

Head Office:
95 Aghafad Road
Dunamanagh
Strabane BT82 0QQ
028 7141 7541

Area Office:
028 85567157
info@stratexni.com



**De La Salle College,
Dundalk**

Geotechnical Investigation

Report No: 19-1015

Consultant Engineers: DCE

Document Control

Project Title	De La Salle College, Dundalk
Document Title	Factual report on Geotechnical Investigations
Reference	19-1015

Revision	Status	Author(s)	Reviewed by	Approved by	Issue Date
01	F	JMK	RP	RP	25/04/2019

Contents	Page No.
1.0 Introduction.....	1
2.0 Site Description	1
3.0 Ground Investigation	2
a. Percussion Boreholes	2
b. Trial Pits.....	2
4.0 Discussion.....	2
a. Geology	2
b. Ground Conditions	3
a. Testing	3
5.0 Recommendations.....	3
a. Development Details.....	3
b. Excavations	4
c. Foundations and floors.....	4
d. Floors	5
e. Sulphate and pH.....	5
Site and exploratory hole location plans	6
Geology Maps	8
Borehole and Trial Pit Logs	11
Geotechnical Laboratory Testing	20
Contamination Testing.....	23

The works were conducted in accordance with:

- Specification: Site Investigation in Construction Pt 3 - Specification for Ground Investigation (ICE, 1993)
- British Standards Institute (1999) BS 5930:1999; *Code of practice for site investigations* incorporating amendment No.1 of December 2007, as partially replaced by:
 - BS EN 1997-2:2007: *Geotechnical Design. Ground Investigation and Testing*
 - BS EN ISO 22475-1:2006: *Geotechnical investigation and testing. Sampling methods and groundwater measurements. Technical principles for execution.*
 - BS EN ISO 14688-1:2004: *Geotechnical investigation and testing. Identification and classification of soil. Principles for a classification.*
 - BS EN ISO 14689-1:2003: *Geotechnical investigation and testing. Identification and classification of soil. Identification and description.*
 - BS EN ISO 22476-2:2005: *Geotechnical investigation and testing. Field testing. Dynamic probing.*
 - BS EN ISO 22476-3:2005: *Geotechnical investigation and testing. Field testing. Standard penetration test.*
- British Standards Institute (1990) BS 1377-2:1990; *Soils for Civil Engineering Purposes. Liquid and Plastic Limits (Atterberg Limits)*
- British Standards Institute (1990) BS 1377-7:1990; *Soils for Civil Engineering Purposes. Shear strength tests (total stress)*

1.0 Introduction

On the instruction of Duffy Chartered Engineers acting on behalf of the client, Stratex Ltd. was appointed to undertake a geotechnical investigation in relation to the proposed development at De La Salle College, Dundalk.

The encountered ground conditions are described in accordance with BS 5930, British Standard Code of Practice for Site Investigations. All comments made in this report are done so on the assumption that the findings are representative of the site area as a whole.

2.0 Site Description

The site as located in the image currently De La Salle College. The proposed development works are for an extension to the college. The site is located on the outskirts of Dundalk within a predominately residential area.



Source: Google Maps

Site layout is shown in Figure 1.

Testing was undertaken at the chosen locations to gain a spread of information across the proposed construction area (shown in Figure 1).

As such this report assumes that its findings are representative of the ground as a whole.

3.0 Ground Investigation

a. Percussion Boreholes

Four boreholes were sunk using a percussion boring rig employing R168mm diameter temporary casing and boring tools. Boreholes were extended to depths of 1.6m at BH1, 2.4m at BH2, 2.75m at BH3 and 3.4m at BH4 at which point they were terminated on a technical refusal.

Representative undisturbed samples were taken at intervals or at each change of stratum in the boreholes for classification and geotechnical laboratory testing purposes.

Standard penetration tests were conducted at regular intervals in each borehole, where appropriate. The borehole logs report whether the split spoon sampler (SPT) or solid cone (CPT) was used. The overall penetration is stated for those tests for which the full 150mm seating or 300mm test drives were not possible.

Any water strikes encountered during boring were recorded along with any changes in their levels as the borehole proceeded.

Logs of the boreholes are provided in Appendix A.

b. Trial Pits

Four trial pits were undertaken with TP1 and TP2 dug to expose existing foundations. Trial pits were extended to depths ranging between 2.4m within TP4 and 0.65m within TP1.

Pits were excavated to the depths required to facilitate the required investigative works, the ground logged and the pits sampled and backfilled.

Logs of the trial pits are attached in Appendix A

4.0 Discussion

a. Geology

Figures 2 and 3 present excerpts of the 1:250 000 Spatial resources of the online geindex of the Geological Survey, Ireland.

The drift or surface geology shows the site to be located within an area of *made ground (urban)*. Encroaching onto the site from the north is an area of *till derived from lower Palaeozoic sandstones and shales*.

The solid geology of the site and the surrounding area is shown to be from the *Clontail formation consisting of calcareous red-mica greywacke*.

b. Ground Conditions

Made Ground:

Made ground was encountered within all test locations in the form of sands, gravels and clays. These materials were overlying the glacial deposits below.

Alluvium:

Alluvium material was not seemingly encountered during the site investigation works.

Glacial:

Glacial material was not encountered within all test locations and generally consisted sands and gravels

Bedrock:

Bedrock may well have been the cause of refusal at test locations, no rotary drilling was undertaken however fragments of broken rock and shale was recovered.

Groundwater:

Groundwater strikes were encountered within some of the test locations. Full groundwater strikes and details can be found within the logs in appendix A.

It should be appreciated that groundwater levels are subject to both seasonal and weather induced variations. Other effects such as construction activities may also change groundwater levels.

a. Testing

Geotechnical testing consisted of insitu SPT tests, results are shown on the logs, Appendix A.

Geotechnical laboratory testing was undertaken and attached in Appendix B

Contamination testing was undertaken and is attached in Appendix C

5.0 Recommendations

a. Development Details

It is understood that the development proposals are for the construction of an extension to the existing school building.

No further details were available to Stratex Ltd at the time of writing.

b. Excavations

While excavations remained stable during works. The area is in general not suitable for any major unsupported excavations, with the underlying natural predominantly granular deposits partial to collapse to their natural angle of repose. As such no operatives should be placed near unsupported excavations.

c. Foundations and floors

The structural loads of the building should be transferred below any made ground or soft / loose natural materials to bear on the underlying firm to stiff / dense glacial deposits.

The table below gives indicative depths and bearing capacities at each test location.

<u>Test No.</u>	<u>Depth to 150kPa</u>	<u>Water strike (m)</u>	<u>Foundation Type</u>
BH1	0.8m	0.6	Trench Fill / Strip / Pad
BH2	2.0m	1.8	Trench Fill / Pad
BH3	2.2m	Dry	Trench Fill / Pad
BH4	1.1m	Dry	Trench Fill / Strip / Pad

The existing foundations were found to bear onto the original glacial material. A visual inspection of the outer walls in the general test vicinities showed no sign of distress or settlement.

Given the depth to a suitable bearing capacity, trench fill foundations are considered to be the most suitable based on the depths to suitable bearing capacity.

Trench fill is required to extend to an approximate depth of c.0.8-2.2m below existing levels to reach a suitable bearing stratum. If trench fill is used the base of excavations for foundations should be thoroughly inspected to ensure a consistent bearing stratum. Any pockets of soft/very loose soil should be excavated with the resultant void backfilled with Grade ST1 concrete. The incorporation of nominal steel reinforcement as a precaution may be advisable to minimise the effects of any potential differential movement.

If during excavation any materials are identified which are soft, obviously organic/peaty, or which vary significantly from those identified in the boreholes it is recommended that excavation be suspended and the advice of a geologist/geotechnical specialist be sought.

d. Floors

The site has obviously been subject to cutting and a certain amount of filling in the past, floors will depend on final levels.

Where floors bear onto original ground then ground bearing floor slabs apply. If the area is raised or on an area of made ground then the floor slab should be suspended.

e. Sulphate and pH

The groundwater analyses established sulphate concentrations indicating Class DS-1 (BRE Special Digest 1). The pH value found throughout the site investigation is that of neutral, reference Table C1 of BRE Special Digest 1 (Building Research Establishment, 2005). The design of underground concrete should be conducted in accordance with the Special Digest

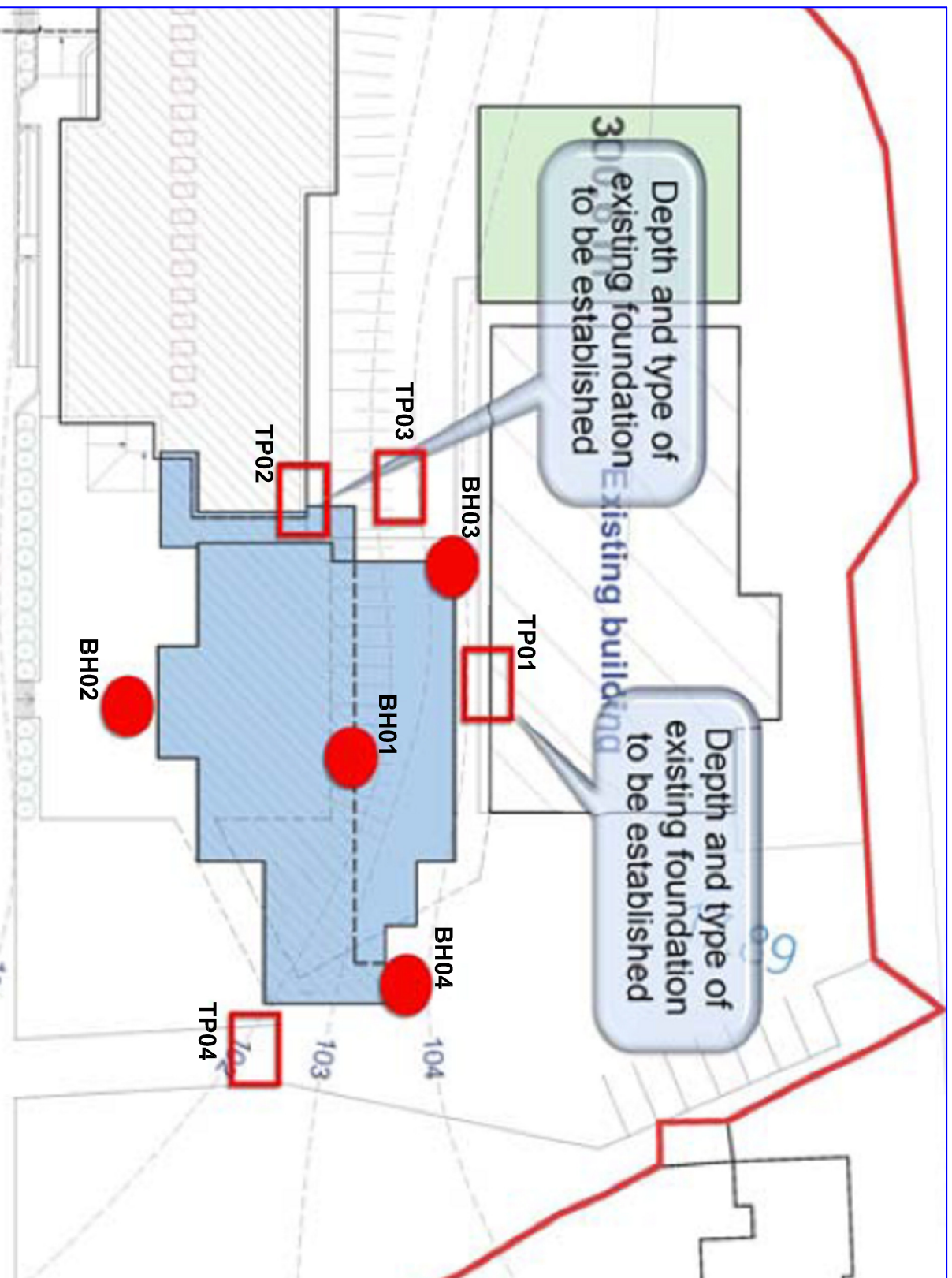
The table below illustrates the sulphate classifications

Sulphate class	mg/l SO ₄
DS-1	<500
DS-2	500 - 1500
DS-3	1600 - 3000
DS-4	3100 - 6000
DS-5	>6000

End of Report dated 25th April 2019

Stratex Ltd

Figure 1
Site and exploratory hole location plans

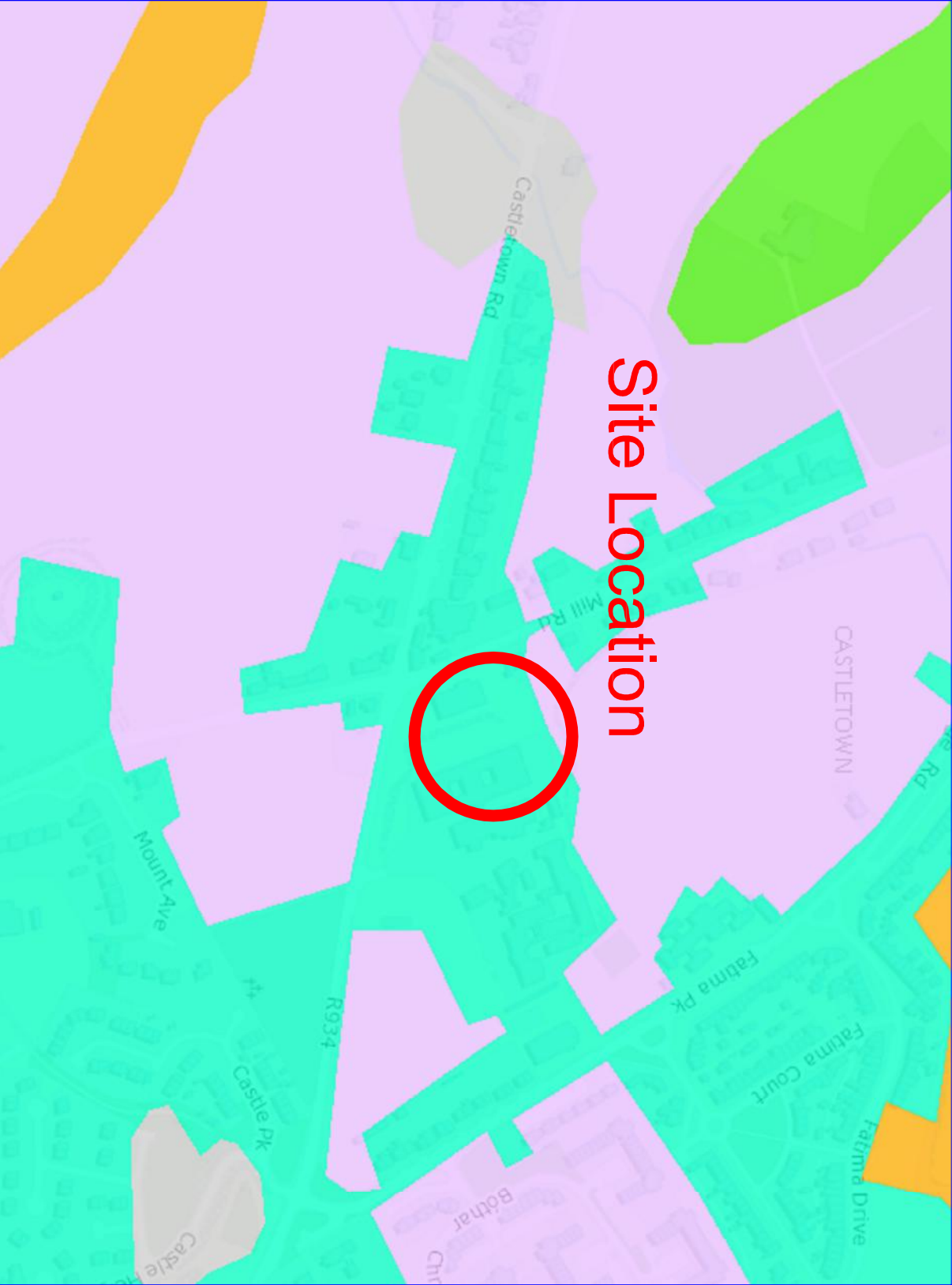


- Boreholes**

Trial Pits

Designed:		Date:	Project Title: De La Salle School, Dundalk	Drawing Title: Test Locations	Scale:	Project No: 19-1015
Drawn: RP		Date: 22-04-2019			Drawing No: SK19-1015-01	Rev: 0
Approved:		Date:			Clients: Duffy Chartered Engineers	

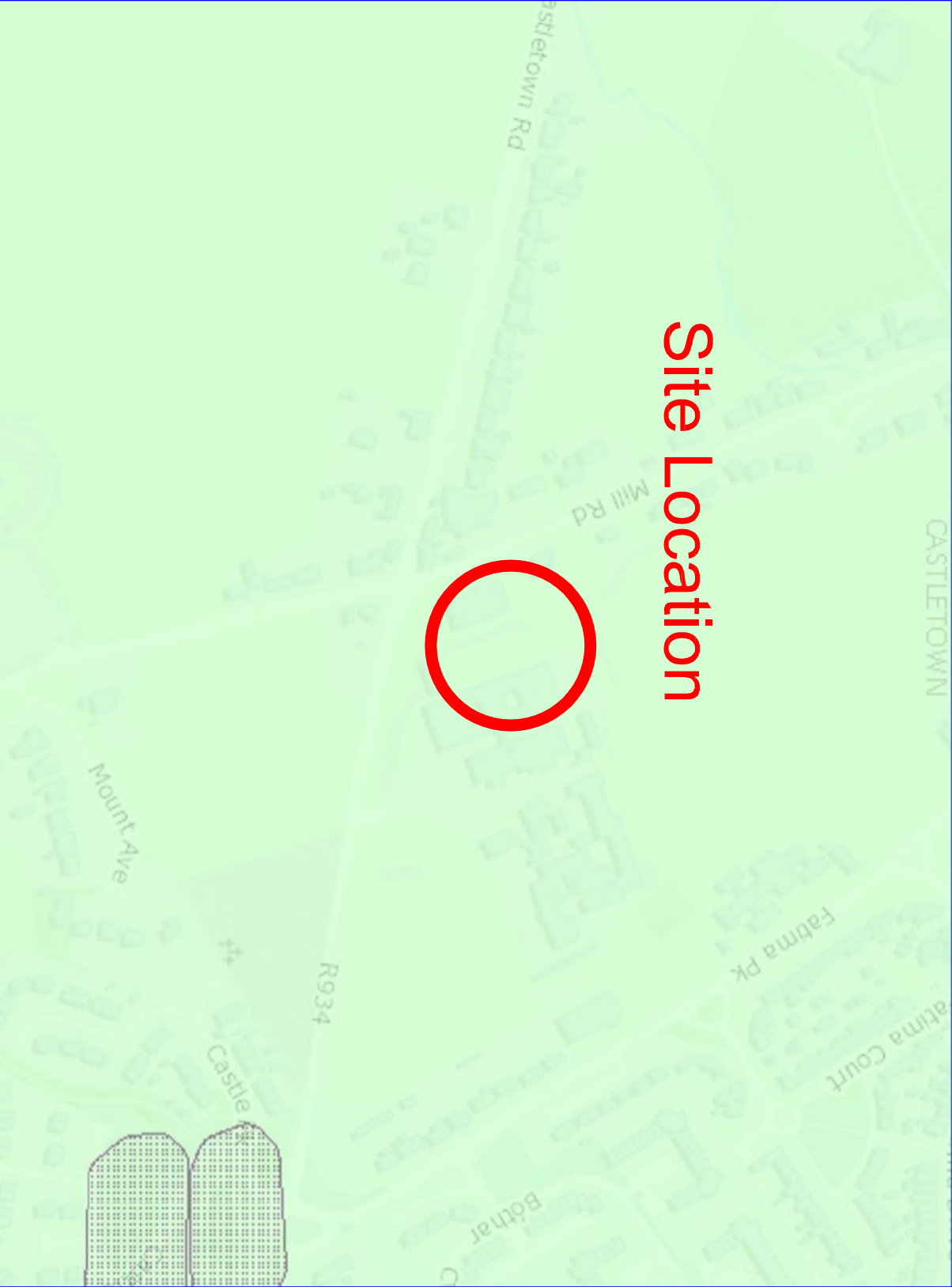
Figure 2 and 3
Geology Maps



Site Location

- Urban
- Till derived from Lower Palaeozoic sandstones and shales
- Alluvium
- Gravels derived from Lower Palaeozoic sandstones and shales

		Stratex Ltd. Area Office: (028) 85567157 Head Office: (028) 71417541	
Designed:	Date:	Project Title: De La Salle College, Dundalk	
Drawn: JMK	Date: 25.04.2019		
Approved:	Date:		
Drawing Title: Drift Geology		Scale: NTS	Project No: 19-1015
Drawing No: SK19-1015-02		Rev: 0	



Site Location



Clontail Formation
(Calcareous red-mica
greywacke)

Drawing Title: Solid Geology			
Scale: NTS	Project No: 19-1015		
Drawing No: SK19-1015-03	Rev: 0		

Designed:		Date:		Project Title: De La Salle College, Dundalk		Drawing Title: Solid Geology	
Drawn: JMK		Date: 25.04.2019		Engineer: JMK		Scale: NTS	
Approved:		Date:				Drawing No: SK19-1015-03	



Stratex Ltd.
Area Office:
(028) 85567157
Head Office:
(028) 71417541

Appendix A
Borehole and Trial Pit Logs

 Stratex Ltd 028 85567157 02871417541 info@stratexni.com				Borehole RECORD				Borehole Number			
S De La Salle College, Dundalk				Architect:		Drilling Equipment:		BH1			
Engineer:				Elevation AOD:		Start: Finish:					
Duffy Chartered Engineers IRL						14/03/2019		NTS			
GROUND WATER				SAMPLES & IN SITU TESTING				STRATA RECORD			
Strike	Well			Depth (m)	Depth/ Type (m)	Standard Penetration Testing	Environmental Samples	Depth (m)	Description	Key	
↓				0.6	1	N = 85			0	Loose grey GRAVEL stone fill (made ground).	
									0.3	Loose to medium dense grey brown silty gravelly SAND (made ground).	
									0.5	Medium dense grey gravelly SAND.	
									1	Medium dense grey slightly silty slightly clayey gravelly SAND, sand is fine to coarse, gravel is fine to medium, angular to subangular	
									1.6	Borehole terminated on technical refusal	
Remarks / Well installation / Casing Details											
Water strike at 0.6m.								U Undisturbed Sample Standing Water Depth Depth to Water Strike		WLS - Windowless Sampler WS - Window Sampler	

 Stratex Ltd 028 85567157 02871417541 info@stratexni.com				Borehole RECORD				Borehole Number					
S De La Salle College, Dundalk				Architect:			Drilling Equipment: Percussive Boring		BH2				
Engineer: Duffy Chartered Engineers IRL				Elevation AOD:			Start: 14/03/2019		Finish: NTS		Scale: -		
GROUND WATER			SAMPLES & IN SITU TESTING				STRATA RECORD						
Strike	Well		Depth (m)	Depth/ Type (m)	Standard Penetration Testing	Environmental Samples	Depth (m)	Description		Key			
↓			1.8	1	N = 11		0	TARMAC					
							0.25	Soft brown silty slightly gravelly sandy CLAY (made ground).					
							0.35	Soft to firm grey silty sandy slightly gravelly CLAY (made ground).					
				0.5	Soft to firm brown silty slightly gravelly sandy CLAY (possible made ground).								
				1.8	Medium dense grey slightly silty gravelly SAND.								
				1.9	Medium dense grey slightly sandy GRAVEL, sand is fine to coarse, gravel is fine to medium, angular to subangular								
				Hydrocarbon odour encountered.									
2.4	Borehole terminated on Refusal												
Remarks / Well installation / Casing Details							U Undisturbed Sample Standing Water Depth Depth to Water Strike					WLS - Windowless Sampler WS - Window Sampler	
Water strike at 1.8m.													

 Stratex Ltd 028 85567157 02871417541 info@stratexni.com				Borehole RECORD				Borehole Number				
Site: De La Salle College, Dundalk				Architect:		Drilling Equipment: Percussive Boring		BH3				
Engineer: Duffy Chartered Engineers IRL				Elevation AOD:		Start: 14/03/2019		Finish: NTS		Scale: -		
GROUND WATER				SAMPLES & IN SITU TESTING				STRATA RECORD				
Strike	Well			Depth (m)	Depth/ Type (m)	Standard Penetration Testing	Environmental Samples	Depth (m)	Description		Key	
								0	Soft to firm brown silty sandy slightly gravelly CLAY (made ground).			
					1	N = 8		0.9	Loose to medium dense brown silty gravelly SAND.			
					2	N = 15		1.7	Medium dense grey silty gravelly SAND, sand is fine to coarse, gravel is fine to medium, angular to subangular with pieces of probable bedrock			
						N = 78 (122mm)		2.75	Borehole terminated on possible bedrock			
Remarks / Well installation / Casing Details								U Undisturbed Sample Standing Water Depth Depth to Water Strike				WLS - Windowless Sampler WS - Window Sampler
Borehole dry upon completion.												

 Stratex Ltd 028 85567157 02871417541 info@stratexni.com				Borehole RECORD				Borehole Number			
Site: De La Salle College, Dundalk				Architect:		Drilling Equipment: Percussive Boring		BH4			
Engineer: Duffy Chartered Engineers IRL				Elevation AOD:		Start: 14/03/2019 Finish: NTS		Scale: -			
GROUND WATER				SAMPLES & IN SITU TESTING				STRATA RECORD			
Strike	Well			Depth (m)	Depth/ Type (m)	Standard Penetration Testing	Environmental Samples	Depth (m)	Description		Key
					1	N = 21		0	Soft to firm brown silty sandy slightly gravelly CLAY (made ground).		
					2	N = 27		0.3	Loose to medium dense grey silty gravelly SAND (made ground).		
					3	N = 53		0.8	Medium dense brown gravelly SAND.		
								2.2	Dense greyish brown very sandy GRAVEL with numerous lenses of gravelly sand, sand is fine to coarse, gravel is fine to medium, angular		
								3.4	Borehole Terminated on Refusal		
Remarks / Well installation / Casing Details Borehole dry upon completion.								U Undisturbed Sample Standing Water Depth Depth to Water Strike WLS - Windowless Sampler WS - Window Sampler			

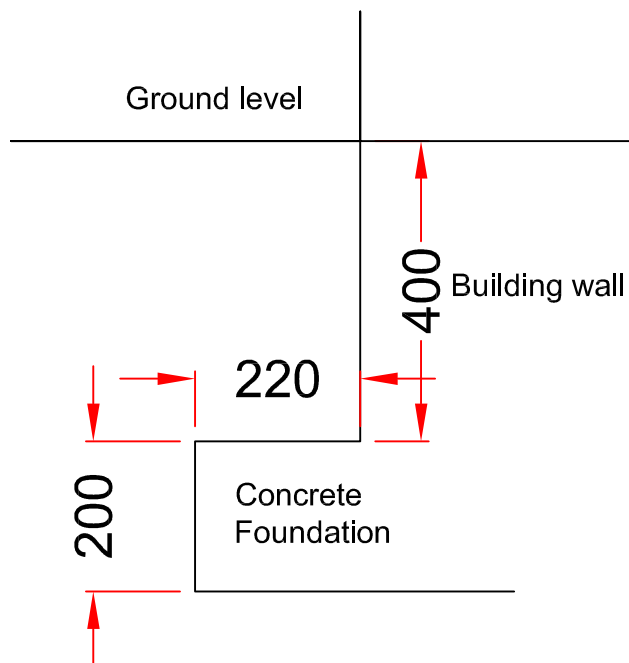
19-1015 De La Salle College, Dundalk

Trial Pit No. 1

Engineer: Duffy Chartered Engineers

Date: 14-03-2019

Site Engineer: J. McKenna



Log of pit	
0-100	TARMAC
100-200	Loose brown gravelly SAND (made ground).
200-400	Loose to medium dense grey gravelly SAND (made ground).
400-650	Medium dense grey brown gravelly SAND.
650-650	Trial pit terminated
Remarks:	Trial pit dry upon completion.

No.	Type of Service	Diameter	Depth to top	Distance to service	E	N	AOD
1							
2							
3							
4							
5							
6							
7							
8							
9							

Samples taken at (m)

No.	1	2	3	4	5	6	7	8	9	10
Small										
Bulk										

Trench Length (mm)

Scale:

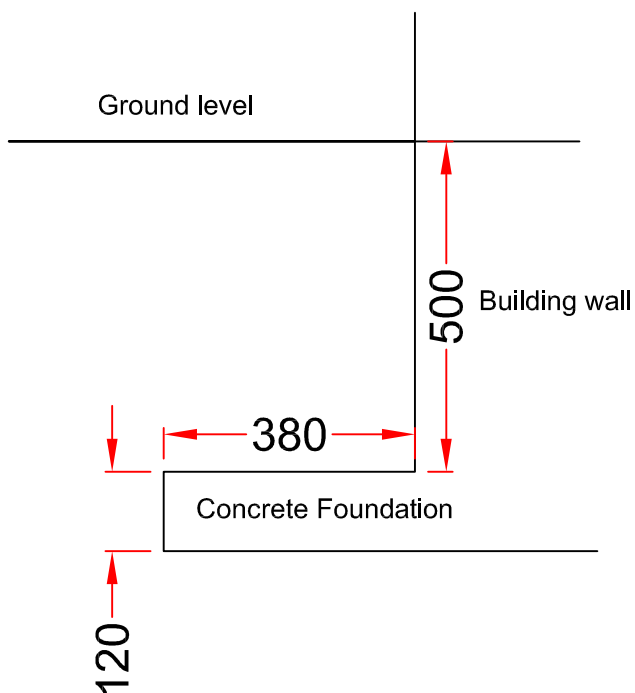
Trench Depth (mm)

Drawn:

John McKenna

Trench Width (mm)

Checked:



Log of pit	
0-500	Loose grey sandy GRAVEL (made ground).
500-700	
700-700	Trial pit terminated
Remarks:	Water strike at 0.5m.

No.	Type of Service	Diameter	Depth to top	Distance to service	E	N	AOD
1	Drain pipe		400mm				
2	Black duct		400mm				
3							
4							
5							
6							
7							
8							
9							
10							
11							

Samples taken at (m)

No.	1	2	3	4	5	6	7	8	9	10
Small										
Bulk										

Trench Length (mm)

Scale:

Trench Depth (mm)

Drawn:

John McKenna

Trench Width (mm)

Checked:

 Stratex Ltd 028 85567157 02871417541 info@stratexni.com				Borehole RECORD				Borehole Number			
Site: De La Salle College, Dundalk				Architect:				Drilling Equipment: Hand Dig			
Engineer: Duffy Chartered Engineers IRL				Elevation AOD:				Start: 14/03/2019 Finish: Scale: - NTS			
GROUND WATER			SAMPLES & IN SITU TESTING				STRATA RECORD				
Strike	Well	Depth (m)	Depth/Type (m)	Standard Penetration Testing	Environmental Samples	Depth (m)	Description	Key			
			1			0	Soft to firm dark brown sandy slightly gravelly TOPSOIL with roots (made ground).	  			
						0.32	Soft to firm grey brown sandy gravelly CLAY (made ground).				
						0.45	Firm grey brown very sandy very gravelly CLAY with cobbles (possible made ground).				
			2			1.1	Medium dense becoming dense greyish brown slightly silty very sandy GRAVEL with numerous lenses of gravelly sand and cobbles				
						2.4	Trial Pit Terminated				
Remarks / Well installation / Casing Details Trial pit dry upon completion.						U Undisturbed Sample Standing Water Depth  Depth to Water Strike 			WLS - Windowless Sampler WS - Window Sampler		

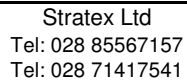
 Stratex Ltd 028 85567157 02871417541 info@stratexni.com				Borehole RECORD				Borehole Number			
Site: De La Salle College, Dundalk				Architect:		Drilling Equipment: Hand Dig		TP04			
Engineer: Duffy Chartered Engineers IRL				Elevation AOD:		Start: 25/03/2019 Finish:		Scale: - NTS			
GROUND WATER				SAMPLES & IN SITU TESTING				STRATA RECORD			
Strike	Well			Depth (m)	Depth/ Type (m)	Standard Penetration Testing	Environmental Samples	Depth (m)	Description	Key	
								0	Sandy gravelly TOPSOIL (Made Ground)		
								0.1	Soft to firm brown silty sandy gravelly CLAY (Made Ground)		
								0.3	Loose grey slightly sandy GRAVEL, sand is fine, gravel is fine to coarse, angular to subangular (Made Gound)		
								0.5	Firm light greyish brown very sandy very gravelly CLAY, sand is fine to medium, gravel is fine to medium subangualr to subrounded (Possible Made Ground)		
					1			0.85	Medium dense becoming dense greyish brown slightly silty very sandy GRAVEL with numerous lenses of gravelly sand and numerous pieces of shale		
					2						
								2.7	Trial Pit Terminatted		
Remarks / Well installation / Casing Details								U Undisturbed Sample Standing Water Depth Depth to Water Strike			WLS - Windowless Sampler WS - Window Sampler
Trial pit dry upon completion.											

Appendix B

Geotechnical Laboratory Testing



BS 1377: Part 1,3 : 1990
Design Sulphate Class of BRE Special Digest

[illegible]

Appendix C
Contamination Testing

Results - Single Stage WAC

Project: St Nicholas, Dundalk

Project: C/ Khorlos, Dandaan					Landfill Waste Acceptance Criteria		
Chemtest Job No: 19-16804					Limits		
Chemtest Sample ID: 828324					Inert Waste Landfill	Stable, Non-reactive hazardous waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample Ref:							
Sample ID: 1							
Sample Location:							
Top Depth(m):							
Bottom Depth(m):							
Sampling Date: 16-May-2019							
Determinand	SOP	Accred.	Units				
Total Organic Carbon	2625	U	%	13	3	5	6
Loss On Ignition	2610	U	%	15	--	--	10
Total BTEX	2760	U	mg/kg	< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg	< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg	150	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg	6.9	100	--	--
pH	2010	U		9.9	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.043	--	To evaluate	To evaluate
Eluate Analysis			10:1 Eluate mg/l	10:1 Eluate mg/kg	Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg		
Arsenic	1450	U	< 0.0010	< 0.050	0.5	2	25
Barium	1450	U	0.0065	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.010	0.04	1	5
Chromium	1450	U	< 0.0010	< 0.050	0.5	10	70
Copper	1450	U	< 0.0010	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	0.0024	< 0.050	0.5	10	30
Nickel	1450	U	< 0.0010	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	< 0.010	0.5	10	50
Antimony	1450	U	< 0.0010	< 0.010	0.06	0.7	5
Selenium	1450	U	< 0.0010	< 0.010	0.1	0.5	7
Zinc	1450	U	0.0049	< 0.50	4	50	200
Chloride	1220	U	19	190	800	15000	25000
Fluoride	1220	U	0.090	< 1.0	10	150	500
Sulphate	1220	U	16	160	1000	20000	50000
Total Dissolved Solids	1020	N	42	420	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	15	150	500	800	1000

Solid Information

Dry mass of test portion/kg	0.090
Moisture (%)	18

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - Single Stage WAC

Project: St Nicholas, Dundalk

Chemtest Job No: 19-16804					Landfill Waste Acceptance Criteria		
Chemtest Sample ID: 828325					Limits		
Sample Ref:					Inert Waste Landfill	Stable, Non-reactive hazardous waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID: 2							
Sample Location:							
Top Depth(m):							
Bottom Depth(m):							
Sampling Date: 16-May-2019					3	5	6
Determinand	SOP	Accred.	Units				
Total Organic Carbon	2625	U	%				
Loss On Ignition	2610	U	%				
Total BTEX	2760	U	mg/kg				
Total PCBs (7 Congeners)	2815	U	mg/kg				
TPH Total WAC (Mineral Oil)	2670	U	mg/kg				
Total (Of 17) PAH's	2700	N	mg/kg				
pH	2010	U					
Acid Neutralisation Capacity	2015	N	mol/kg				
Eluate Analysis			10:1 Eluate mg/l				
Arsenic	1450	U	< 0.0010	< 0.050	0.5	2	25
Barium	1450	U	0.0045	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.010	0.04	1	5
Chromium	1450	U	< 0.0010	< 0.050	0.5	10	70
Copper	1450	U	< 0.0010	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	< 0.0010	< 0.050	0.5	10	30
Nickel	1450	U	< 0.0010	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	< 0.010	0.5	10	50
Antimony	1450	U	< 0.0010	< 0.010	0.06	0.7	5
Selenium	1450	U	< 0.0010	< 0.010	0.1	0.5	7
Zinc	1450	U	0.0026	< 0.50	4	50	200
Chloride	1220	U	2.7	27	800	15000	25000
Fluoride	1220	U	0.069	< 1.0	10	150	500
Sulphate	1220	U	3.0	30	1000	20000	50000
Total Dissolved Solids	1020	N	20	200	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	13	130	500	800	1000

Solid Information

Dry mass of test portion/kg	0.090
Moisture (%)	5.7

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - Single Stage WAC

Project: St Nicholas, Dundalk

Chemtest Job No: 19-16804					Landfill Waste Acceptance Criteria			
Chemtest Sample ID: 828326					Limits			
Sample Ref:					Inert Waste Landfill	Stable, Non-reactive hazardous waste in non-hazardous Landfill	Hazardous Waste Landfill	
Sample ID: 3								
Sample Location:								
Top Depth(m):								
Bottom Depth(m):								
Sampling Date: 16-May-2019								
Determinand	SOP	Accred.	Units					
Total Organic Carbon	2625	U	%		13	3	5	6
Loss On Ignition	2610	U	%		14	--	--	10
Total BTEX	2760	U	mg/kg		< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg		< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg		< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg		4.7	100	--	--
pH	2010	U			8.2	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg		0.021	--	To evaluate	To evaluate
Eluate Analysis			10:1 Eluate mg/l	10:1 Eluate mg/kg	Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg			
Arsenic	1450	U	< 0.0010	< 0.050	0.5	2	25	
Barium	1450	U	0.020	< 0.50	20	100	300	
Cadmium	1450	U	0.00011	< 0.010	0.04	1	5	
Chromium	1450	U	< 0.0010	< 0.050	0.5	10	70	
Copper	1450	U	< 0.0010	< 0.050	2	50	100	
Mercury	1450	U	< 0.00050	< 0.0050	0.01	0.2	2	
Molybdenum	1450	U	0.0046	< 0.050	0.5	10	30	
Nickel	1450	U	0.0024	< 0.050	0.4	10	40	
Lead	1450	U	< 0.0010	< 0.010	0.5	10	50	
Antimony	1450	U	< 0.0010	< 0.010	0.06	0.7	5	
Selenium	1450	U	0.0016	0.016	0.1	0.5	7	
Zinc	1450	U	0.053	0.53	4	50	200	
Chloride	1220	U	2.9	29	800	15000	25000	
Fluoride	1220	U	0.050	< 1.0	10	150	500	
Sulphate	1220	U	86	860	1000	20000	50000	
Total Dissolved Solids	1020	N	150	1500	4000	60000	100000	
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-	
Dissolved Organic Carbon	1610	U	13	130	500	800	1000	

Solid Information

Dry mass of test portion/kg	0.090
Moisture (%)	18

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - Single Stage WAC

Project: St Nicholas, Dundalk

Chemtest Job No: 19-16804 Chemtest Sample ID: 828327 Sample Ref: Sample ID: 4 Sample Location: Top Depth(m): Bottom Depth(m): Sampling Date: 16-May-2019					Landfill Waste Acceptance Criteria Limits		
					Inert Waste Landfill	Stable, Non-reactive hazardous waste in non-hazardous Landfill	Hazardous Waste Landfill
Determinand	SOP	Accred.	Units				
Total Organic Carbon	2625	U	%	< 0.20	3	5	6
Loss On Ignition	2610	U	%	0.51	--	--	10
Total BTEX	2760	U	mg/kg	< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg	< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg	< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg	< 2.0	100	--	--
pH	2010	U		9.2	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.0090	--	To evaluate	To evaluate
Eluate Analysis			10:1 Eluate mg/l	10:1 Eluate mg/kg	Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg		
Arsenic	1450	U	< 0.0010	< 0.050	0.5	2	25
Barium	1450	U	0.0060	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.010	0.04	1	5
Chromium	1450	U	< 0.0010	< 0.050	0.5	10	70
Copper	1450	U	< 0.0010	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	< 0.0010	< 0.050	0.5	10	30
Nickel	1450	U	< 0.0010	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	< 0.010	0.5	10	50
Antimony	1450	U	< 0.0010	< 0.010	0.06	0.7	5
Selenium	1450	U	0.0019	0.019	0.1	0.5	7
Zinc	1450	U	0.0017	< 0.50	4	50	200
Chloride	1220	U	< 1.0	< 10	800	15000	25000
Fluoride	1220	U	0.067	< 1.0	10	150	500
Sulphate	1220	U	9.4	94	1000	20000	50000
Total Dissolved Solids	1020	N	42	420	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	9.9	99	500	800	1000

Solid Information

Dry mass of test portion/kg	0.090
Moisture (%)	12

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

SOP	Title	Parameters included	Method summary
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1450	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2015	Acid Neutralisation Capacity	Acid Reserve	Titration
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS
640	Characterisation of Waste (Leaching)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge

Report Information

Key

- U UKAS accredited
- M MCERTS and UKAS accredited
- N Unaccredited
- S This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
- SN This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
- T This analysis has been subcontracted to an unaccredited laboratory
- I/S Insufficient Sample
- U/S Unsuitable Sample
- N/E not evaluated
- < "less than"
- > "greater than"

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com