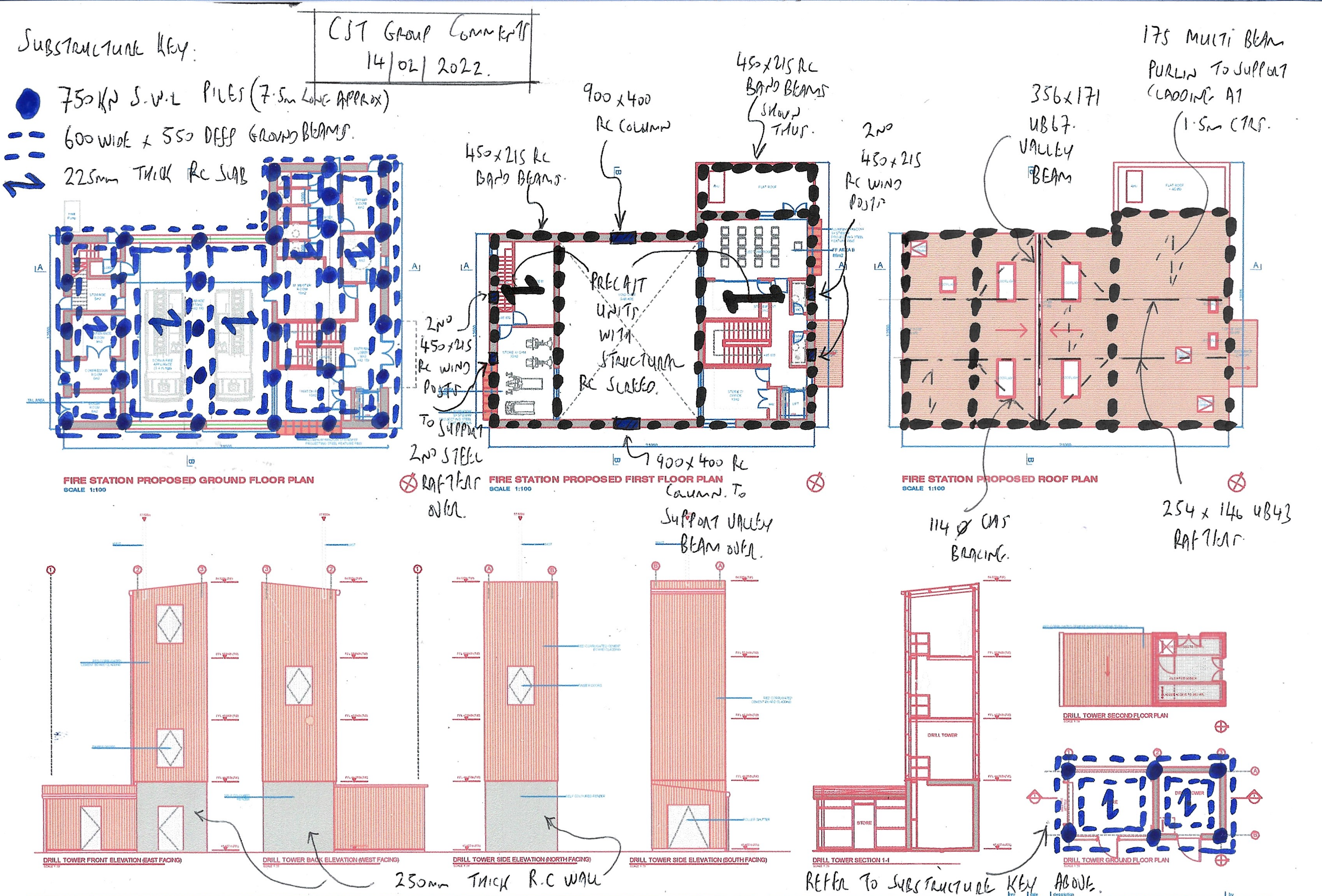
Legend Key

Locations By Type - CP

Contract No:	5911
Contract Name:	Manorhamilton Fire Station
Location:	Manorhamilton, Co. Leitrim
Client:	Leitrim County Council
Engineer:	CST Group
Title:	Site Plan
Scale:	1:500
Drawn By:	SL

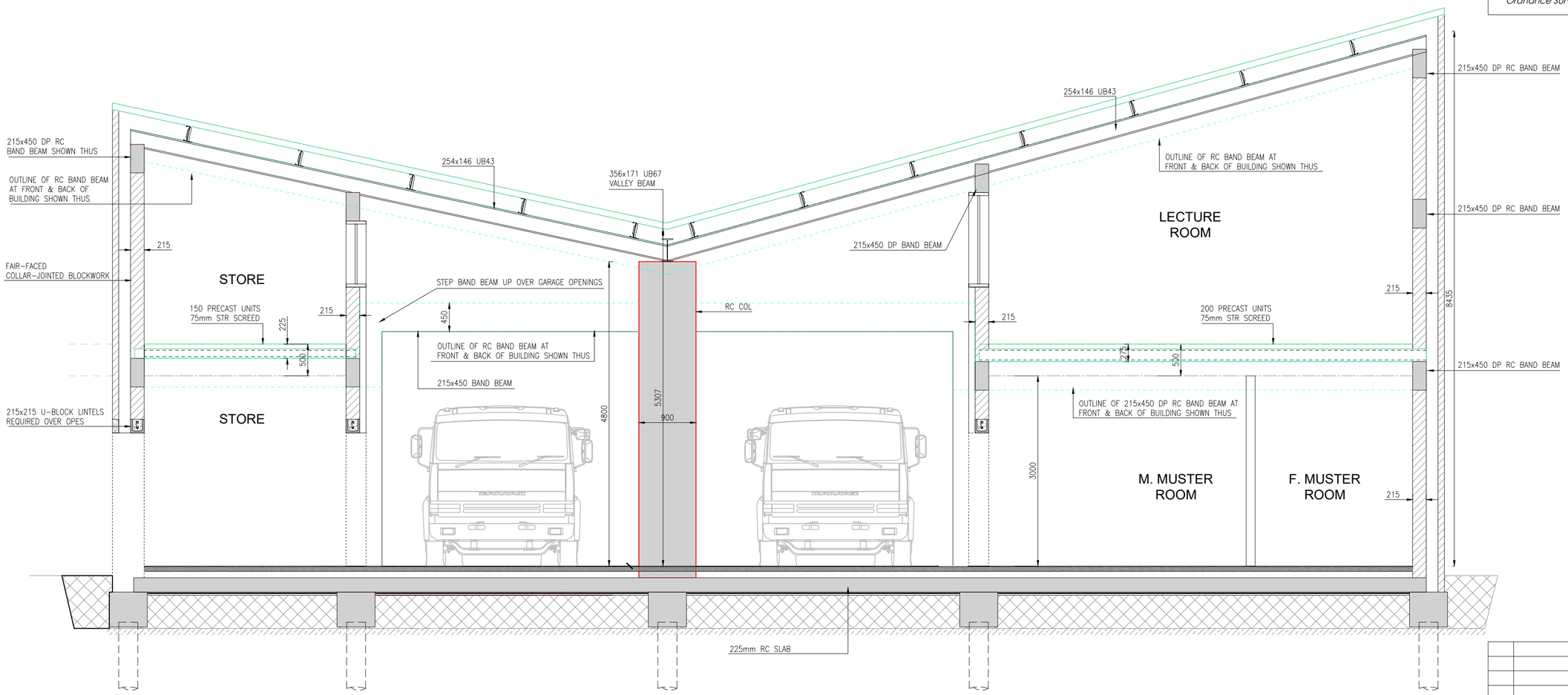
Site Investigations Ltd
The Grange
12th Lock Road
Lucan
Co. Dublin
T: 01 6108768
e: info@siteinvestigations.ie

APPENDIX B Structural Engineering Drawings and Mark-ups



Leitrim County Council
Manorhamilton Fire Station

www.rhatigan.ie	Email: info@rhatigan.ie	Tel: +353 (0)71 9142213	City Gate, Sligo, 91TX2D
CLIENT	Leitrim County Council	JOB NO.	19077
PROJECT	Manorhamilton Fire Station	STAGE	Stage 1
DRAWING	Proposed Plans + Drill Tower	DATE	Jan 2021
DRG NO.	19077 A 110	SCALE	As Shown@A1



TYPICAL SECTION THROUGH BUILDING SHOWING STRUCTURAL DEPTHS

SCALE 1:50

REV.	AMENDMENT	BY	DATE

DRAWN:	ST	TECH. CHECK:	ST
SCALE @ A2:	1:50	ENG. CHECK:	C.O'C
DATE:	07/09/21	APPROVED:	C.O'C
STAGE:	PRELIMINARY		

JOB TITLE:	NEW FIRE STATION AT MANORHAMILTON, Co LEITRIM
DRAWING TITLE:	SECTIONS THROUGH PROPOSED BUILDING SHOWING STRUCTURE
CLIENT:	LEITRIM CO CO

DRAWING No:	119-247-002	REV:	P1

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APPENDIX C Civil Engineering Drawings

+42.0
+41.75
+41.42
+41.75
+42.17
+41.30
+42.17
+41.30
+42.00
+42.17
+42.11
+41.86
+41.80
+42.17
+42.13
+42.00
+42.29
+42.45
+43.11
+42.7
+43.78
6%
2.5%
42.44+
+43.1
42.44+
42.44+
+FFL 42.32
+GARAGE FFL 42.17
Stn 1000 43.59
Stn 1001 43.09
Stn 500
N16
N16

PUMPING STATION ENCLOSURE
CARWASH
DRILL TOWER
STORE
PLANT HOUSE
UNDERGROUND WATER TANK
LAGOON

Wash down area build up
200mm CC37 (C32/40) Concrete to Tii Cl 1001 with A193 mesh reinforcement at mid level.
150mm CL. 804 Sub-base
Geogrid geotextile
min 350 6F2 capping

Drill yard build up
40mm SMA surface coarse
50mm DBM binder coarse
160 mm Dense base
150mm CL. 804 Sub-base
Geogrid geotextile
min 350 6F2 capping

Car park build up
40mm SMA surface coarse
60mm DBM binder coarse
150 mm CL. 804 Sub-base
Min 250mm 6F2 capping

Entrance build up
40mm SMA surface coarse
50mm DBM binder coarse
160 mm Dense base
150mm CL. 804 Sub-base
Geogrid geotextile
min 350 6F2 capping

KEY

+41.80 Proposed level

.42.74 Existing level

REV.	AMENDMENT	BY	DATE
P9	Minor amendments	KL	22.03.23
P8	Layout updated	KL	20.03.23
P7	Drill tower added	KL	06.10.22
P6	Build up note wash down area	SS	06.04.22
P5	Build up note amended	KL	17.02.22
P4	Building layout amended	KL	14.01.22
P3	Level amendments	KL	20.12.21
P2	2A report amendments	KL	15.09.21
P1	Minor amendments	KL	06.09.21

DRAWN:	KL	TECH. CHECK:	ST
SCALE @ A1:	1:250	ENG. CHECK:	C.O'C
DATE:	30.08.2021	APPROVED:	C.O'C
STAGE:	PLANNING		

JOB TITLE: NEW FIRE STATION AT MANORHAMILTON, Co LEITRIM

DRAWING TITLE: SITE LEVLES LAYOUT

CLIENT: LEITRIM CO CO

DRAWING No: 119-247-003 REV: P9

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KEY

- Landscaped area
- Attenuation lagoon
- 225Ø SWS pipe
- ACO Drain
- Kerb drainage Beany Block

REV.	AMENDMENT	BY	DATE
P7	Minor amendments	KL	22.03.23
P6	Layout updated	KL	20.03.23
P5	Drill tower added and storm discharge	KL	06.10.22
P4	Building layout amended	KL	14.01.22
P3	Building layout amended & Slit Sock added	KL	10.12.21
P2	2A report amendments	KL	15.09.21
P1	Minor amendments	KL	06.09.21

DRAWN:	KL	TECH. CHECK:	ST
SCALE @ A1:	1:250	ENG. CHECK:	C.O'C
DATE:	10.08.2021	APPROVED:	C.O'C
STAGE:	PLANNING		

JOB TITLE:	NEW FIRE STATION AT MANORHAMILTON, Co LEITRIM
DRAWING TITLE:	STORM WATER DRAINAGE
CLIENT:	LEITRIM CO CO

DRAWING No: 119-247-500 REV: P7

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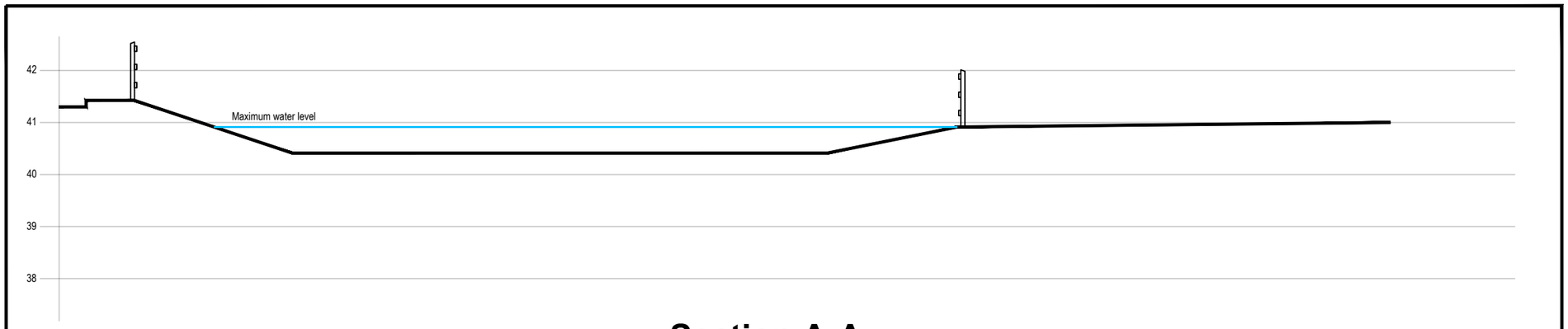
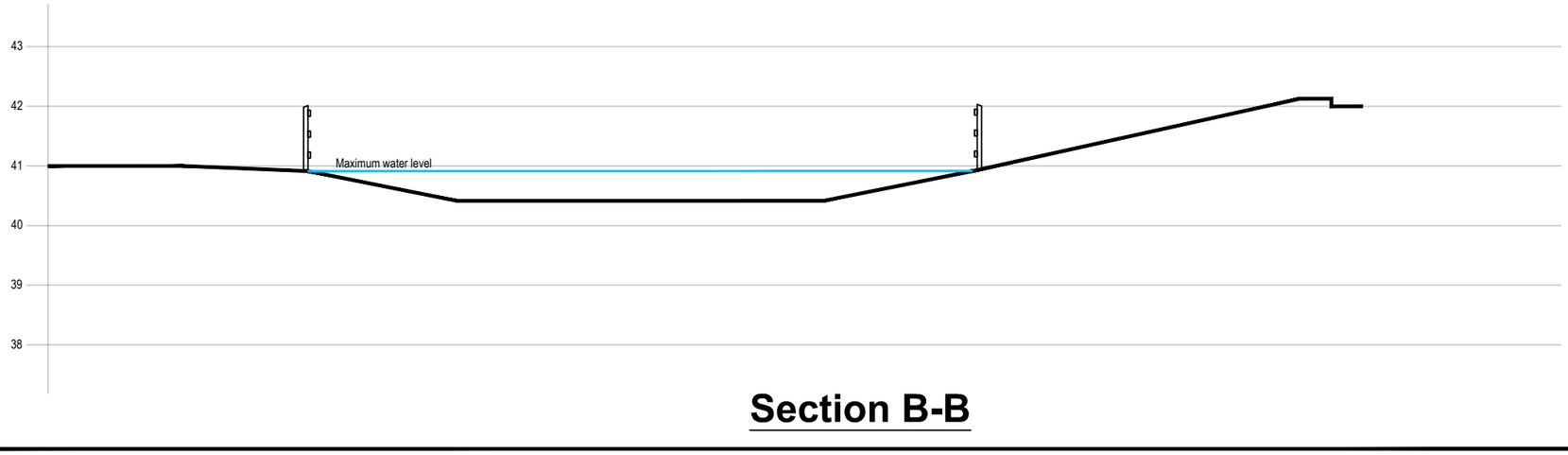


Section A-A



Section B-B

KEY

- Landscaped area
- Attenuation lagoon
- 225Ø SWS pipe
- ACO Drain
- Kerb drainage Beany Block

REV.	AMENDMENT	BY	DATE
P2	Minor amendments	KL	22.03.23
P1	Updated layout	KL	20.03.23

DRAWN:	KL	TECH. CHECK:	ST
SCALE @ A1:	1:250	ENG. CHECK:	C.O'C
DATE:	10.08.2021	APPROVED:	C.O'C
STAGE:	PLANNING		

JOB TITLE:	NEW FIRE STATION AT MANORHAMILTON, Co LEITRIM
DRAWING TITLE:	STORM WATER DRAINAGE LAGOON CROSS SECTION
CLIENT:	LEITRIM CO CO

DRAWING No:	REV:
119-247-501	P2

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63mm HDPE
Rising main discharge directly into treatment plant at IL: 44.80m

Min cover to rising main 1.2m in roadways 900mm in soft areas

Stn 1000
43.59

Stn 1001
43.09

Kingspan DPSBJ2 package pump stn

63mmØ HDPE Rising main

Control Kiosk

PUMPING STATION ENCLOSURE

CARWASH

Car wash grit sump W1 040 Klargester

Washdown interceptor. Kingspan NSFP 003 Interceptor

150mm Ø FWS min cover 1.2m

FW01
CL: 42.17m
IL: 40.82m

DRILL TOWER

STORE

FLAT ROOF

UNDERGROUND WATER TANK

LAGOON

N16

N16

KEY

- 150Ø Foul water pipe
- Wash bay concrete pad
- Pumping station
- Kingspan Interceptor NSFP 003
- Klargester Grit sump W1 040

REV.	AMENDMENT	BY	DATE
P8	Minor amendments	KL	22.03.23
P7	Updated layout	KL	20.03.23
P6	Drill tower added	KL	06.10.22
P5	Building layout amended	KL	11.02.22
P4	Building layout amended	KL	14.01.22
P3	Building layout amended	KL	13.12.21
P2	2A report amendments	KL	15.09.21
P1	Minor amendments	KL	06.09.21

DRAWN:	KL	TECH. CHECK:	ST
SCALE @ A1:	1:250	ENG. CHECK:	C.O'C
DATE:	30.08.2021	APPROVED:	C.O'C
STAGE:	PLANNING		

JOB TITLE:	NEW FIRE STATION AT MANORHAMILTON, Co LEITRIM
DRAWING TITLE:	FOUL DRAINAGE LAYOUT
CLIENT:	LEITRIM CO CO

DRAWING No:	119-247-502	REV:	P8

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REV.	AMENDMENT	BY	DATE
P9	Minor amendments	KL	22.03.23
P8	Updated layout	KL	20.03.23
P7	Drill tower added	KL	06.10.22
P6	Kerbing layout amended	KL	11.02.22
P5	Kerbing layout amended	KL	03.02.22
P4	Building layout amended	KL	14.01.22
P3	Building layout amended	KL	13.12.21
P2	2A report amendments	KL	15.09.21
P1	Minor amendments	KL	06.09.21

DRAWN:	KL	TECH. CHECK:	ST
SCALE @ A1:	1:250	ENG. CHECK:	C.O'C
DATE:	30.08.2021	APPROVED:	C.O'C
STAGE:	PLANNING		

JOB TITLE:	NEW FIRE STATION AT MANORHAMILTON, Co LEITRIM
DRAWING TITLE:	KERBING LAYOUT
CLIENT:	LEITRIM CO CO

DRAWING No:	119-247-1100	REV: P9

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KEY

- 100mm HDPE Watermain to Irish Water specifications
- Sv — Sluice valve
- Wm — Water meter
- Hy — Fire Fighting Hydrant

REV.	AMENDMENT	BY	DATE
P7	Minor amendments	KL	22.03.23
P6	Updated layout	KL	20.03.23
P5	Drill tower added	KL	06.10.22
P4	Building layout amended	KL	11.02.22
P3	Building layout amended	KL	14.01.22
P2	2A report amendments	KL	15.09.21
P1	Hydrant Added	SS	14.09.21

DRAWN:	KL	TECH. CHECK:	ST
SCALE @ A1:	1:250	ENG. CHECK:	C.O'C
DATE:	06.09.2021	APPROVED:	C.O'C
STAGE:	PLANNING		

JOB TITLE:	NEW FIRE STATION AT MANORHAMILTON, Co LEITRIM
DRAWING TITLE:	WATERMAIN LAYOUT
CLIENT:	LEITRIM CO CO

DRAWING No:	119-247-2701	REV:	P7

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APPENDIX D Irish Water Pre-connection Enquiry

Cathal O Connell
1 O' Connell Street
Co. Sligo
F91W7YV

Uisce Éireann
Bosca OP 448
Oifig Sheachadta na
Cathrach Theas
Cathair Chorcaí

Irish Water
PO Box 448,
South City
Delivery Office,
Cork City.

www.water.ie

26 August 2020

Re: CDS20004877 pre-connection enquiry - Subject to contract | Contract denied

Connection for Business Connection of 1 unit(s) at Clooneen TD, Sligo Road, Co. Leitrim

Dear Sir/Madam,

Irish Water has reviewed your pre-connection enquiry in relation to a Water & Wastewater connection at Clooneen TD, Sligo Road, Co. Leitrim (the **Premises**). Based upon the details you have provided with your pre-connection enquiry and on our desk top analysis of the capacity currently available in the Irish Water network(s) as assessed by Irish Water, we wish to advise you that your proposed connection to the Irish Water network(s) can be facilitated at this moment in time.

SERVICE	**OUTCOME OF PRE-CONNECTION ENQUIRY** **THIS IS NOT A CONNECTION OFFER. YOU MUST APPLY FOR A CONNECTION(S) TO THE IRISH WATER NETWORK(S) IF YOU WISH TO PROCEED.**
Water Connection	Feasible without infrastructure upgrade by Irish Water
Wastewater Connection	Feasible without infrastructure upgrade by Irish Water
SITE SPECIFIC COMMENTS	
Water Connection	There is sufficient capacity to accommodate the proposed water connection. Please note, while flows in excess of your required demand may be achieved in the Irish Water network and could be utilised in the event of a fire, Irish Water cannot guarantee a flow rate to meet your fire flow requirement. To guarantee a flow to meet the Fire Authority requirements you should provide adequate fire storage capacity within your development.
Wastewater Connection	There is sufficient capacity to accommodate the proposed wastewater connection. The Customer is responsible for the design & construction of the new proposed wastewater rising main and the private pumping station arrangement, all to be in accordance with the IW Codes of Practice and Standard Details. These are available from the IW website. The customer is also responsible for obtaining the road opening licence (if required) associated with the rising main works. The proposed wastewater rising main will be owned, operated and maintained by the Customer, but Irish Water have the option to vest the rising main in the future. The pumping

	station arrangement should include for a 24 hour storage tank. The customer shall ensure that the rising main and pumping station are adequately sized to ensure septicity does not occur. The Customer is responsible for obtaining all licences/consents/permissions associated with the installation and ongoing operation/maintenance of the rising main and pumping station.
The design and construction of the Water & Wastewater pipes and related infrastructure to be installed in this development shall comply with the Irish Water Connections and Developer Services Standard Details and Codes of Practice that are available on the Irish Water website. Irish Water reserves the right to supplement these requirements with Codes of Practice and these will be issued with the connection agreement.	

General Notes:

1) The initial assessment referred to above is carried out taking into account water demand and wastewater discharge volumes and infrastructure details on the date of the assessment. **The availability of capacity may change at any date after this assessment.**
2) This feedback does not constitute a contract in whole or in part to provide a connection to any Irish Water infrastructure. All feasibility assessments are subject to the constraints of the Irish Water Capital Investment Plan.
3) The feedback provided is subject to a Connection Agreement/contract being signed at a later date.
4) A Connection Agreement will be required to commencing the connection works associated with the enquiry this can be applied for at https://www.water.ie/connections/get-connected/
5) A Connection Agreement cannot be issued until all statutory approvals are successfully in place.
6) Irish Water Connection Policy/ Charges can be found at https://www.water.ie/connections/information/connection-charges/
7) Please note the Confirmation of Feasibility does not extend to your fire flow requirements.
8) Irish Water is not responsible for the management or disposal of storm water or ground waters. You are advised to contact the relevant Local Authority to discuss the management or disposal of proposed storm water or ground water discharges
9) To access Irish Water Maps email datarequests@water.ie
10) All works to the Irish Water infrastructure, including works in the Public Space, shall have to be carried out by Irish Water.

If you have any further questions, please contact Cormac Healy from the design team by email to corhealy@water.ie For further information, visit **www.water.ie/connections.**

Yours sincerely,

Maria O'Dwyer

Connections and Developer Services

APPENDIX E Stage 1 Road Safety Audit Report

New Fire Station at Manorhamilton, Co Leitrim

Stage 1 Road Safety Audit Report

Prepared By:

CST Group Chartered Consulting Engineers
1, O'Connell Street, Sligo, F91 W7YV
+353 (0)71 919 4500 info@cstgroup.ie www.cstgroup.ie

On behalf of **Leitrim County Council**

February 2022

Civil
Structural
Traffic

Table of Contents

Document History

Revision	R0	R0							
Purpose of Issue: P=Preliminary PG=Progress C=Comment I=Information PL=Planning T=Tender CN=Construction	C	PL							
Date:	20 12 21	11 02 22							
Originator:	FF	FF							
Checked By:	PJG	PJG							
Approved By:	FF	FF							

1. Introduction

1.1. This report describes a Stage 1 Road Safety Audit carried out on behalf of Leitrim County Council on a proposed new fire station at Cloneen Td, Manorhamilton, Co Leitrim.

1.2. The audit was carried out between 9th and 10th December 2021.

1.3. The audit team were as follows:

Team Leader:
Francis Fidgeon, Chartered Engineer, BE CEng MIEI
Certificate of Competency in Road Safety Audits (UCD, 2013)
TII Auditor Ref. FF74289

Team Member:
PJ Gallagher. BEng M.Inst.A.E.A. MITAI
TII Auditor Ref. PG3425716

1.4. The audit comprised an examination of the drawings relating to the scheme supplied by the design office. A site visit was carried out by both Audit Team members together on 9th December 2021 between the hours of 11am and 12pm. Weather conditions during the inspection were wet and the road surface was wet. Photographs were taken during the inspection.

1.5. This Stage 1 audit has been carried out in accordance with the relevant sections of the Transport Infrastructure Ireland (TII) Publication (Standard) GE-STY-01024 (Dec 2017) 'Road Safety Audit'. The audit team has examined only those issues within the design relating to the road safety implications of the scheme and has therefore not examined or verified the compliance of the design to any other criteria.

1.6. Appendix A describes the documents examined by the Audit Team.

1.7. All of the problems described in this report are considered by the audit team to require action in order to improve the safety of the scheme and minimise accident occurrence.

2. Items Resulting from Previous Stage 1 Audit

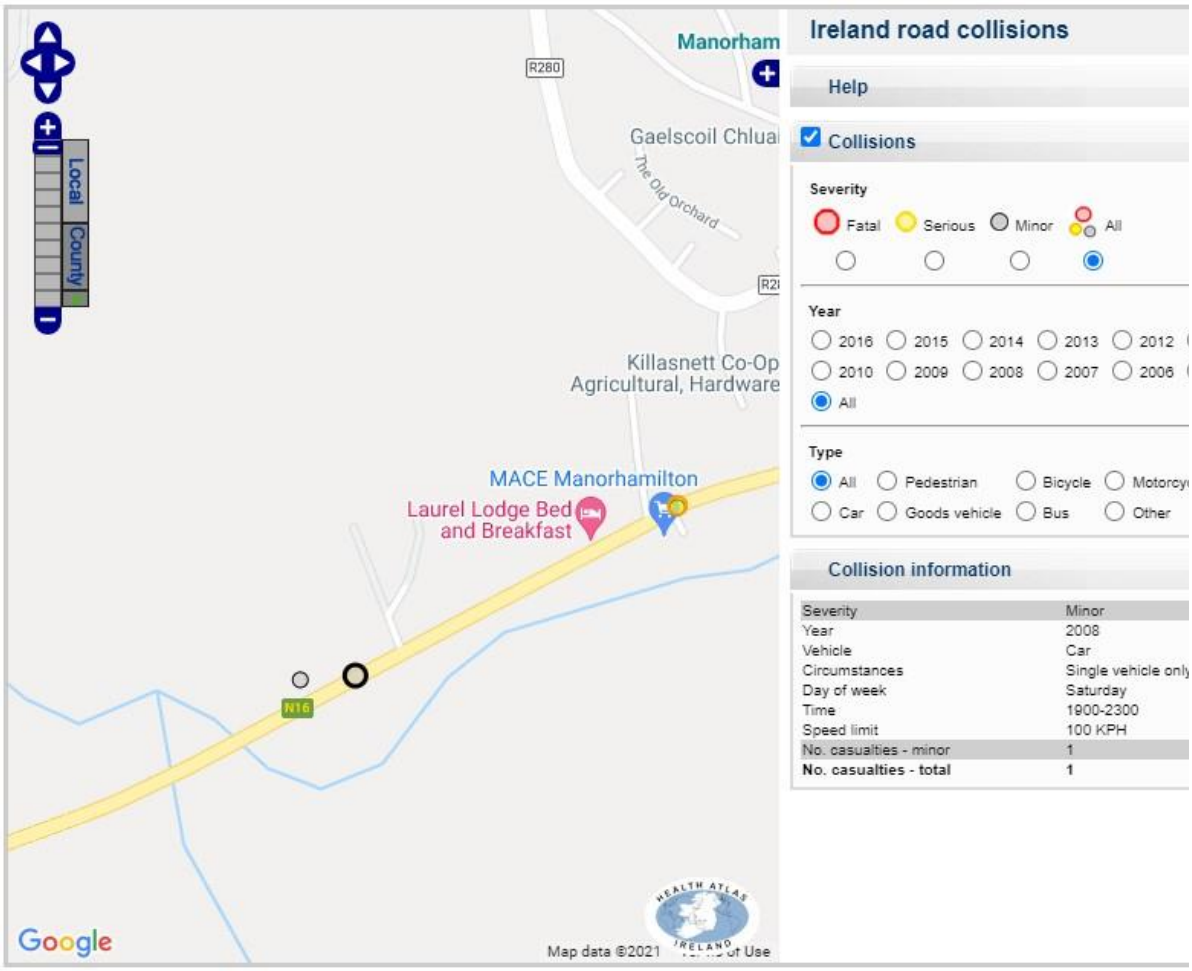
Not applicable.

3. Items Resulting from This Stage 1 Audit

3.1 Collision Data

Collision data has not been supplied with this scheme.

Road Collision Data available on the Road Safety Authority Database, within the period 2005 to 2016, recorded 1 minor collision in the immediate vicinity of the proposed site.



3.2 General Problems / Problems at Multiple Locations

3.2.1 Multiple Junctions with the N16

Problem: The proposal results in multiple junctions/accesses with the N16 in very close proximity.

Hazard: Motorists exiting from an access may see an approaching vehicle on the N16 with their indicator on and presume they are turning left off the N16 into the access they are exiting whereas they may be proceeding to the next access and a T-bone collision may result.

Recommendation: Group the accesses into one junction combined with the access to the treatment plant/recycling centre.

3.2.2 Signage

Problem: No warning signage is shown on the N16 for the fire station access

Hazard: N16 motorists may approach too fast and collide with emerging fire wagons.

Recommendation: Provide warning signage.

3.3 Problems at Specific Locations

3.3.1 Steep Access

Problem: Further to recommendation 3.2.1 the existing access to the treatment plant/recycling is steep with an inadequate dwell area at the N16.

Hazard: Vehicles exiting the access may errantly roll into the path of oncoming N16 traffic resulting in T-bone collisions.

Recommendation: Provide an appropriate dwell area at the mouth of the access.

3.3.2 Sightline

Problem: Further to recommendation 3.2.1 sightline to the left towards Manorhamilton is restricted due to advertising/hedging.

Hazard: Exiting traffic may proceed into the path of oncoming traffic resulting in evasive action by N16 motorists and rear-end collisions.

Recommendation: Ensure adequate visibility is provided.

3.3.3 Speedlimit

Problem: The proposed accesses are near/in the 80kph speedlimit zone.

Hazard: Multiple movements, particularly those associated with the emergency of attending a fire, in conjunction with faster moving traffic on the N16 may result in late braking and T-bone or rear-end collision.

Recommendation: Extend the 60kph zone sufficiently beyond the development.

3.3.4 Overtaking

Problem: Overtaking on the N16 is permitted in the vicinity of the development.

Hazard: Traffic exiting the development, particularly those associated with the emergency of a fire, may pull out into the path of an overtaking vehicle and result in head-on collision.

Recommendation: Prevent overtaking in this area.

3.3.5 Lighting

Problem: Whilst there is a light at the access to the treatment plant/recycling centre the general lighting in Manorhamilton does not extend out to the development.

Hazard: Motorists approaching from the Sligo direction may travel at inappropriate speeds towards past the development at night not as they focus their attention on slowing for the lit-up area and T-bone/rear-end collision with fire station traffic may result.

Recommendation: Extend the lighting past the development.

4. Audit Team Statement

We certify that we have examined the drawings and other information listed in Appendix A. This examination has been carried out with the sole purpose of identifying any features of the design that could be removed or modified to improve the safety of the scheme. The problems that we have identified have been noted in the report, together with suggestions for improvement which we recommend should be studied for implementation. No one in the audit team has been involved with the scheme design as shown in Appendix A.

Signed .....
Francis Fidgeon
Chartered Engineer
Audit Team Leader

Date 10 December 2021

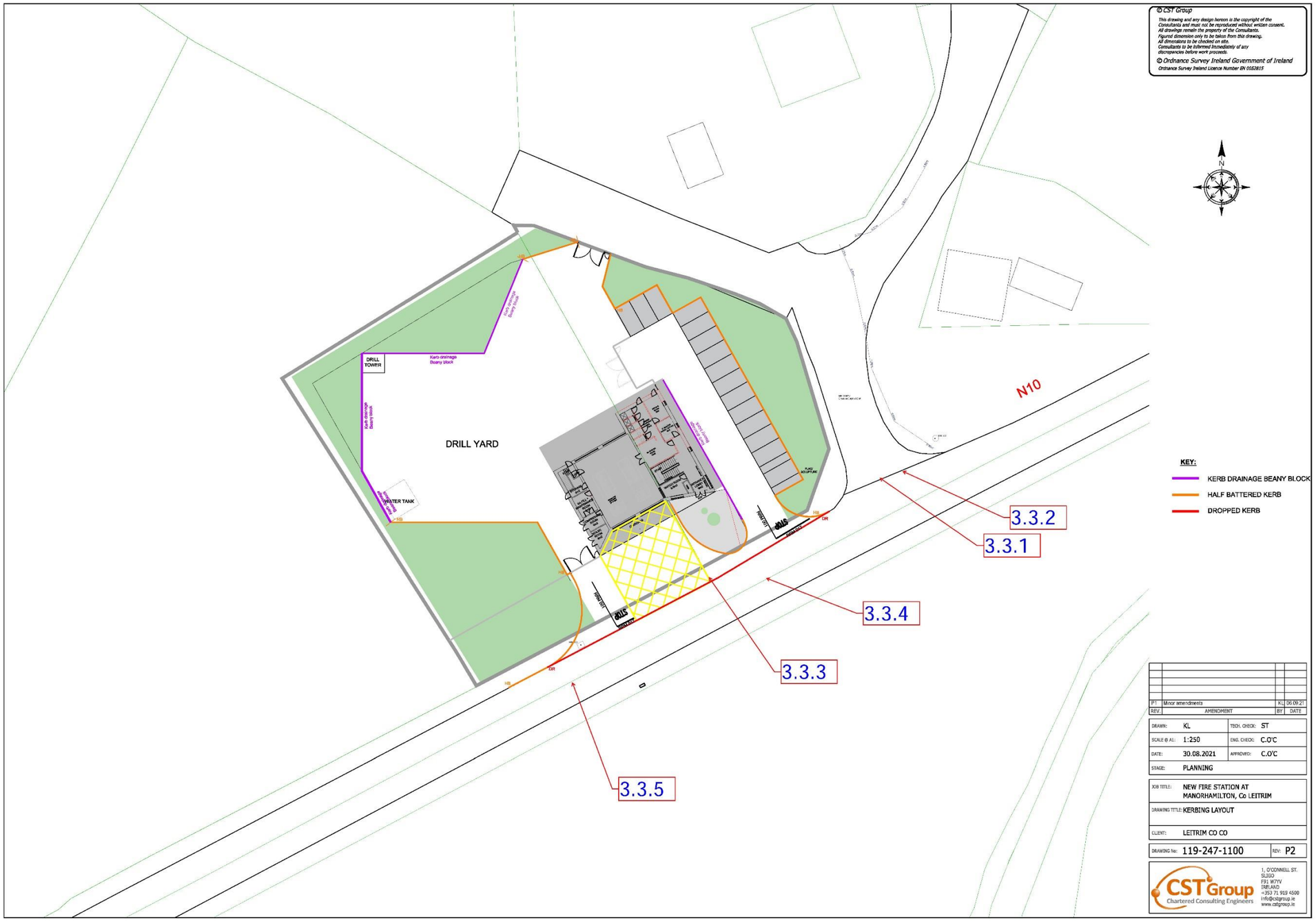
Signed .....
PJ Gallagher
Audit Team Member

Date 10 December 2021

Appendix A List of Documents Examined

DOCUMENT REF / NAME:	RECEIVED FROM:	DATE:
119247 500 P2 Storm Water Drainage	CST Group	09/12/2021
119247 1100 P2 Kerbing Layout	CST Group	09/12/2021

Appendix B Problem Location Plan



Appendix C TII Approval of RSA Team

From: TII Systems Notification <noreply@tii.systems>
Sent: 23 December 2021 11:30
To: Michael Gallagher <mgallagher@leitrimcoco.ie>
Cc: roadsafetyaudits@nra.ie; Fiona.Bohane@corkrdo.ie; Alastair.DeBeer@TII.ie; Bryan.kennedy@TII.ie; LCurtis@Kerrycoco.ie; ffidgeon@cstgroup.ie; pjgallagher20@hotmail.com
Subject: RSAAS - Road Safety Audit Approvals System - Audit Approval 22267242/24119/Stage 1
Importance: High

Michael Gallagher
Aras an Chontae
Carrick on Shannon
Co. Leitrim

Date: 23/12/2021

Our Ref: 22267242/24119/Stage 1

re: N16 Access off N16 at Clooneen Td Manorhamilton

APPROVAL OF ROAD SAFETY AUDIT TEAM, Stage 1

Dear Michael Gallagher,

The following members of the proposed road safety audit team are approved to carry out the Stage 1 road safety audit of N16 Access off N16 at Clooneen Td Manorhamilton.

1. Francis Fidgeon - CST Group Consulting Engineers - Leader
2. PJ Gallagher - CST Consulting Engineers - Member

A copy of all audit reports, design team response and exception reports must be uploaded through RSAAS. Successful upload of these reports and completion of the audit approval process is necessary for any further audit approval on this scheme.

Yours sincerely,

Lucy Curtis

Regional Road Safety Engineer
roadsafetyaudits@tii.ie

Appendix D RSA Feedback Form

ROAD SAFETY AUDIT FEEDBACK FORM

CST Group Chartered Consulting Engineers
1, O'Connell Street, Sligo, F91 W7YV, Ireland

Scheme: New Fire Station at Manorhamilton Co Leitrim on behalf of Leitrim County Council

Audit Stage: 1 **Date Audit Completed:** 10/12/2021 **Route No.** N16 **Our Ref :**119247|R0

TO BE COMPLETED BY DESIGNER				TO BE COMPLETED BY AUDIT TEAM LEADER
Paragraph No. in Safety Audit Report	**Problem accepted (Yes/No)**	**Recommended measure accepted (Yes/No)**	**Describe alternative measure(s). Give reasons for not accepting recommended measure. Only complete if recommended measure is not accepted.**	**Alternative measures or reasons accepted by Auditors (Yes/No)**
3.2.1	Yes	No	Due to the use of the building (Fire Station), direct access to the N16 is required for to access and exit the Garage and staff carpark for emergency situations. The client notes that due to the location of the recycling bins on the access road adjacent, often there are several cars parked on this road. Grouping emergency traffic with the public access to the sewage treatment plant and recycling centre could lead to accidents and/or delays in deploying the fire service in an emergency situation. The Design Team have reconfigured the site layout to allow for an *exit only* gate from the staff carparking to reduce traffic to the N16. The client notes that the no. of call outs from this fire station is likely to be 1-2 times a week with staff training happening one evening a fortnight, i.e there is no continuous traffic to/from this station envisaged. This option has been discussed with Michael Gallagher, Senior Executive Engineer, Roads Department, Leitrim County Council.	Yes
3.2.2	Yes	Yes	Warning Signage noting *'Caution Fire Station Access'* proposed in both directions on N16.	
3.3.1	No	No	As discussed with Michael Gallagher, Senior Executive Engineer, Roads Department, Leitrim County Council, we believe there is no issue with the current dwell area of the access road.	Yes. We may have noted a potential issue on site if the layout was redesigned following Recommendation 3.2.1 where fire trucks would also be using the existing access
3.3.2	No	No	As discussed with Michael Gallagher, Senior Executive Engineer, Roads	Yes

ROAD SAFETY AUDIT FEEDBACK FORM

CST Group Chartered Consulting Engineers
1, O'Connell Street, Sligo, F91 W7YV, Ireland

TO BE COMPLETED BY DESIGNER				TO BE COMPLETED BY AUDIT TEAM LEADER
Paragraph No. in Safety Audit Report	**Problem accepted (Yes/No)**	**Recommended measure accepted (Yes/No)**	**Describe alternative measure(s). Give reasons for not accepting recommended measure. Only complete if recommended measure is not accepted.**	**Alternative measures or reasons accepted by Auditors (Yes/No)**
			Department, Leitrim County Council, we believe there is no issue with the current sightline from the access road.	
3.3.3	Yes	Yes	As discussed with Michael Gallagher, Senior Executive Engineer, Roads Department, Leitrim County Council. We wish to move the existing speed limit sign to align with the site boundary. We note that this may be subject to the TII National Speed Limit Review.	
3.3.4	Yes	Yes	We wish to have a solid line *'no overtaking'* zone along the stretch of road at the proposed Fire Station and access road.	
3.3.5	Yes	No	As discussed with Michael Gallagher, Senior Executive Engineer, Roads Department, Leitrim County Council. We do not see the need to extend the public lighting from Mace shop (c.200m away). We have added 3 no. additional site lighting poles to the front of the site which will light both the entrance area and part of the Firs Station Site. We note there is 1 no. existing lighting pole to the rhs of the entrance to the access road.	Yes. The recommendation is to ensure the N16 is adequately lit at the proposed development so that traffic arriving from the Sligo direction does not perceive they only need to slow/proceed with caution from the Mace shop on

Signed: _____ Designer Date: 10/2/22
Ian Pudney
Rhatigan Architects

Signed: Francis Fidgeon Audit Team Leader Date: 09/02/2022
Francis Fidgeon
CST Group Chartered Consulting Engineers

Signed: Finian Joyce Employer Date: 9/2/2022
Finian Joyce
Chief Fire Officer
Leitrim County Council