Cherry Orchard Apartments – Site Investigation

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Client:	Dublin City Council
Client's Representative:	Hayes Higgins Partnership
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APPENDICES

Document Control Sheet

Report No.:	OCB20-070
Project title:	Cherry Orchard Apartments
Client:	Dublin City Council
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Revision	Status	Report prepared by:	Report reviewed by:	Report approved by:	Issue date
001	Draft Factual	Ian Holley	Glen Byrne	Michael O'Connell	24th August 2021

The works were conducted in accordance with:

BS EN 1997: *Eurocode 7 - Geotechnical Design – Parts 1 & 2* (2007)

UK Specification for Ground Investigation 2nd Edition (2012)

British Standards Institute (2010) BS 5930:1999 + A2: 2010, Code of practice for site investigations. Incorporating Amendment Nos. 1 and 2, as partially replaced by:

- BS EN ISO 22475-1:2006: Geotechnical investigation and testing. Sampling methods and groundwater measurements. Technical principles for execution
- BS EN ISO 14688-1:2002/Amd 1:2013: Geotechnical investigation and testing. Identification and classification of soil. Identification and description
- BS EN ISO 14688-2:2004/Amd 1:2013: 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 rock. Identification and description
- BS EN ISO 22476-2:2005/Amd 1:2011: Geotechnical investigation and testing. Field testing. Dynamic probing
- BS EN ISO 22476-3:2005/Amd 1:2011: Geotechnical investigation and testing. Field testing. Standard penetration test

METHODS OF DESCRIBING SOILS AND ROCKS

Soil and rock descriptions are based on the guidance in Section 6 of BS 5930: 1999 + A2: 2010, The Code of Practice for Site Investigation. The amendments revised the Standard to remove text superseded by BS EN ISO 14688-1:2002, BS EN ISO 14688-2:2004 and EN ISO 14689-1:2003 and refers to the relevant standard for each affected subclause. However, the following terms are used in the description of fine-grained soils, where applicable:

- Soft to Firm: fine-grained soil with consistency description close to the boundary between soft and firm soil (Table 13 of BS5930).
- Firm to Stiff: fine-grained soil with consistency description close to the boundary between firm and stiff soil (Table 13 of BS5930).

Abbreviations used on exploratory hole logs	
U	Nominal 100mm diameter undisturbed open tube sample
P	Nominal 100mm diameter undisturbed piston sample
B	Bulk disturbed sample
D	Small disturbed sample
W	Water sample
ES / EW	Soil sample for environmental testing / Water sample for environmental testing
SPT	Standard penetration test using a split spoon sampler (small disturbed sample obtained)
SPT (C)	Standard penetration test using 60-degree solid cone
x,x/x,x,x,x	Blows per increment during the standard penetration test. The initial two values relate to the seating drive (150mm) and the remaining four to the 75mm increments of the test length. The length achieved is stated (mm) for any test increment less than 75mm
N=X	SPT blow count 'N' given by the summation of the blows 'X' required to drive the full test length (300mm)
N=X/Z	Incomplete standard penetration test where the full test length was not achieved. The blows 'X' represent the total blows for the given test length 'Z' (mm)
V VR	Shear vane test (borehole) Hand vane test (trial pit) Shear strength stated in kPa V: undisturbed vane shear strength VR: remoulded vane shear strength
dd/mm/yy: 1.0 dd/mm/yy: dry	Date & water level at the borehole depth at the end of shift and the start of the following shift
Abbreviations relating to rock core – reference Clause 44.4.4 of BS 5930: 1999	
TCR (%)	Total Core Recovery: Ratio of rock/soil core recovered (both solid and non-intact) to the total length of core run.
SCR (%)	Solid Core Recovery: Ratio of solid core to the total length of core run. Solid core has a full diameter, uninterrupted by natural discontinuities, but not necessarily a full circumference and is measured along the core axis between natural fractures.
RQD (%)	Rock Quality Designation: Ratio of total length of solid core pieces greater than 100mm to the total length of core run.
FI	Fracture Index: Number of natural discontinuities per metre over an indicated length of core of similar intensity of fracturing.
NI	Non-Intact: Used where the rock material was recovered fragmented, for example as fine to coarse gravel size particles.
AZCL	Assessed zone of core loss: The estimated depth range where core was not recovered.
DIF	Drilling induced fracture: A fracture of non-geological origin brought about by the rock coring.

Cherry Orchard Apartments

1 AUTHORITY

On the instructions of Consulting Engineers, Hayes Higgins Partnership ("the Client's Representative"), acting on the behalf of Dublin City Council ("the Client"), a ground investigation was undertaken at the above location to provide geotechnical and environmental information for input to the design and construction of a proposed apartment complex.

This report details the work carried out both on site and in the geotechnical and chemical testing laboratories; it contains a description of the site and the works undertaken, the exploratory hole logs and the laboratory test results.

All information given in this report is based upon the ground conditions encountered during the site investigation works, and on the results of the laboratory and field tests performed. However, there may be conditions at the site that have not been taken into account, such as unpredictable soil strata, contaminant concentrations, and water conditions between or below exploratory holes. It should be noted that groundwater levels usually vary due to seasonal and/or other effects and may at times differ to those measured during the investigation.

This report was prepared by OCB Geotechnical Ltd for the use of Hayes Higgins Partnership and Dublin City Council in response to particular instructions. Any other parties using the information contained in this report do so at their own risk and any duty of care to those parties is excluded.

2 SCOPE

The extent of the investigation, as instructed by the Client's Representative, included boreholes, trial pits, dynamic probing, soil sampling, in-situ and laboratory testing, and the preparation of a report on the findings.

3 DESCRIPTION OF SITE

As shown on the site location plan in Appendix A, the works were conducted on the site of an industrial estate unit in the Cherry Orchard Industrial Estate, Ballyfermot, Dublin 10. The site is bordered by Kennelsfort Road Upper to the west and by industrial estate units to the north, east and south.

4 SITE OPERATIONS

Site operations, which were conducted between 21st July 2021 and 23rd August 2021, included:

- Four (4) Cable Percussion Boreholes
- Four (4) Dynamic Probes
- Eight (8) Trial Pits
- Two Infiltration tests performed in one (1) Trial Pit
- Indirect CBR tests at four (4) locations

The exploratory holes and in situ tests were located as instructed by the Client's Representative, as shown on the exploratory hole location plan in Appendix A.

4.1 Cable Percussion Boreholes

Four boreholes (BH01 – BH04) were put down to completion in minimum 200mm diameter using a Pilcon cable percussion soil boring rig. All boreholes were terminated on encountering virtual refusal on obstructions, including large boulders and/or possible weathered bedrock.

Hand dug inspection pits were carried out between ground level and 1.2m depth to ensure boreholes were put down at locations clear of services or subsurface obstructions.

Disturbed (bulk bag and tub) samples were taken within the encountered strata.

Standard penetration tests were carried out in accordance with EC7 at standard depth intervals using the split spoon sampler (SPT). The penetrations are stated for those tests for which the full 150mm seating drive or 300mm test drive was not possible. The N-values provided on the borehole logs are uncorrected and no allowance has been made for energy ratio corrections.

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

Where water was added to assist with boring, a note has been added to the log to account for same.

Appendix B presents the borehole logs.

4.2 Dynamic Probes

Eight probes (DP01-DP08) were put down to refusal using a Dando Terrier rig using the DPH method as

described in BSEN ISO 22476-2. The method entails a 50kg hammer falling 500mm onto a 90° cone of 50.5mm diameter.

Hand dug inspection pits were carried out between ground level and 1.2m depth to ensure probes were put down clear of services or subsurface obstructions. The probes were taken typically to depths between 2.20m and 2.80m bgl. where they were terminated upon encountering virtual refusal on obstructions.

Appendix C provides the dynamic probe logs in the form of plots, against depth, of the number of blows per 100mm penetration.

4.3 Trial Pits

Eight trial pits (TP01–TP08) were excavated using an 8t tracked excavator fitted with a 600mm wide bucket, to depths of between 2.10m and 3.70m, TP01 was terminated at 0.50m due to a concrete slab obstruction.

Environmental samples were taken in each trial pit. Disturbed (small tub and bulk bag) samples were taken at standard depth intervals and at change of strata.

Any water strikes encountered during excavation were recorded along with any changes in their levels as the excavation proceeded. The stability of the trial pit walls was noted on completion.

Appendix D presents the trial pit logs with photographs of the pits and arising provided in Appendix E.

4.4 Infiltration Tests

Two infiltration/soakaway tests were carried out at one location in accordance with BRE Digest 365 - Soakaways (BRE, 2007).

Appendix F presents the results and analysis of the infiltration test. The absence of the outflow from the pit precluded calculation of infiltration coefficients.

4.5 Indirect CBR Tests

An indirect CBR test was conducted at four locations (CBR01 – CBR04) using a Dynamic Cone Penetrometer (DCP). The equipment was developed in conjunction with the UK Transport Research Laboratory, is used widely throughout the world, and is referred to in the UK Highway Agency Interim Advice Note 73/06.

The test results are presented in Appendix G in the form of plots of the variation with depth of the cumulative blow count. Straight lines have been fitted to the plots and the CBR for each depth range estimated using the following relationship, as proposed by DTP Interim Advice Note 73/06 (Design Guidance for Road Pavement Foundations):

Log CBR = 2.48-1.057 Log (mm/blow)

The frequently elevated CBR values are a consequence of the coarse-grained content of the penetrated soils and are often not representative of the soil matrix.

4.6 Surveying

A broad survey of the site using a handheld CAT scanner to identify any existing buried services or old foundations/obstructions to excavation was carried out before commencement of excavation works.

5 LABORATORY WORK

Upon their receipt in the laboratory, all disturbed samples were carefully examined and accurately described and their descriptions incorporated into the borehole logs.

5.1 Geotechnical Laboratory Testing of Soils

Laboratory testing of soils comprised:

- **Soil Classification:** Moisture Content measurement, Atterberg Limit tests and Particle Size Distribution analysis.
- **Soil Chemistry:** pH and Water-Soluble Sulphate content

Laboratory testing of soils samples was carried out in accordance with British Standards Institute (1990) *BS 1377:1990, Methods of test for soils for civil engineering purposes. Parts 1 to 9.*

The test results are presented in Appendix H.

Note: Awaiting receipt of laboratory test results.

5.2 Environmental Laboratory Testing of Soils

Environmental testing was conducted on selected environmental samples by James Fisher Testing Services at its laboratory in Portlaoise. Results of environmental testing are presented in Appendix I.

Note: Awaiting receipt of laboratory test results.

6 GROUND CONDITIONS

6.1 General Geology of the Area

Teagasc soil mapping indicates that soils in the site vicinity consist of both Made Ground and glacial till derived from limestones.

The Geological Survey of Ireland (GSI) bedrock database indicates that soils at the site are underlain at depth by the Lower Carboniferous-age Lucan Formation, which consists of dark-grey to black, fine-grained, occasionally cherty, micritic limestones that weather paler, usually to pale grey. There are rare dark coarser grained calcarenitic limestones, sometimes graded, and interbedded dark-grey calcareous shales. The formation ranges from 300m to 800m in thickness. The Lucan Formation strata were deformed during the Variscan Orogeny in Late Carboniferous to Early Permian times and are typically gently folded and faulted with fold axes predominantly trending northeast-southwest. There are no known karst features occurring locally within the Lucan Formation, but the formation could potentially be prone to karstification.

According to GSI groundwater maps, the site overlies a locally important aquifer, consisting of bedrock which is moderately productive only in local zones, and it has a moderate groundwater vulnerability index.

6.2 Ground Types Encountered During Investigation of the Site

A summary of the ground types encountered in the exploratory holes is listed below, in approximate stratigraphic order:

- Made Ground (Paved surface): Trial Pits TP03 to TP06 encountered 100mm of macadam surfacing. In addition TP07 and TP08 encountered 250mm of concrete surfacing.
- Topsoil: Encountered in TP01 and TP02 to 400mm.
- Made Ground (sub-base): Approximately 200mm to 600mm of aggregate fill beneath the paved surfaces. Up to 1.25m of fill beneath the concrete surfacing in TP07.
- Made Ground (fill): Reworked sandy gravelly clay fill, observed in TP02 and TP04.
- Glacial Till: silty sandy gravelly clay, frequently with low cobble content, typically soft to firm in upper horizons, becoming stiffer with increasing depth.
- Bedrock: Possible rockhead was encountered at depths ranging from 2.10m in BH02, TP03 and TP04 to 3.70m in TP02.

6.3 Groundwater

Details of the individual groundwater strikes, along with any relative changes in levels as works proceeded, are presented on the exploratory hole logs for each location.

It should be noted that any groundwater strikes within bedrock may have been masked by the fluid used as the drilling flush medium.

OCB cannot comment on groundwater conditions between or below exploratory hole locations. Groundwater conditions are subject to change seasonally and in response to local weather events.

7 DISCUSSION

7.1 Proposed Construction

It is proposed to construct an apartment complex.

No further details were available to OCB Geotechnical at the time of preparing this report.

8 REFERENCES

BS EN 1997-1: 2007. *Eurocode 7 - Geotechnical design - Part 1 General Rules*. British Standards Institution, London.

BS EN 1997-2: 2007. *Eurocode 7 - Geotechnical design - Part 2 Ground investigation and testing*. British Standards Institution, London.

BS 1377: 1990. *Methods of test for soils for civil engineering purposes*. British Standards Institution, London.

BS 5930: 2015. *Code of practice for ground investigations*. British Standards Institution, London.

BS EN ISO 14688-1: 2002. *Geotechnical investigation and testing - Identification and classification of soil - Part 1 Identification and description*. British Standards Institution, London.

BS EN ISO 14689-1: 2003. *Geotechnical investigation and testing - Identification and classification of rock - Part 1 Identification and description*. British Standards Institution, London.

Building Research Establishment, 2005. BRE Special Digest 1, Concrete in aggressive ground.

Building Research Establishment, 2007. BRE Digest 365: Soakaways.

BS EN 12457-2: 2002 Characterisation of waste. Leaching. Compliance test for leaching of granular waste materials and sludges. One stage batch test at a liquid to solid ratio of 10 l/kg for materials with particle size below 4 mm (without or with size reduction).

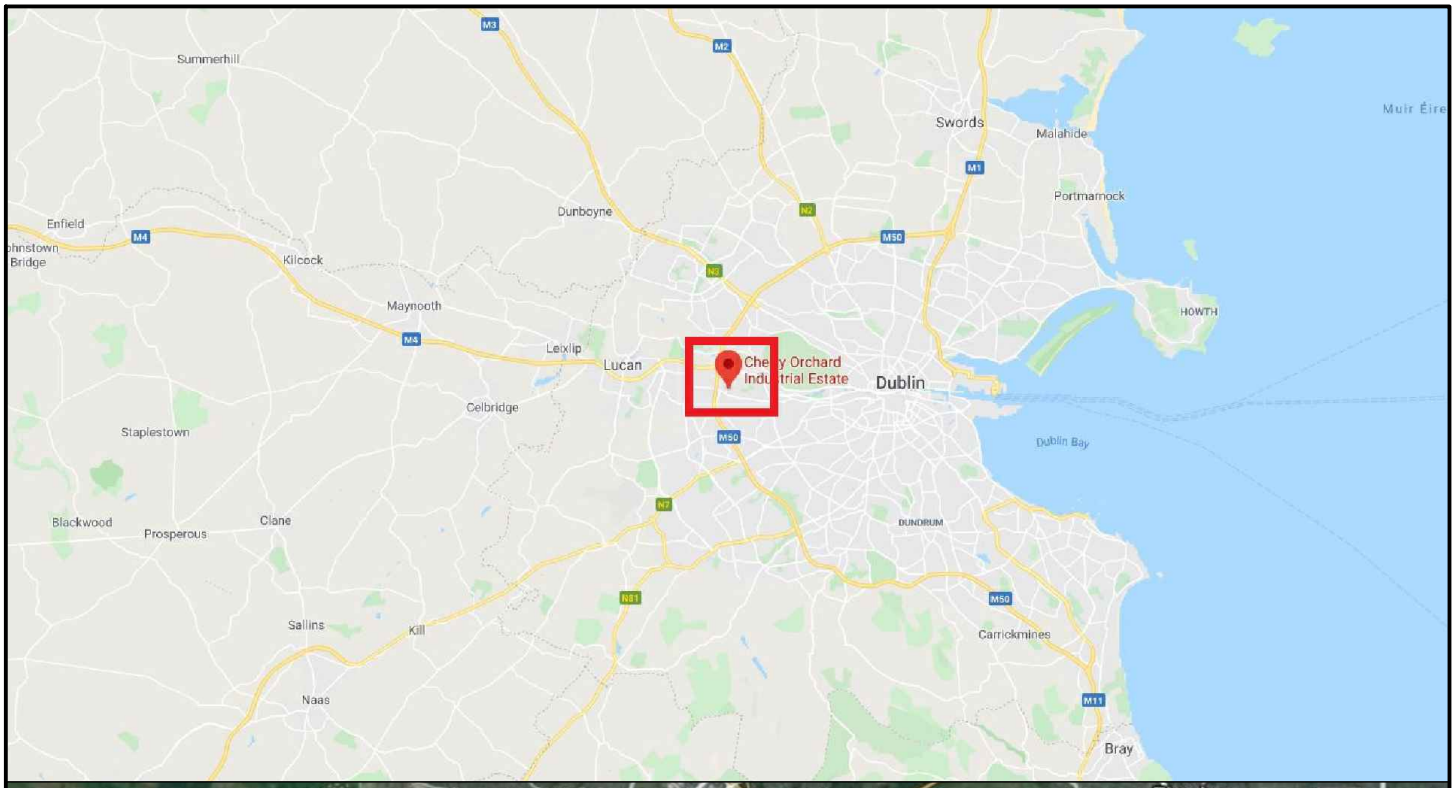
Environmental Protection Agency / Draft Guidance Note on Soil Recovery Waste Acceptance Criteria. December 2017.
http://www.epa.ie/pubs/consultation/soilrecoveryconsultation/

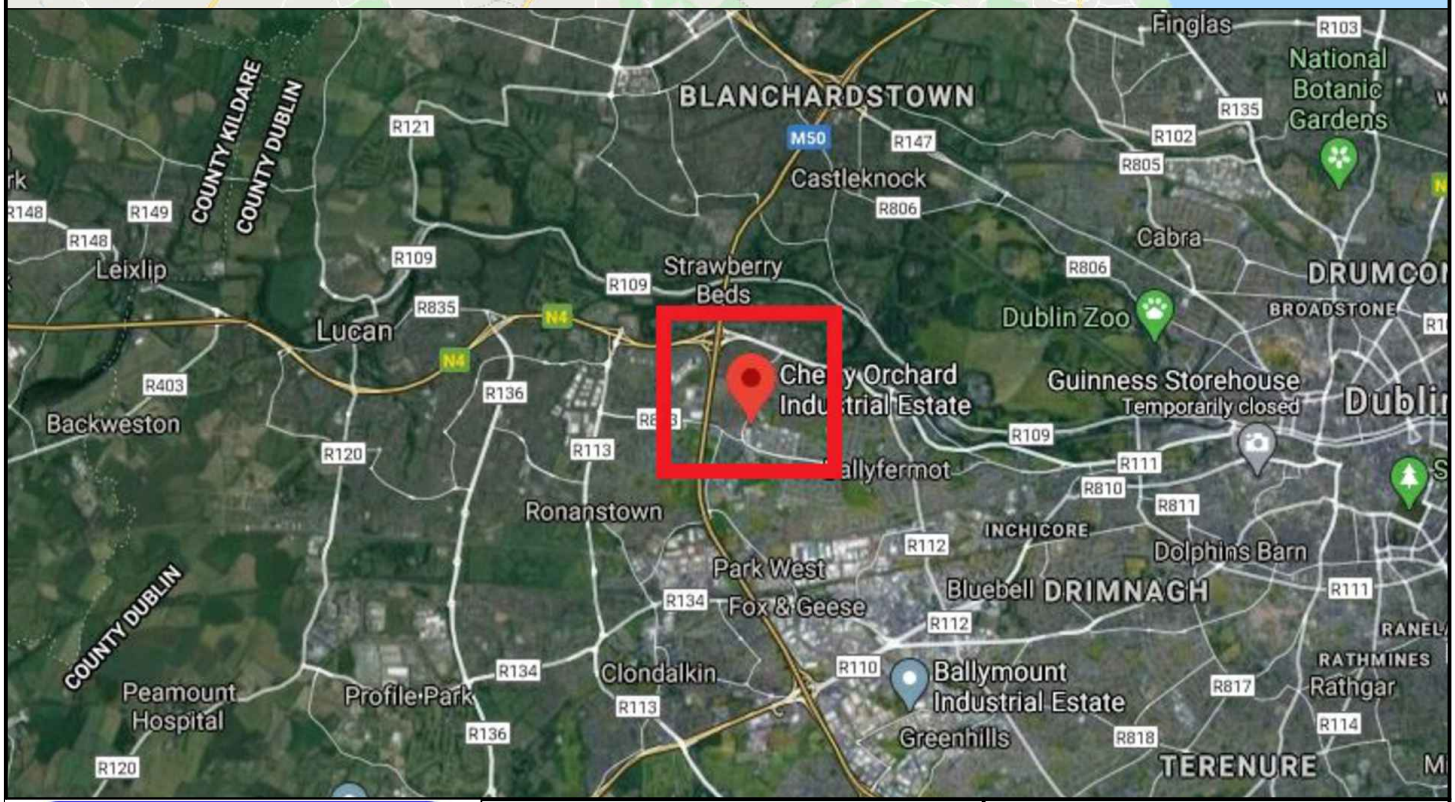
Environmental Protection Agency / Waste Classification List of Waste & Determining if Waste is Hazardous or Non-hazardous. 1st June 2015
https://www.epa.ie/pubs/reports/waste/stats/wasteclassification/EPA_Waste_Classification_2015_Web.pdf

Environment Agency UK (2009). Soil Guideline Values (SGVs).
https://www.gov.uk/government/collections/land-contamination-technical-guidance

Soil Remediation Circular 2013, Ministry for Environment and Infrastructure, The Hague, Netherlands.
https://rwsenvironment.eu/subjects/soil/legislation-and/soil-remediation/

Appendix A Site and Exploratory Hole Location Plans





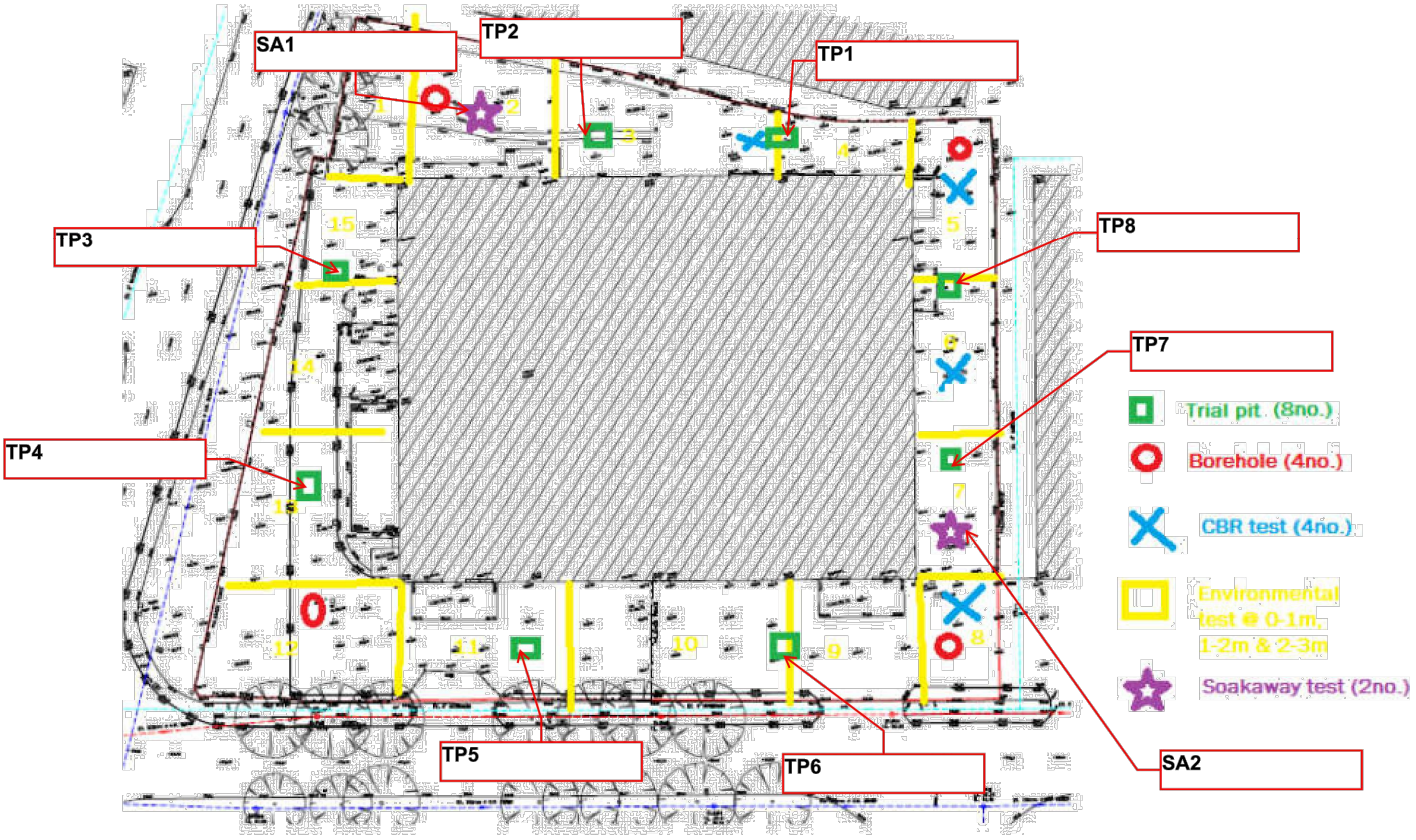
Cherry Orchard Apartments

SITE LOCATION MAPS

Client: Dublin City Council

Engineer: Hayes Higgins Partnership

Date: August 2021



Cherry Orchard Apartments

Exploratory Hole Locations

Client: Dublin City Council

Engineer: Hayes Higgins Partnership

Date: August 2021

Appendix B Borehole Logs

Project No.: 20-070	**Project Name:** Cherry Orchard Apartments		**Borehole No.:** BH01
Coordinates: E	**Client:** Comhairle Cathrach Bhaile Átha Cliath / Dublin City Council		Sheet 1 of 1
Method: Cable Percussion	**Client's Representative:** Hayes Higgins Partnership		**Scale:** 1:50
Plant: Pilcon	**Ground Level:** mOD	**Dates:** 30/07/2021 - 30/07/2021	**Driller:** NG
			Logger: ST

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
						(0.30)		TARMACADAM surfacing		
						0.30				
						(0.30)		MADE GROUND: Granular fill material		
						0.60				
						(0.40)		A little: Soft dark olive grey slightly sandy slightly gravelly silty CLAY with an organic odor, moist.		
1.00	B1					1.00		over		
1.00 - 1.45	SPT (S) N=12			N=12 (1,2/2,3,3,4)				Greyish brown slightly sandy slightly gravelly CLAY with low cobble content, moist. Sand fine to coarse. Gravel fine to coarse, angular to subrounded.		
						(1.00)		Stiff greyish brown and olive brown with a little orange brown slightly sandy, slightly gravelly silty CLAY with low cobble content, slightly organic. Sand fine to coarse. Gravel fine to coarse. Gravel and cobbles angular to subrounded.		
2.00	B2					2.00				
2.00 - 2.45	SPT (S) N=17			N=17 (4,4/4,4,4,5)				Very stiff greyish brown slightly gravelly slightly sandy CLAY with occasional cobbles, moist. Sand fine to coarse. Gravel fine to coarse, angular to subrounded.		
						(0.80)				
2.80 - 2.86	SPT (S)			50 (50 for 60mm/50 for 0mm)		(0.80)		Possible Bedrock: Recovered as angular gravel size fragments of Medium strong dark grey Siltstone		
								End of borehole at 2.800m		

Remarks
Cable Percussion refusal at 2.80m on possible bedrock.

Water Added	
From (m)	To (m)

Water Strike - General			
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
2.80	2.80	20	2.20

Casing Details	
To (m)	Diam (mm)
2.80	200

Chiselling Details		
From (m)	To (m)	Time (hh:mm)
2.80	2.80	01:00

	Project No.: 20-070	**Project Name:** Cherry Orchard Apartments	**Borehole No.:** BH02
	Coordinates: E	**Client:** Comhairle Cathrach Bhaile Átha Cliath / Dublin City Council	Sheet 1 of 1
Method: Cable Percussion	N	**Client's Representative:** Hayes Higgins Partnership	**Scale:** 1:50
Plant: Pilcon	**Ground Level:** mOD	**Dates:** 30/07/2021 - 30/07/2021	**Driller:** NG
			Logger: ST

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
						(0.10) 0.10		TARMACADAM surfacing		
						(0.65)		MADE GROUND: Granular fill material		
						0.75				
1.00	B1							Stiff greyish brown slightly sandy slightly gravelly CLAY with low cobble content, moist. Sand fine to coarse. Gravel fine to coarse. Gravel and cobbles subangular to subrounded dark grey limestone and siltstone.		
1.00 - 1.45	SPT (S) N=11			N=11 (2,2/2,3,3,3)		(1.05)				
						1.80				
2.00	B2					(0.30)		Very stiff greyish brown and olive brown with a little orange brown slightly sandy, slightly gravelly silty CLAY with low cobble content. Sand fine to coarse. Gravel fine to coarse. Gravel and cobbles angular to subrounded.		
2.00 - 2.19	SPT (S)			50 (25 for 175mm/50 for 20mm)		(0.10) 2.10		Possible bedrock		
								End of borehole at 2.100m		

Remarks
Cable Percussion refusal at 2.10m on possible bedrock.

Water Added	
From (m)	To (m)

Water Strike - General			
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
2.10	2.10	20	2.00

Casing Details	
To (m)	Diam (mm)
2.10	200

Chiselling Details		
From (m)	To (m)	Time (hh:mm)
2.10	2.10	01:00

	Project No.: 20-070	**Project Name:** Cherry Orchard Apartments	**Borehole No.:** BH03
	Coordinates: E	**Client:** Comhairle Cathrach Bhaile Átha Cliath / Dublin City Council	Sheet 1 of 1
Method: Cable Percussion	N	**Client's Representative:** Hayes Higgins Partnership	**Scale:** 1:50
Plant: Pilcon	**Ground Level:** mOD	**Dates:** 31/07/2021 - 31/07/2021	**Driller:** NG
			Logger: ST

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
						(0.10) 0.10		TARMACADAM surfacing		
						(0.50)		MADE GROUND: Granular fill material.		
						0.60			▼	
						(0.40)		Olive brown with a little orange brown mottling slightly sandy slightly gravelly silty CLAY with low cobble content, moist. Sand fine to coarse. Gravel fine to coarse. Gravel and cobbles angular to subrounded, mostly dark grey limestone and siltstone.		
1.00 1.00 - 1.45	B1 SPT (S) N=8			N=8 (2,2/2,2,2,2)		1.00		Firm greyish brown with a little yellowish brown mottling slightly sandy slightly gravelly to gravelly silty CLAY with low cobble content, moist. Sand fine to coarse. Gravel fine to coarse, angular to subrounded. Cobbles mostly subangular. Gravel and cobbles mostly limestone and siltstone.		
						(1.40)				
2.00 2.00 - 2.45	B2 SPT (S) N=9			N=9 (2,2/2,2,2,3)						
						(0.40) 2.40		Possible bedrock		
								End of borehole at 2.400m		

Remarks
Cable Percussion refusal at 2.40m on possible bedrock.

Water Added		Water Strike - General			
From (m)	To (m)	Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
		0.60	0.60	20	0.60

Casing Details		Chiselling Details		
To (m)	Diam (mm)	From (m)	To (m)	Time (hh:mm)
2.40	200	2.40	2.40	01:00

Project No.: 20-070	**Project Name:** Cherry Orchard Apartments		**Borehole No.:** BH04
Coordinates: E	**Client:** Comhairle Cathrach Bhaile Átha Cliath / Dublin City Council		Sheet 1 of 1
Method: Cable Percussion	**Client's Representative:** Hayes Higgins Partnership		**Scale:** 1:50
Plant: Pilcon	**Ground Level:** mOD	**Dates:** 31/07/2021 - 31/07/2021	**Driller:** NG
			Logger: ST

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
						(0.20) 0.20		CONCRETE surfacing		
						(0.60) 0.80		MADE GROUND: Granular fill material.		
1.00 1.00 - 1.45	B1 SPT (S) N=15			N=15 (3,3/3,4,4,4)		(0.50) 1.30		Firm to Stiff greyish brown slightly sandy slightly gravelly silty CLAY with low cobble content, moist. Sand fine to coarse. Gravel fine to coarse, angular to subrounded. Cobbles subangular. Trace of plastic bag fragments.		
2.00 2.00 - 2.45	B2 SPT (S) N=20			N=20 (5,5/5,5,5,5)		(2.30)		Very stiff greyish brown with some weathering to olive brown and yellowish brown, slightly sandy slightly gravelly very silty CLAY with low cobble content, moist. Sand fine to coarse. Gravel fine to coarse, angular to subrounded. Cobbles mostly subangular. Gravel and cobbles mostly dark grey limestone and siltstone.		
3.00 3.00 - 3.45	B3 SPT (S) N=20			N=20 (3,5/5,6,5,4)		3.60		End of borehole at 3.600m		

Remarks
Cable Percussion refusal at 3.60m on possible bedrock.

Water Added	
From (m)	To (m)

Water Strike - General			
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details	
To (m)	Diam (mm)
3.60	200

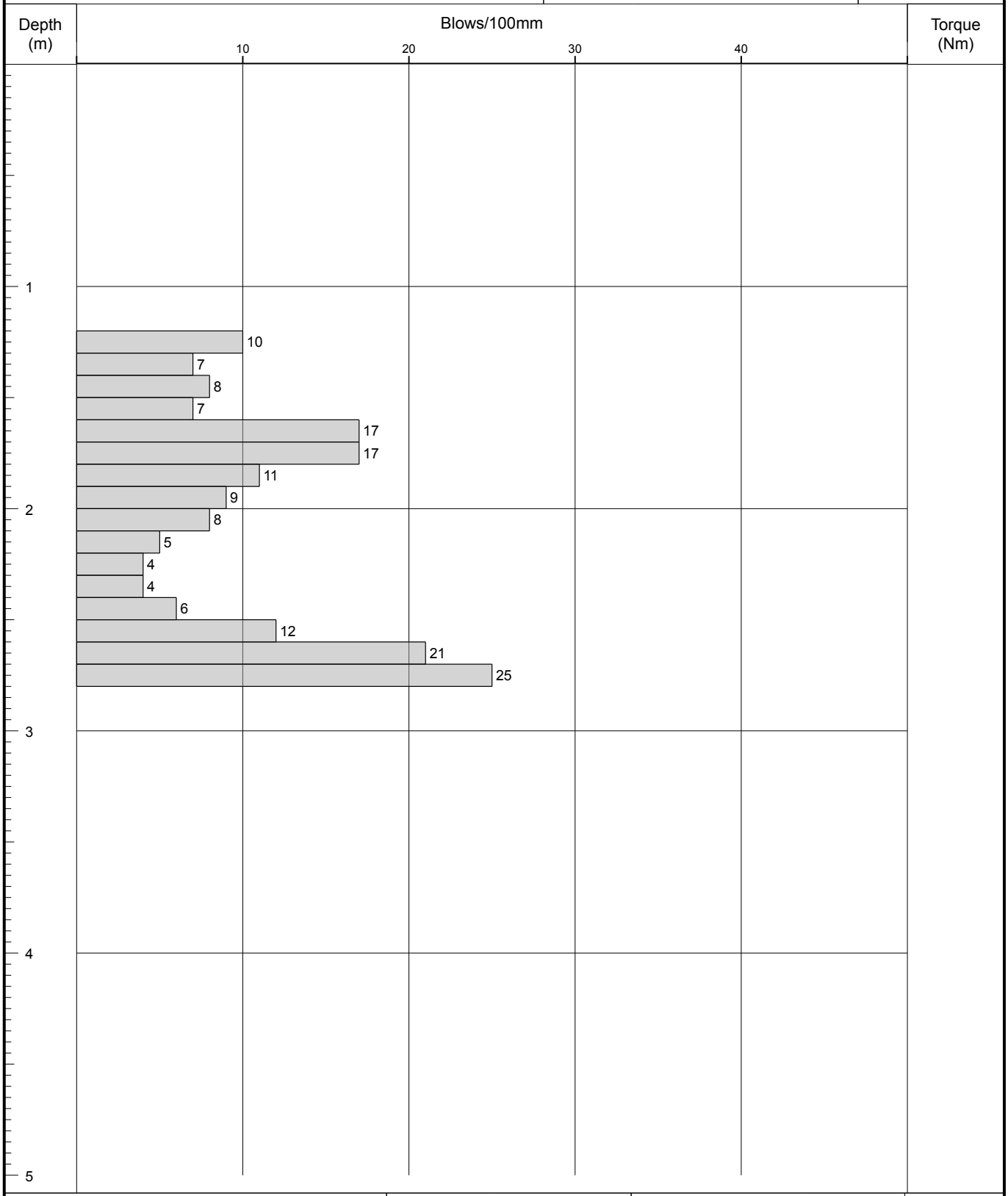
Chiselling Details		
From (m)	To (m)	Time (hh:mm)
3.60	3.60	01:00

Appendix C Dynamic Probe Logs

Probe Log

Borehole No.
DP01
Sheet 1 of 1

Project Name: Cherry Orchard Apartments	Project No. 20-070	Co-ords: -	Hole Type DP
Location: Cherry Orchard, Dublin 10		Level:	Scale 1:25
Client: Comhairle Cathrach Bhaile Átha Cliath / Dublin City Council		Dates: 20/08/2021 -	Logged By



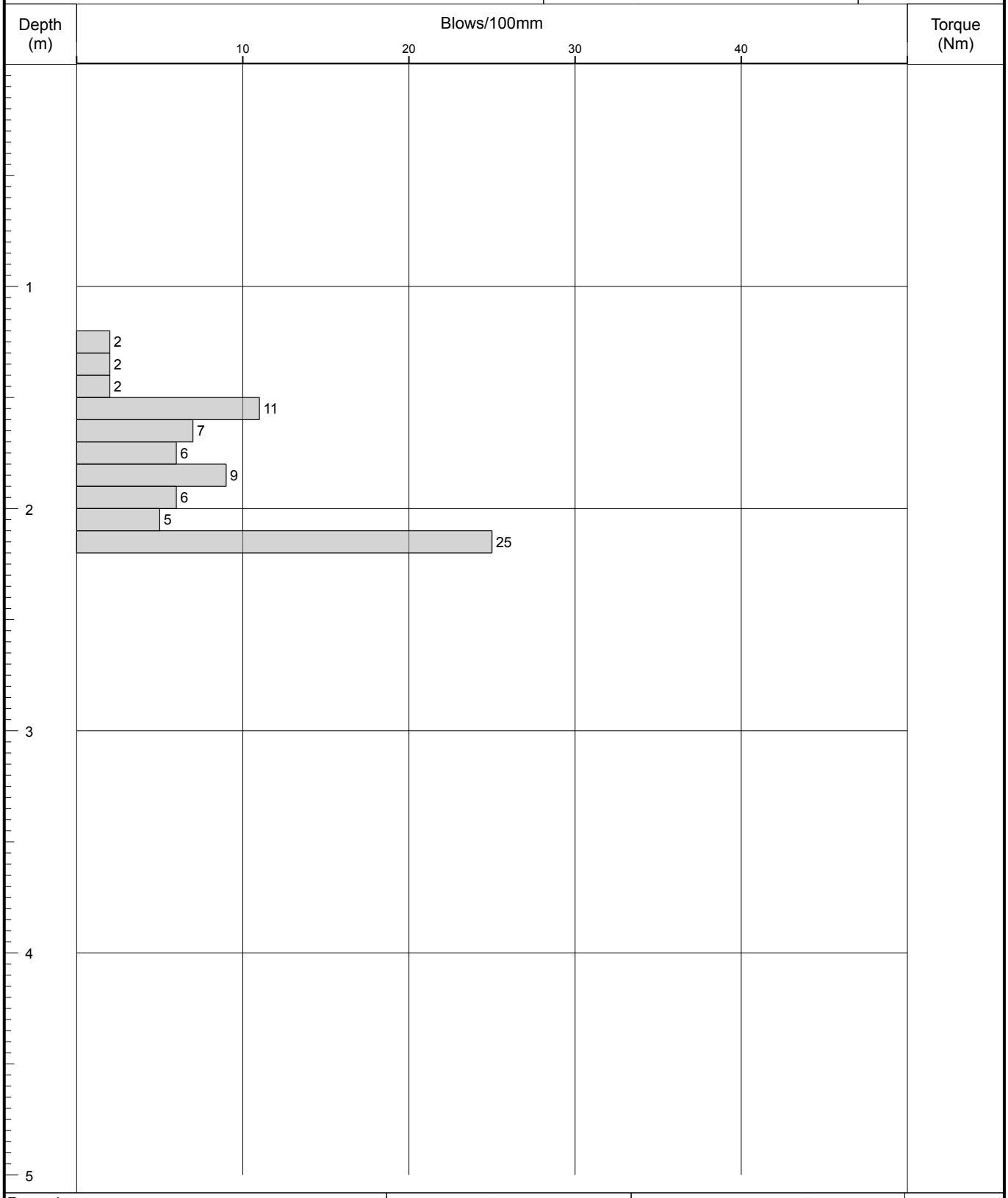
Remarks

Fall Height	500	Cone Base Diameter	50
Hammer Wt	50	Final Depth	2.80
Probe Type	DPH	Log Scale	1:25

Probe Log

Borehole No.
DP02
Sheet 1 of 1

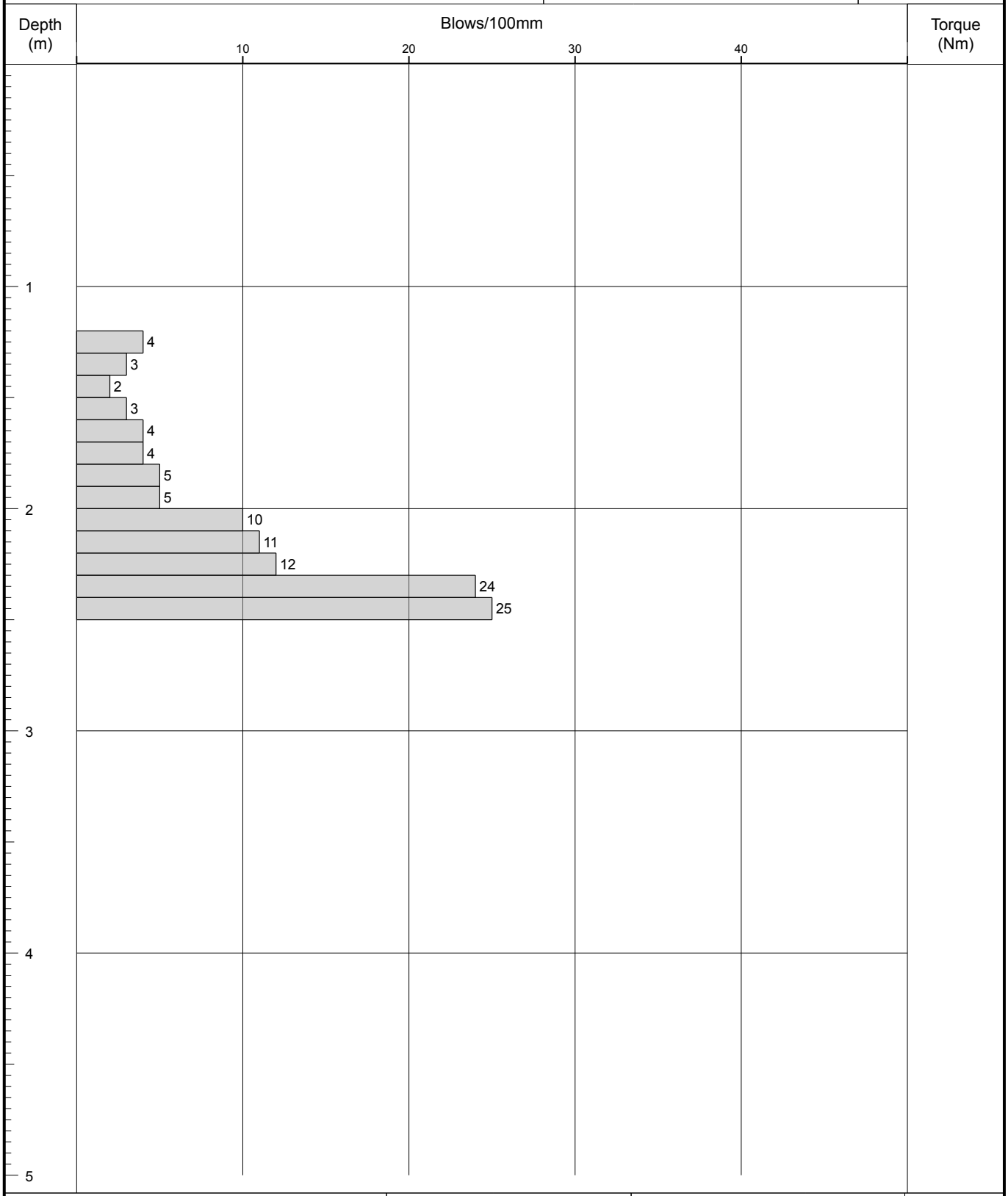
Project Name: Cherry Orchard Apartments	Project No. 20-070	Co-ords: -	Hole Type DP
Location: Cherry Orchard, Dublin 10		Level:	Scale 1:25
Client: Comhairle Cathrach Bhaile Átha Cliath / Dublin City Council		Dates: 23/08/2021 -	Logged By



Remarks				
	Fall Height	500	Cone Base Diameter	50
	Hammer Wt	50	Final Depth	2.20
	Probe Type	DPH	Log Scale	1:25

Probe Log

			Borehole No. **DP03** Sheet 1 of 1
Project Name: Cherry Orchard Apartments	Project No. 20-070	Co-ords: -	Hole Type DP
Location: Cherry Orchard, Dublin 10		Level:	Scale 1:25
Client: Comhairle Cathrach Bhaile Átha Cliath / Dublin City Council		Dates: 23/08/2021 -	Logged By

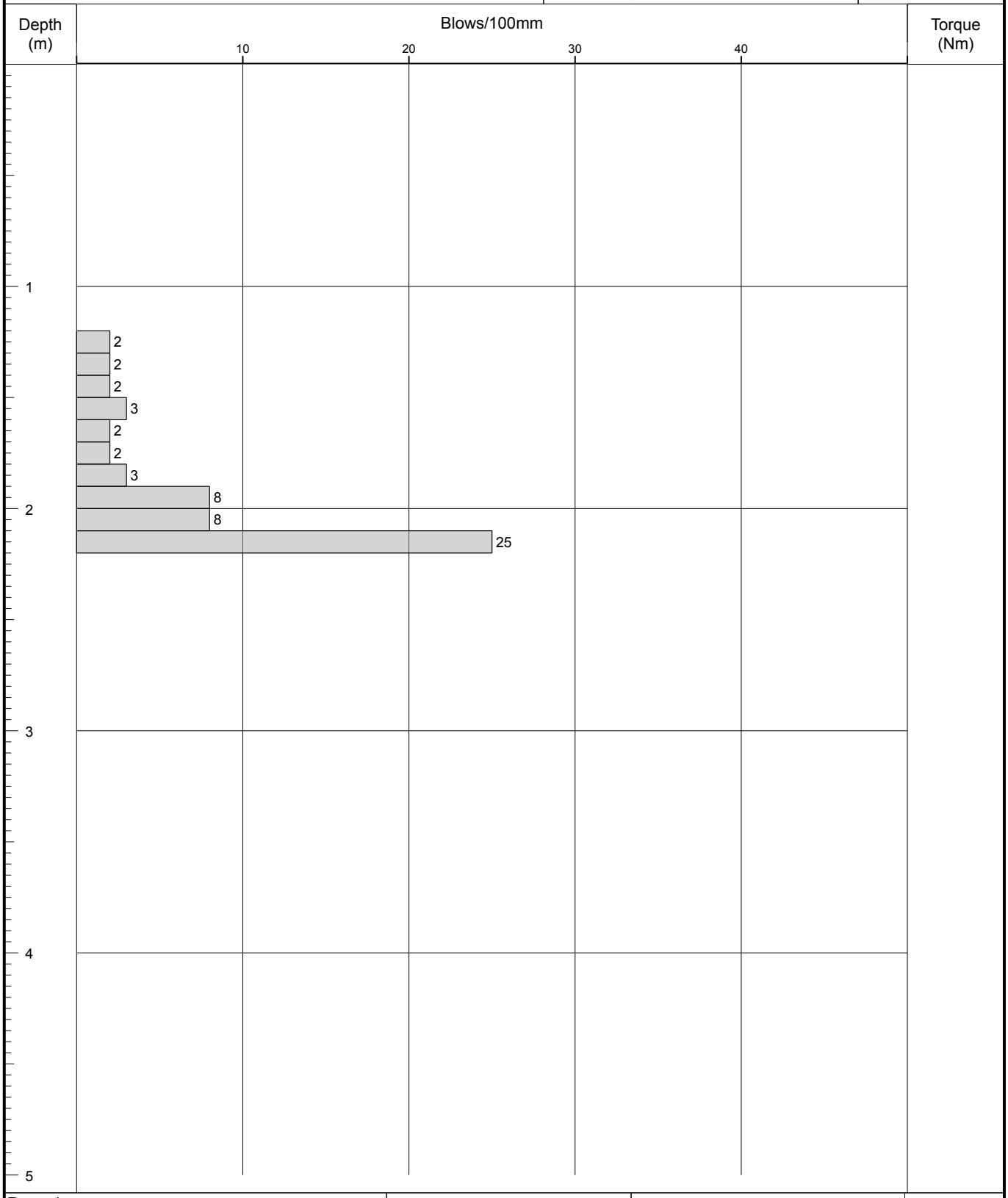


Remarks	Fall Height	500	Cone Base Diameter	50
	Hammer Wt	50	Final Depth	2.50
	Probe Type	DPH	Log Scale	1:25

Probe Log

Borehole No.
DP04
Sheet 1 of 1

Project Name: Cherry Orchard Apartments	Project No. 20-070	Co-ords: -	Hole Type DP
Location: Cherry Orchard, Dublin 10		Level:	Scale 1:25
Client: Comhairle Cathrach Bhaile Átha Cliath / Dublin City Council		Dates: 23/08/2021 -	Logged By



Remarks

Fall Height	500	Cone Base Diameter	50
Hammer Wt	50	Final Depth	2.20
Probe Type	DPH	Log Scale	1:25

Appendix D Trial Pit Logs

Project No.: 20-070	**Project Name:** Cherry Orchard Apartments		**Trial Pit No.:** **TP01**
Co-ordinates: E N	**Client:** Comhairle Cathrach Bhaile Átha Cliath / Dublin City Council		Sheet 1 of 1
Method: Excavation	**Client's Representative:** Hayes Higgins Partnership		**Scale:** 1:20
Plant: 8t Tracked Excavator	**Ground Level:** mOD	**Date:** 21/07/2021	**Driver:** NG **Logger:** ST

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water
				(0.50)		TOPSOIL	
0.50 0.50	B1 ES2			(0.00)		CONCRETE slab obstruction. Pit was extended but concrete slab was continuous. Trial Pit terminated. End of trial pit at 0.500m	

0.5
1.0
1.5
2.0
2.5
3.0
3.5

Remarks
Trial Pit terminated at 0.50m on concrete slab obstruction.

Water Strikes:

Struck at (m):	Remarks:
	None Encountered

Stability: Good

Width: 2.00

Length: 3.00

Project No.: 20-070	**Project Name:** Cherry Orchard Apartments		**Trial Pit No.:** **TP02**
Co-ordinates: E	**Client:** Comhairle Cathrach Bhaile Átha Cliath / Dublin City Council		Sheet 1 of 1
Method: Excavation	**Client's Representative:** Hayes Higgins Partnership		**Scale:** 1:20
Plant: 8t Tracked Excavator	**Ground Level:** mOD	**Date:** 21/07/2021	**Driver:** NG / **Logger:** ST

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water
				(0.40)		MADE GROUND / TOPSOIL	
				0.40 (0.10)		Tarmacadam (Former surfacing)	
0.50	B1			0.50		MADE GROUND: Firm greyish brown slightly sandy slightly gravelly CLAY with low cobble content and occasional rootlets, moist. Some cobble size tarmac fragments. Sand fine to coarse. Gravel fine to coarse, angular to subangular.	
0.50	ES2			(0.40)			
				0.90		Firm olive brown with a little orange brown mottling slightly sandy slightly gravelly silty CLAY with low cobble content, moist. Sand fine to coarse. Gravel fine to coarse. Gravel and cobbles mostly angular to subangular, dark grey weathering to dark brown siltstone and limestone. Below 2.5m becoming greyish brown with some weathering to olive brown.	
1.50	B3						
1.50	ES4						
				(2.20)			
2.50	B5						
2.50	ES6						
3.10	B7			3.10		Firm greyish brown slightly sandy slightly gravelly to gravelly silty CLAY with medium cobble content and low small boulder content, moist. Sand fine to coarse. Gravel fine to coarse, angular to subrounded. Cobbles and boulders mostly subangular, dark grey limestone and siltstone.	
				(0.60)			
				(3.70)		Possible BEDROCK	
						End of trial pit at 3.700m	

Remarks
Trial Pit terminated at 3.70m on possible bedrock obstruction.

Water Strikes:

Struck at (m):	Remarks:
	None Encountered

Stability: Good

Width: 0.70

Length: 3.00

Project No.: 20-070	**Project Name:** Cherry Orchard Apartments		**Trial Pit No.:** TP03
Co-ordinates: E	**Client:** Comhairle Cathrach Bhaile Átha Cliath / Dublin City Council		Sheet 1 of 1
Method: Excavation	**Client's Representative:** Hayes Higgins Partnership		**Scale:** 1:20
Plant: 8t Trackled Excavator	**Ground Level:** mOD	**Date:** 21/07/2021	**Driver:** NG / **Logger:** ST

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water
				(0.10) 0.10		TARMACADAM surfacing	
						MADE GROUND / SUBBASE: Greyish brown clayey sandy Gravel with high cobble content, moist. Sand fine to coarse. Gravel fine to coarse. Gravel and cobbles angular to subangular dark grey limestone.	
				(0.60)			
0.50 0.50	B1 ES2						
				0.70		Firm brownish grey to greyish brown with a little olive brown weathering slightly sandy slightly gravelly to gravelly silty CLAY with medium cobble content, low small boulder content and occasional dark brown partially decayed roots. Sand fine to coarse. Gravel fine to coarse, angular to subrounded. Cobbles and boulders mostly subangular to subrounded including much dark grey limestone.	
				(1.40)			
1.50 1.50	B3 ES4						▼
				2.10 (0.10) 2.20		Possible bedrock: Recovered as angular tabular gravel to cobble size fragments of medium strong dark grey muddy Limestone with occasional thin calcite veining, distinctly weathered with some olive green to yellowish brown discolouration along incipient fractures.	
						End of trial pit at 2.200m	

Remarks
Trial Pit terminated at 2.20m on possible bedrock obstruction.

Water Strikes:

Struck at (m):	Remarks:
2.00	

Stability: Moderate

Width: 1.00

Length: 3.00

Project No.: 20-070	**Project Name:** Cherry Orchard Apartments		**Trial Pit No.:** **TP04**
Co-ordinates: E	**Client:** Comhairle Cathrach Bhaile Átha Cliath / Dublin City Council		Sheet 1 of 1
Method: Excavation	**Client's Representative:** Hayes Higgins Partnership	N	**Scale:** 1:20
Plant: 8t Tracked Excavator	**Ground Level:** mOD	**Date:** 21/07/2021	**Driver:** NG / **Logger:** ST

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water
				(0.10) 0.10		TARMACADAM surfacing	
				(0.30) 0.40		MADE GROUND: Coarse granular subbase.	
0.50 0.50	B1 ES2			(0.50) 0.90		MADE GROUND: Greyish brown with a little yellowish brown slightly sandy slightly gravelly silty Clay with low cobble content and a trace of wood, plastic and red brick or claystone fragments. Sand fine to coarse. Gravel fine to coarse. Gravel and cobbles angular to subrounded., including dark grey limestone.	
1.50 1.50	B3 ES4			(1.20) 2.10		Firm greyish brown with a little yellowish brown weathering slightly sandy slightly gravelly silty CLAY with low cobble content, moist. Sand fine to coarse. Gravel fine to coarse. Gravel and cobbles and boulders mostly subangular, dark grey limestone and siltstone.	
						Possible BEDROCK. End of trial pit at 2.100m	

Remarks
Trial Pit terminated at 2.10m on possible bedrock obstruction.

Water Strikes:

Struck at (m):	Remarks:
	None Encountered

Stability: Good

Width: 1.00

Length: 3.00

Project No.: 20-070	**Project Name:** Cherry Orchard Apartments		**Trial Pit No.:** TP05
Co-ordinates: E	**Client:** Comhairle Cathrach Bhaile Átha Cliath / Dublin City Council		Sheet 1 of 1
Method: Excavation	**Client's Representative:** Hayes Higgins Partnership	N	**Scale:** 1:20
Plant: 8t Tracked Excavator	**Ground Level:** mOD	**Date:** 21/07/2021	**Driver:** NG / **Logger:** ST

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water
				(0.10) 0.10		TARMACADAM surfacing	
				(0.20) 0.30		MADE GROUND: Slightly sandy slightly clayey coarse GRAVEL.	
0.50 0.50	B1 ES2			(0.50) 0.80		Firm greyish brown with a little yellowish brown slightly sandy slightly gravelly silty CLAY with low cobble and boulder content and a trace of red brick or claystone and white possible mortar fragments, moist. Sand fine to coarse. Gravel fine to coarse, angular to subrounded. Cobbles and boulders mostly subangular, (Possible partially disturbed native soil)	
1.50 1.50	B3 ES4			(1.60)		Firm greyish brown with a little yellowish brown weathering slightly sandy slightly gravelly silty CLAY with low cobble and small boulder content, moist. Sand fine to coarse. Gravel fine to coarse. Gravel, cobbles and boulders mostly subangular, occasionally subrounded, mostly dark grey limestone and siltstone.	
				(2.40)		Possible BEDROCK End of trial pit at 2.400m	

Remarks
Trial Pit terminated at 2.40m on possible bedrock obstruction.

Water Strikes:

Struck at (m):	Remarks:
	None Encountered

Stability: Good

Width: 0.50

Length: 3.00

Project No.: 20-070	**Project Name:** Cherry Orchard Apartments		**Trial Pit No.:** TP06
Co-ordinates: E	**Client:** Comhairle Cathrach Bhaile Átha Cliath / Dublin City Council		Sheet 1 of 1
Method: Excavation	**Client's Representative:** Hayes Higgins Partnership	N	**Scale:** 1:20
Plant: 8t Tracked Excavator	**Ground Level:** mOD	**Date:** 21/07/2021	**Driver:** NG / **Logger:** ST

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water
				(0.10) 0.10		TARMACADAM surfacing	
				(0.20) 0.30		MADE GROUND: Brown slightly sandy slightly clayey subangular coarse GRAVEL.	
0.50	B1					Firm olive brown to yellowish brown slightly sandy slightly gravelly silty CLAY with low cobble and small boulder content, moist. Sand fine to coarse. Gravel fine to coarse. Gravel, cobbles and boulders mostly subangular mostly dark grey limestone and siltstone.	
0.50	ES2			(0.50) 0.80			
						Firm greyish brown with a little yellowish brown mottling slightly sandy slightly gravelly silty CLAY with low cobble and small boulder content, moist. Sand fine to coarse. Gravel fine to coarse. Gravel, cobbles and boulders mostly subangular, occasionally subrounded, mostly dark grey limestone and siltstone.	
1.50	B3						
1.50	ES4			(1.50) 2.30			
2.30	B5					Firm dark brown gravelly CLAY with cobbles and boulders.	
2.30	ES6			(0.10) 2.40		Possible BEDROCK: Recovered as angular tabular gravel to cobble size fragments of weak to medium strong dark greyish brown Siltstone.	
						End of trial pit at 2.400m	

Remarks
Trial Pit terminated at 2.40m on possible bedrock obstruction.

Water Strikes:

Struck at (m):	Remarks:
2.40	

Stability: Good

Width: 0.50

Length: 4.00

Project No.: 20-070	**Project Name:** Cherry Orchard Apartments		**Trial Pit No.:** TP07
Co-ordinates: E N	**Client:** Comhairle Cathrach Bhaile Átha Cliath / Dublin City Council		Sheet 1 of 1
Method: Excavation	**Client's Representative:** Hayes Higgins Partnership		**Scale:** 1:20
Plant: 8t Tracked Excavator	**Ground Level:** mOD	**Date:** 22/07/2021	**Driver:** NG **Logger:** ST

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water
				(0.25)		CONCRETE surfacing	
				0.25		MADE GROUND: Coarse granular subbase.	
				(1.25)			
1.50 1.50	B1 ES2			1.50		Firm greyish brown with some yellowish brown weathering slightly sandy slightly gravelly silty CLAY with low cobble content, moist. Sand fine to coarse. Gravel fine to coarse. Gravel and cobbles mostly subangular, including much dark grey limestone and siltstone.	
				(0.50)			
				(2.00)		Possible SILTSTONE bedrock End of trial pit at 2.000m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5

Remarks
Trial Pit terminated at 2.00m on possible bedrock obstruction.

Water Strikes:	
Struck at (m):	Remarks:
	None Encountered

Stability: Good

Width: 0.50

Length: 3.00

Project No.: 20-070	**Project Name:** Cherry Orchard Apartments		**Trial Pit No.:** **TP08**
Co-ordinates: E	**Client:** Comhairle Cathrach Bhaile Átha Cliath / Dublin City Council		Sheet 1 of 1
Method: Excavation	**Client's Representative:** Hayes Higgins Partnership	N	**Scale:** 1:20
Plant: 8t Tracked Excavator	**Ground Level:** mOD	**Date:** 22/07/2021	**Driver:** NG / **Logger:** ST

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water
				(0.25)		CONCRETE surfacing	
				0.25 (0.10)		Clause 804 subbase.	
				0.35 (0.30)		TARMACADAM	
				0.65 (0.55)		MADE GROUND: Coarse GRAVEL	
				1.20		Firm olive brown with a little yellowish brown mottling slightly gravelly sandy silty CLAY with low cobble content, moist. Sand mostly fine to medium. Gravel fine to coarse. Gravel and cobbles mostly subangular dark grey limestone and siltstone.	
1.50 1.50	B1 D2			(1.30)			
2.50 2.50	B3 D4			2.50 (0.50)		Firm brownish grey with a little olive grey to yellowish brown weathering slightly sandy slightly gravelly silty CLAY with low cobble and small boulder content and occasional dark brown partially decayed roots, moist. Sand fine to coarse. Gravel fine to coarse. Gravel and cobbles mostly subangular dark grey limestone.	
				(0.50)		Possible BEDROCK End of trial pit at 3.000m	

Remarks
Trial Pit terminated at 3.00m on possible bedrock obstruction.

Water Strikes:	
Struck at (m):	Remarks:
	None Encountered

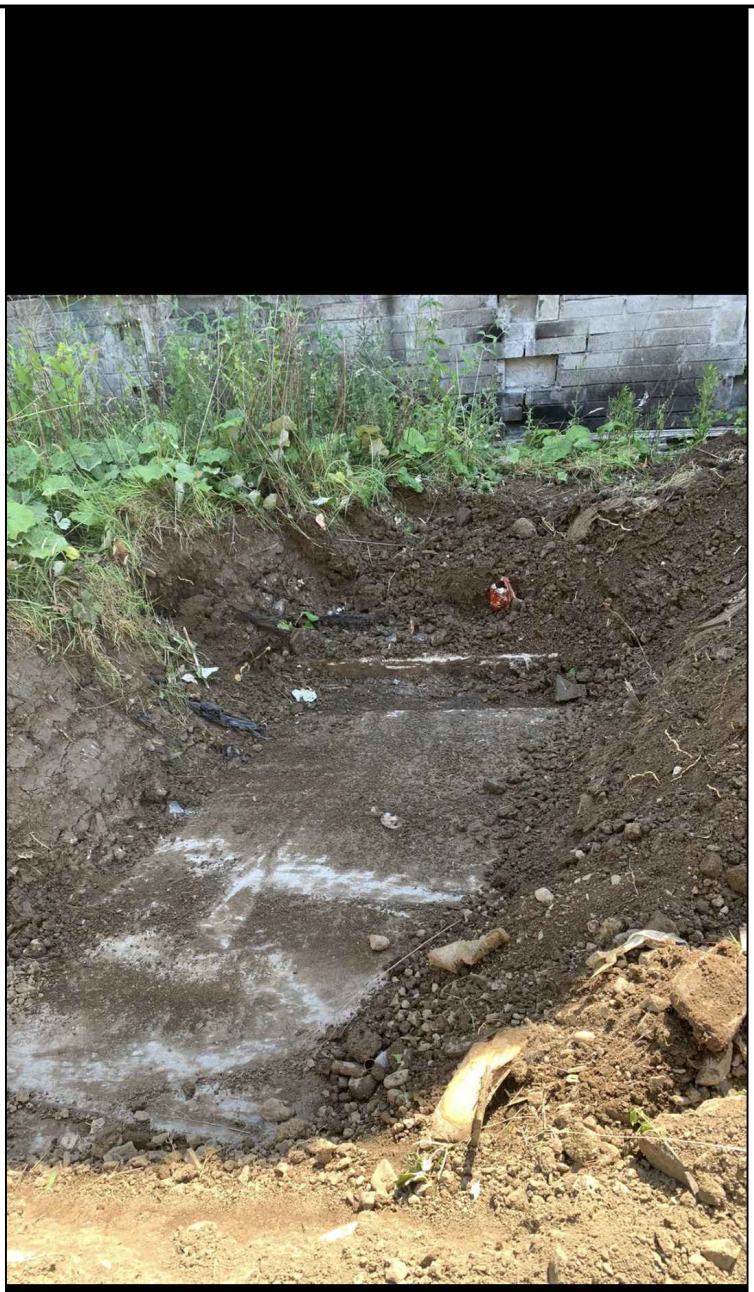
Stability: Good

Width: 0.50

Length: 3.00

Appendix E Trial Pit Photographs

Cherry Orchard Apartments	T.PIT1
	Trial Pit Photographs
	Client: Dublin City Council
	Engineer: Hayes Higgins Partnership
	Date: August 2021



	T.PIT1
	Trial Pit Photographs
Cherry Orchard Apartments	Client: Dublin City Council
	Engineer: Hayes Higgins Partnership
	Date: August 2021

Cherry Orchard Apartments

T.PIT1

Trial Pit Photographs

Client: Dublin City Council

Engineer: Hayes Higgins Partnership

Date: August 2021

Cherry Orchard Apartments

T.PIT2

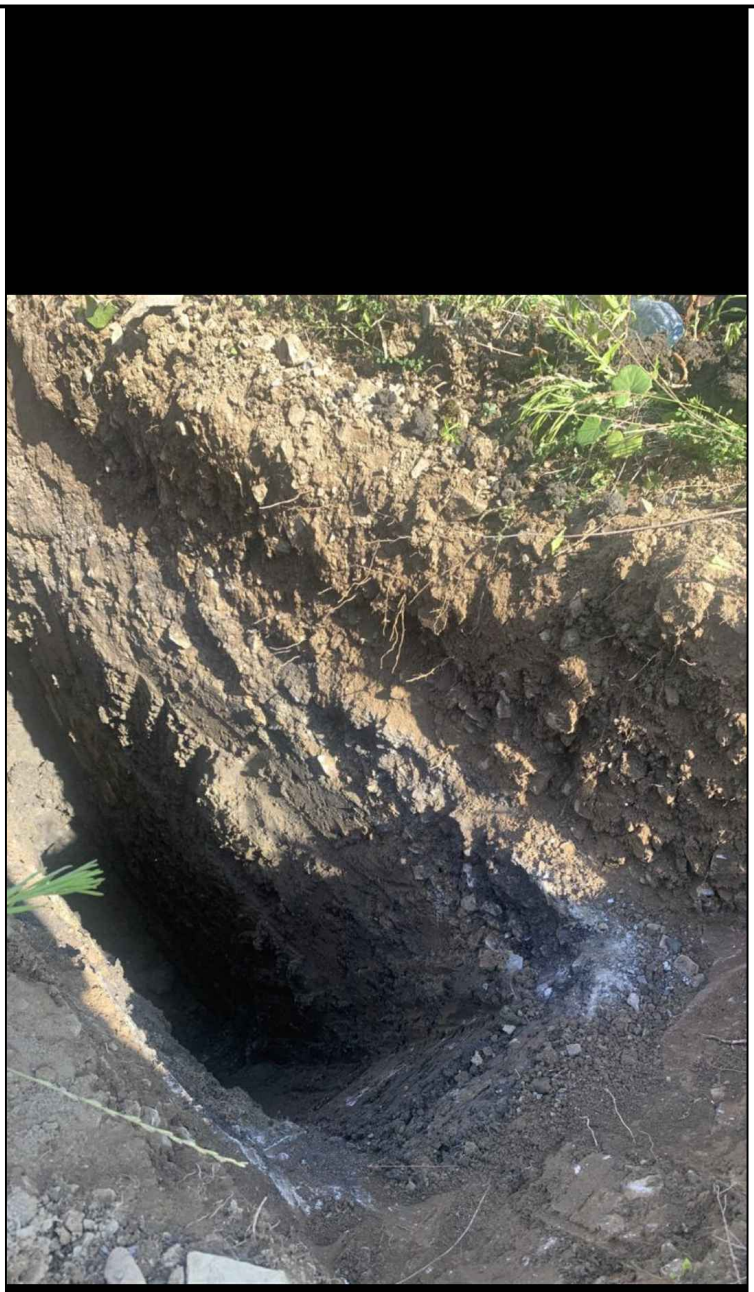
Trial Pit Photographs

Client: Dublin City Council

Engineer: Hayes Higgins Partnership

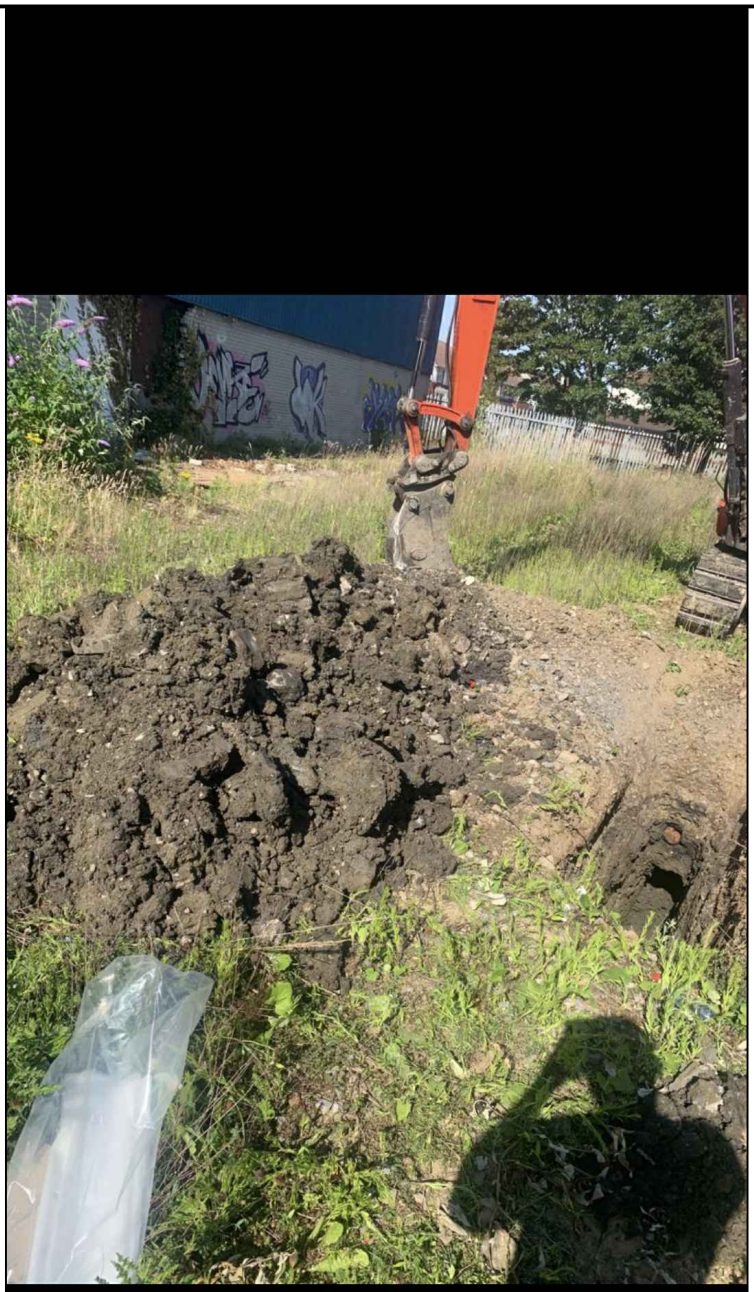
Date: August 2021

ocbgeo	Cherry Orchard Apartments	T.PIT2
		Trial Pit Photographs
		Client: Dublin City Council
		Engineer: Hayes Higgins Partnership
		Date: August 2021



ocbgeo	Cherry Orchard Apartments	T.PIT2 Trial Pit Photographs Client: Dublin City Council Engineer: Hayes Higgins Partnership Date: August 2021

ocbgeo	Cherry Orchard Apartments	T.PIT2
		Trial Pit Photographs
		Client: Dublin City Council
		Engineer: Hayes Higgins Partnership
		Date: August 2021



ocbgeo	Cherry Orchard Apartments	T.PIT2 Trial Pit Photographs Client: Dublin City Council Engineer: Hayes Higgins Partnership Date: August 2021

ocbgeo	Cherry Orchard Apartments	T.PIT2
		Trial Pit Photographs
		Client: Dublin City Council
		Engineer: Hayes Higgins Partnership
		Date: August 2021

ocbgeo	Cherry Orchard Apartments	T.PIT2
		Trial Pit Photographs
		Client: Dublin City Council
		Engineer: Hayes Higgins Partnership
		Date: August 2021

Cherry Orchard Apartments

T.PIT3

Trial Pit Photographs

Client: Dublin City Council

Engineer: Hayes Higgins Partnership

Date: August 2021

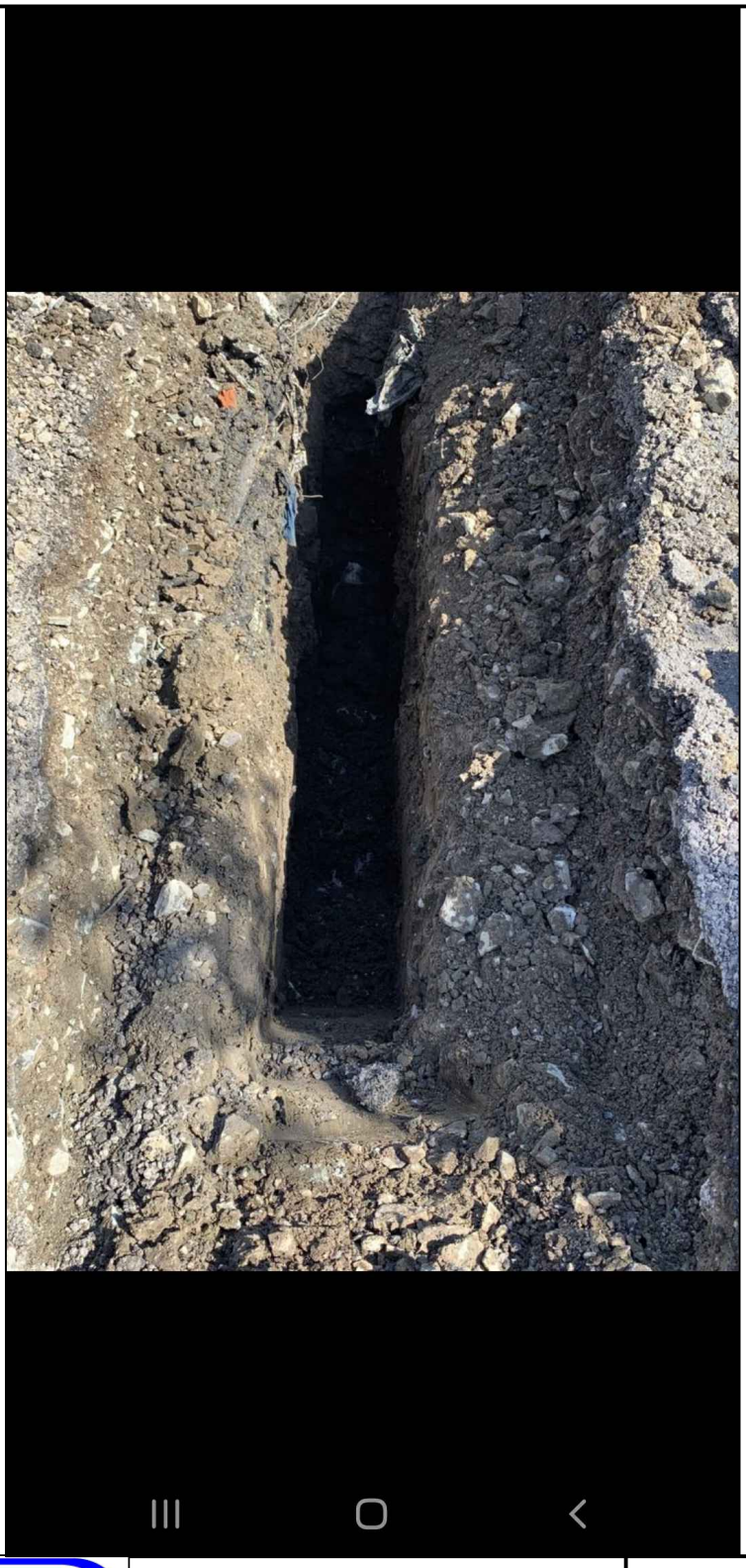
ocbgeo	Cherry Orchard Apartments	T.PIT3
		Trial Pit Photographs
		Client: Dublin City Council
		Engineer: Hayes Higgins Partnership
		Date: August 2021

ocbgeo	Cherry Orchard Apartments	T.PIT3
		Trial Pit Photographs
		Client: Dublin City Council
		Engineer: Hayes Higgins Partnership
		Date: August 2021

ocbgeo	Cherry Orchard Apartments	T.PIT3
		Trial Pit Photographs
		Client: Dublin City Council
		Engineer: Hayes Higgins Partnership
		Date: August 2021

	T.PIT4
	Trial Pit Photographs
Cherry Orchard Apartments	Client: Dublin City Council
	Engineer: Hayes Higgins Partnership
	Date: August 2021

ocbgeo	Cherry Orchard Apartments	T.PIT4
		Trial Pit Photographs
		Client: Dublin City Council
		Engineer: Hayes Higgins Partnership
		Date: August 2021



ocbgeo	Cherry Orchard Apartments	T.PIT4
		Trial Pit Photographs
		Client: Dublin City Council
		Engineer: Hayes Higgins Partnership
		Date: August 2021

ocbgeo	Cherry Orchard Apartments	T.PIT4
		Trial Pit Photographs
		Client: Dublin City Council
		Engineer: Hayes Higgins Partnership
		Date: August 2021

	T.PIT5
Cherry Orchard Apartments	Trial Pit Photographs
	Client: Dublin City Council
	Engineer: Hayes Higgins Partnership
	Date: August 2021

Cherry Orchard Apartments

T.PIT5

Trial Pit Photographs

Client: Dublin City Council

Engineer: Hayes Higgins Partnership

Date: August 2021

Cherry Orchard Apartments

T.PIT5

Trial Pit Photographs

Client: Dublin City Council

Engineer: Hayes Higgins Partnership

Date: August 2021

Cherry Orchard Apartments

T.PIT5

Trial Pit Photographs

Client: Dublin City Council

Engineer: Hayes Higgins Partnership

Date: August 2021

Cherry Orchard Apartments

T.PIT5

Trial Pit Photographs

Client: Dublin City Council

Engineer: Hayes Higgins Partnership

Date: August 2021

Cherry Orchard Apartments

T.PIT6

Trial Pit Photographs

Client: Dublin City Council

Engineer: Hayes Higgins Partnership

Date: August 2021

Cherry Orchard Apartments

T.PIT6

Trial Pit Photographs

Client: Dublin City Council

Engineer: Hayes Higgins Partnership

Date: August 2021

Cherry Orchard Apartments

T.PIT6

Trial Pit Photographs

Client: Dublin City Council

Engineer: Hayes Higgins Partnership

Date: August 2021

Cherry Orchard Apartments

T.PIT6

Trial Pit Photographs

Client: Dublin City Council

Engineer: Hayes Higgins Partnership

Date: August 2021

Cherry Orchard Apartments

T.PIT7

Trial Pit Photographs

Client: Dublin City Council

Engineer: Hayes Higgins Partnership

Date: August 2021

	Cherry Orchard Apartments	T.PIT7
		Trial Pit Photographs
		Client: Dublin City Council
		Engineer: Hayes Higgins Partnership
		Date: August 2021

Cherry Orchard Apartments

T.PIT8

Trial Pit Photographs

Client: Dublin City Council

Engineer: Hayes Higgins Partnership

Date: August 2021

Cherry Orchard Apartments

T.PIT8

Trial Pit Photographs

Client: Dublin City Council

Engineer: Hayes Higgins Partnership

Date: August 2021

Cherry Orchard Apartments

T.PIT8

Trial Pit Photographs

Client: Dublin City Council

Engineer: Hayes Higgins Partnership

Date: August 2021

Cherry Orchard Apartments

T.PIT8

Trial Pit Photographs

Client: Dublin City Council

Engineer: Hayes Higgins Partnership

Date: August 2021

Cherry Orchard Apartments

T.PIT8

Trial Pit Photographs

Client: Dublin City Council

Engineer: Hayes Higgins Partnership

Date: August 2021

Appendix F Infiltration Test Data

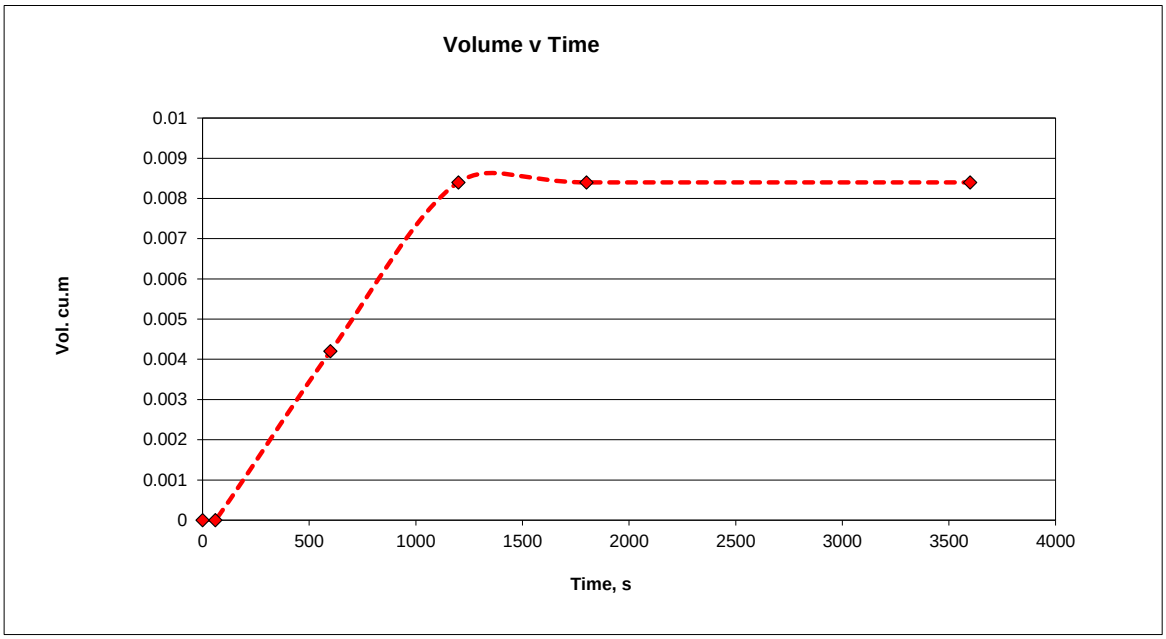
INFILTRATION TEST DATA *OCB Geotechnical Ltd*

Project Name	Cherry Orchard			**Date**	22/07/21
Project No.	20-070			**Location**	SA01
Easting		**Northing**		**Level**	

Length (m)	**2.2**	Width (m)	**0.6**	Depth (m)	**1.5**
Length Base (m)	**0.7**			Effective Depth (m)	**1.0**
Effective Length (m)	**1.45**				

	Time (min)	Measure (m)	Time (s)	Depth (m)	Fall (m)	Volume (m^3)
Start	0	0.500	0	1	0	0
	1	0.500	60	1	0	0
	10	0.510	600	0.990	0.01	0.0042
	20	0.520	1200	0.980	0.02	0.0084
	30	0.520	1800	0.980	0.02	0.0084
	60	0.52	3600	0.98	0.02	0.0084

Area	0.42 m^2	$V_{p75\text{-}25\ theory}$	volume	0.435	m^3
50% Area_eff, a_{p50}	2.47 m^2	$V_{p75\text{-}25}$	volume		m^3
		$t_{p\ 75\text{-}25}$	time		s
		Infiltration Coefficient	***f***		ms^{-1}



NOTES:
The water level did not fall sufficiently in order to calculate an Infiltration Coefficient

INFILTRATION TEST DATA *OCB Geotechnical Ltd*

Project Name	Cherry Orchard			**Date**	22/07/21
Project No.	20-070			**Location**	SA02
Easting		**Northing**		**Level**	

Length (m)	**2.5**	Width (m)	**1.2**	Depth (m)	**1.5**
Length Base (m)	**0.9**			Effective Depth (m)	
Effective Length (m)	**1.7**				

NOTES:
The water was draining faster than it could be filled. Test not possible.

Appendix G Indirect CBR Test Results

Dynamic Cone Penetrometer (DCP) test results and estimated CBR

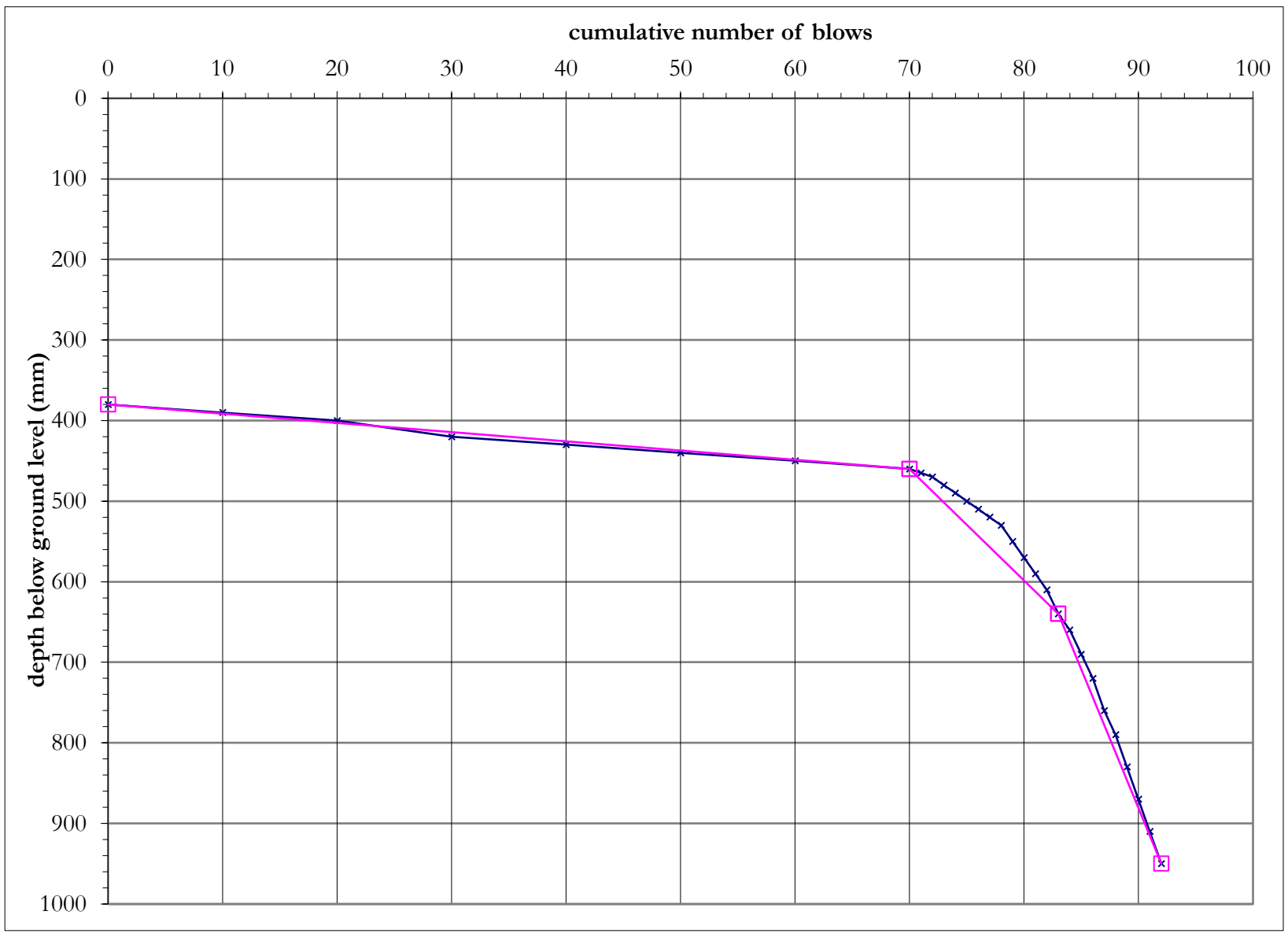
Project Number	20-070
Project Name	Cherry Orchard
Site Location	Cherry Orchard, Palmerstown, Dublin

Test Number	CBR1
Depth bgl (m)	0.38m

Date Tested	30/07/2021
Weather	Dry

Test conducted in accordance with Documented In-House Technical Procedure IMS TP7-4.
CBR calculated using the TRL equation: log10(CBR) = 2.48 - 1.057 x log10(mm/blow) iaw IAN 73/06 Rev 1 2009.

Surface preparation	Description of surface material at test depth
none - test undertaken as per insitu conditions	Made ground - brown clay



top / base of layer (mm)	mm/ blow	CBR (%)
0	1.1	>100
460		
460	14	19
640		
640	34	7.2
950		

CBR Range	Min: 7.2 Max: >100	The selection of layers is based on visual interpretation of the data. The insitu DCP reading (mm/blow) and CBR values are valid at the time of testing; variation in moisture content or other factors may affect the insitu value.

Deviation(s) from standard procedure	None

Observations and comments	DCP test complete over full length of test

Approved Name and Appointment		
Paul McNamara Director		August 2021

Dynamic Cone Penetrometer (DCP) test results and estimated CBR

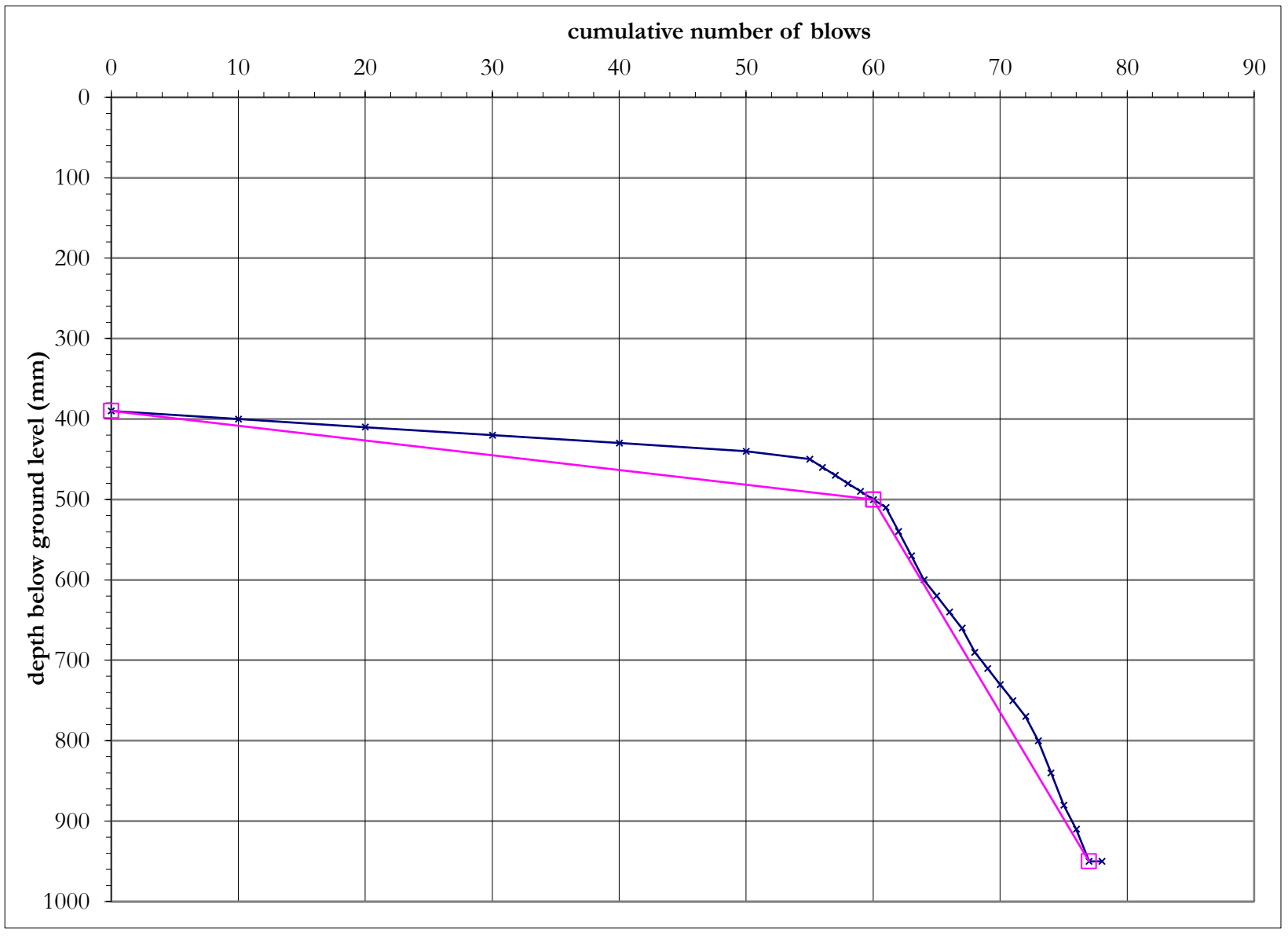
Project Number	20-070
Project Name	Cherry Orchard
Site Location	Cherry Orchard, Palmerstown, Dublin

Test Number	CBR02
Depth bgl (m)	0.39m

Date Tested	30/07/2021
Weather	Dry

Test conducted in accordance with Documented In-House Technical Procedure IMS TP7-4.
CBR calculated using the TRL equation: log10(CBR) = 2.48 - 1.057 x log10(mm/blow) iaw IAN 73/06 Rev 1 2009.

Surface preparation	Description of surface material at test depth
none - test undertaken as per insitu conditions	Made ground - brown clay



top / base of layer (mm)	mm/ blow	CBR (%)
0	1.8	>100
500		
500	26	9.5
950		

CBR Range	Min: 9.5 Max: >100	The selection of layers is based on visual interpretation of the data. The insitu DCP reading (mm/blow) and CBR values are valid at the time of testing; variation in moisture content or other factors may affect the insitu value.

Deviation(s) from standard procedure	None

Observations and comments	DCP test complete over full length of test

Approved Name and Appointment		
Paul McNamara Director		August 2021

Dynamic Cone Penetrometer (DCP) test results and estimated CBR

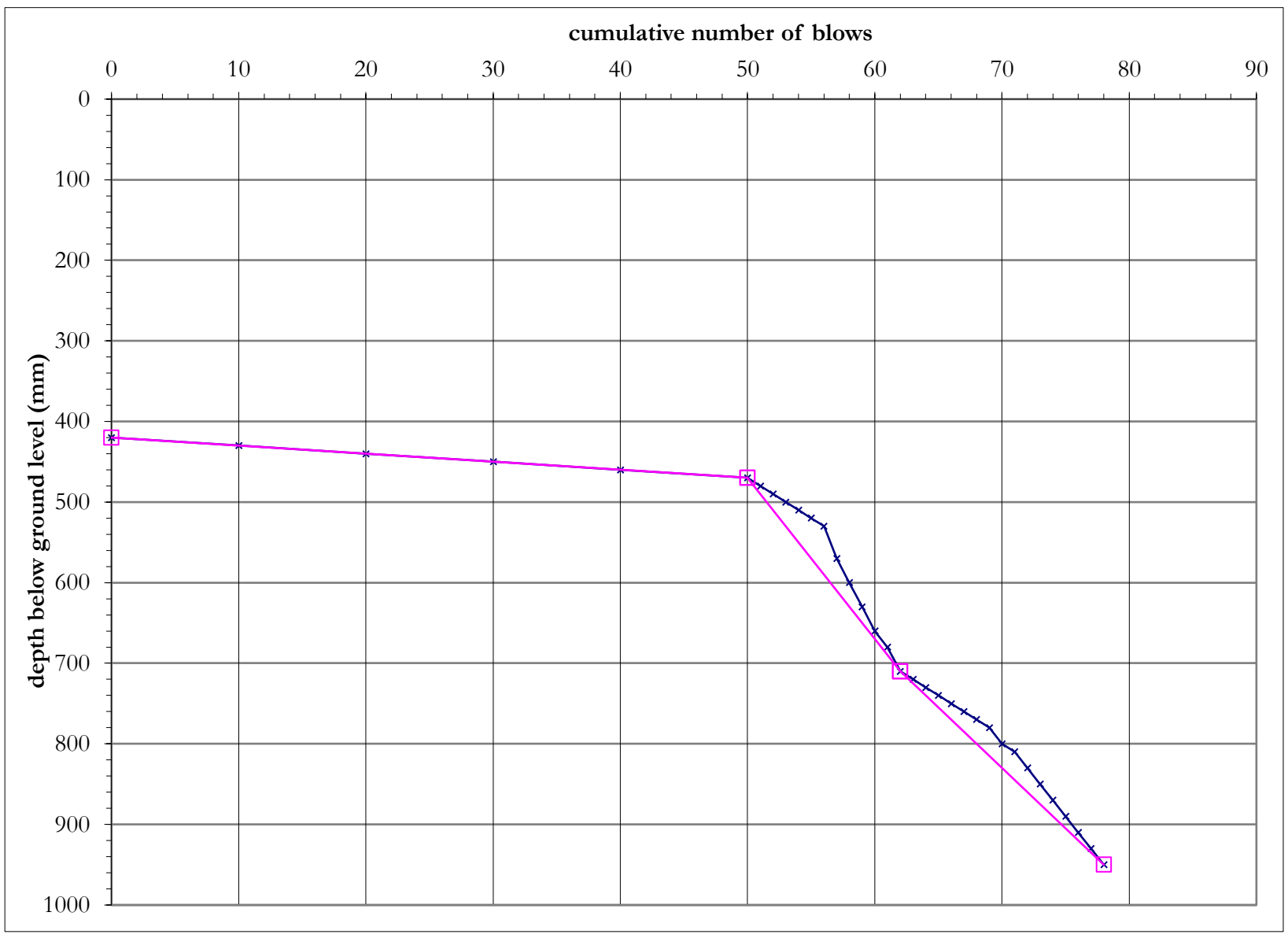
Project Number	20-070
Project Name	Cherry Orchard
Site Location	Cherry Orchard, Palmerstown, Dublin

Test Number	CBR03
Depth bgl (m)	0.42m

Date Tested	30/07/2021
Weather	Dry

Test conducted in accordance with Documented In-House Technical Procedure IMS TP7-4.
CBR calculated using the TRL equation: log10(CBR) = 2.48 - 1.057 x log10(mm/blow) iaw IAN 73/06 Rev 1 2009.

Surface preparation	Description of surface material at test depth
none - test undertaken as per insitu conditions	Made ground - brown clay



top / base of layer (mm)	mm/ blow	CBR (%)
0	1	>100
470		
470	20	13
710		
710	15	17
950		

CBR Range	Min: 13 Max: >100	The selection of layers is based on visual interpretation of the data. The insitu DCP reading (mm/blow) and CBR values are valid at the time of testing; variation in moisture content or other factors may affect the insitu value.

Deviation(s) from standard procedure	None

Observations and comments	DCP test complete over full length of test

Approved Name and Appointment		
Paul McNamara Director		August 2021

Dynamic Cone Penetrometer (DCP) test results and estimated CBR

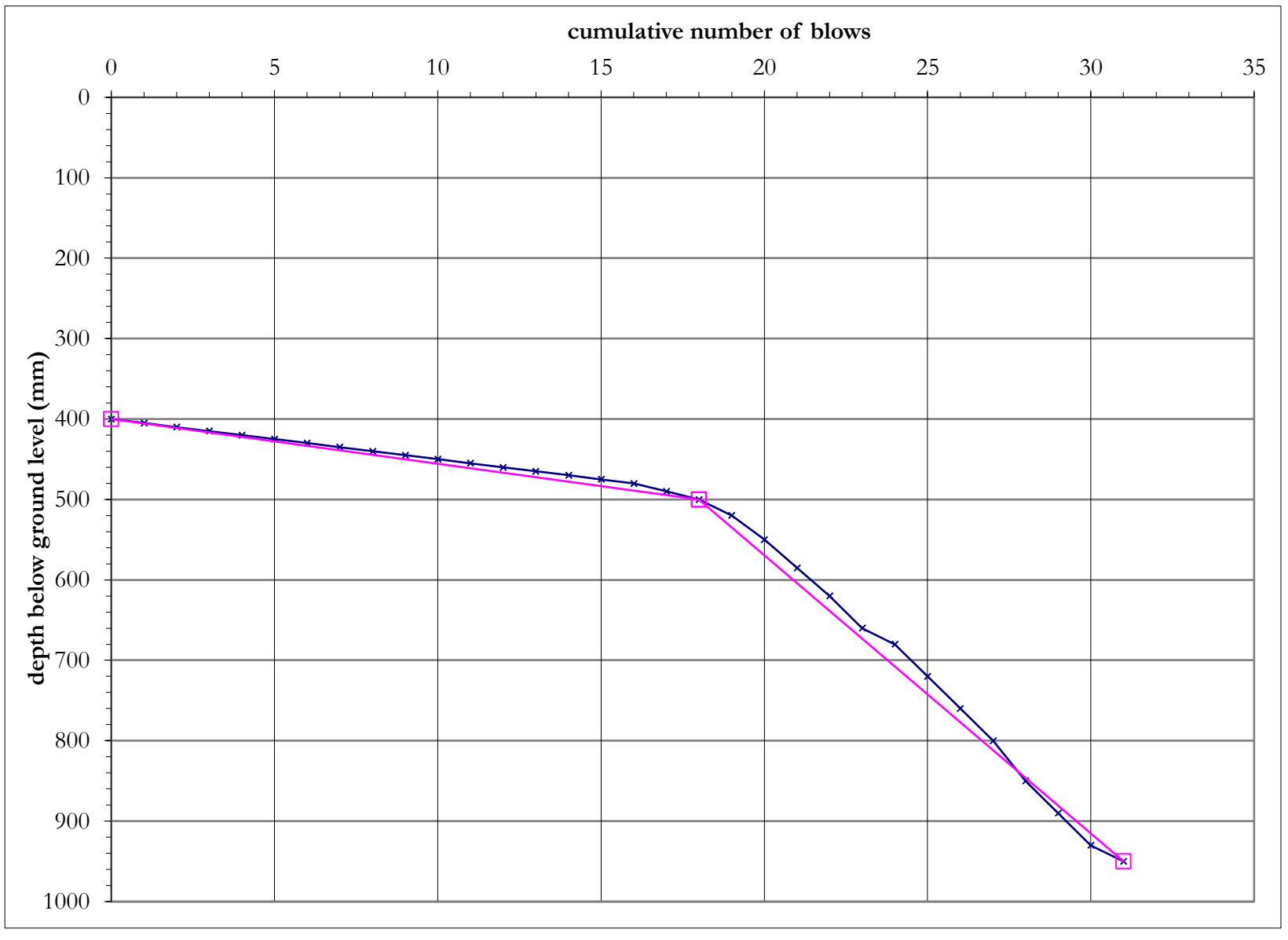
Project Number	20-070
Project Name	Cherry Orchard
Site Location	Cherry Orchard, Palmerstown, Dublin

Test Number	CBR04
Depth bgl (m)	0.40

Date Tested	30/07/2021
Weather	Dry

Test conducted in accordance with Documented In-House Technical Procedure IMS TP7-4.
CBR calculated using the TRL equation: log10(CBR) = 2.48 - 1.057 x log10(mm/blow) iaw IAN 73/06 Rev 1 2009.

Surface preparation	Description of surface material at test depth
none - test undertaken as per insitu conditions	Made ground - brown clay



top / base of layer (mm)	mm/ blow	CBR (%)
0	5.6	49
500		
500	35	7.1
950		

CBR Range	Min: 7.1 Max: 49	The selection of layers is based on visual interpretation of the data. The insitu DCP reading (mm/blow) and CBR values are valid at the time of testing; variation in moisture content or other factors may affect the insitu value.

Deviation(s) from standard procedure	None

Observations and comments	DCP test complete over full length of test

Approved Name and Appointment		
Paul McNamara Director		August 2021

Appendix H Geotechnical Soil Laboratory Test Results

Appendix I Environmental Laboratory Test Results