ABBVIE

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Consulting Engineers

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FOREWORD

The following Conditions and Notes on Site Investigation Procedures should be read in conjunction with this report.

General.

Recommendations made, and opinions expressed in the report are based on the strata observed in the exploratory holes, together with the results of in-situ and laboratory tests. No responsibility can be held for conditions which have not been revealed by exploratory work, or which occur between exploratory hole locations. Whilst the report may suggest the likely configuration of strata, both between exploratory hole locations, or below the maximum depth of the investigation, this is only indicative, and liability cannot be accepted for its accuracy.

Unless specifically stated, no account has been taken of possible subsidence due to mineral extraction below or close to the site.

Boring Procedures.
Unless otherwise stated, the 'Shell and Auger' technique of soft ground boring has been employed. All boring operations sampling and/or logging of soils and in-situ testing complies with the recommendations of the British Standard Code of Practice BS 5930 (1981) Site Investigation' and BS 1377:1990, 'Methods of test for soils for civil engineering purposes'.

Whilst the technique allows the maximum data to be obtained in soft ground, some disturbance and variation of soft and layered soils is unavoidable. Attention is drawn to this condition, whenever it is suspected. Where cobbles and boulders are recorded, no conclusion should be drawn concerning the size, presence, lithological nature, or numbers per unit volume of ground.

Where peat has been encountered during siteworks, samples have been logged in accordance with the Von Post Classification (ref. Von Post, L. 1992. Sveriges Gologiska Undersoknings torvinventering och nogra av dess hittils vunna resultat (SGU peat inventory and some preliminary results) Svenska Mosskulturforeningens Tidskrift, Jonkoping, Swedden, 36, 1-37 & Hobbs N. B. Mire morphology and the properties of some British and foreign peats. QJEG, Vol. 19, 1986).

Routine Sampling.

Undisturbed samples of soils, predominantly cohesive in nature are obtained unless otherwise stated by a 104mm diameter open-drive tube sampler. In granular soils, and where undisturbed sampling is inappropriate, disturbed samples are collected. Smaller disturbed samples are also recovered at intervals to allow a visual examination of the full strata section.

In-Situ Testing.

Standard penetration tests, utilising either the standard split spoon sampler or solid cone and automatic trip-hammer are conducted unless otherwise where required by instruction. Subsequent to a seating drive of 150mm, a summation for the number of blows for 300mm penetration is recorded on the boring records together with the blow count for each 75mm penetration. In cases where incomplete penetration is obtained, the number of blows for the recorded value of penetration are noted. In coarse granular soils, a cone end is fitted to the sampler and a similar procedure adopted.

Groundwater.

The depth of entry of any influx of groundwater is recorded during the course of boring operations. However, the normal rate of boring does not usually permit the recording of an equilibrium level for any one water strike. Where possible drilling is suspended for a period of twenty minutes to monitor the subsequent rise in water level.

Groundwater conditions observed in the borings or pits are those appertaining to the period of investigation. It should be noted however, that groundwater levels are subject to diurnal, seasonal and climatic variations and can also be affected by drainage condition, tidal variation or other causes.

Retention of Samples.

After satisfactory completion of all the scheduled laboratory tests on any sample, the remaining material is discarded unless a period of retention of samples is agreed, it is our normal practice to discard all soil samples one month after submission of our final report.

REPORT ON A SITE INVESTIGATION FOR A DEVELOPMENT AT ABBVIE BALLYTIVNAN SLIGO

JACOBS CONSULTING ENGINEERS

Report No 20974

JULY 2018

I Introduction

A new development is proposed at the ABBVIE Complex located on the Old Bundoran Road at Ballytivnan in Sligo.

The consulting engineers for the project, ACOBS acting for ABBVIE, have ordered an investigation of ground conditions at the site to provide data on which to base foundation and infrastructural design.

The programme of the investigation included the construction of four cable percussion boreholes and three machine excavated trial pits in accessible locations outside the existing plant. One soakaway test was carried out at TP01 while a plate bearing test was also completed in this area.

Works were also carried out within the existing warehouse with dynamic probing to establish soil strength below the floor concrete.

All field-work was carried out in accordance with BS 5930, Code of Practice for Site Investigations (1999) and Euro-code 7.

A programme of laboratory testing to confirm geotechnical, chemical and environmental soil parameters was scheduled. Geotechnical laboratory testing was carried out at IGSL's Accredited Laboratory and chemical and environmental testing was carried out by Chemtest in the U.K.

This report presents all factual data pertaining to the project and comments on the findings relative to future development.

Page 1

II Fieldwork

The site is located at the ABBVIE facility in Sligo. A site location map and a borehole, trial pit and probe layout is enclosed in Appendix VII to this report. All exploratory locations were determined by Jacobs and marked out by site personnel for IGSL.

The original scope of the investigation was amended and scheduled Geophysical Surveying and Rotary Core Drilling was not required.

Scheduled plate bearing tests within the existing building were also cancelled to avoid damage to the existing floor slab. These were replaced by Dynamic Probes taken through the pre-cored concrete floor.

Field operations were supervised by an IGSL geotechnical engineer under the direction of Jacobs.

Boreholes

The four exploratory holes were bored with conventional 200mm cable-tool methods using a Dando Exploratory Rig. Hand digging and electronic scanning was carried out at each borehole location to ensure that underground services were not damaged. Shallow refusal was recorded on an obstruction in BH01 at 1.70 metres. A re-bore (BH01A) was scheduled close to the original location

Detailed geotechnical boring records are contained in Appendix I to this report - the records give details of stratification sampling, in-situ testing and groundwater. Note is also taken of any obstructions to normal boring requiring the use of the heavy chisel for advancement.

Boreholes commenced on Tarmac or Concrete surface with granular fill below the surfacing to 0.70 metres BGL in each instance.

Soft to firm mottled grey brown gravelly silty CLAY was noted below he upper fill at BH01, BH03 and BH04. This stratum shows an increasing strength / depth pattern.

In the above three locations a dense sandy GRAVEL stratum was encountered below the gravelly CLAY at depths between 3.00 and 3.50 metres. These boreholes were terminated at depths between 4.60 and 5.50 metres, probably on cobble or boulder obstruction. Proof core drilling to determine the possible presence of rock was not scheduled.

The stratification at BH02 is markedly different. Here stiff brown gravelly CLAY is noted below the fill at 0.70 metres and the stratum continues to borehole completion at 5.00 metres.

Ground water was noted only in BH03 in the gravel stratum at 4.70 metres BGL. No free water was observed in the other boreholes.

Trial Pits

Trial Pits were opened under engineering supervision at three specified locations, north of the existing building. Detailed geotechnical records are presented in Appendix II.

Trial Pit 01 penetrated surface topsoil to underlying firm brown silty CLAY with root fibres. Firm gravelly silty CLAY was then noted and continues to the final depth of 2.00 metres. This excavation was dry and stable.

At TP02, topsoil overlies a stratum of granular FILL with some plastic, wire and roots. Firm silty CLAY extends from 0.80 to 1.50 metres with stiff grey brown sandy gravelly CLAY noted from 1.50 to the final depth of 2.10 metres. This trial pit was also dry and stable.

TP03 was located close to the existing building and MADE GROUND extends to 0.80 metres overlying firm organic silty CLAY from 0.80 to 1.50 metres. Firm gravelly CLAY with a thin gravel band extends from 1.50 to the final depth of 2.10 metres. Ground water ingress was noted in the thin gravel layer at 2.05 metres BGL.

Samples were taken at intervals for inspection and detailed geotechnical analysis.

Trial Pits were carefully backfilled with excavated material and the affected areas were reinstated.

Dynamic Probes

Heavy-duty dynamic probes were carried out at three locations within the existing facility. The concrete floor was pre-cored to facilitate the probing.

A tracked Competitor Probe Rig was used to establish a strength/depth pattern for the sub-soils. A 50kg hammer falling through 500mm is used to drive a 43.7mm diameter cone into the soil.

Probing is in accordance with the DPH specification of BS 1377: Part 9: 1990. In these tests, the soil resistance is measured in terms of the number of drop-hammer blows required to drive the test probe through each 100 mm increment of penetration. The results are presented in both graphical and tabular form in Appendix III. Probing is generally terminated following successive blow counts in excess of 25, to avoid damage to the apparatus.

Where very soft soils are encountered, the probe may penetrate the soil under self-weight and blow counts of zero may be entered where this happens. Blow counts of zero do not signify a void, unless specifically mentioned.

The concrete floor was pre-cored to 0.20 metres. Densely compacted granular FILL was noted below the floor concrete and probing continued to refusal at depths between 0.70 and 1.00 metres. The probes did not penetrate to any natural underlying stratum.

Percolation Test

A soakaway test was carried out in one trial pit location in accordance with BRE Digest 365.

The trial pit was excavated to 2.00 metres and carefully logged. The pit was then part filled with water and the dispersion of the water over time was recorded. The test was carried out over two cycles of filling and dispersion, the infiltration rate is calculated from the final cycle.

The test record is presented in Appendix IV with the infiltration rate as follows:

Infiltration Rate "f" = 0.00627 m/min

Plate Bearing Test

One plate bearing test was carried out at a depth of 0.50 metres in the vicinity of TP01.

A 450mm diameter steel plate is loaded and office added incrementally and the deflection or settlement is recorded by dial gauges. The test is carried out over two stages, load cycle and reload cycle.

The data is plotted and Modulus of Subgrade Reaction and equivalent CBR values are calculated. Data is presented in Appendix V and results summarised as follows:

	Modulus of Subgrade Reaction MPa /m	CBR %
Initial Load Cycle	17	1.3
Re -Load Cycle	29	1.6

III Testing

(a) In-Situ:

Standard penetration tests were carried out at approximate 1.00 metre intervals in the geotechnical boreholes to measure relative in-situ soil strength. N values are noted in the right hand column of the boring records, representing the blow count required to drive the standard sampler 300mm into the soil, following initial seating blows. Where full test penetration was not achieved the blow count for a specific penetration is recorded, or refusal is indicated where appropriate.

The results of the tests are summarised as follows:

STRATUM	N VALUE RANGE	COMMENT
BH01/03/04		
1.00 m BGL in Clay	3 to 7	Soft
2.00 m BGL in Clay	9 to 12	Firm
3.00 m BGL in Clay	15 to 17	Firm / Stiff
100 - DGI : G 1	10. 50 14. 63	off.
4.00 m BGL in Gravel	18 to 50 of of of	Medium Dense /Dense
5.00 m BGL in Gravel	22 to > 50 5 10 10 10 10 10 10 10 10 10 10 10 10 10	Medium Dense / Dense
BH02	3 to 7 9 to 12 15 to 17 18 to 50 22 to > 50 could not be seed for some seed to som	
Gravelly CLAY	co 200 to 53	Stiff to Very Stiff

Refusal of SPT apparatus was recorded on boulder obstructions in the GRAVEL at the base of the boreholes.

(b) Laboratory:

All geotechnical samples from the boreholes have been returned to the IGSL laboratory for initial visual inspection, a schedule of testing was prepared and tests as appropriate carried out. Chemical and environmental testing was carried out by CHEMTEST in the UK. Laboratory data is presented in Appendix VI.

The various tests comprised the following.

- a. Classification (Liquid and Plastic Limits)
- b. Grading Analysis (Wet sieve/ Hydrometer)
- c. MCV
- d. Sulphate and pH determination
- d. RILTA Environmental Suite

Classification / Moisture Content

The liquid and plastic limits for samples from both trial pits and boreholes were established in accordance with BS1377 Part 2.

Tests on the upper cohesive soils indicate both clay matrix and silt matrix material with clay plotted in the CL/CI Zones and silt in ML/MI Zones.

Moisture contents for these samples range from about 17 to 40% with a reducing pattern of moisture content with depth. A moisture content of 10% was noted in the stiff clay sample from BH02.

Four samples from the lower granular stratum established that the material is a slightly silty or clayey sandy GRAVEL.

Grading

PSD curves were established for samples of both the upper cohesive soils and the lower granular stratum using both wet sieve and hydrometer methods as appropriate.

The graphs for the cohesive soils reflect fairly uniform characteristics with soils graded from the fine clay to coarse gravel fraction. The material is generally described as brown slightly sandy slightly gravelly CLAY, occasionally grading to slightly sandy slightly gravelly SILT.

PSD tests on the lower granular stratum confirm that this is typically brown silty sandy GRAVEL with some 80% of the sample passing to the gravel fraction.

MCV

Two samples of soil from TP01 and TP02 had MCV values established as follows:

TP01	0.50 m BGL	MCV 5.40	Moisture Content	32
TP02	1.20 m BGL	MCV 14.3	Moisture Content	19

Sulphate / pH

Four soil samples had sulphate content and PH established. Sulphate concentrations (SO4 2:1 extract) ranging from < 0.010 to 0.045 g/l were established with pH values ranging from 5.4 to 8.6.

No special precautions are necessary to protect foundation concrete from sulphate aggression. A sulphate design class of DS-1 (ACEC Classification for Concrete) is indicated for concentrations less than 0.5 g/l.

RILTA Environmental

One sample was analysed in detail to RILTA Suite parameters. Detailed test data has been provided by CHEMTEST and is presented in Appendix VI. Results indicate very low or negligible concentrations of the various contaminants, all falling within the parameters for INERT waste material. The results indicate that material excavated from this site can be disposed of to a licensed landfill facility.

No traces of asbestos were identified during routine screening.

IV: Discussion

The investigation has been carried out at a proposed extension to the Abbvie Plant at Sligo. Work was carried out both in the area of a proposed extension and within the existing buildings.

A new extension to the existing warehouse is proposed and four boreholes were constructed under the new building footprint.

The existing warehouse floor is also to be upgraded to facilitate the installation of new machinery.

New Extension

Three of the four boreholes confirmed similar stratification with surface FILL overlying soft to firm gravelly CLAY / SILT with medium dense to dense silty sandy GRAVEL noted at about 3.00 metres. Laboratory tests indicate quite high moisture contents in the clay stratum, consistent with the "soft to firm" designation based on SPT data.

At BH02 however stiff gravelly CLAY extends from about 1.50 to 5.00 metres.

The findings at the three consistent boreholes have been used to assess an allowable bearing pressure for structural foundations.

SPT tests from 1.00 to 2.00 metres BGL were low (N values from 3 to 11) and these soils are deemed unsuited for support of structural loads.

To achieve an allowable bearing pressure of 150 KPa, foundations would have to be placed on the stiff gravelly CLAY at an approximate depth of 3.00 metres BGL.

At 4.00 metres BGL in the GRAVEL soils, an allowable bearing pressure of 200 KPa is indicated by the in situ tests.

The required excavation depth to achieve an adequate allowable bearing pressure may economically preclude direct excavation and the use of piles to support structural loads should be considered. It is understood that at least part of the existing building may have been piled.

Specialist piling contractors should be consulted to determine the most suitable pile type for this project. In this regard we would note that pile lengths may well exceed the depths specified and achieved in this investigation. Rotary core drilling should be considered to establish bedrock conditions in the area and confirm final design parameters for any proposed piling.

Ground Floor Slabs

a. Existing Plant

Three dynamic probes confirmed the make up of floors in the existing warehouse. 200mm of concrete overlies at least 1.00 metre of very dense granular fill.

b. New Extension

The boreholes have noted soft to firm gravelly clay/silt below surface fill. The trial pits indicate firm gravelly CLAY between 1.00 and 1.50 metres BGL. This stratum will be suitable for support of ground floor slabs.

We would suggest that the upper soft / organic material be removed and replaced with suitable granular fill. The composition of the floor in the existing warehouse would be appropriate for the new extension (0.80 to 1.00 metres of compacted fill below floor concrete).

Very careful visual inspection of ground floor excavation is recommended to ensure that all unsuitable organic soils are removed.

New Pavements

A CBR value of 1.6% was determined in the area of TP01 at a depth of 0.50 metres. The low CBR suggests that the use of a geo-grid or geo-textile would be appropriate for new pavement construction.

Percolation

An infiltration rate "f" of 0.00627 metres/minute was established in the soak-away test, carried out in firm gravelly CLAY soil. The gravelly clay soils are relatively impermeable and consideration should be given to the use of the local authority drainage system for disposal of surface and storm water.

IGSL Ltd/JC JULY 2018 Appendix I Boring Records

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	IENT		bbvie acobs		C-COUNT OF NATIONAL PRINTERS	to disconstitution of the control of						SED B	PA Y DE		
Depth (m)			C	escription		Legend	Elevation	Depth (m)	Ref. Number	Sample Type	Depth (m)	Recovery	Field Test Results	Standpipe Details	
0	MAI	DE GROI	JND: Tarr JND: Grai		lv		10.67	0.10	AA96074	В	0.50-1.00				
1	(fine	-coarse.	subround rse) CLA	ed-angular) very sandy / with medium cobble	,				AA96075	U	1.20-1.70	40%red 8 blows			
2					-	× ×		8	AA96076	В	2.00-2.50		N = 53 (4, 6, 8, 15, 15, 15)		
3					- - - - -	- X - X - X - X	oses only	or any or	AA96077	В	3.00-3.50		N = 20 (6, 10, 6, 5, 4, 5)		
4					For its	X - X - X - X - X - X - X - X - X - X -			AA96078	В	4.00-4.50		N = 29 (8, 8, 8, 7, 7, 7)		
5	End	of Boreh	ole at 5.00	O m Cour	est of cold	X	5.77	5.00							
6															
7															
								ion el line	_						
	m (m)		Time	-ISELLING Comments		Wate			Sealed	Rise		ne C	WATER STRIKE DETAILS Comments		
1 101	(111)	10 (111)	(h)	Comments		Strike	De	pth	At	То	(mii	1)	No water strike		

HARD STRATA BORING/CHISELLING

From (m) To (m) Time (h) Comments Water Strike Depth At To (min) Comments

No water strike

HOLE Depth RZ Top RZ Base Type

REMARKS Location CAT scanned and inspection pit hand dug to 1.2m

REMARKS Location CAT scanned and inspection pit hand dug to 1.2m

Sample Legend Depth Sample (Jar + Vial + Tub)

Sample Legend Depth Sample (Jar + Vial + Tub)

Sample Legend Depth Sample (Jar + Vial + Tub)

WATER STRIKE DETAILS

No water strike

Comments

Comments

U-Undisturbed 100mm Diameter Sample (Jar + Vial + Tub)

WATER STRIKE DETAILS

No water Strike Details

No water strike

IGSL
CONTRACT
CO-ORDINA
GROUND LE

REPORT NUMBER

[IGST			GI	EOTECI	HNICA	L BOF	RING	RECC	RD				20974	
co	NTRAC	T Ab	bvie Sligo)								BOREHOLE NO. BH03 SHEET Sheet 1 of 1			
		NATES LEVEL (r	837	,879.91 E ,610.38 N 9.86			PE OLE DIAM OLE DEPT		nm)	Dando 20 5.00		DATE COMMENCED 13/06/2018 DATE COMPLETED 13/06/2018			
	IENT GINEEF		bvie obs			CONTRACTOR OF THE PARTY OF	MMER REI					BORED PROCES		PA Y DE	
Depth (m)		,	De	escription			P	ation	Depth (m)	per		nples	very	Field Test	Standpipe Details
o Dep	MAD	E CROU	ND: Tarm	aaadam			Legend	67.6 Elevation		Ref. Number	Sample Type	Depth (m)	Recovery	Results	Stan
	MADI	E GROUI	ND: Gran	ular fill				9.76	0.10	AA96069	В	0.50-1.00			
1	grave	lly (fine-c	oarse, su	rown sandy bangular-a rown organ	ngular) SIL	um) T/CLAY	- x - x - x - x		*	AA96070	В	1.20-1.70		N = 3 (1, 0, 0, 1, 1, 1)	
2	Firm I subro	ight brow unded-ar	n slightly ngular) ve	silty gravell ry sandy (m	y (fine, nedium) CL/	AY	- X X X X X X X X X X X X X X X X X X X	7.86	2.00	AA96071	В	2.00-2.50		N = 9 (2, 2, 3, 2, 2, 2)	
3	(coars	se) GRAV	EL (fine- gular) wit	wn/grey clay coarses, th mediun c	ndy	X	6.76	Qt 7. 3010 Qt	AA96072	В	3.00-3.50		N = 17 (2, 3, 3, 6, 3, 5)		
4						Fortig				AA96073	В	4.00-4.50		N = 18 (2, 3, 4, 5, 6, 3)	
6	End o	f Borehol	e at 5.00	m	Course	to ord		4.86	5.00					N = 22 (3, 5, 8, 5, 6, 3)	
HA	RD STE	RATA BO		SELLING			Water	Cor	ing I C	anlad	Diag	Т:-		ATER STRIKE DETA	AILS
From 4.		Го (m) 4.9	Time (h) 0.75	Comments			Strike 4.70			ealed At	Rise To 4.90	(m	in)	comments	
INICT	TALL 47	TON DET	All C				D.1		Hole	Casing	Den	th to I		OUNDWATER PROC	GRESS
	NSTALLATION DETAILS Date Tip Depth RZ Top RZ Base Type						Date		epth	Depth	Wa	oth to cater C	commer	its	
	06-18 IARKS	5.00 Location	2.00 CAT sca	5.00 inned and ii	50mm		ug to 1.2m		Sample D - Small Di	e Legend			U - Und	listurbed 100mm Diameter	
						B - Bulk Disturbed Samp LB - Large Bulk Disturbed P - Ur						Sample P - Und	listurbed Piston Sample Iter Sample		

REPORT NUMBER

	1331	.)		GE	EOTECH	INICA	L BOF	RING	RECC	ORD				20974		
СО	NTRA	CT Ab	bvie Sligo									BORE	HOLE NO	D. BH04 Sheet 1 of 1		
		NATES LEVEL (r	837,	321.19 E 564.72 N 9.85			PE OLE DIAM OLE DEPT		nm)	Dando 2 4.60	000	DATE COMMENCED 18/06/2018 DATE COMPLETED 18/06/2018				
	IENT GINEEI		bvie obs		1		MMER RE					BORE				
Depth (m)			De	scription			Legend	Elevation	Depth (m)	Ref. Number	Samble	nples Depth	(m) Recovery	Field Test Results	Standpipe Details	
0	MAD	F GROUI	ND: Concr	ete				9.65	0.20	W Z	ω⊢		- 8		<u> </u>	
	MAD	E GROUI	ND (Comp	rised of gra	anular road	fill)		9.65	0.20	AA91003	В	0.50				
1	coars	o firm bro se,sub rou arse) CLA	inded to a	/ silty grav ngular) ver	elly (fine to y sandy (me	edium				AA91004	В	1.00		N = 5 (1, 0, 1, 1, 1, 2)		
2							A		88	AA91005	В	2.00		N = 12 (2, 2, 3, 4, 3, 2)		
3	Dens coars conte	e,subrou	own GRAV	EL (fine to gular) and	bble	0000	6.85 off	. 3.00 th	AA91006	В	3.00		N = 34 (3, 6, 10, 7, 8, 9)			
4	Obstr	uction				cot in		5.25	4.60	AA91007	В	4.00		N = 50/225 mm (6, 10, 15, 15, 20)		
5			e at 4.60 r	n	Conset	it or								N = 50/75 mm (25, 50)		
7																
ПА	DD ST	DATA DO	RING/CHIS	SELLING										ATED STRIKE DETA	AU 0	
		To (m)	Time C	comments			Water			ealed	Rise		ime (ATER STRIKE DETA Comments	AIL5	
3.	TALLA Date	3.8 4.6	(h) 1 2		Strike	De	ptn	At	To_	(1	min)	No water strike				
				***									GR	OUNDWATER PRO	GRESS	
INST	ISTALLATION DETAILS Date Tip Depth RZ Top RZ Base Type								Hole epth	Casing Depth	Dep	oth to ater	Comme	nts		
REM	MARKS	Location	CAT scar	nned and ir	t hand du	ug to 1.2m		D - Small D B - Bulk Dis	Legeno isturbed (tub) turbed			U - Un Sampl	disturbed 100mm Diameter			
							B - Bulk Disturbed LB - Large Bulk Disturbed Env - Environmental Sample (Ja					Sample P - Undisturbed Piston Sample r + Vial + Tub) W - Water Sample				

Appendix II Things of Pit Records

Earling to the records

Consent of contribution of the contribution of

	1								REPORT N	UMBER	Ų.
	T BSL	RIAL PIT	RECC	RD					20	974	
CON	ITRACT Abbvie Sligo						TRIAL P	PIT NO.	TP0		
		CO-ORDINAT	ES				DATE S	TARTE		et 1 of 1 5/2018	
LOG	GED BY DE	ODOLIND I E	(El (m)				DATE C			5/2018	
CLIE		GROUND LEV	VEL (M)				EXCAVA METHO	NOITA D	Hitao SBL0	hi Zaxis C	80
ENGI	INEER Jacobs										L
								Sample	s	oa)	mete
	Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Туре	Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0	TOPSOIL		717 71V	0.00							
	Firm brown silty CLAY with occasional rootle	ets	× × × × × × × × × × × × × × × × × × ×	0.20			AA81371	В	0.40-0.50		
1.0	Firm-stiffbrown mottled orange slightly sandy gravelly (fine-coarse, subrounded-angular) s	/ (medium) ilty CLAY	X X X	1.00	d other use	_v .	AA81372	В	1.10-1.20		
2.0	Firm brown/grey slightly sandy (medium) silty (fine-coarse, subrounded-angular) CLAY with (subrounded-angular) content End of Trial Pit at 0.00m	y very gravelly h low cobble	Φ X X X X X X X X X	2.00	, c		AA81373	В	1.80-1.90		
¯3.0	County	h low cobble For inspector									
4.0											
	ndwater Conditions mained dry										
:: :: :: :: : : : : : : : : : : :	•										
Stabil Pit rer	lity mained stable										
Gene Soaka	ral Remarks away pit										

									_	REPORT N	LIMBER	
2		т	RIAL PIT	RFCC	RD							
VIII.	331		INALI III	ILOC						20	974	
CON	ITRACT	Abbvie Sligo						TRIAL F	PIT NO.	TPO	2	
			CO-ORDINAT	.E6				SHEET			et 1 of 1	
LOG	GED BY	DE	THE REAL PROPERTY AND THE PARTY AND THE					DATE S			5/2018 5/2018	
CLIE		Abbvie	GROUND LEV	/EL (m)				EXCAV/ METHO	NOITA	Hitad SBL	chi Zaxis	80
ENG	INEER	Jacobs				Ι	T					
									Sample	s	a)	Hand Penetrometer (KPa)
		Geotechnical Description				_	ike				Vane Test (KPa)	netror
				Legend	£	Elevation	Water Strike	Sample Ref	Φ	£	e Tes	id Pei a)
	-				Depth (m)	Ele	Wat	San Ref	Туре	Depth	Van	Har (KP
- ^{0.0} -	TOPSOI MADE G	L ROUND: brown silty clay with grran	ular fill, wire	<u> </u>	0.10							
-	and root				0.30			AA81379	В	0.20-0.30		
	pieces	Noone and grandial in man ood	ioloriai piaolio									
	Firm-stiff	light brown mottled dark brown sligl	ntly sandy		0.80			AA81380	В	0.70-0.80		
1.0	(medium) silty CLAY		×								
				<u>×</u>		net it		AA81381	В	1.10-1.20		
	Stiff grev	/brown slightly gravelly (fine, subang	ular-angular)	X	1,50	y other us						
	slightly s	/brown slightly gravelly (fine, subanç ilty CLAY	,arar arigarar,		offoil							
2.0				200				AA81382	В	1.80-1.90		
. 2.0	End of Ti	ial Pit at 0.00m	nection	Wiles -	2.10							
			For its period									
			of cob,									
			int									
3.0		Co										
6												
4.0												
Grou	ndwater Co	onditions								1		
Stabi	litv											
Pit rei	mained sta	ble										
Gene	ral Remark	XS .										

IGSL TP LOG 20974.GPJ IGSL.GDT 25/6/18

	A									REPORT N	UMBER	
	SSL SSL	Т	RIAL PIT I	RECO	RD					20	974	
CON	ITRACT	Abbvie Sligo						TRIAL F	PIT NO.	TP0		
			CO-ORDINAT	ES				SHEET DATE S	TARTE		et 1 of 1 5/2018	
LOG	GED BY	DE	GROUND LEV	/EL /m\				DATE C			5/2018	
CLIE	NT INEER	Abbvie Jacobs	OKOOND LLV	, LL (III)				METHO!		Hitad SBL0	chi Zaxis C	, 80
LIVO		Vaccini							Sample	es	(F	neter
		Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Туре	Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0	MADE 0	GROUND: Brown/black silty clay with	granular fill					0,11				
	MADE (GROUND: Grey/brown gravelly silty c redbrick, plastic, wood and wire pied	slay with ces		0.30			AA81374	В	0.30-0.40		
- - - 1.0	Firm bro organic	wn/grey SILT/CLAY with frequent ro traces	otlets and	**************************************	0.80	ے		AA81375	В	0.80-0.90		
	Firm ligh subangu CLAY w	nt brown/grey gravelly (fine-coarse, ılar-angular) silty very sandy (mediur ith low cobble (subangular-angular) o	m-coarse)		1.50 only af	y offer ne		AA81376	В	1.60-1.70		
2.0				X (0)	2.00		1	AA81377	В	1.90-2.00		
2.0	\GRAVEI	own silty very clayey very sandy (med L (medium-coarse, subangular-angul rial Pit at 0.00m	lar) colytight	ALL A	2.10		(Standing)	AA81378	В	2.00-2.10		
3.0		,										
4.0												
	ndwater C ding at 2.0	Conditions 5m										
Stabi Pit re	lity mained st	able										
Gene	eral Remar	ks										

IGSL TP LOG 20974.GPJ IGSL.GDT 25/6/18

Appendix III Dynamic Probes

Consent of convident owner required for any other convincence of the convenience of the convenienc

IGSL		DYNAMIC PROBE	RECOR	RD				RE	PORT NU 209		
CONTRACT	Abbvie , Sligo					PRO SHE	BE NO.		DP01 Sheet 1	of 1	
CO-ORDINATE	S							ENCE	24/05/20		
GROUND LEVE	EL (mOD)	HAMMER MASS (50 100					24/05/20)18	
ENGINEER	Jacobs	FALL HEIGHT (m	m)	500		PRO	BE TYP		DPH		
Depth (m)	Geotechnical De	scription	Legend	Depth (m)	Elevation (mOD)	Water	Depth (m)	Probe Readings (Blows/Increment)		nic Probe ecord	25
0.0 .	Probe at 1.00 m						0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90	0 0 3 13 23 25 24 35 38 25	3	3	35 38
2.0	Probe at 1.00 m	For its pedion per for its pedion ped	ited de din o	iy other i	çe.						
3.0		Consentated								 	_
4.0											
GROUNDWAT REMARKS Cored to 0.20r	ER OBSERVATIONS									,	



REPORT NUMBER

1	BSL		ים	YNAIVII	C PROBE R	ECO	אט					209	963	
	TRACT	Abbvie , Slig	0						PRO SHE	BE NO. ET		DP02 Sheet 1	of 1	
	ORDINATE			u A	MMER MASS (kg)		50			E COMMI				
	GROUND LEVEL (mOD) CLIENT ENGINEER Jacobs			REMENT SIZE (m		100		DATE COMPLETED 24/05/2018						
				1	LL HEIGHT (mm)		500		PRO	BE TYPE	Ē	DPH		
Depth (m)		Ge	otechnical Descri	iption		Legend	Depth (m)	Elevation (mOD)	Water			Graph Re	nic Prob ecord	5
	End of I	Probe at 0.80	m		,	74.	sy other v	ģ.		0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70	0 0 10 13 29 34 40 33			29 34 40 333
2.0				Consent of	of its pection during section of the	red for s	•							
4.0										•				
REM	UNDWATI	ER OBSERVA	ΠONS											

E		D	YNAMIC PROBE F	RECOI	RD				RE	PORT	NUM 096		
ાઉ	BL/												
CONT	TRACT A	Abbvie , Sligo					PRO SHE	BE NO. ET		DP0	14 et 1 of	1	
	RDINATES		HAMMER MASS (kg)		50			E COMM					
GROU	JND LEVEL NT	(mOD)	INCREMENT SIZE (m		100			E COMPL)	
ENGIN	NEER J	acobs	FALL HEIGHT (mm)		500		PRO	BE TYPI	-	DF	′ П	_	
Depth (m)		Geotechnical Desc	ription	Legend	Depth (m)	Elevation (mOD)	Water	Depth (m)	Probe Readings (Blows/Increment)	Gra	aphic Reco	Probe rd	
0.0								0.00 0.10 0.20 0.30 0.40 0.50 0.60	0 0 10 44 49 48 50				44 49 48 50
	End of Pro	obe at 0.70 m					ľ	0.00		*****	,,,,,,		
1.0						ee.							
2.0			ion purpi	ited for ?	ay other								
			For its petion purpose										
3.0			Co.		in the second								
4.0													
GROL	UNDWATER	OBSERVATIONS		1									
REMA	ARKS												
Cored	d to 0.20m												
					_								

Appendix IV Percolation Test Data

Percolation of Test Data

Consent of Confriding transfer and Confri

Suaka	way D	esign f -value from fie	ld tests	(F2C) IGS
	Abbvie, SI		Contract No.	20974
Test No.	STP01			
Client	Abbvie / J			
Date:	24/05/20			
	of ground c			Ground water
from 0.00	0.20	Description TOPSOIL		Ground water
0.20	1.00	Firm brown silty CLAY with occasional rootle		Dry
1.00	1.70	Firm-stiffbrown mottled orange slightly sand		- 519
1.70	2.00	Firm brown/grey slightly sandy silty very gra		1
Notes:				
Field Data		Field Test		
Depth to	Elapsed	Depth of Pit (D)	2.00]m
Water	Time	Width of Pit (B)	0.40	- '''
(m)	(min)	Length of Pit (L)		- '''
(111)	(11111)	Length of Fit (L)	1.00	٦
1.30	0.00	Initial depth to W	/ater = 1.30]m
1.35	2.00	Final depth to wa		m
1.40	5.00	Flanced time (mi	35.00	1
1.45	8.00	Top of permeable Base of permeab	1 USE	_
1.50	10.00	Top of permeable	e 5011	m
1.55	12.00	Base of permeab	te soil	m
1.60	15.00	es of for t		
1.70	20.00	Base of permeab		
1.80	25.00	an Pur teda		
1.90	30.00	ecito niet		٦.
2.00	35.00	Basè area=	0.64	m2
		*Av. side area of permeable stratum over te	est period 1.4	m2
		Total Exposed ar	rea = 2.04	Jm2
		nsett [*]	used/unit exposed area	/ unit time
		.,		
		f= 0.00627 m/min or	0.0001046	m/sec
		Depth of water vs Elapsed Time (r	mins)	
	40.00			\neg
~	35.00			
Elapsed Time (mins)	30.00		•	7
ت				
me	25.00		•	
Ë	20.00			
sec	15.00		<u> </u>	
ab		•		
Ш	10.00	•		
	5.00	•		
	0.00	•		ì
		0.50 1.00 1.50	2.00	2.50
	0.00	0.50 1.00 1.50	2.00	2.30