

Kilkenny County Council

Proposed residential development at Dunningstown Road, Kilkenny

Engineering Services Report

Kilkenny County Council		
	Kilgallen & Partners Consulting Engineers Danville Business Park Co. Kilkenny	
22038-ESR Issue PL1		

REVISION HISTORY

Client	Kilkenny County Council
Project	Proposed residential development at Dunningstown Road, Kilkenny
Title	Engineering Services Report

Date	Detail of Issue	Issue No.	Origin	Checked	Approved
02/06/23	Initial issue	PL1	AC	PB	PB

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Appendix B Rainfall Data – Design for 100-year rainfall event

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1. INTRODUCTION

1.1 Introduction

This report relates to the roads, drainage and water supply services for the proposed development ('the Development') of a site ['the Site'] at Dunningstown Road, Kilkenny, Co. Kilkenny and is submitted in support of an application for Planning Permission for the Development.

The Development comprises 6 no. units together with associated streets, footways, drainage, services, boundary treatment and landscaping.

The following drawings should be read in conjunction with this report:

Drawing No.	Title	Issue
22038-C-DR-101	Roads and Streets – Layout, Longitudinal Section and Details	PL1
22038-C-DR-102	Roads and Streets – Swept Path Analysis	PL1
22038-C-DR-201	Drainage & Water Supply Layout & Longitudinal Sections	PL1
22038-C-DR-202	Drainage – Construction Details	PL1

2. ROADS AND STREETS

The internal road network and long sections through the road centrelines are shown on drawing no. 22038-C-DR-101.

Traffic Calming

The internal access road is relatively short with a pronounced bend and so encourages low speeds. This low-speed environment is enhanced by using it as 'homezone' area for shared pedestrian and vehicle activity.

Sightlines and stopping sight distances are provided in accordance with the requirements of the Design Manual for Urban Roads and Streets (DMURS) for a 30kph design speed.

Drainage and Construction

Surface water run-off from roads will be collected by gullies and from the gullies will discharge to the surface water sewer network. All roads are designed to ensure that sufficient crossfalls and gradients are available to drain all areas of the road network.

Pavement and capping layer depths for internal roads will be determined in accordance with the 'Guide to site development works for housing areas' as published by the Department for the Environment.

3. WASTEWATER

3.1 Collection Network and Outfall

Separate systems will be provided within the development for the collection and disposal of surface water runoff and wastewater.

The wastewater sewer network for the Development will discharge to an existing wastewater sewer which is located in the Talbots Gate housing estate.

A pre-connection enquiry was made to Irish Water for this development (Ref No. CDS22008299). A copy of the Confirmation of Feasibility is provided in Appendix A.

Each house will be served by a separate private foul drain with individual inspection chamber to Irish Water details and which subsequently will discharge directly to a foul sewer in a public area.

Wastewater sewers are to be constructed in accordance with the Irish Water Code of Practice.

3.2 Design of Network

The Development will generate 2,430 litres of wastewater per day. These calculations were submitted as part of the pre-connection enquiry.

Wastewater sewers are designed to comply with the Irish Water Code of Practice for Wastewater

4. SURFACE WATER DRAINAGE

4.1 Collection Network and Outfall

Separate systems will be provided within the development for the collection and disposal of surface water run-off and wastewater.

Each unit will be served by a surface water drainage system for disposal of roof-water run-off.

Surface water sewers will be constructed in accordance with the '*Guide to site development works for housing areas*' as published by the Department of the Environment.

4.2 Design of Network

The rainfall data used in the design is site-specific and was obtained from Met Eireann. In accordance with recommendations of GSDSDS, a climate change factor of 20% was applied to the design of the surface water sewers. This was achieved by applying a 20% factor to the rainfall data obtained from Met Eireann.

The surface water collection networks were designed in accordance with IS EN 752-4: Part 4 '*Drain and sewer systems outside buildings*' as published by the NSAI, to carry the 2 year rainfall event without surcharge. The design was carried out using the industry-standard software package 'Storm and Sanitary Analysis'.

Self-cleansing flows of greater than 0.75m/s are provided generally. This is not always possible at upstream pipe-runs where contributing areas are low. In these cases, minimum gradients of 1:DN are provided, where DN is the internal diameter of the pipe.

Rainfall data used in the design and calculations for the 100-year design storm are provided in Appendix B.

4.3 SUDS Strategy and Compliance with GSDSDS

A ground investigation was carried out to determine the potential of the insitu soils to infiltrate run-off. The investigation found insitu soils to be of good permeability and so it is suited for infiltration of run-off from intense rainfall events. Accordingly, surface water run-off will be collected, stored and discharged as described below. (A copy of the GI report is provided in Appendix C).

The surface water network for the development will discharge to an underground storage are (Stormtech Arch Chambers or similar approved). A porous stone base under these chambers will allow first-flush run-off from rainfall events to infiltrate to ground to the maximum extent that sub-soil permeabilities allow.

In accordance with recommendations of GSDSDS, a climate change factor of 20% has been applied to the design of the surface water sewers. This was achieved by applying a 20% factor to the rainfall data obtained from Met Eireann as described in Section 4.1.

Refer to Appendix B for design calculations.

4.4 Surface Water Drainage System- Operation and Maintenance

The surface water drainage system operates entirely under force of gravity.

Drains and gullies in public areas should be inspected on an annual basis, with covers lifted to ensure that manholes remain accessible. Where the inspection reveals evidence of silt or other deposits, these should be sucked out and disposed of appropriately. However, given the nature of the development and the traffic flows that it will generate, it is not anticipated that significant maintenance measures will be required for this infrastructure.

Maintenance of electrical infrastructure will not be required.

A Safety File for the infrastructure in public areas will be prepared in accordance with the Safety, Health and Welfare at Work (Construction) Regulations. In terms of the operation and maintenance of the surface water drainage system, the Safety File should set out:

- Drawings and details of the surface water drainage system together with a description of how the system operates and how damage or failures of the system will manifest themselves;
- The maintenance regime to be applied, based on the designer's assessment of maintenance requirements and manufacturer's recommendations;
- Designer's assessment of risks in maintenance or repair that may not be obvious to a competent caretaker of remedial works contractor.

5. WATER SUPPLY

5.1 Water Supply Network

The water supply for the development will be taken from the existing water supply network located on the Dunningstown Road.

The Development will generate a demand for potable water of 2,430 litres of wastewater per day.

The water supply network was designed to comply with the Irish Water Code of Practice for Water Supply.

Hydrants and sluice valves are located throughout the network in accordance with the requirements of the "*Site development works for housing areas*" as published by the Department of the Environment.

Air valves will be constructed at all high points on site, with scour valves to be constructed at low points.

APPENDIX A
Irish Water Confirmation of Feasibility

CONFIRMATION OF FEASIBILITY

Andrew Cantwell
Kilgallen & Partners
3 Danville Business Park
Co.Kilkenny
R95VH33

27 February 2023

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

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

www.water.ie

**Our Ref: CDS22008299 Pre-Connection Enquiry
Dunningstown Road, Kilkenny, Kilkenny**

Dear Applicant/Agent,

We have completed the review of the Pre-Connection Enquiry.

Irish Water has reviewed the pre-connection enquiry in relation to a Water & Wastewater connection for a Housing Development of 6 unit(s) at Dunningstown Road, Kilkenny, Kilkenny, (the **Development**).

Based upon the details provided we can advise the following regarding connecting to the networks;

- **Water Connection**
 - Feasible without infrastructure upgrade by Irish Water
 -
- **Wastewater Connection**
 - Feasible without infrastructure upgrade by Irish Water
 - Connection will be via Talbots Court existing third party infrastructure. Permission to connect to this network will be required at application stage.
 - No stormwater will be permitted to enter the wastewater network.

This letter does not constitute an offer, in whole or in part, to provide a connection to any Irish Water infrastructure. Before the Development can be connected to our network(s) you must submit a connection application and be granted and sign a connection agreement with Irish Water.

As the network capacity changes constantly, this review is only valid at the time of its completion. As soon as planning permission has been granted for the

Development, a completed connection application should be submitted. The connection application is available at www.water.ie/connections/get-connected/

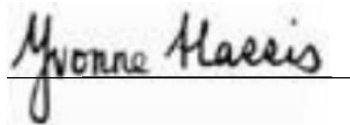
Where can you find more information?

- **Section A** - What is important to know?
- **Section B** - Details of Irish Water's Network(s)

This letter is issued to provide information about the current feasibility of the proposed connection(s) to Irish Water's network(s). This is not a connection offer and capacity in Irish Water's network(s) may only be secured by entering into a connection agreement with Irish Water.

For any further information, visit www.water.ie/connections, email newconnections@water.ie or contact 1800 278 278.

Yours sincerely,

A handwritten signature in black ink that reads "Yvonne Harris". The signature is written in a cursive style and is positioned above a horizontal line.

Yvonne Harris
Head of Customer Operations

Section A - What is important to know?

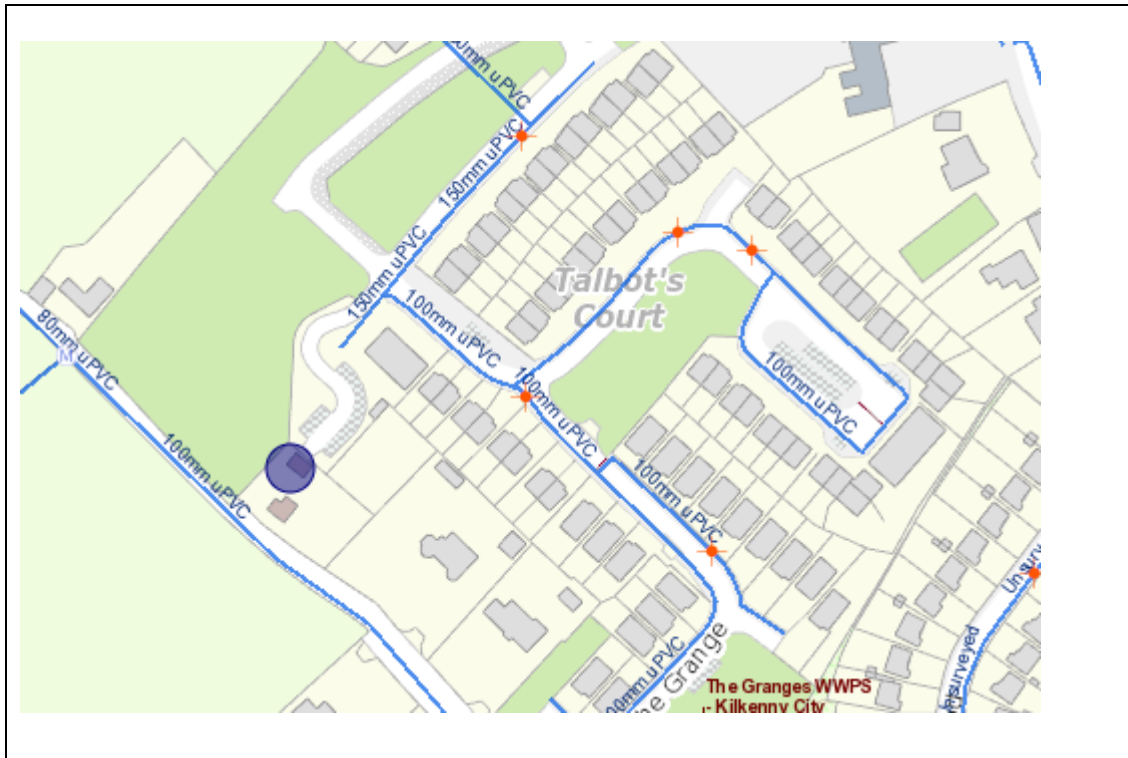
What is important to know?	Why is this important?
Do you need a contract to connect?	<ul style="list-style-type: none"> • Yes, a contract is required to connect. This letter does not constitute a contract or an offer in whole or in part to provide a connection to Irish Water's network(s). • Before the Development can connect to Irish Water's network(s), you must submit a connection application <u>and be granted and sign</u> a connection agreement with Irish Water.
When should I submit a Connection Application?	<ul style="list-style-type: none"> • A connection application should only be submitted after planning permission has been granted.
Where can I find information on connection charges?	<ul style="list-style-type: none"> • Irish Water connection charges can be found at: https://www.water.ie/connections/information/charges/
Who will carry out the connection work?	<ul style="list-style-type: none"> • All works to Irish Water's network(s), including works in the public space, must be carried out by Irish Water*. <p>*Where a Developer has been granted specific permission and has been issued a connection offer for Self-Lay in the Public Road/Area, they may complete the relevant connection works</p>
Fire flow Requirements	<ul style="list-style-type: none"> • The Confirmation of Feasibility does not extend to fire flow requirements for the Development. Fire flow requirements are a matter for the Developer to determine. • What to do? - Contact the relevant Local Fire Authority
Plan for disposal of storm water	<ul style="list-style-type: none"> • The Confirmation of Feasibility does not extend to the management or disposal of storm water or ground waters. • What to do? - Contact the relevant Local Authority to discuss the management or disposal of proposed storm water or ground water discharges.
Where do I find details of Irish Water's network(s)?	<ul style="list-style-type: none"> • Requests for maps showing Irish Water's network(s) can be submitted to: datarequests@water.ie

<p>What are the design requirements for the connection(s)?</p>	<ul style="list-style-type: none"> The design and construction of the Water & Wastewater pipes and related infrastructure to be installed in this Development shall comply with <i>the Irish Water Connections and Developer Services Standard Details and Codes of Practice</i>, available at www.water.ie/connections
<p>Trade Effluent Licensing</p>	<ul style="list-style-type: none"> Any person discharging trade effluent** to a sewer, must have a Trade Effluent Licence issued pursuant to section 16 of the Local Government (Water Pollution) Act, 1977 (as amended). More information and an application form for a Trade Effluent License can be found at the following link: https://www.water.ie/business/trade-effluent/about/ <p>**trade effluent is defined in the Local Government (Water Pollution) Act, 1977 (as amended)</p>

Section B – Details of Irish Water’s Network(s)

The map included below outlines the current Irish Water infrastructure adjacent the Development: To access Irish Water Maps email

datarequests@water.ie



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Note: The information provided on the included maps as to the position of Irish Water’s underground network(s) is provided as a general guide only. The information is based on the best available information provided by each Local Authority in Ireland to Irish Water.

Whilst every care has been taken in respect of the information on Irish Water’s network(s), Irish Water assumes no responsibility for and gives no guarantees, undertakings or warranties concerning the accuracy, completeness or up to date nature of the information provided, nor does it accept any liability whatsoever arising from or out of any errors or omissions. This information should not be solely relied upon in the event of excavations or any other works being carried out in the vicinity of Irish Water’s underground network(s). The onus is on the parties carrying out excavations or any other works to ensure the exact location of Irish Water’s underground network(s) is identified prior to excavations or any other works being carried out. Service connection pipes are not generally shown but their presence should be anticipated.

APPENDIX B

Rainfall data

Return Period	Event Duration													
	5	10	15	30	60	120	180	240	360	540	720	1080	1440	2880
1	3.90	5.50	6.50	8.20	10.40	13.20	15.10	16.70	19.20	22.10	24.30	28.00	30.90	37.50
2	4.60	6.40	7.60	9.50	11.90	15.00	17.20	18.90	21.60	24.70	27.10	31.00	34.10	41.00
5	6.90	9.60	11.30	13.90	17.00	20.90	23.60	25.70	29.10	32.80	35.70	40.30	43.90	51.60
30	12.20	16.90	19.90	23.70	28.30	33.70	37.30	40.10	44.50	49.30	53.00	58.70	63.10	71.60
100	17.30	24.10	28.40	33.20	38.70	45.20	49.60	52.90	57.90	63.40	67.60	74.10	79.00	87.60

Total Rainfall (mm) from Met Eireann records

Return Period	Event Duration													
	5	10	15	30	60	120	180	240	360	540	720	1080	1440	2880
1	46.80	33.00	26.00	16.40	10.40	6.60	5.03	4.18	3.20	2.46	2.03	1.56	1.29	0.78
2	55.20	38.40	30.40	19.00	11.90	7.50	5.73	4.73	3.60	2.74	2.26	1.72	1.42	0.85
5	82.80	57.60	45.20	27.80	17.00	10.45	7.87	6.43	4.85	3.64	2.98	2.24	1.83	1.08
30	146.40	101.40	79.60	47.40	28.30	16.85	12.43	10.03	7.42	5.48	4.42	3.26	2.63	1.49
100	207.60	144.60	113.60	66.40	38.70	22.60	16.53	13.23	9.65	7.04	5.63	4.12	3.29	1.83

Equivalent Rainfall Intensity (mm/hr)

Return Period	Event Duration													
	5	10	15	30	60	120	180	240	360	540	720	1080	1440	2880
1	56.16	39.60	31.20	19.68	12.48	7.92	6.04	5.01	3.84	2.95	2.43	1.87	1.55	0.94
2	66.24	46.08	36.48	22.80	14.28	9.00	6.88	5.67	4.32	3.29	2.71	2.07	1.71	1.03
5	99.36	69.12	54.24	33.36	20.40	12.54	9.44	7.71	5.82	4.37	3.57	2.69	2.20	1.29
30	175.68	121.68	95.52	56.88	33.96	20.22	14.92	12.03	8.90	6.57	5.30	3.91	3.16	1.79
100	249.12	173.52	136.32	79.68	46.44	27.12	19.84	15.87	11.58	8.45	6.76	4.94	3.95	2.19

Rainfall Intensity (mm/hr) with 20% Climate Change Factor

Design calculations for 100 year rainfall event

Project Description

File Name 22038 Dunningstown Road.SPF

Project Options

Flow Units LPS
Elevation Type Elevation
Hydrology Method Modified Rational
Time of Concentration (TOC) Method User-Defined
Link Routing Method Hydrodynamic
Enable Overflow Ponding at Nodes YES
Skip Steady State Analysis Time Periods YES

Rainfall Details

Return Period..... 100 years
Event Duration 15 minutes

Run-off Coefficients

Roofs, Paved Areas and Grassed Verges..... 1
Permeable Pavement 0.5
Other Grassed Areas 0

Ref.	Area	Run-off Coefficient	Rainfall During Event	Run-off volume
	(sq.m)		(mm)	(m ³)
Sub-01	100	1.0	34.08	3.4
Sub-02	100	1.0	34.08	3.41
Sub-03	200	1.0	34.08	6.82
Sub-04	400	1.0	34.08	13.63
TOTAL RUN-OFF				27.3

CONTRIBUTING AREAS

Upstream manhole	Downstream manhole	Length	Invert level		Gradient	Diameter	Peak Flow	Capacity	Peak Flow / Capacity	Peak Flow Velocity	Total Time Surcharged	Status
			Inlet	Outlet						(m/sec)	(min)	
		(m)	(m)	(m)	(%)	(mm)	(lps)	(lps)				
S1	S2	19.25	61.01	60.91	0.50	225	6.4	31.7	0.20	0.26	0.00	Calculated
S2	S3	24.10	60.91	60.79	0.50	300	40.6	68.2	0.59	0.85	15.00	SURCHARGED
S3	Infiltration	2.60	60.79	60.78	0.35	300	47.6	56.9	0.84	1.60	198.00	SURCHARGED

NETWORK CALCULATIONS

Storage Area 1

Invert level of Sub-base Layer	60.28 m
Invert level of Storage Chamber	60.78 m
Max. Water Level during Critical Storm	61.22 m
Storage Provided at Max. Water level	49.3 m ³

Depth above IL (m)	IL (m OD)	Storage Volume (cumulative) (m ³)	Storage Type
0	60.280	0.0	Sub-base Layer
0.025	60.305	1.2	
0.051	60.331	2.5	
0.076	60.356	3.8	
0.102	60.382	5.1	
0.127	60.407	6.3	
0.152	60.432	7.5	
0.178	60.458	8.8	
0.203	60.483	10.1	
0.229	60.509	11.4	
0.254	60.534	12.6	Hydrochamber and Stone Surround
0.279	60.559	13.8	
0.305	60.585	15.1	
0.33	60.610	16.4	
0.356	60.636	17.7	
0.381	60.661	18.9	
0.406	60.686	20.1	
0.432	60.712	21.4	
0.457	60.737	22.7	
0.483	60.763	24.0	
0.508	60.788	25.4	
0.533	60.813	26.9	
0.559	60.839	28.5	
0.584	60.864	30.0	
0.61	60.890	31.6	
0.635	60.915	33.1	
0.66	60.940	34.5	
0.686	60.966	36.0	
0.711	60.991	37.5	
0.737	61.017	38.9	
0.762	61.042	40.3	
0.787	61.067	41.7	
0.813	61.093	43.0	
0.838	61.118	44.3	
0.864	61.144	45.6	
0.889	61.169	46.9	
0.914	61.194	48.1	
0.94	61.220	49.3	
0.965	61.245	50.4	
0.991	61.271	51.5	
1.016	61.296	52.5	
1.041	61.321	53.5	
1.067	61.347	54.4	
1.092	61.372	55.2	
1.118	61.398	56.0	
1.143	61.423	56.7	
1.168	61.448	57.3	
1.194	61.474	57.7	
1.219	61.499	58.0	
1.245	61.525	58.1	

Network Summary for Critical Event **15 minutes**

A	Peak Outflow (lps)	47.63
B	Max Water Level (m)	61.22
C	Storage Provided	58.10
D	Total exfiltration volume (1000-m ³)	0.000
E	Total discharge to outfall (m3)	42.9
F	Total amount discharged during event (m3) [= D + E]	42.9
G	Total run-off during event (m3)	27.3
H	Newtork Storage (m3) [= G - (F + C)]	-73.7
	Total Flooded Volume (ha-mm)	0

APPENDIX C
Ground Investigation Report



GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

Catherinestown House,
Hazelhatch Road,
Newcastle,
Co. Dublin,
D22 YD52

Tel: 01 601 5175 / 5176
Email: info@gii.ie
Web: www.gii.ie

Ground Investigations Ireland
Dunningstown Road
Kilkenny County Council
Ground Investigation Report
October 2022





GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

Catherinestown House,
Hazelhatch Road,
Newcastle,
Co. Dublin,
D22 YD52

Tel: 01 601 5175 / 5176
Email: info@gii.ie
Web: www.gii.ie

DOCUMENT CONTROL SHEET

Project Title	Dunningstown Road
Engineer	Kilgallen & Partners
Client	Kilkenny County Council
Project No	12128-08-22
Document Title	Ground Investigation Report

Rev.	Status	Author(s)	Reviewed By	Approved By	Office of Origin	Issue Date
A	Interim	B Sexton	C Finnerty	B Sexton	Dublin	14 October 2022

Ground Investigations Ireland Ltd. present the results of the fieldworks and laboratory testing in accordance with the specification and related documents provided by or on behalf of the client. The possibility of variation in the ground and/or groundwater conditions between or below exploratory locations or due to the investigation techniques employed must be taken into account when this report and the appendices inform designs or decisions where such variation may be considered relevant. Ground and/or groundwater conditions may vary due to seasonal, man-made or other activities not apparent during the fieldworks and no responsibility can be taken for such variation. The data presented and the recommendations included in this report and associated appendices are intended for the use of the client and the client's geotechnical representative only and any duty of care to others is excluded unless approved in writing.



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Catherinestown House,
Hazelhatch Road,
Newcastle,
Co. Dublin,
D22 YD52

Tel: 01 601 5175 / 5176
Email: info@gii.ie
Web: www.gii.ie

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

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Appendix 3	Soakaway Records
Appendix 4	Dynamic Probe Records
Appendix 5	GPR Survey
Appendix 6	Laboratory Testing



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1.0 Preamble

On the instructions of Kilgallen & Partners Consulting Engineers, a site investigation was carried out by Ground Investigations Ireland Ltd., in October 2022 at the site of the proposed residential development at Dunningstown Road, Kilkenny City.

2.0 Overview

2.1. Background

It is proposed to construct a new residential development comprising houses at the proposed site. At the time of the site investigation the site was occupied by two building which had been in use as weather monitoring stations. The proposed construction is envisaged to consist of conventional foundations and pavement make up with some local excavations for services and plant.

2.2. Purpose and Scope

The purpose of the site investigation was to investigate subsurface conditions utilising a variety of investigative methods in accordance with the project specification. The scope of the work undertaken for this project included the following:

- Visit project site to observe existing conditions
- Carry out 7 No. Trial Pits to a maximum depth of 2.5m BGL
- Carry out 1 No. Soakaway to determine a soil infiltration value to BRE digest 365
- Carry out 7 No. Dynamic Probes to determine strength/density characteristics
- Carry out a GPR survey of the site
- Geotechnical Laboratory testing
- Report with recommendations

3.0 Subsurface Exploration

3.1. General

During the ground investigation a programme of intrusive investigation specified by the Consulting Engineer was undertaken to determine the sub surface conditions at the proposed site. Regular sampling and in-situ testing was undertaken in the exploratory holes to facilitate the geotechnical descriptions and to enable laboratory testing to be carried out on the soil samples recovered during excavation and drilling.

The procedures used in this site investigation are in accordance with Eurocode 7 Part 2: Ground Investigation and testing (ISEN 1997 – 2:2007) and B.S. 5930:2015.

3.2. Trial Pits

The trial pits were excavated using a 5T tracked excavator at the locations shown in Figure 1 in Appendix 1. The locations were checked using a CAT scan to minimise the potential for encountering services during the excavation. The trial pits were sampled, logged and photographed by a Geotechnical Engineer/Engineering Geologist prior to backfilling with arisings. Notes were made of any services, inclusions, pit stability, groundwater encountered and the characteristics of the strata encountered and are presented on the trial pit logs which are provided in Appendix 2 of this Report.

3.3. Soakaway Testing

The soakaway testing was carried out in selected trial pits at the locations shown in the exploratory hole location plan in Appendix 1. These pits were carefully excavated and filled with water to assess the infiltration characteristics of the proposed site. The pits were allowed to drain and the drop in water level was recorded over time as required by BRE Digest 365. The pits were logged prior to completing the soakaway test and were backfilled with arising's upon completion. The soakaway test results are provided in Appendix 3 of this Report.

3.4. Dynamic Probing

The dynamic probe tests (DPH) were carried out at the locations shown in the location plan in Appendix 1 in accordance with B.S. 1377: Part 9 1990. The test consists of mechanically driving a cone with a 50kg weight in 100mm intervals and monitoring the number of blows required. An equivalent Standard Penetration Test (SPT) 'N' value may be calculated by dividing the total number of blows over a 300mm drive length by 1.5. The dynamic probe logs are provided in Appendix 4 of this Report.

3.5. Ground Penetrating Radar (GPR) Survey

A GPR survey was completed across the site to identify buried services and other analogies. The survey was limited by the fact that the site was heavy overgrown at the time of the survey. The results of the survey are presented in Appendix 5 of this Report.

3.6. Surveying

The exploratory hole locations have been recorded using a KQ GEO Technologies KQ-M8 System which records the coordinates and elevation of the locations to ITM or Irish National Grid as required by the project specification. The coordinates and elevations are provided on the exploratory hole logs in the appendices of this Report.

3.7. Laboratory Testing

Samples were selected from the exploratory holes for a range of geotechnical and environmental testing to assist in the classification of soils and to provide information for the proposed design.

Environmental & Chemical testing as required by the specification, including the pH and sulphate testing was carried out by Element Materials Technology Laboratory in the UK.

Geotechnical testing consisting of moisture content, Atterberg limits and Particle Size Distribution (PSD) tests were carried out in Professional Soil Laboratory (PSL) in the UK.

The results of the laboratory testing are included in Appendix 6 of this Report.

4.0 Ground Conditions

4.1. General

The ground conditions encountered during the investigation are summarised below with reference to insitu and laboratory test results. The full details of the strata encountered during the ground investigation are provided in the exploratory hole logs included in the appendices of this report.

The sequence of strata encountered were relatively consistent across the site and generally comprised;

- Topsoil/Surfacing
- Made Ground
- Granular Deposits

TOPSOIL: Topsoil was encountered in the majority of the exploratory holes and was present to a maximum depth of 0.30m BGL.

SURFACING: Tarmacadam was encountered at TP-01 and TP-02 to a maximum depth of 0.10m BGL.

MADE GROUND: Made Ground deposits were encountered beneath the Topsoil/Surfacing and were present to a depth of between 0.30m and 1.00m BGL. These deposits were described generally as *brown/grey slightly clayey sandy fine to coarse subrounded to rounded Gravel with occasional fragments of plastic and metal.*

GRANULAR DEPOSITS: Granular deposits were encountered within/below/at the base of the cohesive deposits and were typically described as *grey/brown slightly clayey sandy fine to coarse subrounded to rounded GRAVEL with many subrounded to rounded cobbles and boulders.* The secondary sand/gravel and silt/clay constituents varied across the site and with depth while occasional or frequent cobble and boulder content also present where noted on the exploratory hole logs.

Based on the SPT N values the deposits are typically dense. The gravels encountered at TP-04 were found to be loose to a depth of 1.50m BGL after which they became dense. It should be noted that many of the trial pits where granular deposits were encountered, experienced instability. This was described either as side wall spalling or as side wall collapse in the remarks section at the base of the trial pit logs.

4.2. Groundwater

No groundwater was noted during the investigation however it should be noted that these exploratory holes did not remain open for sufficiently long periods of time to establish the hydrogeological regime and groundwater levels would be expected to vary with the time of year, rainfall, nearby construction and other factors.

4.3. Laboratory Testing

4.3.1. Geotechnical Laboratory Testing

The geotechnical laboratory results were not available at the time of writing this report.

4.3.2. Chemical Laboratory Testing

The chemical laboratory results were not available at the time of writing this report.

The results from the completed laboratory testing will be included in Appendix 7 of this report.

5.0 Recommendations & Conclusions

5.1. General

The recommendations given and opinions expressed in this report are based on the findings as detailed in the exploratory hole records. Where an opinion is expressed on the material between exploratory hole locations, this is for guidance only and no liability can be accepted for its accuracy. No responsibility can be accepted for conditions which have not been revealed by the exploratory holes. Limited information has been provided at the ground investigation stage and any designs based on the recommendations or conclusions should be completed in accordance with the current design codes, taking into account the variation and the specific details contained within the exploratory hole logs.

5.2. Foundations

An allowable bearing capacity of 125 kN/m² is recommended for conventional strip or pad foundations on the dense of medium dense granular deposits at a depth of 1.0m BGL.

The possibility for variation in the depth of the made ground in the vicinity of these foundations should be considered and foundation inspections should be carried out. Any soft spots encountered at the proposed foundation depths should be excavated and replaced with lean mix concrete. Where the granular deposits are deeper, lean mix trench fill is recommended to achieve the recommended allowable bearing capacity.

A ground bearing floor slab is recommended to be based on the medium dense granular deposits with an appropriate depth of compacted hardcore specified by the consulting engineer and in accordance with the limits and guidelines in SR21:2014 +A1:2016 and/or NRA SRW CL808 Type E granular stone fill. Made Ground should be removed below any proposed floor slabs. Where the depth of Made Ground/Soft deposits exceeds 0.9m then suspended floor slabs should be considered.

5.3. Excavations

Short term temporary excavations in the cohesive deposits will remain stable for a limited time only and will require to be appropriately battered or the sides supported if the excavation is below 1.25m BGL or is required to permit man entry.

Any excavations which penetrate the granular deposits will require to be appropriately battered or the sides supported.

The stability noted on the trial pit logs should be consulted when determining the most appropriate construction methods for excavations.

5.4. Soakaway Design

An infiltration rate of $f=1.31 \times 10^{-5}$ m/s was calculated for the soakaway location SA-01.

The recommendations provided in this report should be verified in the design of the proposed buildings, using the full details of the loading conditions and taking into consideration the allowable tolerable

settlements/movements that the building can accommodate. The founding strata should be inspected and verified by a suitably qualified engineer prior to construction of the building foundations.

APPENDIX 1 - Figures



649360E

649380E

649400E

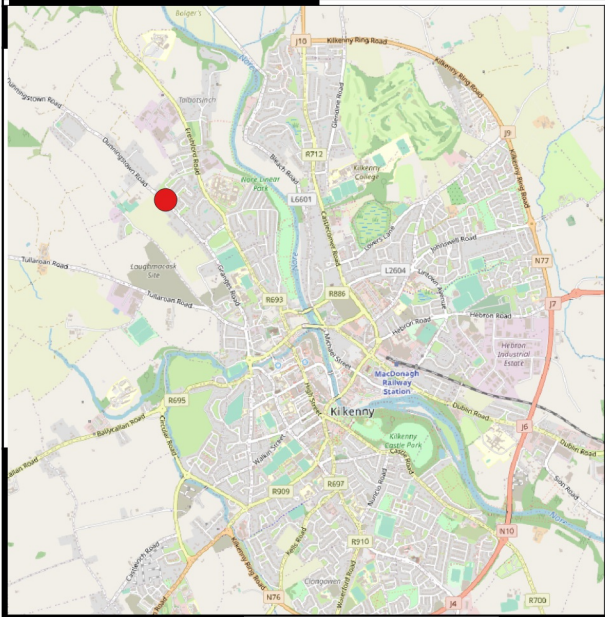
649420E





657480N

657460N

657440N

657420N



-  Indicative Site Boundary
-  Site Location
- SI Points
 -  Soakaway
 -  Trial Pit

Client:



Project Code:

12128-08-22

Project Title:

Dunningstown

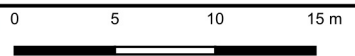
Drawing Title:

Figure 1 Site Location and Layout



GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

Ground Investigations Ireland Ltd.
 Catherinstown House,
 Hazelhatch Road,
 Newcastle, Co. Dublin
 www.gii.ie 01-6015175/5176



Drawn BS	By:	Date: 14-10-2022
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649360E

649380E

649400E

649420E

APPENDIX 2 – Trial Pit Records





Machine : 5T Tracked Excavator Method : Trial Pit	Dimensions 1.80m x 0.60m x 1.50m (L x W x D)	Ground Level (mOD)	Client Kilgallen & Partners	Job Number 12128-08-22
	Location	Dates 04/10/2022	Engineer	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50	B				0.10 0.10 0.30 0.40	<p>TOPSOIL</p> <p>MADE GROUND: Reddish brown/grey slightly clayey sandy fine to coarse subrounded to rounded Gravel with occasional fragments of plastic and metal</p> <p>Dense grey/brown sandy fine to coarse subrounded to rounded GRAVEL with some subrounded to rounded cobbles</p>		
1.50	B				(1.10) 1.50	Complete at 1.50m		

Plan .	Remarks No groundwater encountered Trial pit spalling from 1.00m BGL Complete at 1.50m BGL Soakaway test carried out in trial pit upon completion in accordance with BRE Digest 365 Trial pit backfilled upon completion of soakaway					
	<table border="1"> <tr> <td>Scale (approx)</td> <td>Logged By</td> <td>Figure No.</td> </tr> <tr> <td>1:25</td> <td>AB</td> <td>12128-08-22.SA01</td> </tr> </table>	Scale (approx)	Logged By	Figure No.	1:25	AB
Scale (approx)	Logged By	Figure No.				
1:25	AB	12128-08-22.SA01				



Machine : 5T Tracked Excavator Method : Trial Pit	Dimensions 3.40m x 1.30m x 2.50m (L x W x D)	Ground Level (mOD)	Client Kilgallen & Partners	Job Number 12128-08-22
	Location	Dates 04/10/2022	Engineer	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50	B				0.10	TARMACADAM		
					0.20	FILL: Grey sandy coarse angular Gravel (Crushed Rock Fill)		
1.50	B				0.30	MADE GROUND: Reddish brown/grey clayey sandy fine to coarse subrounded to rounded Gravel with occasional subrounded to rounded cobbles and boulders and occasional fragments of red brick and clay pipe		
					(0.70)			
2.50	B				1.00	Dense grey/brown slightly clayey sandy fine to coarse subrounded to rounded GRAVEL with many subrounded to rounded cobbles and boulders		
					(1.10)			
					2.10	Complete at 2.50m		

Plan .	Remarks No groundwater encountered Trial pit spalling from 0.40m BGL Refusal at 2.50m BGL Trial pit backfilled upon completion	
		Scale (approx) 1:25



Machine : 5T Tracked Excavator Method : Trial Pit	Dimensions 3.40m x 1.30m x 2.50m (L x W x D)	Ground Level (mOD)	Client Kilgallen & Partners	Job Number 12128-08-22
	Location	Dates 04/10/2022	Engineer	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50	B				(0.10)	TARMACADAM		
					(0.20)	FILL: Grey sandy coarse angular Gravel (Crushed Rock Fill)		
1.50	B				0.30	MADE GROUND: Reddish brown slightly sandy gravelly Clay with some fragments of red brick, concrete and crushed rock fill		
					(0.60)			
2.50	B				0.90	Dense grey/brown slightly clayey sandy fine to coarse subrounded to rounded GRAVEL with some subrounded to rounded cobbles and boulders		
					(1.60)			
					2.50	Complete at 2.50m		

Plan .	Remarks No groundwater encountered Trial pit spalling from 0.40m BGL Refusal at 2.50m BGL Trial pit backfilled upon completion	
		Scale (approx) 1:25



Machine : 5T Tracked Excavator Method : Trial Pit	Dimensions 3.40m x 1.30m x 2.50m (L x W x D)	Ground Level (mOD)	Client Kilgallen & Partners	Job Number 12128-08-22
	Location	Dates 04/10/2022	Engineer	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50	B				(0.20) 0.20 (0.10) 0.30	<p>TOPSOIL</p> <p>Loose reddish brown/grey slightly clayey gravelly fine to coarse SAND with some subrounded to rounded cobbles (Possible Made Ground)</p> <p>Dense grey/brown sandy fine to coarse subrounded to rounded GRAVEL with some subrounded to rounded cobbles</p>		
1.50	B				(2.20)			
2.50	B				2.50	Complete at 2.50m		

Plan .	Remarks No groundwater encountered Trial pit spalling from surface Refusal at 2.50m BGL Trial pit backfilled upon completion					
	<table border="1"> <tr> <td>Scale (approx)</td> <td>Logged By</td> <td>Figure No.</td> </tr> <tr> <td>1:25</td> <td>AB</td> <td>12128-08-22.TP03</td> </tr> </table>	Scale (approx)	Logged By	Figure No.	1:25	AB
Scale (approx)	Logged By	Figure No.				
1:25	AB	12128-08-22.TP03				



Machine : 5T Tracked Excavator
Method : Trial Pit

Dimensions
3.40m x 1.30m x 2.20m (L x W x D)

Ground Level (mOD)

Client
Kilgallen & Partners

Job Number
12128-08-22

Location

Dates
04/10/2022

Engineer

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50	B				0.20	TOPSOIL		
					0.20	Loose reddish brown/grey slightly clayey gravelly fine to coarse SAND with some subrounded to rounded cobbles (Possible Made Ground)		
					0.50	Loose grey/brown sandy fine to coarse subrounded to rounded GRAVEL with some subrounded to rounded cobbles		
1.50	B				1.50	Dense grey/brown sandy fine to coarse subrounded to rounded GRAVEL with some subrounded to rounded cobbles		
					(0.70)			
2.20	B				2.20	Complete at 2.20m		

Plan

•	•	•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•	•	•

Remarks

No groundwater encountered
Trial pit spalling from surface
Refusal at 2.20m BGL
Trial pit backfilled upon completion

Scale (approx) 1:25	Logged By AB	Figure No. 12128-08-22.TP03
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Machine : 5T Tracked Excavator Method : Trial Pit	Dimensions 3.50m x 1.20m x 2.50m (L x W x D)	Ground Level (mOD)	Client Kilgallen & Partners	Job Number 12128-08-22
	Location	Dates 04/10/2022	Engineer	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50	B				(0.30)	TOPSOIL		
					0.30	MADE GROUND: Reddish brown/grey slightly clayey gravelly fine to coarse Sand with occasional fragments of metal and plastic		
1.50	B				(0.60)			
					0.90			
2.50	B				2.50	Complete at 2.50m		

Plan .	Remarks No groundwater encountered Trial pit spalling from 1.00m BGL Refusal at 2.50m BGL Trial pit backfilled upon completion	
		Scale (approx) 1:25



Machine : 5T Tracked Excavator Method : Trial Pit	Dimensions 3.20m x 1.30m x 2.30m (L x W x D)	Ground Level (mOD)	Client Kilgallen & Partners	Job Number 12128-08-22
	Location	Dates 04/10/2022	Engineer	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50	B				(0.20)	TOPSOIL		
					0.20	Loose reddish brown/grey slightly clayey gravelly fine to coarse SAND with some subrounded to rounded cobbles (Possible Made Ground)		
1.50	B				(0.80)			
					1.00			
2.30	B				2.30	Complete at 2.30m		

Plan .	Remarks No groundwater encountered Trial pit spalling from 0.50m BGL Refusal at 2.30m BGL Trial pit backfilled upon completion	
		Scale (approx) 1:25



Machine : 5T Tracked Excavator Method : Trial Pit	Dimensions 3.20m x 1.30m x 2.30m (L x W x D)	Ground Level (mOD)	Client Kilgallen & Partners	Job Number 12128-08-22
	Location	Dates 04/10/2022	Engineer	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50	B				(0.20)	TOPSOIL		
					0.20	Loose reddish brown/grey slightly clayey gravelly fine to coarse SAND with some subrounded to rounded cobbles (Possible Made Ground)		
1.50	B				0.50	Medium dense grey/brown sandy fine to coarse subrounded to rounded GRAVEL with some subrounded to rounded cobbles		
					(0.50)	Dense grey/brown sandy fine to coarse subrounded to rounded GRAVEL with some subrounded to rounded cobbles		
2.30	B				2.30	Complete at 2.30m		

Plan .	Remarks No groundwater encountered Trial pit spalling from 0.40m BGL Refusal at 2.30m BGL Trial pit backfilled upon completion	
		Scale (approx) 1:25

APPENDIX 3 – Soakaway Records





GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

Catherinstown House,
Hazelhatch Road,
Newcastle,
Co. Dublin,
D22 YD52

Tel: 01 601 5175 / 5176
Email: info@gii.ie
Web: www.gii.ie

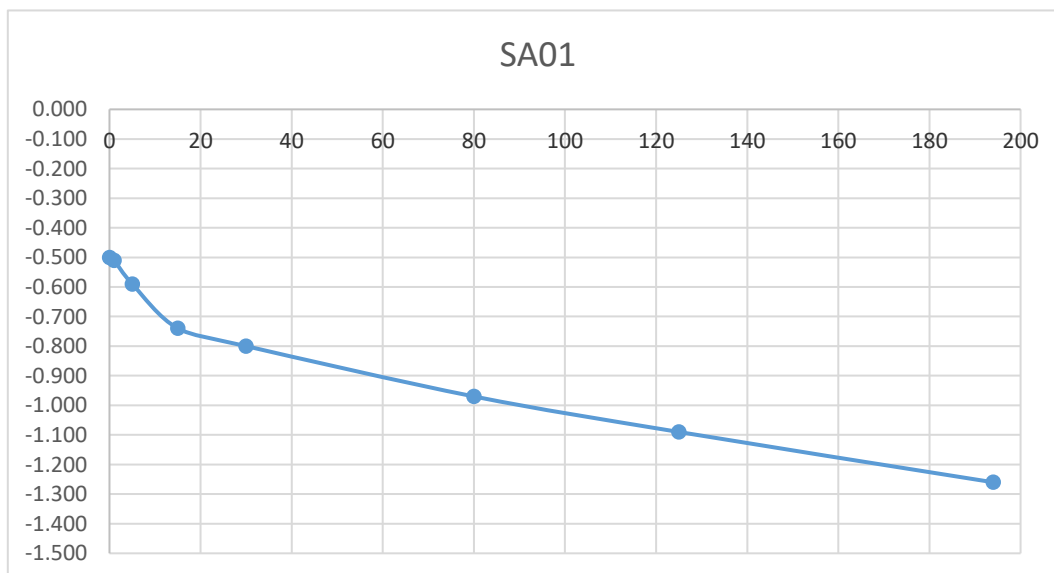
SA01

Soakaway Test to BRE Digest 365

Trial Pit Dimensions: 1.80m x 0.60m 1.50m (L x W x D)

Date	Time	Water level (m bgl)
04/10/2022	0	-0.500
04/10/2022	1	-0.510
04/10/2022	5	-0.590
04/10/2022	15	-0.740
04/10/2022	30	-0.800
04/10/2022	80	-0.970
04/10/2022	125	-1.090
04/10/2022	194	-1.260

Start depth 0.50	Depth of Pit 1.500	Diff 1.000	75% full 0.75	25%full 1.25
Length of pit (m)	Width of pit (m)		75-25Ht (m)	Vp75-25 (m3)
1.500	0.600		0.500	0.45
Tp75-25 (from graph) (s)	11400		50% Eff Depth	ap50 (m2)
			0.500	3
f =	1.316E-05	m/s		



APPENDIX 4 – Dynamic Probe Records





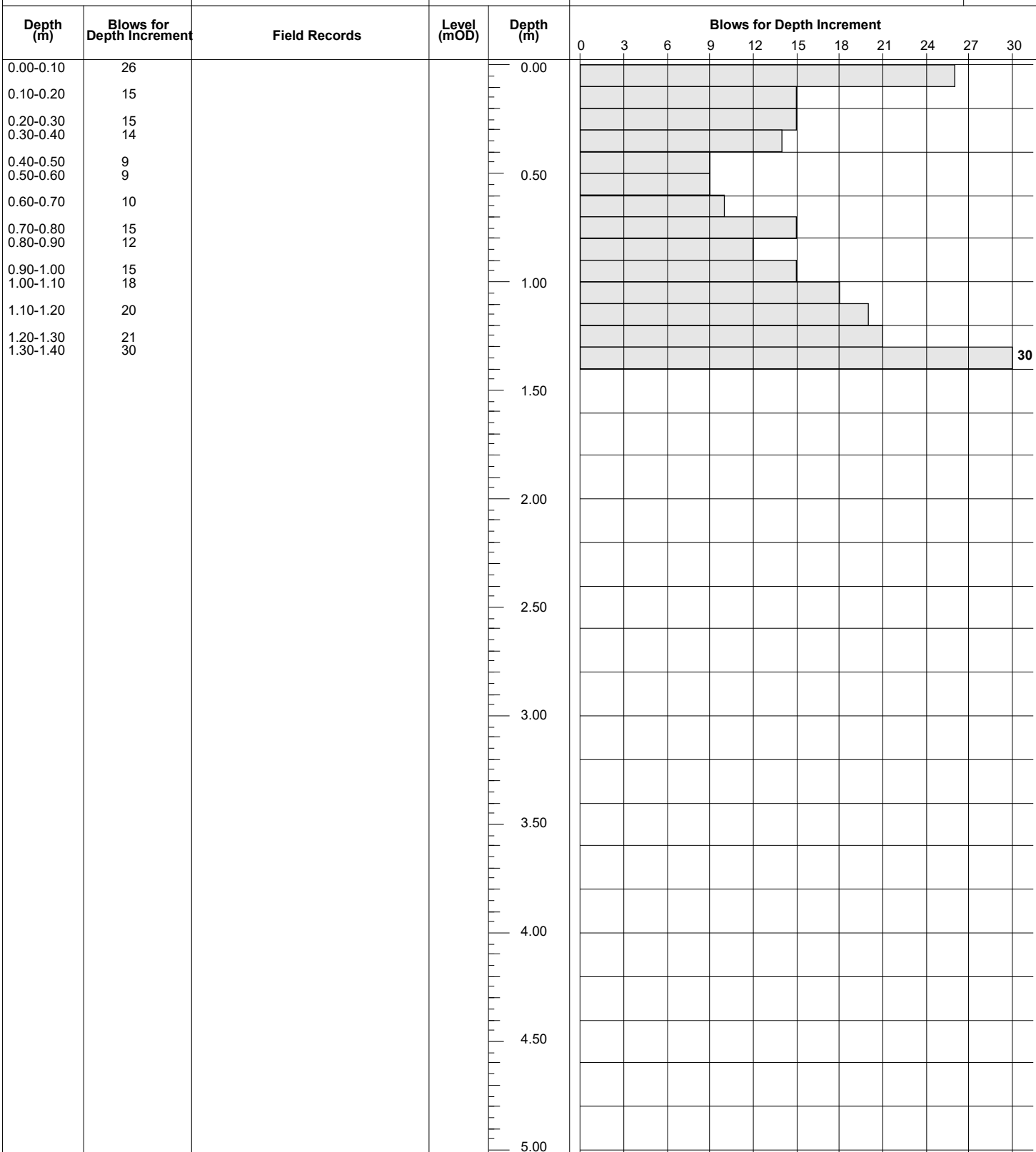
Machine : Tecop 10 Method : Dynamic Probe	Cone Dimensions Diameter 43.7mm	Ground Level (mOD)	Client Kilgallen & Partners	Job Number 12128-08-22
	Location	Dates 04/10/2022	Engineer	Sheet 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)	Blows for Depth Increment												
					0	3	6	9	12	15	18	21	24	27	30		
0.00-0.10	11			0.00	[Bar chart showing 11 blows for 0.00-0.10m increment]												
0.10-0.20	11				[Bar chart showing 11 blows for 0.10-0.20m increment]												
0.20-0.30	5				[Bar chart showing 5 blows for 0.20-0.30m increment]												
0.30-0.40	23				[Bar chart showing 23 blows for 0.30-0.40m increment]												
0.40-0.50	17				[Bar chart showing 17 blows for 0.40-0.50m increment]												
0.50-0.60	19			0.50	[Bar chart showing 19 blows for 0.50-0.60m increment]												
0.60-0.70	18				[Bar chart showing 18 blows for 0.60-0.70m increment]												
0.70-0.80	21				[Bar chart showing 21 blows for 0.70-0.80m increment]												
0.80-0.90	21				[Bar chart showing 21 blows for 0.80-0.90m increment]												
0.90-1.00	26			1.00	[Bar chart showing 26 blows for 0.90-1.00m increment]												
				1.50	[Empty bar chart area]												
				2.00	[Empty bar chart area]												
				2.50	[Empty bar chart area]												
				3.00	[Empty bar chart area]												
				3.50	[Empty bar chart area]												
				4.00	[Empty bar chart area]												
				4.50	[Empty bar chart area]												
				5.00	[Empty bar chart area]												

Remarks Refusal at 1.00m BGL	Scale (approx)	Logged By
	1:25	AB
	Figure No. 12128-08-22.DP01	



Machine : Tecop 10 Method : Dynamic Probe		Cone Dimensions Diameter 43.7mm	Ground Level (mOD)	Client Kilgallen & Partners	Job Number 12128-08-22
Location		Dates 04/10/2022	Engineer	Sheet 1/1	

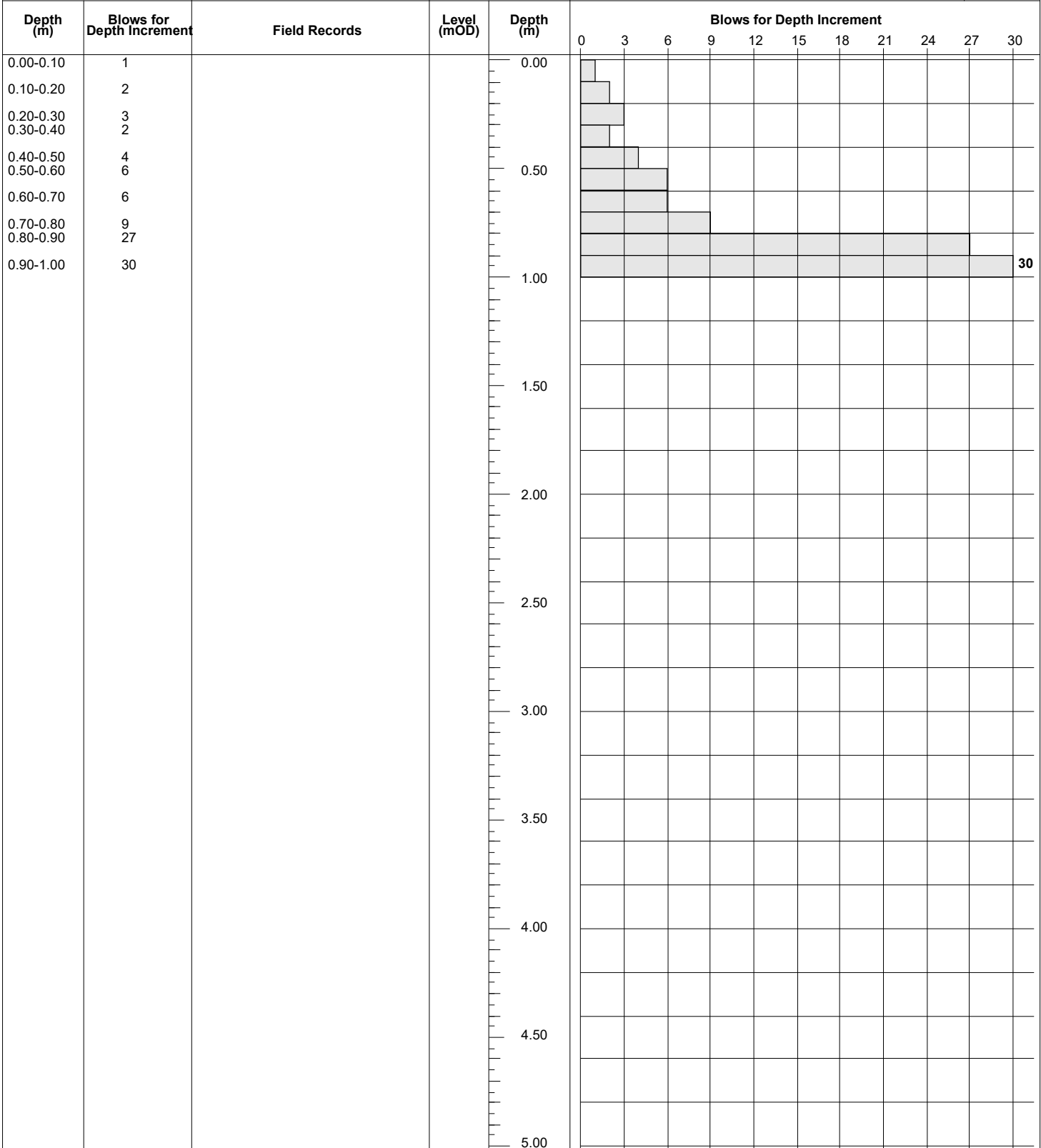


Remarks
Refusal at 1.40m BGL

Scale (approx)	Logged By
1:25	AB
Figure No.	
12128-08-22.DP02	



Machine : Tecop 10 Method : Dynamic Probe	Cone Dimensions Diameter 43.7mm	Ground Level (mOD)	Client Kilgallen & Partners	Job Number 12128-08-22
	Location	Dates 04/10/2022	Engineer	Sheet 1/1



Remarks
Refusal at 1.00m BGL

Scale (approx)	Logged By
1:25	AB
Figure No.	
12128-08-22.DP03	



Machine : Tecop 10
Method : Dynamic Probe

Cone Dimensions
Diameter 43.7mm

Ground Level (mOD)

Client
Kilgallen & Partners

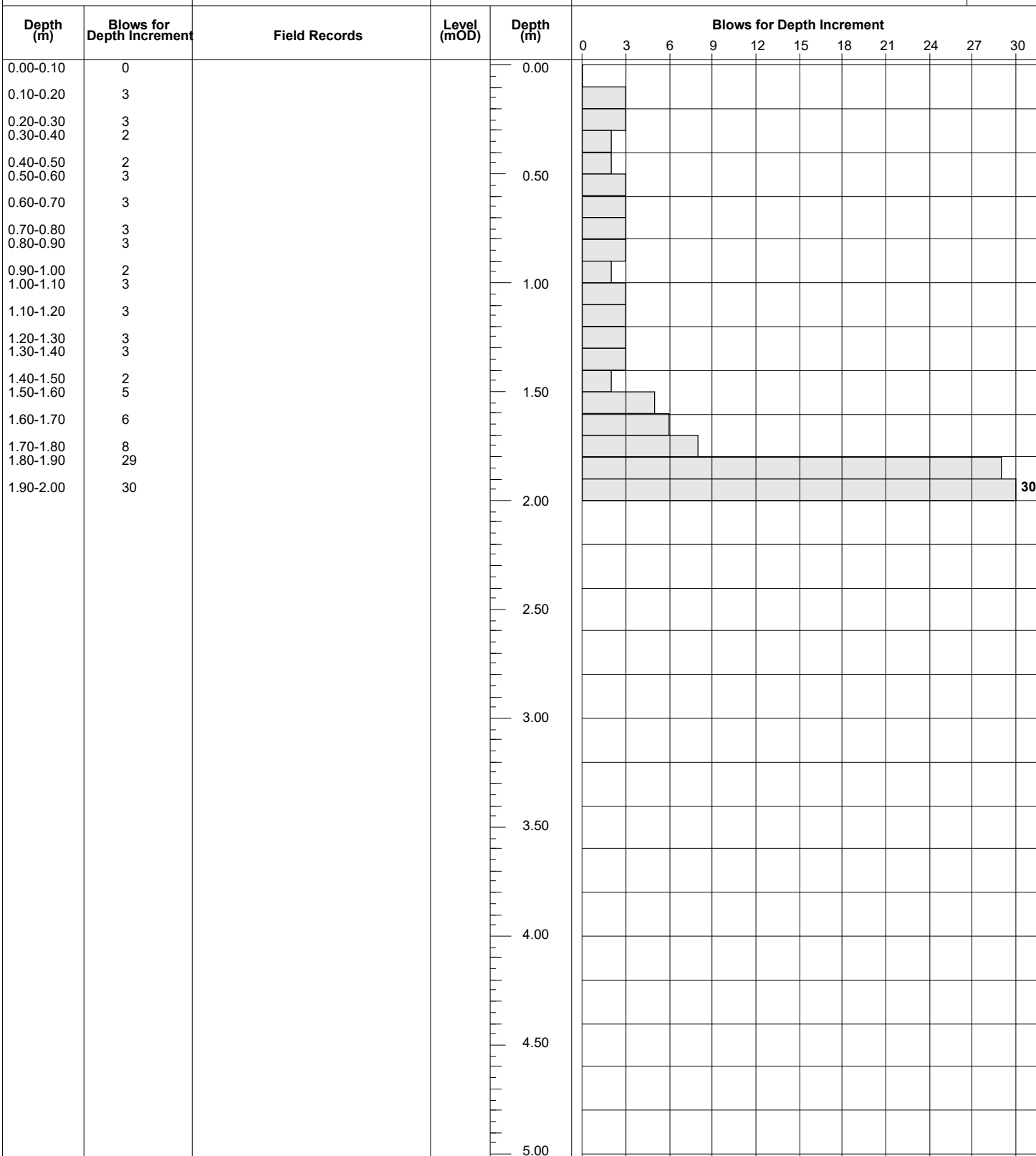
Job Number
12128-08-22

Location

Dates
04/10/2022

Engineer

Sheet
1/1

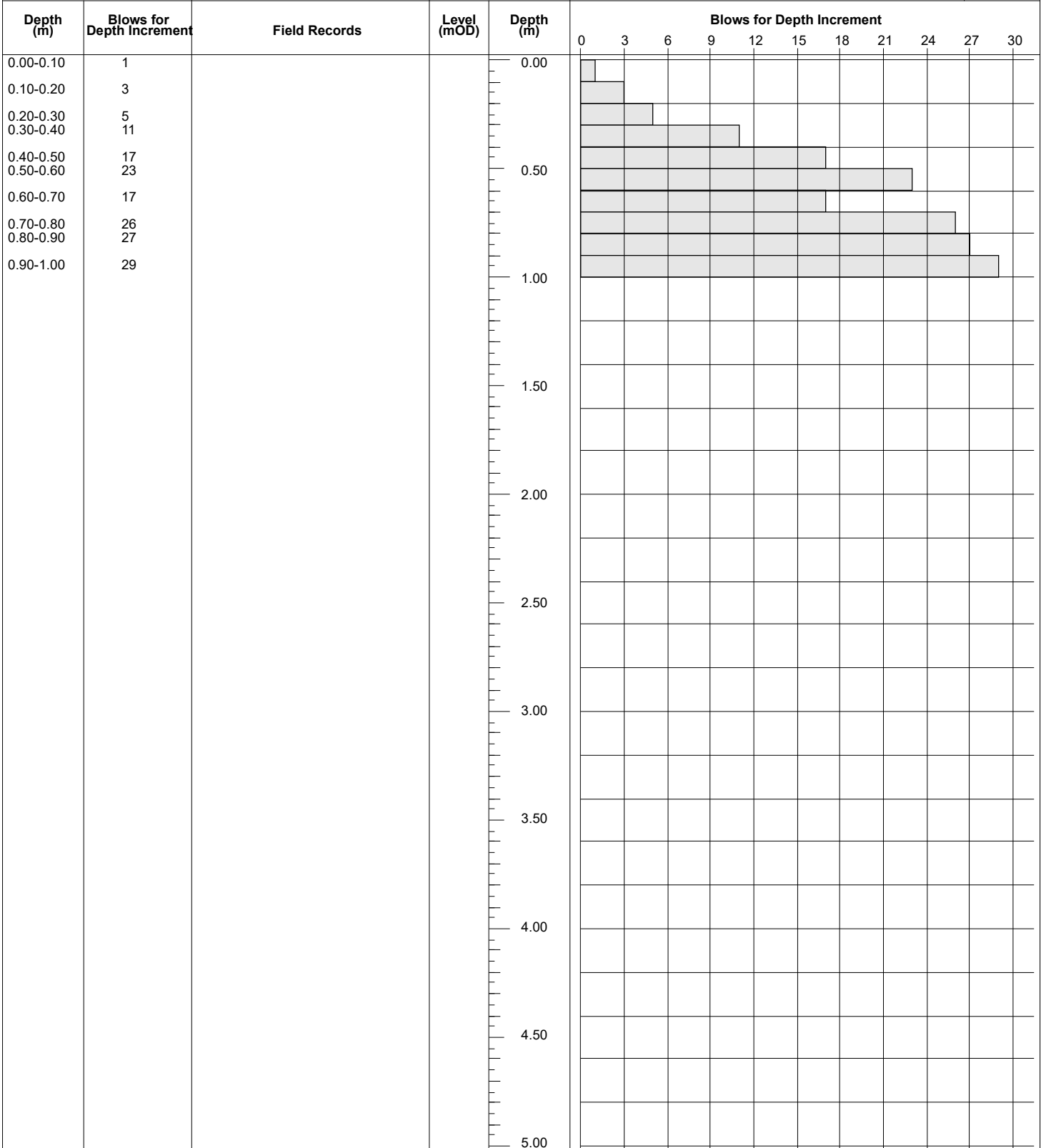


Remarks
Refusal at 2.00m BGL

Scale (approx) 1:25
Logged By AB
Figure No. 12128-08-22.DP04



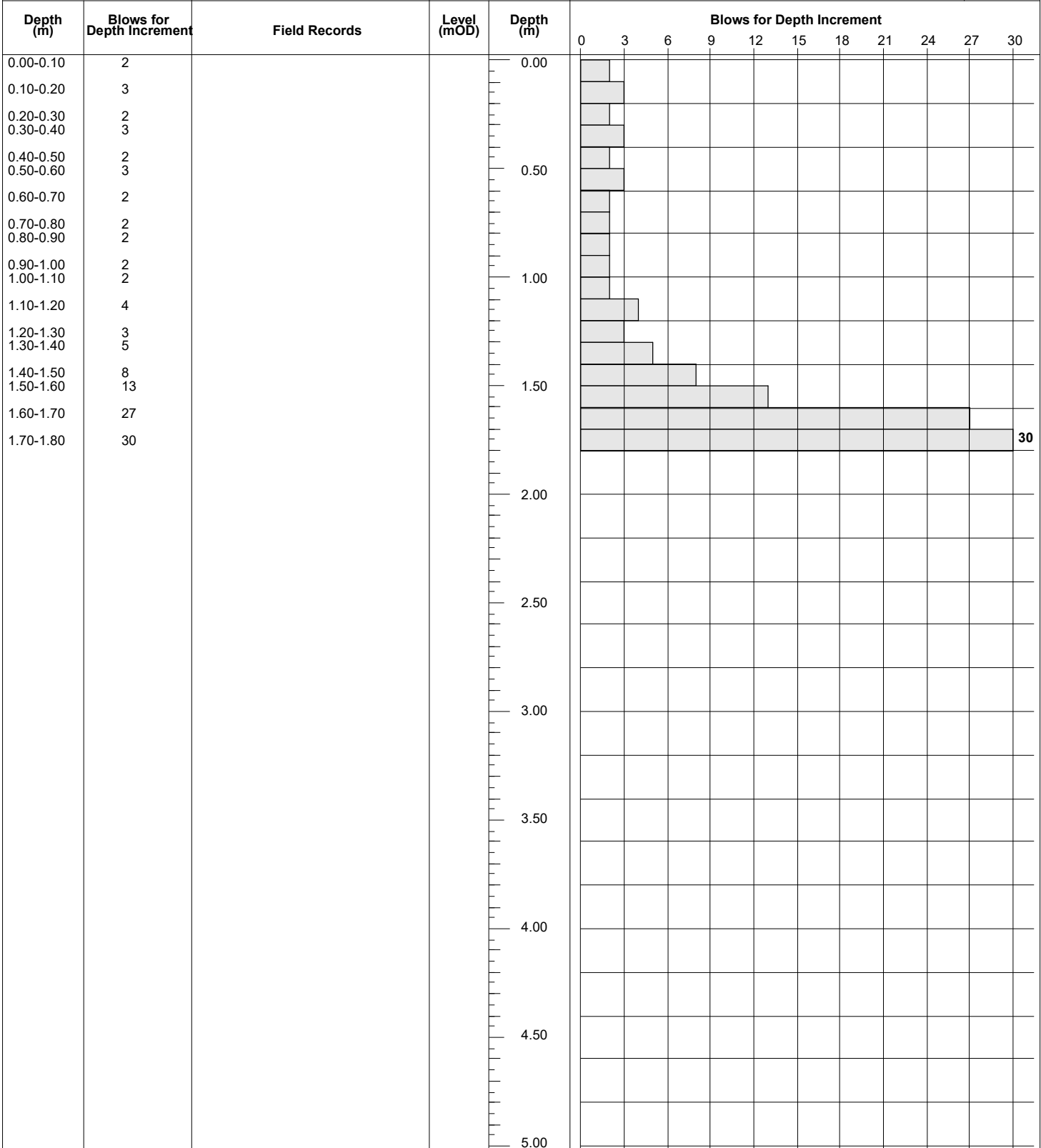
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Location		Dates 04/10/2022	Engineer	Sheet 1/1	



Remarks Refusal at 1.00m BGL	Scale (approx)	Logged By
	1:25	AB
	Figure No. 12128-08-22.DP05	



Machine : Tecop 10 Method : Dynamic Probe	Cone Dimensions Diameter 43.7mm	Ground Level (mOD)	Client Kilgallen & Partners	Job Number 12128-08-22
	Location	Dates 04/10/2022	Engineer	Sheet 1/1

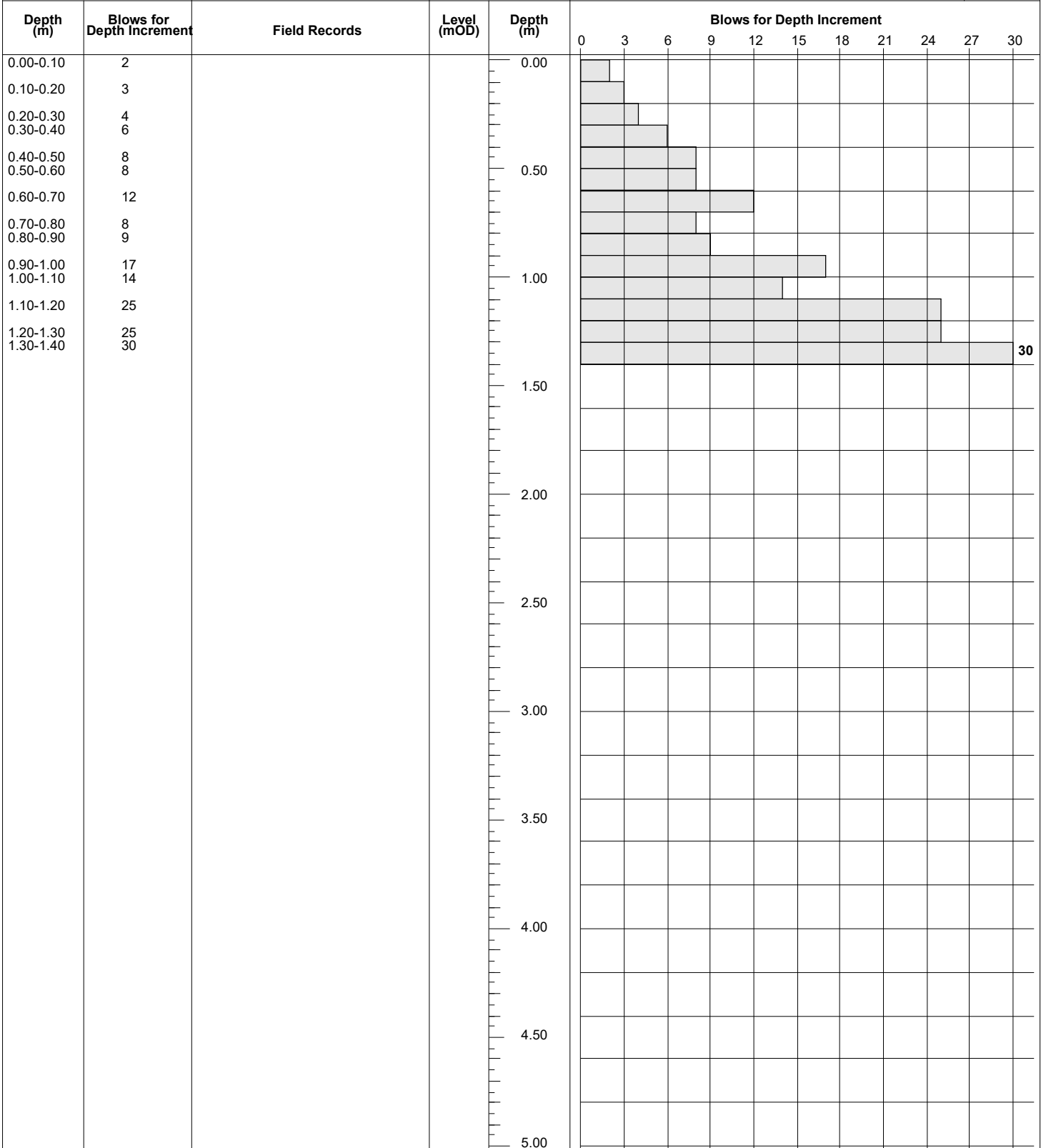


Remarks
Refusal at 1.80m BGL

Scale (approx)	Logged By
1:25	AB
Figure No.	
12128-08-22.DP06	



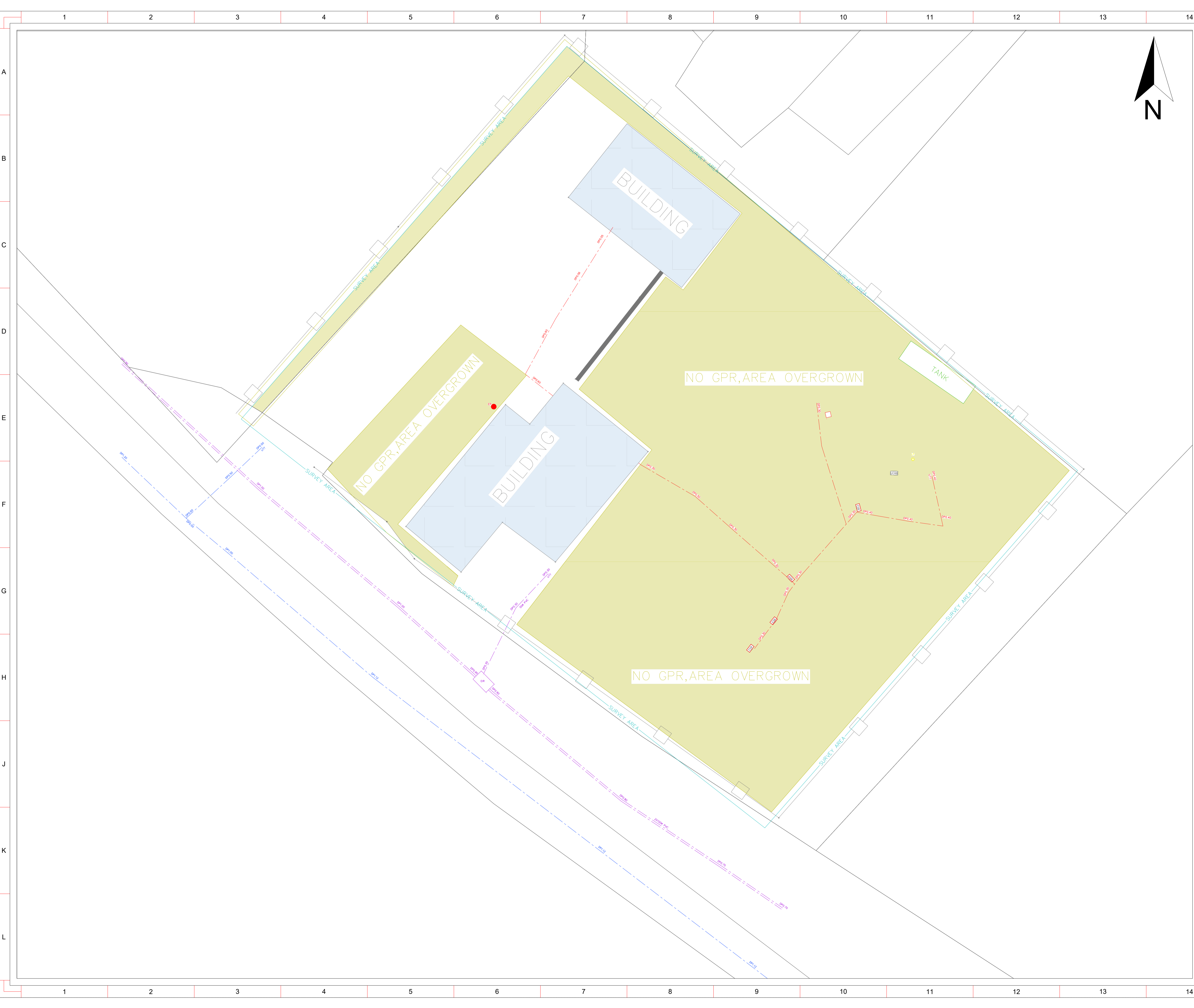
Machine : Tecop 10 Method : Dynamic Probe	Cone Dimensions Diameter 43.7mm	Ground Level (mOD)	Client Kilgallen & Partners	Job Number 12128-08-22
	Location	Dates 04/10/2022	Engineer	Sheet 1/1



Remarks Refusal at 1.40m BGL	Scale (approx)	Logged By
	1:25	AB
	Figure No. 12128-08-22.DP07	

APPENDIX 5 – GPR Survey





SERVICES LEGEND

UNDERGROUND ELECTRICITY LINE	FOUL DRAINAGE
ELECTRICAL M/HOLE	FOUL M/HOLE
OVERHEAD LINE WITH POLE	STORM DRAINAGE
OVERHEAD ELECTRIC	STORM DRAINAGE M/HOLE
UNDERGROUND HV ELECTRICITY LINE	COMBINED DRAINAGE
6M HIGH STREET LIGHT	COMBINED DRAINAGE M/HOLE
MINI PILLAR	PRODUCT DRAINAGE
UG ELECTRIC TRAFFIC CONTROL	PRODUCT DRAINAGE M/HOLE
TRAFFIC CONTROL M/HOLE	CHEMICAL LINE
EIR	CHEMICAL M/HOLE
EIR CHAMBER	ROAD GULLY
OVERHEAD LINE WITH POLE	GULLY TRAP
ENET	WATER MAIN
ENET CHAMBER	SLICE VALVE
COPHS	FIRE HYDRANT
COPHS CHAMBER	WATER METER
VIRGIN	SCOUR VALVE
VIRGIN CHAMBER	PRESSURE RELEASE VALVE
FIBRE	AIR VALVE
FIBRE CHAMBER	NON RETURN VALVE
AURORA TELECOM	FUEL LINE/TANK
AURORA TELECOM CHAMBER	GAS SV
CATV	GAS LINE
CATV CHAMBER	GAS HP
BT/FESAT	GL 00.00 GROUND LEVEL (METRES - OS DATUM)
BT/FESAT CHAMBER	CL 00.00 COVER LEVEL (METRES - OS DATUM)
SIRO FIBRE	IL 00.00 INVERT LEVEL (METRES - OS DATUM)
SIRO CHAMBER	DP1.50 DEPTH TO TOP OF SERVICE DUCT OR CABLE
UNIDENTIFIED SERVICE	DP ON MANHOLES = INVERT LEVEL OF CHAMBER
UNIDENTIFIED CHAMBER	DP ON DRAINAGE = INVERT LEVEL OF PIPE
EARTH LINE AND RODS	UTO UNABLE TO OPEN
TRAFFIC SENSORS	OSA OUTSIDE SURVEY AREA
CCTV POLE	UFT UNABLE TO TRACE
UTILITIES CABINET	QL-B4 QL-B4 DRAWN FROM RECORDS
	SURVEY AREA

Please note that the absence of services on this drawing is not solid proof that these services are not present in the ground. While every method of underground utility locating has been adhered to in this survey, some services may lie outside the range of the GPR and electro-magnetic/locator signal. Poor ground conditions and/or services situated underneath other services can also prove impossible to locate. Due to the fact that utility Service Plans were provided to MetroScan by the contractor, MetroScan cannot be held responsible for any services that have not been identified. The contractor should not assume that all services have been identified and must exercise a duty of care when excavating.

Hand/ Vacuum excavation is advised to determine exact depth and position of service prior to excavation commencing. Please note that the drawing provided is valid for 60 days from date stated below.

Drawing is intended solely for use of the contractor named below.

Accuracy Levels

In ideal conditions the accuracy levels of the EM, is +/-5% whilst the GPR outputs accuracy levels of 10% up to 2.5m depth. These accuracy levels can vary depending on ground conditions, depths of services, congestion of services (may cause signal to bend on to other services).

Depths noted on drawings should be taken as indicative and hand/ vacuum excavation is advised where exact depth are required. Depths of services will be given where direct access is available through visual inspection, eg manholes.

All Cover level elevations for Manholes / Inspection Chambers will be taken from topographical survey if supplied.

Survey Limitations

Non-conductive services pose a difficult task to identify. Direct buried fibre optic cables are difficult to identify with GPR. They can easily be traced when placed in a conduit by the means of a sensor or cable reel.

If MetroScan cannot get an accurate signal from a service, it will be noted on the drawing that the service is 'Taken from records QL-B4'.

If manholes cannot be opened on site, they will be marked on the drawing as UTO (unable to open).

Excluded from the survey unless otherwise stated:

Domestic services. Services above ground. Disconnected services where no signal can be obtained.

- ### Notes
- GPR scanning frequency 250 and 700 mhz
 - Depth of investigation 2.5m, self calibrating.
 - Radio detection equipment: Vvaxx Metrotech VLoc Pro3 / RD7000
 - GPR scanning limited to smooth surfaces only no obstruction.
 - Survey area marked on drawing
 - All depths stated are an indication of depth caution required when excavating.
 - All Utilities are classified QL- B2 unless noted otherwise.

PAS 128

Survey Type	Quality Level	Location Accuracy		Supporting Data
		Horizontal	Vertical	
D. Detailed utility record search	QL-D	Undefined	Undefined	
C. Site Reconnaissance	QL-C	Undefined	Undefined	A segment of utility whose location is demonstrated by visual reference to street furniture, topographical features or evidence of previous street works.
B. Detection	QL-B4 QL-B3 QL-B2 QL-B1	Undefined plus/minus 500mm plus/minus 250mm plus/minus 40% of the detected depth	Undefined plus/minus 100% of the detected depth	A utility segment which is suspected to exist but has not been detected and is therefore shown as an assumed route. Horizontal location only of the utility detected by one of the geophysical techniques used.
A. Verification	QL-A	plus/minus 50mm	plus/minus 15mm	Horizontal and vertical location of the utility detected by multiple geophysical techniques used.

Client : Ground Investigations Ireland
Site Address : Dunningstown Rd.
 Kilkenny

Drawing Title: MUL1225_GII_Dunningstown
Drwg No: 1

Site Completion Date: 9th September 2022
Sheet No: 1

Scale: 1:100@A1
Coordinates: ITM
Revision No:

Address: Rathjarney
 Piercestown
 Co. Wexford
 Tel (086) 8522298
 (086) 1935847

Email: john@metroscan.ie
 cian@metroscan.ie

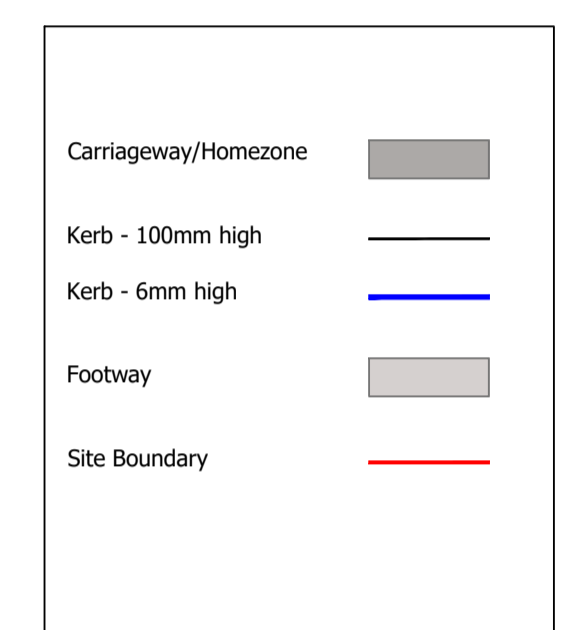
Website: www.metroscan.ie

APPENDIX 6 – Laboratory Testing

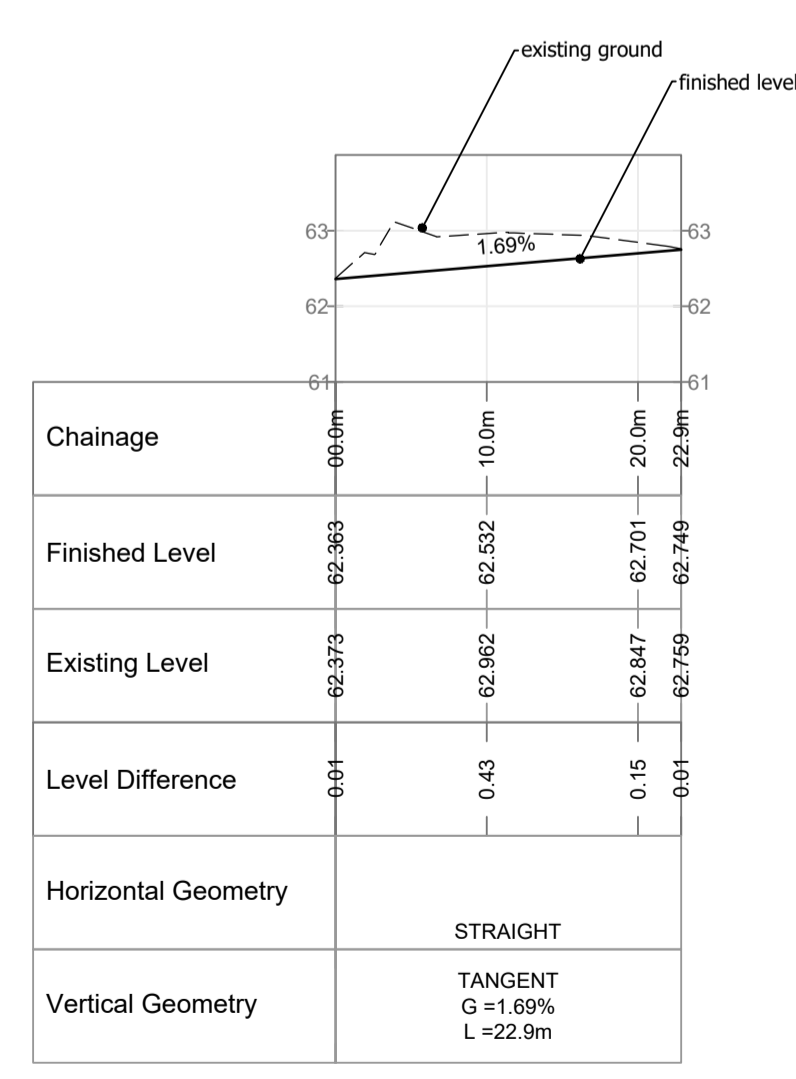




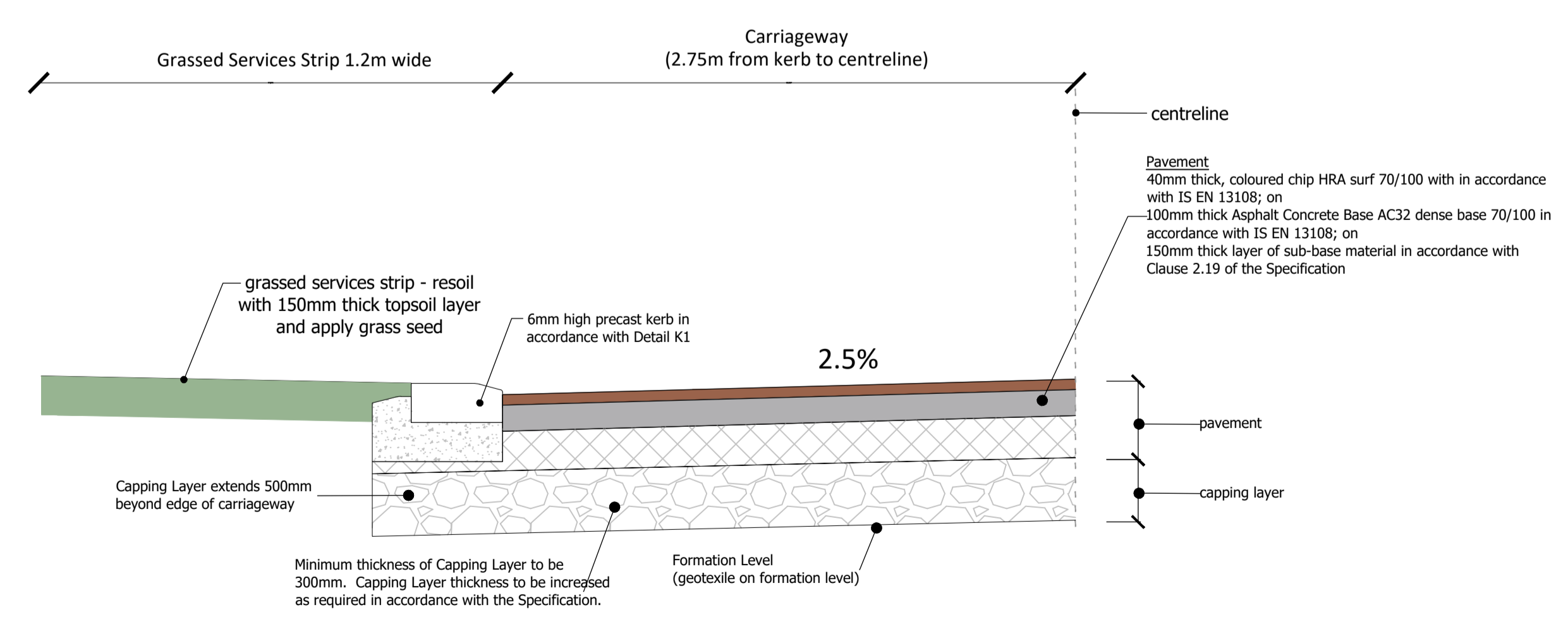
- GENERAL**
1. Datum for levels is OS Malin Head.
 2. Verify existing levels prior to commencement of works. Report any discrepancies immediately to the Employer's Representative.
 3. The locations shown for existing services are indicative only and may not be accurate. Furthermore, uncharted services may also be present. The Contractor should assume the existence of services unless proven otherwise.
 4. It is the Contractor's responsibility to determine the existence and precise location of any service located within the site. All works shall be carried out in strict accordance with the document 'Code of Practice for Avoiding Danger from Underground Services' as published by the Health and Safety Authority.



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ROAD ENTRANCE



DETAIL R7
HOMEZONE (Not to Scale)

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PL1	02/06/23	AC	ISSUED FOR PLANNING

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CLIENT
 KILKENNY COUNTY COUNCIL

PROJECT
 RESIDENTIAL DEVELOPMENT AT DUNNINGSTOWN ROAD, KILKENNY

TITLE
 ROADS AND STREETS - GENERAL LAYOUT, LONGITUDINAL SECTION AND DETAILS

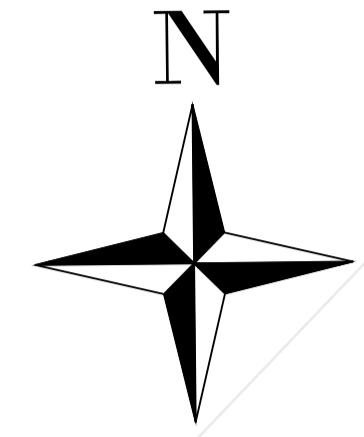
KILGALLEN & PARTNERS
 CONSULTING ENGINEERS
 E-mail: info@kilgallen.ie, Web: www.kilgallen.ie

KYLEEPROBE
 WELL ROAD
 PORTLAOISE
 T +353 56 866 2860

DANVILLE BUSINESS PARK
 KILKENNY
 +353 56 777 01090

DRN:	DRAWING NO.:	REV.:	
AC	22038-C-DR-101	PL1	
CHWD:	SCALE:	SIZE:	DATE:
PB	1:250 @ A1	A1	02/06/23

- GENERAL**
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7.9m Refuse Vehicle

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KILKENNY COUNTY COUNCIL

PROJECT
RESIDENTIAL DEVELOPMENT AT DUNNINGSTOWN ROAD, KILKENNY

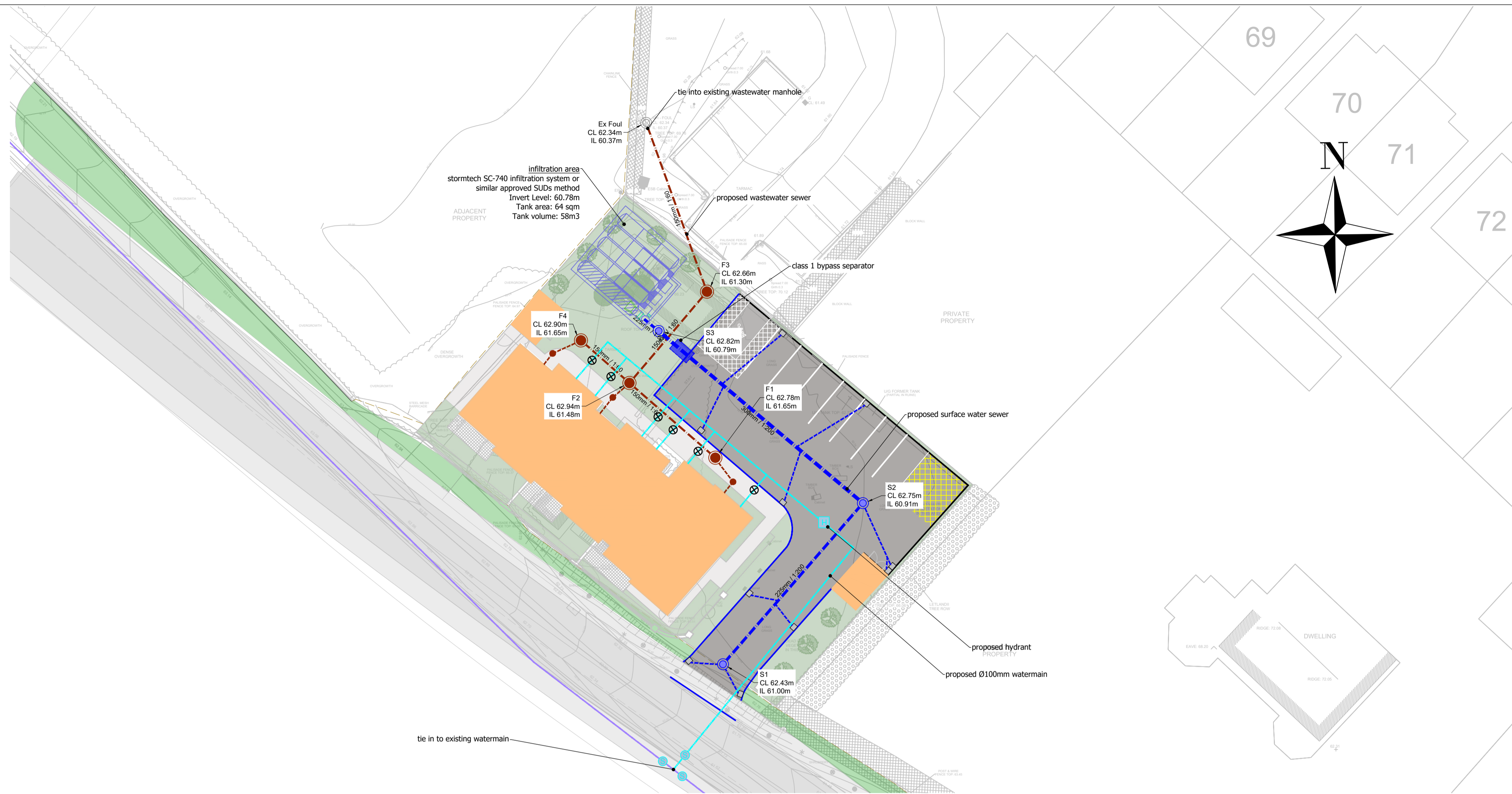
TITLE
SWEPT PATH ANALYSIS

KILGALLEN & PARTNERS
CONSULTING ENGINEERS
E-mail: info@kilgallen.ie, Web: www.kilgallen.ie

KYLEKPROE
WELL ROAD
PORTLAOISE
T +353 56 866 2860

UNIT 3
DANVILLE BUSINESS PARK
KILKENNY
+353 56 777 01090

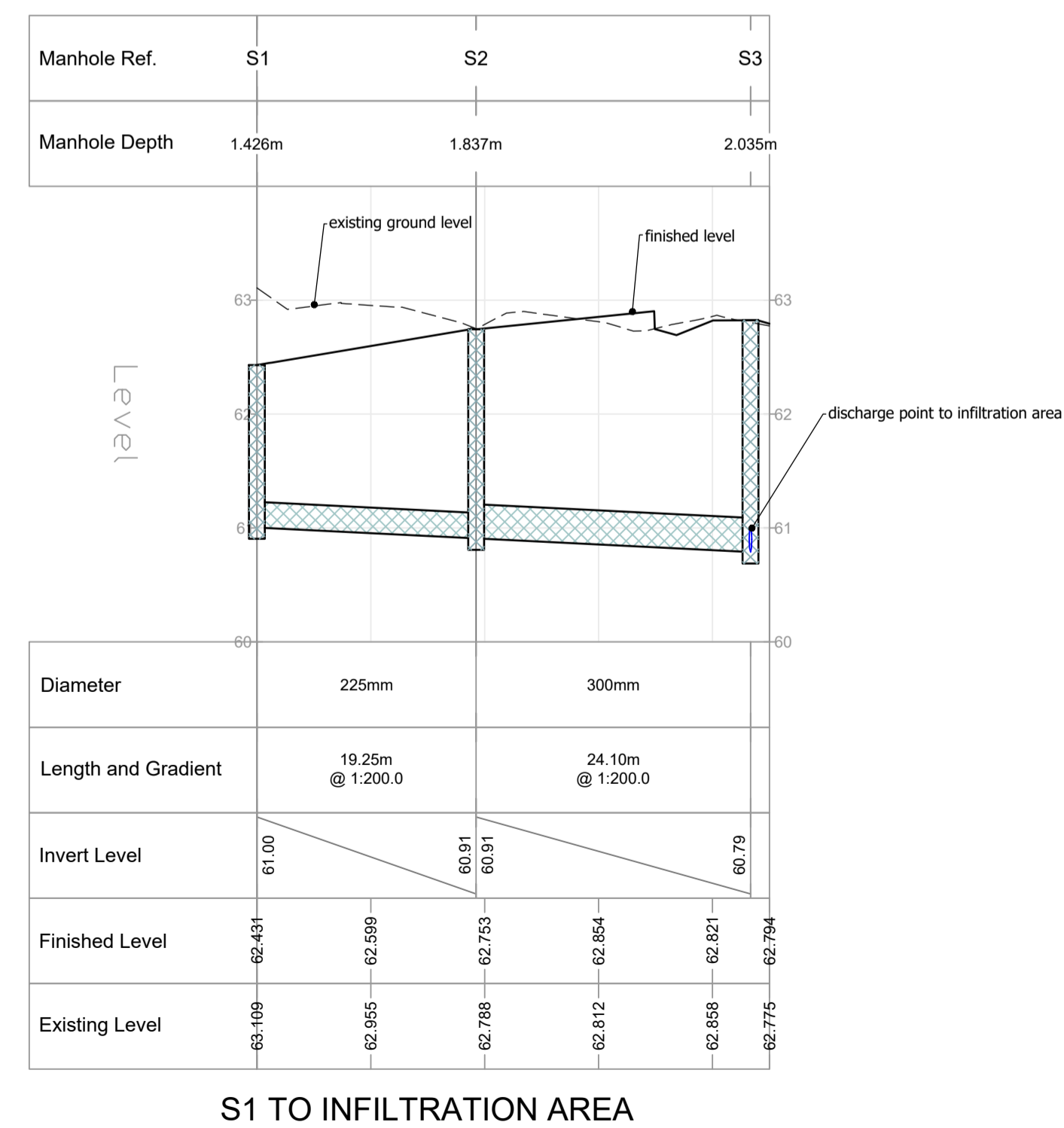
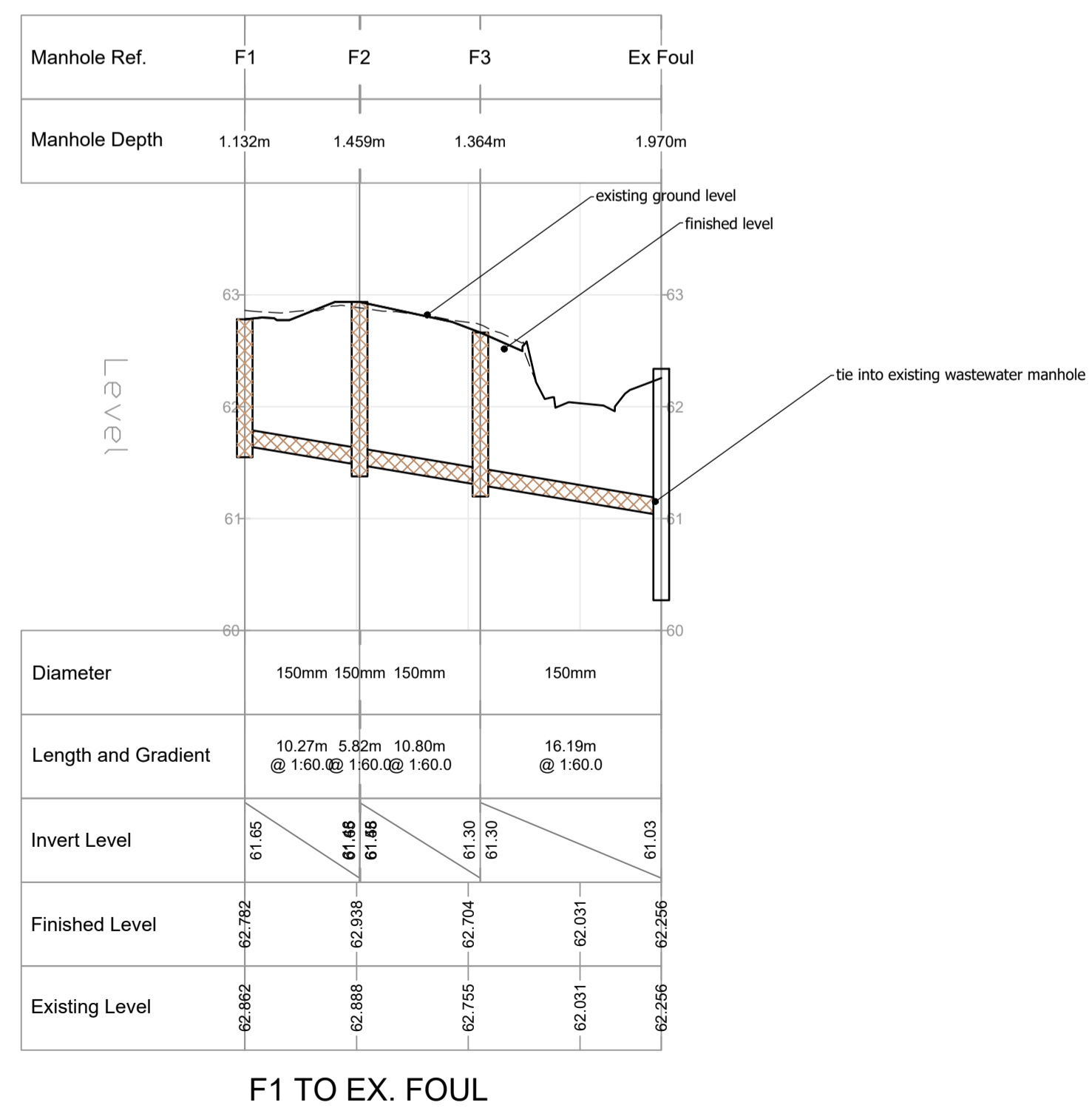
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CHWD: PB	SCALE: 1:100 @ A1	DATE: 02/06/23



LEGEND

- Surface water drain / sewer and chamber
- Gully and discharge pipe
- House drain - surface water
- Wastewater sewer and chamber
- House drain - wastewater with 600mm dia. inspection chamber
- 100mm OD HDPE watermain
- Sluice valve in accordance with STD-W-15
- On line hydrant in accordance with STD-W-19
- On line air valve in accordance with STD-W-22
- Boundary box in accordance with STD-W-03
- Scour Chamber in accordance with STD-W-30B
- Bulk Meter in accordance with STD-W-26A

- GENERAL**
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 - The locations shown for existing services are indicative only and may not be accurate. Furthermore, uncharted services may also be present. The Contractor should assume the existence of services unless proven otherwise.
 - It is the Contractor's responsibility to determine the existence and precise location of any service located within the site. All works shall be carried out in strict accordance with the document 'Code of Practice for Avoiding Danger from Underground Services' as published by the Health and Safety Authority.
- SURFACE WATER**
- The Specification for surface water drainage works shall be Specification for Roadworks published by Transport Infrastructure Ireland.
 - All surface water drains and sewers to be constructed in accordance with Detail D1.
 - Discharge pipes from gullies to drains and sewers shall be 150mm dia. Saddle connection for discharge pipes in accordance with Detail D3.
 - Chambers to be 1200mm dia. PCC in accordance with the 'Code of Practice for Chamber and Gully Top Installations' published by Leicis County Council.
 - Road gullies shall be in accordance with TII Detail CC-SCD-00510 and CC-SCD-00512.
 - Separators to be installed in accordance with Detail D5 and manufacturer's recommendations.
 - Each house to be served by a separate drain of min diameter 100mm dia. and laid to a minimum grade of 1 in 100.
- WASTEWATER**
- Construction of wastewater infrastructure to comply with the Irish Water Code of Practice for Wastewater Infrastructure.
 - Pipes for wastewater gravity sewers shall be uPVC pipes application area code "UD", stiffness class 8kN/m² in accordance with 3.13 of the Irish Water 'Wastewater Code of Practice'.
 - Wastewater drains and sewers to be constructed in accordance with STD-WW-07.
 - The minimum separation between wastewater pipes and other services shall not be less than either that shown in STD-WW-05 or that shown on M&E drawings.
 - Each house to be served by a separate drain of min diameter 100mm dia. and laid to a minimum grade of 1 in 60.
 - Chambers on wastewater drains and sewers in public areas shall be in accordance with STD-WW-10.
 - Private-side inspection chambers shall be in accordance with STD-WW-02, STD-WW-03 and STD-WW-13 and shall have a minimum depth to invert of 0.5m and a maximum depth to invert of 1.2m.
 - Maximum depth to invert for Access Junctions to be 0.6m.
- WATER SUPPLY INFRASTRUCTURE**
- Construction of water supply infrastructure to comply with the Irish Water Code of Practice for Water Supply Infrastructure.
 - Pipes for watermains shall be HDPE PE-80 with an SDR-11 or SDR-17 rating in accordance with 3.9.2. of Irish water 'Code of Practice for Water Supply Infrastructure'.
 - The minimum separation between watermains and other services shall not be less than either that shown in STD-W-11 or that shown on M&E drawings.
 - Each house to be served by a separate service main and Boundary Box in accordance with STD-W-03.



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STATUS
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KILKENNY COUNTY COUNCIL

PROJECT
RESIDENTIAL DEVELOPMENT AT DUNNINGSTOWN ROAD, KILKENNY

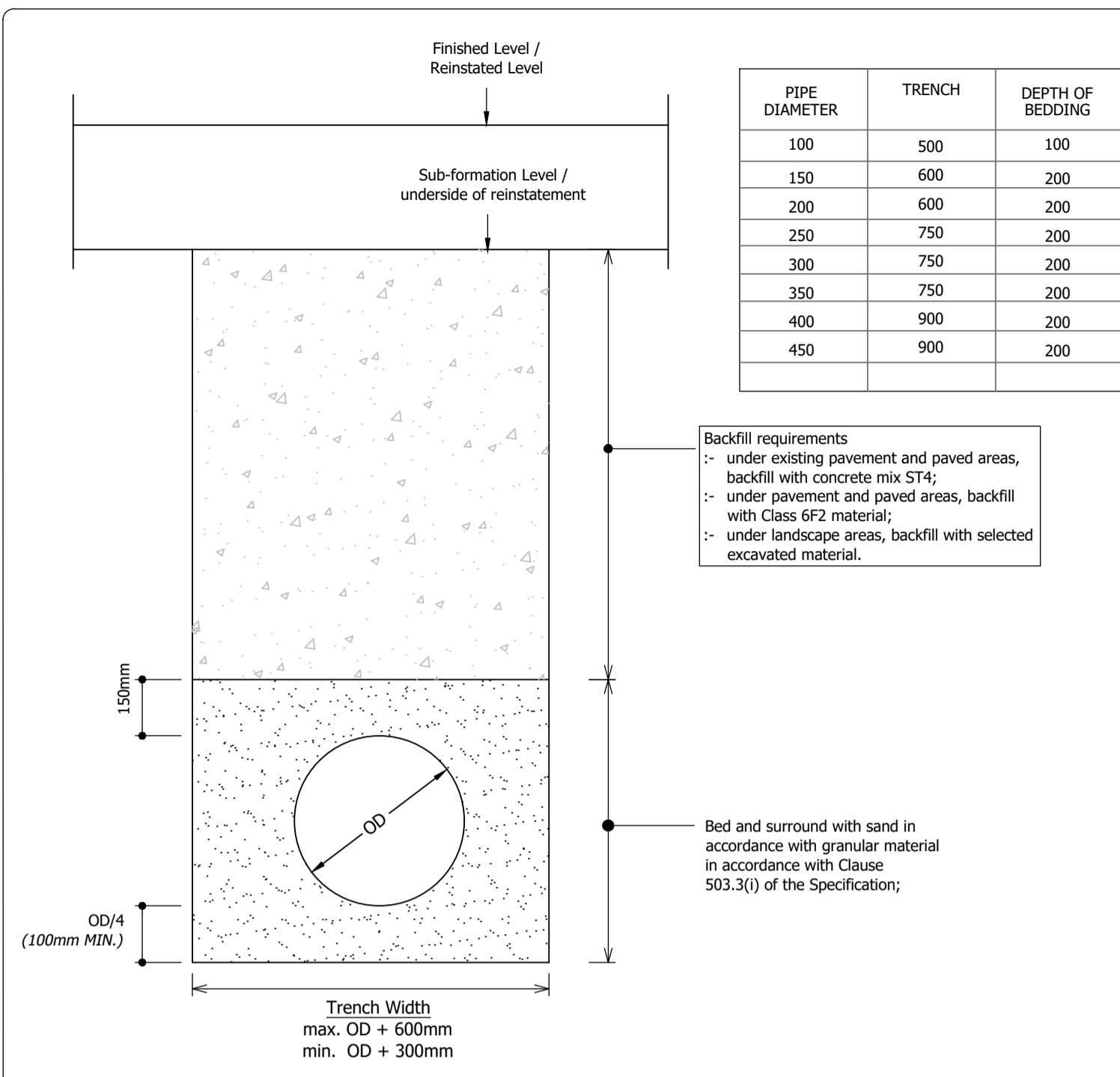
TITLE
DRAINAGE & WATER SUPPLY - GENERAL LAYOUT & LONGITUDINAL SECTIONS

KILGALLEN & PARTNERS
CONSULTING ENGINEERS
Email: info@kilgallen.ie, Web: www.kilgallen.ie

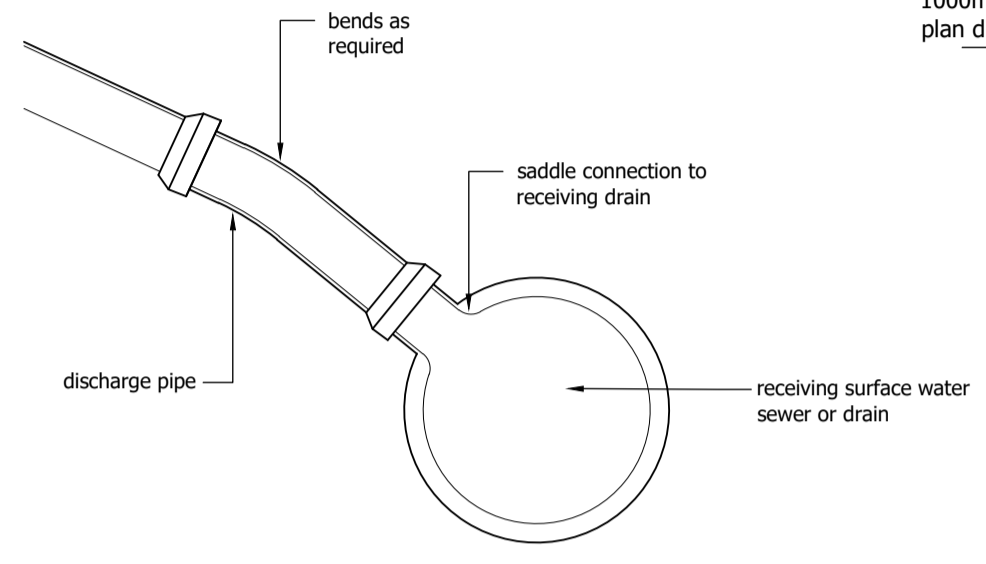
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DANVILLE BUSINESS PARK KILKENNY T +353 56 777 01090

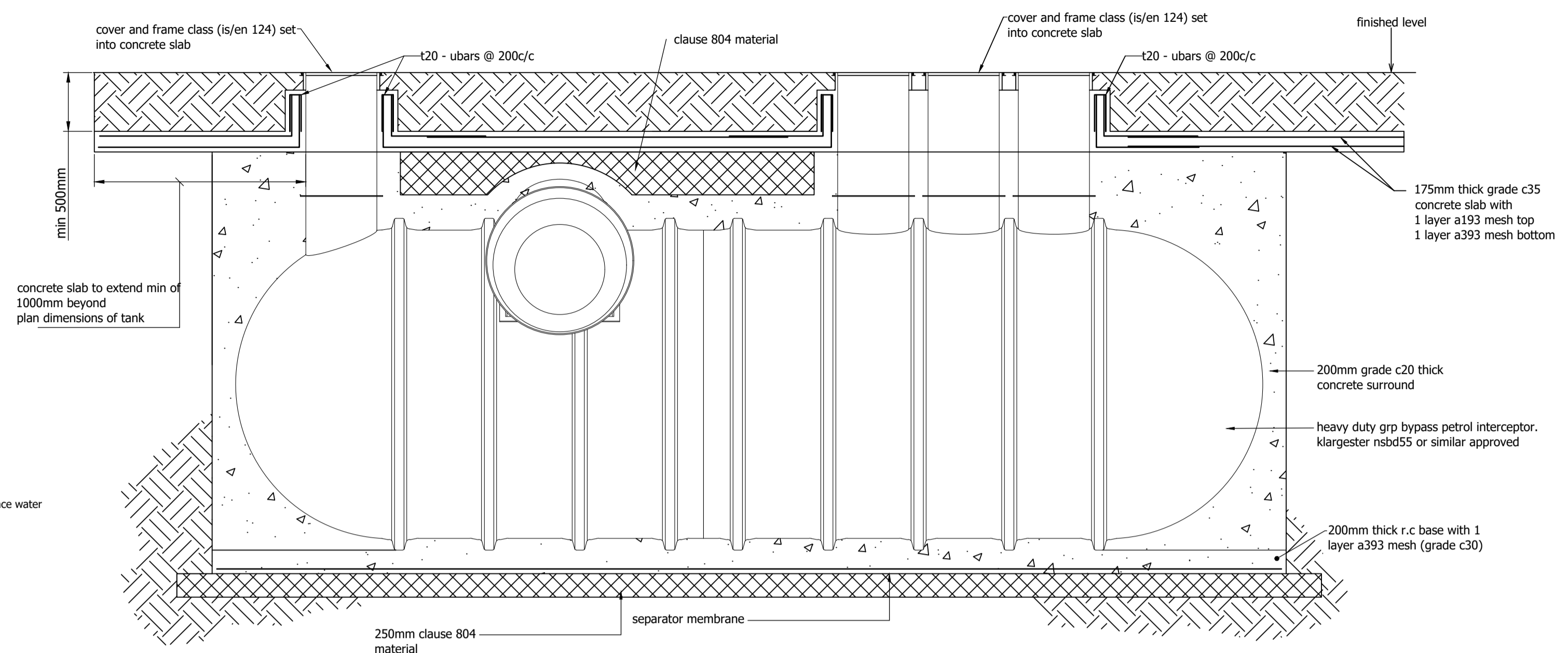
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CHWD:	SCALE:	SIZE:
PB	as shown @ A1	A1
DATE:	02/06/23	



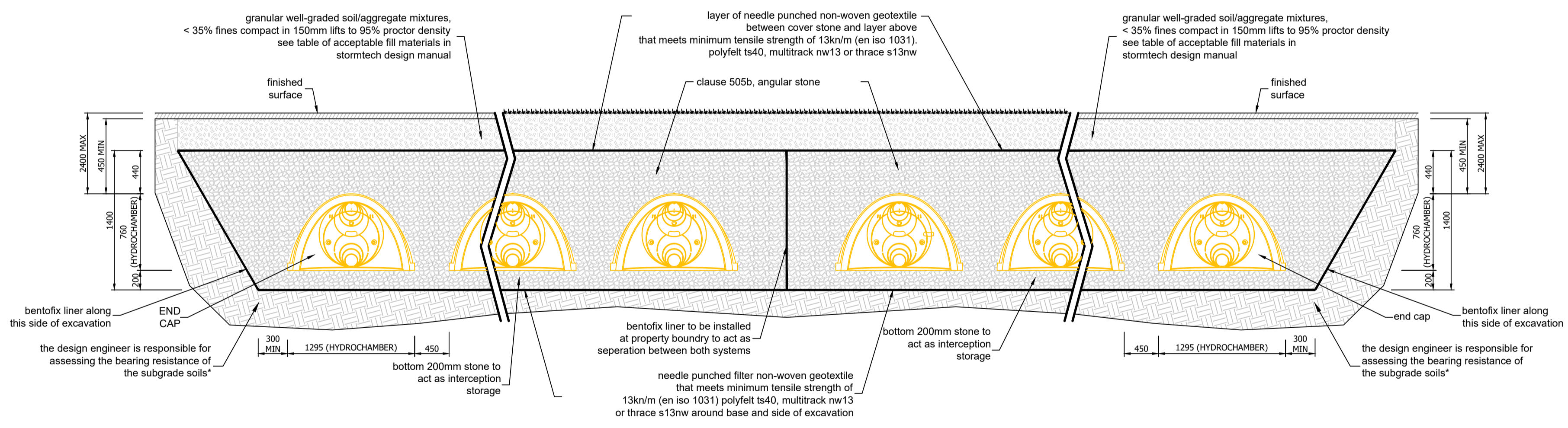
DETAIL D1
Trench Detail for Surface Water Drains and Sewers



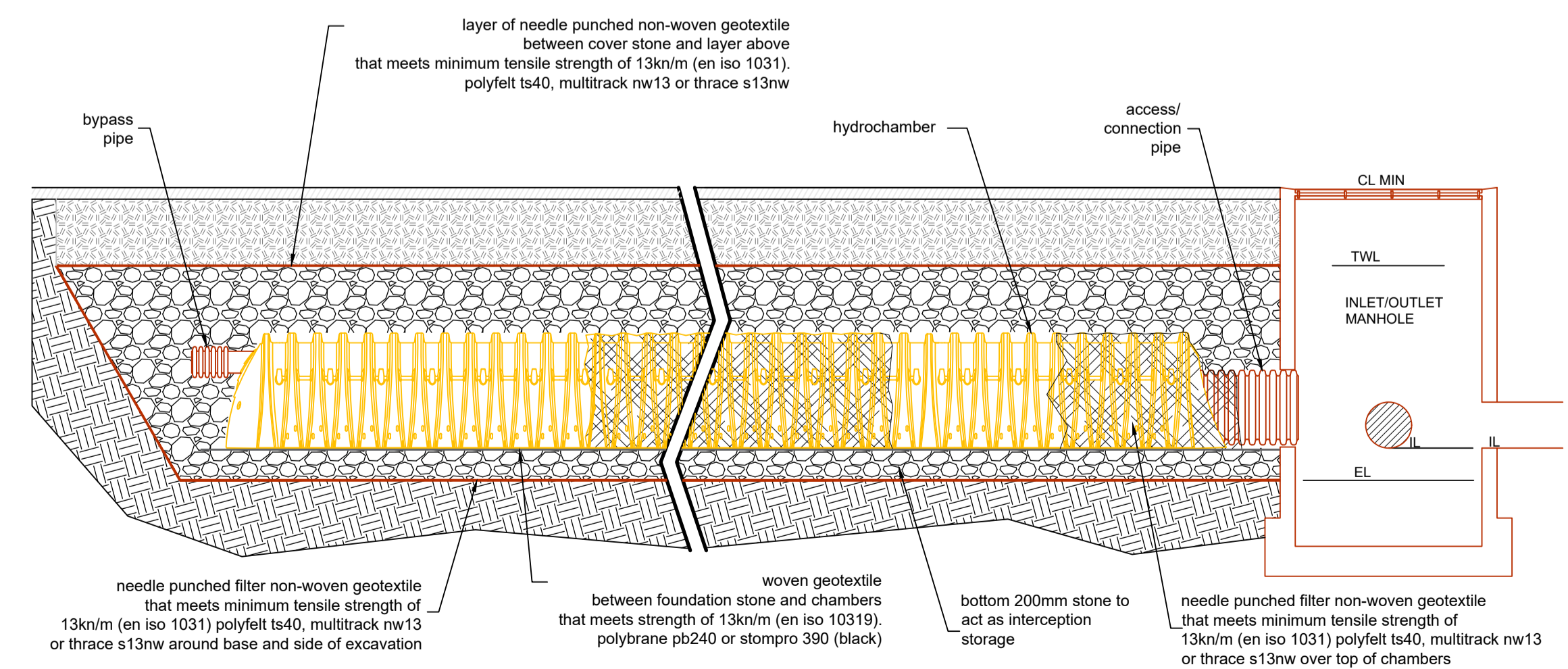
DETAIL D3
Saddle Connection from Gully Discharge Pipe to Surface Water Sewer



DETAIL D5
Installation of Separators



DETAIL D7
HYDROCHAMBERS - ELEVATION



DETAIL D7
HYDROCHAMBERS - SECTION

- GENERAL**
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- SURFACE WATER**
- The Specification for surface water drainage works shall be Specification for Roadworks published by Transport Infrastructure Ireland.
 - All surface water drains and sewers to be constructed in accordance with Detail D1.
 - Discharge pipes from gullies to drains and sewers shall be 150mm dia. Saddle connection for discharge pipes in accordance with Detail D3.
 - Chambers to be 1200mm dia. PCC in accordance with the 'Code of Practice for Chamber and Gully Top Installations' published by Laois County Council.
 - Road gullies shall be in accordance with TII Detail CC-SCD-00510 and CC-SCD-00512.
 - Separators to be installed in accordance with Detail D5 and manufacturer's recommendations.
 - Each house to be served by a separate drain of min diameter 100mm dia. and laid to a minimum grade of 1 in 100.

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- Construction of wastewater infrastructure to comply with the Irish Water Code of Practice for Wastewater Infrastructure.
 - Pipes for wastewater gravity sewers shall be uPVC pipes application area code 'UD', stiffness class 8kN/m² in accordance with 3.13 of the Irish Water 'Wastewater Code of Practice'.
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 - Maximum depth to invert for Access Junctions to be 0.6m.

- WATER SUPPLY INFRASTRUCTURE**
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 - Pipes for water mains shall be HDPE PE-80 with an SDR-11 or SDR-17 rating in accordance with 3.9.2 of Irish water 'Code of Practice for Water Supply Infrastructure'.
 - The minimum separation between water mains and other services shall not be less than either that shown in STD-W-11 or that shown on M&E drawings.
 - Each house to be served by a separate service main and Boundary Box in accordance with STD-W-03.

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PRELIMINARY. NOT TO BE USED FOR ANY OTHER PURPOSE.

CLIENT
KILKENNY COUNTY COUNCIL

PROJECT
RESIDENTIAL DEVELOPMENT AT DUNNINGSTOWN ROAD, KILKENNY

TITLE
DRAINAGE - ENGINEERING DETAILS

KILGALLEN & PARTNERS
CONSULTING ENGINEERS
E-mail: info@kilgallen.ie, Web: www.kilgallen.ie

KYLEPROBE WELL ROAD PORTLADISE T +353 56 866 2860

UNIT 3 DANVILLE BUSINESS PARK KILKENNY T +353 56 777 01090

DRN:	DRAWING NO.:	REV.:
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CHKD:	SCALE:	SIZE:
PB	As shown @ A1	A1
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