



Letterkenny Northern Network Project

Ground Investigation Contract Information Pack

Donegal County Council

T02 | July 2026



Letterkenny Northern Network Project

Ground Investigation Contract Information Pack

Donegal County Council

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Letterkenny Northern Network Project

Ground Investigation Contract Information Pack

Donegal County Council

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PRELIMINARY SAFETY & HEALTH PLAN



Letterkenny Northern Network Project

Ground Investigation Contract
Part 4 - Preliminary Safety & Health Plan

Donegal County Council

T01 | July 2026



Letterkenny Northern Network Project
Ground Investigation Contract
Part 4 - Preliminary Safety & Health Plan
Donegal County Council

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Author: Marc Jones (MJ)

Checker: Paul Kissane (PK)

Approver: Marc Jones (MJ)

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Letterkenny Northern Network Project

Preliminary Safety & Health Plan

[Prepared in Accordance with the Safety, Health and Welfare at Work (Construction) Regulations 2013]

Letterkenny Northern Network Project

Ground Investigation Contract

Part 4 - Preliminary Safety & Health Plan

Donegal County Council

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1. GENERAL

1.1 Project Supervisor Design Process

Roughan & O'Donovan (ROD) have been engaged by Donegal County Council (DCC) to act as Project Supervisor for the Design Process [PSDP] for this project.

1.2 Scope and Purpose of Preliminary Safety and Health Plan (Designer)

For the purposes of this Contract, Letterkenny Northern Network Project – Ground Investigation Contract, this document shall constitute the Preliminary Safety and Health Plan as required by regulation 12 of the Safety, Health and Welfare at Work (Construction) Regulations, 2013 (hereinafter referred to as the Construction Regulations). This document has been prepared for the purpose of providing information to the Project Supervisor for the Construction Stage [PSCS] who will further develop it for the Safety and Health Plan for the construction site, as required by Regulation 16 of the Construction Regulations.

1.3 Client

The Client for this project is

Donegal County Council
County House,
Lifford,
Co. Donegal,
F93 Y622.

The contact within the Client is Ross Hannigan, (Tel: 074 9153900, E: rhannigan@Donegalcoco.ie)

1.4 Designers

The Designers for the project are:

Roughan & O'Donovan (ROD)
Fourth Floor, The Chase, Arkle Road, Dublin 18, D18 Y3X2, Ireland
Tel: +353 (0)1 294 0800

The contact within ROD is Paul Kissane (Tel: +353 (0)1 294 0800, Paul.Kissane@rod.ie).

1.5 Requirement for Notification by the PSCS

The project scale and duration requires that written notice (Form AF2) be sent to the HSA by the PSCS before work begins as per Regulation 22 of the Construction Regulations.

1.6 Related Documents

This Preliminary Safety and Health Plan should be read in conjunction with the following documents:

- i) Scope
- ii) Contract Drawings (included within scope)
- iii) The Specification
- iv) Bill of Quantities
- v) Safety, Health and Welfare at Work Act 2005;
- vi) Traffic Signs Manual 2010 – Chapter 8 – Temporary Traffic Measures and Signs for Roadworks;
- vii) S.I. No. 291 Safety, Health and Welfare at Work (Construction) Regulations, 2013;
- viii) S.I. No. 299 Safety, Health and Welfare at Work (General Application) Regulations 2007;
- ix) Guidelines and Codes of Practice as published from time to time by the HSA.

2. DESCRIPTION OF THE PROJECT

The works will involve carrying out a number of boreholes (rotary open-hole drilling and core holes), slit trenches, trial pits, pavement cores, dynamic cone penetrometer. The boreholes are provided to determine sufficient sub-ground conditions and depth to bedrock below proposed foundations. Trial pits are provided to obtain a geological description of the first meters of soils, to carry out in situ testing and to obtain soil samples. Pavement cores will provide information on the type of existing pavement at tie ins of the proposed road with the existing roads. Geophysical surveying can be used to aid in the detection of buried utilities. Slit trenches will provide information to establish the line, level, dimensions and type of services. Dynamic cone penetrometer will provide information about the soil strength and stiffness at areas of difficult access. Traffic Management will be required to provide a safe working environment for all works on or in the vicinity of the public roads.

The plans showing the extent and type of work to be carried out at specific locations are indicated on the drawings included within the scope.

3. OBJECTIVE OF THE WORKS

This contract will provide information on existing ground conditions, contamination, utilities and pavement makeup details to enable the design of the scheme, which includes several road safety interventions such as road realignments, presence of any irregularities in the geological structure that may affect the proposed construction work. It will also provide information on the soil and rock characteristics that will be used in the design of foundations across the scheme.

4. CONSTRUCTION ACTIVITIES

The field works envisaged are as follows:-

- a) Traffic management;
- b) Protection and detection of existing services;
- c) Execution of boreholes (rotary core holes);
- d) Excavation for slit trenches and trial pits;
- e) Execution of dynamic cone penetrometer;
- f) Execution of pavement cores;
- g) Installation of Standpipes and water level measurement at selected boreholes as well as another water monitoring;
- h) In situ testing;
- i) Disposal of material;
- j) Reinstatement;
- k) Compliance with H&S legislation.

5. PROJECT TIMESCALE

The commencement date for the Ground Investigation works is estimated as Q3, 2026 subsequent to confirmation that all the necessary documentation has been provided.

6. STAFFING

The estimated number of people to work on site is 4-8.

7. WORK INVOLVING PARTICULAR RISKS

The following is a list summarising those particular risks referred to in Schedule 1 of the Safety, Health and Welfare at Work (Construction) Regulations 2013 which are considered relevant to the proposed works and are deemed to be reasonably foreseeable to the Designer:

1. Work which puts persons at work at risk of –
 - a. falling from a height;
 - b. Burial under earthfalls;
 - c. Drowning;when the risk is particularly aggravated by the nature of the works or processes used or by the environment at the place of work or construction site.
2. Work near high voltage power lines (overground and underground cables).
3. Work which puts persons at work at risk from chemical or biological substances.
4. Work involving the assembly or disassembly of heavy prefabricated components.

The following is a non-exhaustive list of those works related to this project which will involve particular risks to health and safety:

Risks to Safety and Health of Workers

The following is a non-exhaustive list of the particular risks to the health and safety of workers on site in the carrying out of the Investigations for this project:

- i) Work involving the use of rotary drilling equipment;
- ii) Work involving the use of drilling and excavation equipment;
- iii) working adjacent to existing utilities; includes buried utilities including electrical cables, water pipes and telecoms ducts;
- iv) Work involving the maintenance and reading of piezometer groundwater levels;
- v) Execution of infiltration tests;
- vi) working in the vicinity of vehicles on site;
- vii) working in the vicinity of traffic on the existing road network;
- viii) working adjacent to live traffic;
- ix) work involving temporary traffic management of traffic on temporary road surfaces and provision of traffic management adjacent to the works (including provision for pedestrians/cyclists);
- x) Work involving temporary diversions of traffic and provision of traffic management adjacent to the works;
- xi) working in overgrown and uneven areas;
- xii) work involving excavation, disposal and reinstatement;
- xiii) work involving the use of cutting tools;
- xiv) Work involving exposure of workers to dust from cutting of either natural or artificial materials and the consequent effects on health, e.g., sensitisation of the respiratory system and other respiratory illnesses, irritation and injury to eyes, dermatitis and other skin complaints;
- xv) Work involving the use of heavy machinery;
- xvi) Work involving the manual handling of small plant and materials;
- xvii) Work involving the handling of hazardous materials;
- xviii) Work involving exposure of workers to contaminated materials;
- xix) Work involving exposure of workers to excessive noise / vibration and the consequent effects on health;
- xx) Working adjacent to existing buildings;
- xxi) Works on agricultural lands;
- xxii) Mammal borne diseases;

- xxiii) exposure to Weils disease;

Risks to Safety of the Public and Others

The following is a non-exhaustive list of the particular risks to the safety of the public and others in the works:

- i) proximity of vehicles and equipment to vehicles and pedestrian paths;
- ii) spread of disease and prevention of same.

Specific Measures for Reducing Particular Risks

It is envisaged that the following non-exhaustive list of specific measures for reducing particular risks will be addressed by the Contractor.

- i) Securing of the Site against unauthorised access;
- ii) Measures will be required for the safe operation of plant and other construction activities where these are in the vicinity of E.S.B. power lines, Eir, BT, Bórd Gáis pipe lines and watermains;
- iii) Desk study service tracking for this stage of the project has not been completed. Existing utility drawings from prior planning stage has been carried out and a copy of drawings developed at that time are included with the information pack. The drawings indicate that services are located on site and these need to be confirmed by careful means by the Contractor prior to excavating;
- iv) The Contractor to use experienced personnel for maintenance and monitoring of piezometer installations;
- v) The provision of appropriate access and personnel trained in use.
- vi) The provision of appropriate traffic management and diversions on and adjacent to public roads.
- vii) The agreement and implementation of safe systems of work particularly in respect of live traffic activities.
- viii) The Contractor to complete a Temporary Traffic Management Plan.
- ix) Supervision of the Contractors own staff with regard to adherence to the Company Health and Safety Policy/Statement and specific Project Safety and Health Plan.
- x) Take adequate security measures whilst work is progressing;
- xi) Securing of the work areas against unauthorised access;
- xii) Attachment points to be provided on items to be handled, with self-release shackles and weight details provided on all elements;
- xiii) The Contractor to ensure the maintenance of appropriate slope angles on side walls in open excavation to ensure slope stability and eliminate the risk of collapse/burial under different weather conditions;
- xiv) Maintaining a safe and stable support platform for equipment, vehicles and working personnel in areas of soft ground;
- xv) Maintaining a safe distance from infiltration test pits and backfilling it immediately after the test is completed;
- xvi) The Contractor to employ good house-keeping measures on this site;
- xvii) Supervision of the Contractor's own staff with regard to adherence to the Contractor's own Company Health and Safety Policy/Statement and Specific Project Safety and Health Plan;
- xviii) The Contractor to ensure the provision of fencing/barriers to temporary platforms and open excavations when left unsupervised for any period of time;
- xix) Maintaining a safe and practical distance from live carriageways and the implementation of agreed traffic management when working in the vicinity or on existing carriageway.
- xx) Provide relevant training, PPE and medical equipment appropriate to the location and work being carried out.
- xxi) Establish communication protocol prior to commencing works.
- xxii) Protection measures to be established when working at height.

- xxiii) Establish areas of soft ground and take adequate precautions to ensure safety of contractor's personnel.
- xxiv) Maintaining a safe and practical distance from any existing watercourse.
- xxv) Take precaution against infection/Weils disease.
- xxvi) Provide sufficient welfare facilities, first aid kit etc.

8. REQUIREMENTS FOR CONTINUING LIAISON

Liaison between the PSCS, the PSDP, the Civil Designer and the Ground Investigation Contractor will be required at regular intervals throughout the course of the site works to consider the following:

- (a) *Health and safety implications of ongoing activities on, or adjacent to the site;*
- (b) *Unforeseen eventualities during project execution resulting in changes in the scope or location of the Works and which might affect particular risks, contract timescale, or have other health and safety implications;*
- (c) *Notification of any incidents which may affect working arrangements;*
- (d) *Liaison with landowners, the Local Authorities and other relevant 3rd Parties i.e. An Garda Síochana;*

9. SAFETY FILE

Pursuant to regulation 13 of the Safety and Health at Work (Construction) Regulations 2013, the Project Supervisor for the Design Process is required to:

'prepare a safety file appropriate to the characteristics of the project, containing relevant safety and health information, including any information provided under regulation 21, to be taken into account during any subsequent construction work following completion of the project and promptly deliver the safety file to the client on completion of the project.'

In order to prepare the safety file, the PSDP must receive the appropriate information from designers, the PSCS and other duty-holders.

Regulation 21 requires the PSCS to

'co-ordinate arrangements among contractors to ensure the provision of relevant information, in writing, necessary for the project supervisor for the design process to complete the safety file referred to in regulation 13, monitor the implementation of the arrangements and take any necessary corrective action, as set out in regulation 20, and provide in writing to the project supervisor for the design process all relevant information necessary for that project supervisor to complete the safety file referred to in regulation 13.'

The following is a non-exhaustive list of contents that are required to be included in the safety file. It is not intended to be a complete list and in no way relieves the PSCS of his obligations under the regulations.

- Safety and Health Plan for the construction site prepared by the PSCS;
- As Built Drawings;
- Details of Equipment and Maintenance Facilities;
- Maintenance Procedures and Manuals;
- Relevant Certificates from Suppliers / Manufacturers / Specialist Contractors etc;
- SI information for contaminated land;
- Details of Location and Nature of Utilities and Services and details of relevant procedures and precautions to be followed.

10. DESIGN ASSUMPTIONS

Any changes arising from unforeseen eventualities during the investigation works which might affect particular risks, the time for completion or have other safety and health implications should be notified to the PSDP.

11. DESIGNERS ASSESSMENT OF SAFETY AND HEALTH HAZARDS / RISKS

The designer's assessment of safety and health hazards/risks is contained in Appendix A.

APPENDIX A

Designer's Assessment of Safety and Health Hazards/Risks

Made (Design Engineer):	MJ			Scheme Name:	Project Number:
Checked:	PK			Letterkenny Northern Network Project - Ground Investigation Contract	26.142
Date:	14/07/2026			Investigations to inform Detailed Design / Construction Contract Requirements	
Identified Hazard or Risk	Exposed Party			Evaluation, Design Decisions and / or Alternative Actions	
(P) indicates a Particular Risk listed in Schedule 1 of the Regulations	Contractor	Public	Maintainer	<i>Description of risk or hazardous activity</i> Describe the design decisions, assumed construction methods and / or alternative actions	Is the risk of a substantial or unusual nature such that information should be provided to the PSDP?
Works which puts persons at work at risk of falling from a height (P)	✓	✓		The ground investigation requires excavations and working adjacent to embankments. Investigation is also required on areas with sloped ground, adjacent to watercourses and existing structures. It is anticipated the Contractor will provide safety induction for all personnel and access routes accordingly. All employees to wear appropriate personal protective equipment and to plan movement of plant and equipment. Wheel chocks and/or appropriate edge protection should be provided at deep excavations. Contractors personnel are not required to enter the excavation. Excavation should not be left unattended for any period of time unless appropriately protected from unauthorised entry.	Yes
Working near Overhead & Underground HV/MV/LV cables and live services (P)	✓	✓		The Geotechnical Investigation requires excavation in the form of exploratory holes. The Designer anticipates that significant underground and overground services including Eir and electricity are present at the site. The Designer also recognises that other undocumented or unknown services may be present that have not been identified during initial utility tracking carried out to date. Residual risk remains for undocumented services such as gas, electricity, water etc. It is specified that the Contractor "shall satisfy himself as to the position of any underground services" as per Part 3: The Scope. Upon obtaining results specified, exploratory holes are to be backfilled immediately. This will reduce risk of electrocution/exposure to live services to the Contractor. Utilities tracking to date to be provided to the contractor on request. In areas where overhead lines are present, it is anticipated that the Contractor provide exclusion zones and crossing points at these locations.	Yes
Working in proximity to farm animals	✓			The nature of work involves working close to farm animals. Liaise with farm owners & business etc where required.	No
Work which puts persons at work at risk from chemical or biological substances (P)	✓			Presence of Unacceptable soil materials at the site of the works is not anticipated but it can not be ruled out. It is anticipated the Contractor will complete a thorough desk study of the site in advance of progressing the works and review historic records of use within the extents of the investigation. Any unacceptable material that requires disposal should be disposed off in accordance with legislation. It is assumed that adequately experienced and trained personnel will complete the investigation and necessary PPE provided to all personnel.	No
Work exposing persons at work to the risk of drowning (P)	✓			The ground investigation requires trial pits, infiltration tests and boreholes adjacent to existing watercourses. It is anticipated that safety induction will be provided to all operatives, PPE will be provided to all operatives and no trip zones will be established in the vicinity of excavations. Wheel chocks and/or appropriate edge protection should be provided at the edge of deep excavations. A safe distance will be kept at all times from adjacent watercourses and it is assumed that safe systems of work will be implemented by the contractor.	No

Identified Hazard or Risk	Exposed Party			Evaluation, Design Decisions and / or Alternative Actions	
(P) indicates a Particular Risk listed in Schedule 1 of the Regulations	Contractor	Public	Maintainer	<i>Description of risk or hazardous activity</i> Describe the design decisions, assumed construction methods and / or alternative actions	Is the risk of a substantial or unusual nature such that information should be provided to the PSDP?
Work exposing persons at work to the risk of burial (P)	✓			<i>The ground investigation requires trial pits and slit trenches.</i> It is anticipated that safety induction will be provided to all operatives, temporary support will be provided where necessary, PPE will be provided to all operatives and no trip zones will be established in the vicinity of excavations. Wheel chocks and/or appropriate edge protection should be provided at the edge of deep excavations.	No
Work involving the assembly or dismantling of heavy prefabricated components (P)	✓	✓		<i>The ground investigation requires logs of existing ground and structures using plant and machinery.</i> It is anticipated the personnel undertaking operations will be adequately trained and provided with appropriate PPE. The Contractor shall submit method statements for approval and provide adequate working space in accordance with Ch. 8 of the TSM and local authority requirements.	No
Presence of Asbestos	✓	✓		<i>The Contract requires excavation in the form of exploratory holes.</i> Risk of encountering asbestos is present during excavation noting that not all service details are available.	No
Work which puts persons at work at particular risk of construction traffic or other traffic	✓	✓		<i>The investigation works will be carried out adjacent to a trafficked road network.</i> The site is semi urban in nature, access/egress off the existing road network will require the implementation of traffic management in areas of limited stopping sight distance near bends and junctions. It is assumed that the Contractor will implement agreed traffic management and or diversions as required for the full duration of the works with adequate working space to be provided. It is anticipated that the Contractor will provide safety induction, PPE to personnel and provide traffic management in accordance with the Traffic Signs Manual, and the requirements of Donegal County Council. It is anticipated that the Contractor will complete a Temporary Traffic Management Plan. It is also anticipated that the contractor will liaise with Donegal County Council and agree safe systems of work.	Yes
Management of Construction Traffic	✓	✓		<i>A number of vehicles and plant will be required on site during the Works. Access across/ through existing fence lines and boundaries/ ditches will be required, where approved.</i> The use of transport vehicles, plant and materials handling plant should be planned. The Contractor is anticipated to provide traffic management and routing of vehicles and personnel to reduce risk. Flashing beacons, mirrors, reversing sirens and reversing cameras to be in operation on applicable plant. Roll over protection where required, especially where steep ground is present. Working close to mobile plant: All ground workers should be advised not to approach vehicles from the rear. The ground workers should approach from the side and signal to the driver, wait for the vehicle to stop and the driver to indicate for you to come forward. The Contractor shall advise all the operators / drivers to always park plant safely & secure especially if left on site overnight.	Yes
Unauthorised Access by members of the public	✓	✓		<i>There is risk of unauthorised access by members of the public as works are located in a semi-urban environment and adjacent to the existing road network.</i> The Designer anticipates that unauthorized access during working hours will be prevented by the Contractor's supervisory personnel. The Client / Contractor should ensure that appropriate measures are undertaken, to manage the flow of traffic with sufficient barriers, fencing, demarcation and signage provided to secure the site.	Yes

Identified Hazard or Risk	Exposed Party			Evaluation, Design Decisions and / or Alternative Actions	
(P) indicates a Particular Risk listed in Schedule 1 of the Regulations	Contractor	Public	Maintainer	<i>Description of risk or hazardous activity</i> Describe the design decisions, assumed construction methods and / or alternative actions	Is the risk of a substantial or unusual nature such that information should be provided to the PSDP?
Interfaces with live public roads and footpaths within local authority lands	✓	✓		<i>The works require investigative works on public roads and footpaths</i> The Contractor will be required to establish traffic safety and management in accordance with the traffic signs manual and the requirements of Donegal County Council. All Operatives are required to undergo relevant induction prior to working on the live carriageway.	Yes
Slips, Trips	✓	✓		<i>Slips, trips and falls are a risk on uneven ground.</i> It is assumed that lighting shall be provided for any works carried out at night. An experienced contractor who is aware of this risk and that the existing ground may be uneven underfoot to be appointed. Pedestrians and cyclists might be present. Diversions should be well posted and follow routes that do not put the general public at risk of slips, trips or falls. Options for access will need to be reviewed where constraints such as steep grounds affect the access route.	Yes
Manual handling	✓			<i>The nature of work involves manual handling.</i> It is anticipated that the risk assessment will be carried out. Mechanical aids shall be provided where necessary. All staff to be trained in manual handling.	No
Vibration/ Noise	✓	✓		<i>The Geotechnical Investigation requires excavation in the form of trial pit and boreholes.</i> The contractor is anticipated to provide suitable PPE to operatives in close proximity to the work and consider regular servicing of items of plant and fitting silencers to plant. It is anticipated that site assessment should be carried out and possible sources should be identified. Source of noise/ vibration should be removed/ reduce where possible. Site personnel should be informed of hazards.	No
Welfare	✓			<i>No water, electrical or foul services are readily available on the site</i> The Contractor may need to provide independent welfare facilities.	Yes
Weils Disease and other mammal borne diseases	✓			<i>Weils disease and other mammal borne diseases are a risk on the site.</i> It is assumed that the Contractor will be experienced in the gathering of data of this type in this type of environment. Appropriate training, safety equipment and PPE should be provided to operatives.	Yes
<i>Other parties please take note:</i> These are designer's risk evaluations of design options carried out in-house for the purpose of our complying with designers' duties under the Safety, Health and Welfare at Work (Construction) Regulations 2013. The evaluations relate only to those aspects/elements of the project which Roughan & O'Donovan are responsible for designing under the terms of our appointment by our client. Other parties should not rely on these evaluations for their own purposes; in particular, contractors, who must deal with and control all risks arising during construction, must carry out their own definitive risk assessments <i>ab initio</i> for that purpose.					

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6. The Contractor shall make contact with utility providers, obtain the latest records available and satisfy themselves with the location of existing utilities prior to the commencement of the works.
7. It shall be assumed that the Contractor has accounted for measures for dealing with existing utilities appropriately, including any impact these utilities may have on the construction works, based on the latest information from Utility Providers at the time of entering the Contract.
8. The Contractor shall carry out appropriate investigations including but not limited to Soil Sampling, trial pits and etc. to take, to confirm utility identification, positions and depths relevant to the Works.

Boundary Extent
EIR Overhead
Eir Telecoms Underground
BT
ENET
Telecoms Underground Coit / Magnet / Virgin
Telecom Pole
BT / ENET Chamber
Eir Chamber
GAS Distribution Pipe (Medium Pressure)
GAS Distribution Pipe with 110mm Teuto Duct
GAS Valve
CD
Surface Water Carrier Drain
Gully and Gully Tail
Drainage Chamber
Foul / Combined Sewer
Mini-Pillar
Sub Station
ESB Medium Voltage Underground
MV-DH
ESB Medium Voltage overhead
38kV-U
ESB 38kV Underground (Abandoned)
L-V-U
ESB Low Voltage Underground
ESB Pole
Watermain
Air Valve
Scour Valve
Sluice valve
Hydrant
Meter
Existing Pumping Station
Existing Electricity Point
Manhole Sewer

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6. The Contractor shall make contact with utility providers, obtain the latest records available and satisfy themselves with the location of existing utilities prior to the commencement of the works.
7. It shall be assumed that the Contractor has accounted for measures for dealing with existing utilities appropriately, including any impact these utilities may have on the construction works, based on the latest information from Utility Providers at the time of entering the Contract.
8. The Contractor shall carry out appropriate investigations including but not limited to: Soil boring, trial pits etc. to the top, to confirm utility identification, positions and depths relevant to the Works.

	Boundary Extent		
	EIR Overhead		
	Eir Telecoms Underground		
	BT Telecoms Underground		
	ENET Telecoms Underground		
	Telecoms Underground Collt / Magnet / Virgin		
	Telecom Pole		
	BT / ENET Chamber		
	Eir Chamber		
	GAS Distribution Pipe (Medium Pressure)		
	GAS Distribution Pipe with 110mm Telco Duct		
	GAS Valve		
	Surface Water Carrier Drain		
	Gully and Gully Tail		
	Drainage Chamber		
	Foul / Combined Sewer		
	Mini-Pillar		
	Sub Station		
	ESB Medium Voltage Underground		
	ESB Medium Voltage overhead		
	ESB 38kV Underground (Abandoned)		
	ESB Low Voltage Underground		
	ESB Pole		
	Watermain		
	Air Valve		Existing Pumping Station
	Scour Valve		Existing Discharge Point
	Sluice valve		Manhole Sewer
	Hydrant		
	Meter		

CONSULTANT



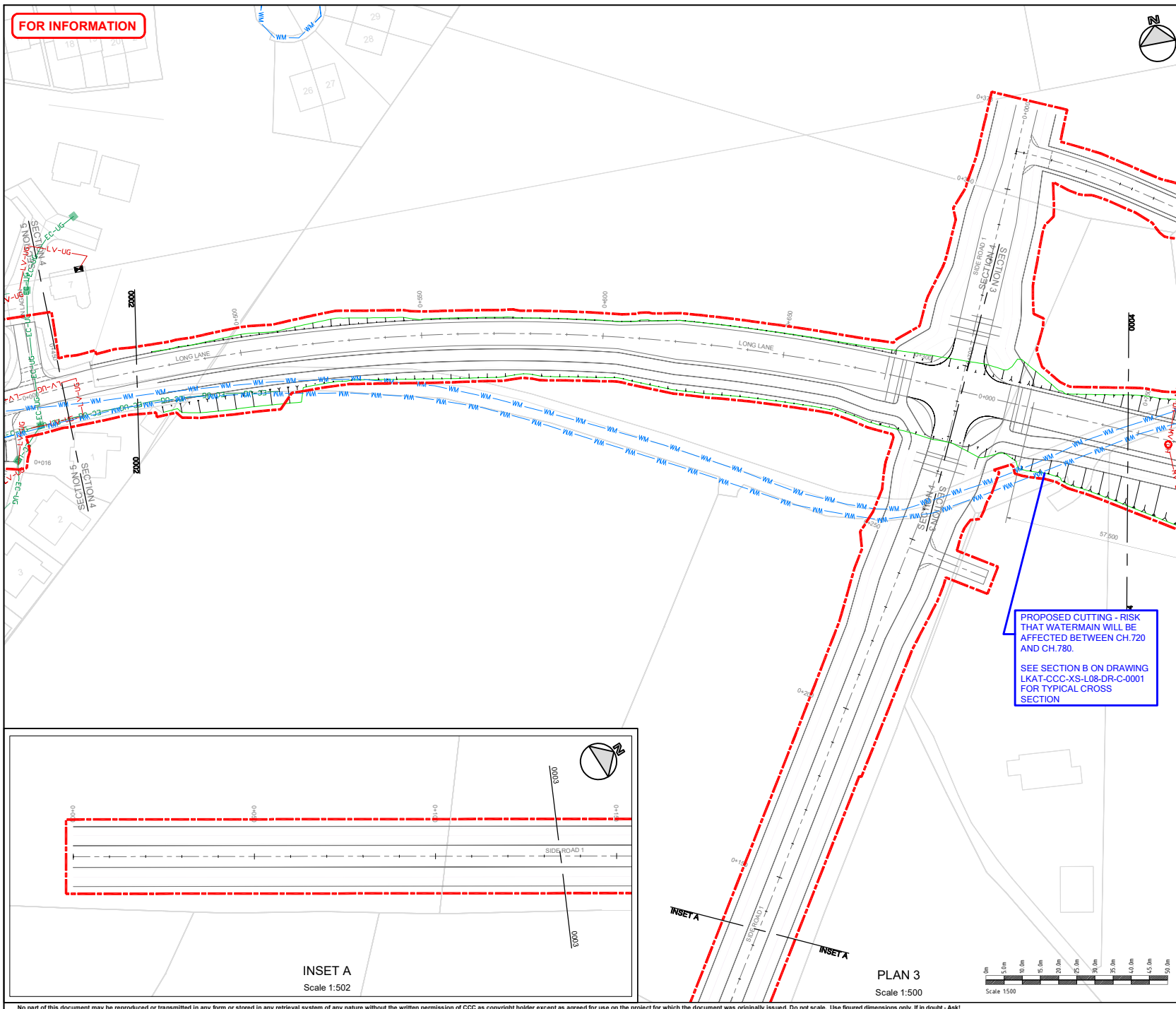
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LEGEND

- Boundary Extent
- EIR Overhead
- Eir Telecoms Underground
- BT Telecoms Underground
- ENET Telecoms Underground
- Telecoms Underground Cables / Magnet / Virgin
- Telecom Pole
- BT / ENET Chamber
- Eir Chamber
- GAS-D GAS Distribution Pipe (Medium Pressure)
- GAS-D GAS Distribution Pipe with 110mm Telco Duct
- GAS Valve
- CD Surface Water Carrier Drain
- Gully and Gully Tail
- Drainage Chamber
- Foul / Combined Sewer
- Mini-Pillar
- Sub Station
- ESB Medium Voltage Underground
- ESB Medium Voltage overhead
- ESB 38kV Underground (Abandoned)
- ESB Low Voltage Underground
- ESB Pole
- Watermain
- Air Valve
- Scour Valve
- Sluice valve
- Hydrant
- Meter
- Existing Pumping Station
- Existing Discharge Point
- Manhole Sewer

KEY PLAN

SCHEME 8

INSET A

REV	DATE	DESCRIPTION	BY	CHK	APD
000	21/02/2024	DETAILED DESIGN	YC	MMK	BC

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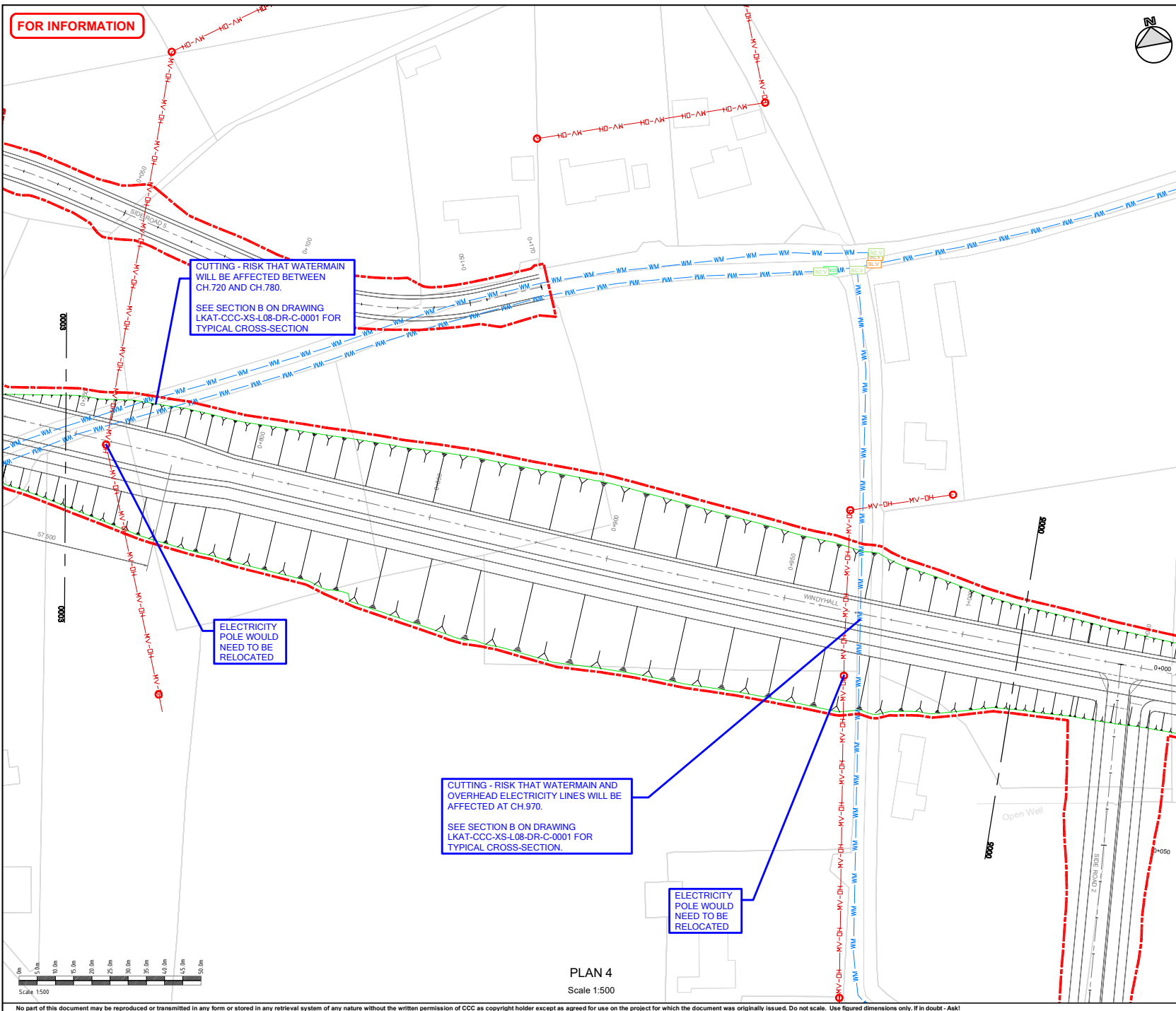
LETTERKENNY ACTIVE TRAVEL
SCHEME 8

EXISTING UTILITIES
NORTHERN NETWORK PROJECT
SHEET 3 OF 8

APPROVED FOR REVIEW AND COMMENTS

DATE 28/01/2024 **SCALE** 1:500 **APP** A1

PROJECT CODE LKAT-CCC-UC-L08-DR-C-0003 **ISSUE** 100



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- Drainage Chamber
- Foul / Combined Sewer
- Mini-Pillar
- Sub Station
- ESB Medium Voltage Underground
- MV-DH ESB Medium Voltage overhead
- ESB 38kV Underground (Abandoned)
- LV-UG ESB Low Voltage Underground
- ESB Pole
- Watermain
- Air Valve
- Scour Valve
- Sluice valve
- Hydrant
- Meter
- Existing Pumping Station
- Existing Discharge Point
- Manhole Sewer

KEY PLAN

SCHEME 8

INSET A

REV	DATE	DESCRIPTION	BY	CHK	APD
000	21/02/2024	DETAILED DESIGN	YC	MMK	BC

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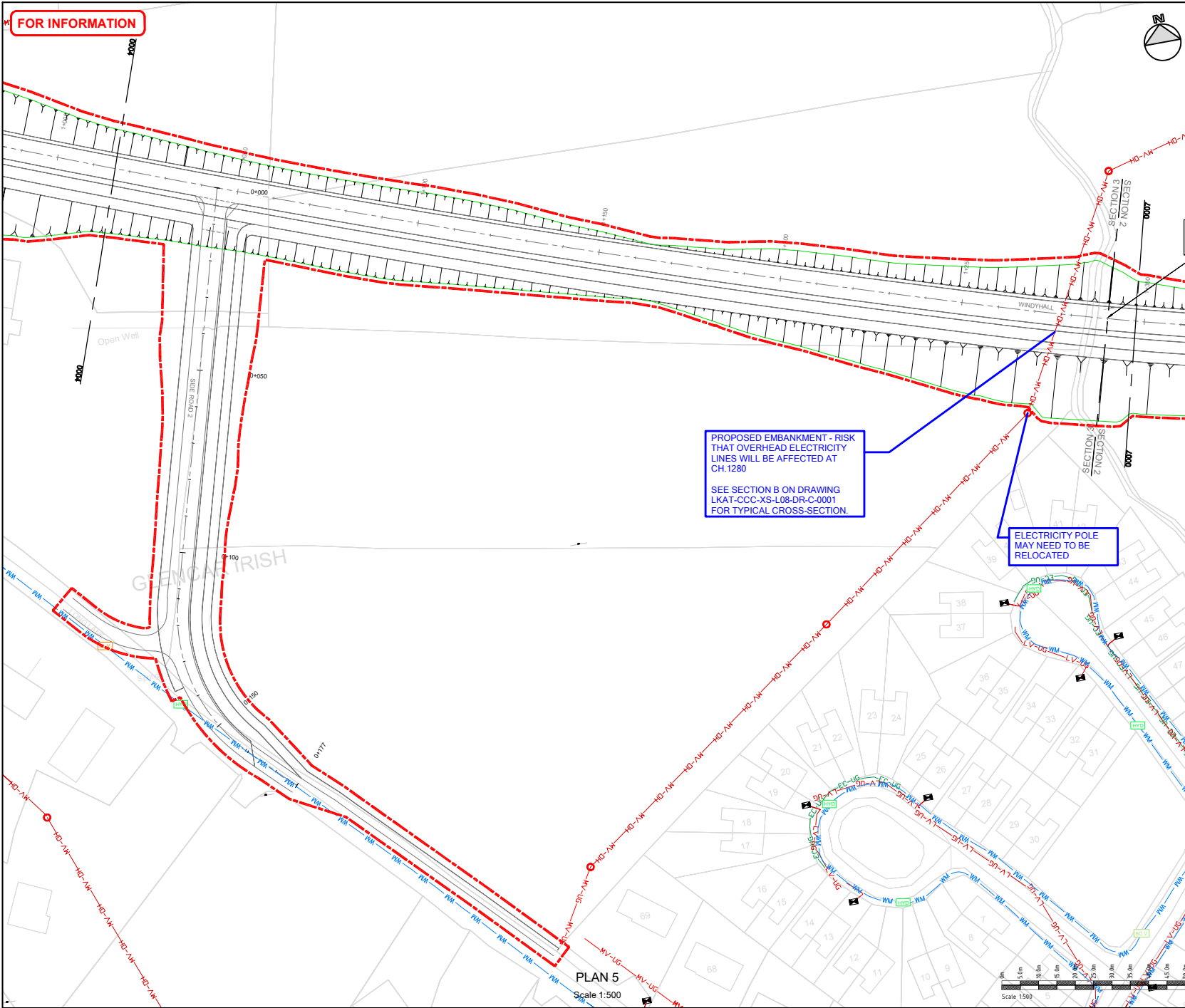
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LETTERKENNY ACTIVE TRAVEL
SCHEME 8

EXISTING UTILITIES
NORTHERN NETWORK PROJECT
SHEET 4 OF 8

APPROVED FOR	FOR REVIEW AND COMMENTS	DATE
28/01/2024	1:500	A1

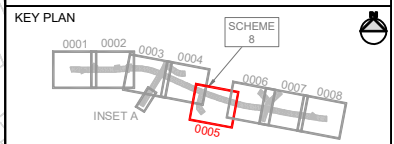
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- LEGEND**
- Boundary Extent
 - EIR Overhead
 - Eir Telecoms Underground
 - BT Telecoms Underground
 - ENET Telecoms Underground
 - Telecoms Underground Curb / Magnet / Virgin
 - Telecom Pole
 - BT / ENET Chamber
 - Eir Chamber
 - GAS-D GAS Distribution Pipe (Medium Pressure)
 - GAS-D GAS Distribution Pipe with 110mm Telco Duct
 - GAS Valve
 - Surface Water Carrier Drain
 - Gully and Gully Tail
 - Drainage Chamber
 - Foul / Combined Sewer
 - Mini-Pillar
 - Sub Station
 - ESB Medium Voltage Underground
 - ESB Medium Voltage overhead
 - ESB 38kV Underground (Abandoned)
 - ESB Low Voltage Underground
 - ESB Pole
 - Watermain
 - Air Valve
 - Scour Valve
 - Sluice valve
 - Hydrant
 - Meter
 - Existing Pumping Station
 - Existing Discharge Point
 - Manhole Sewer



0001	0002	0003	0004	0005	0006	0007	0008
INSET A							

000	01/02/2024	DETAILED DESIGN	YC	MMK	BC
REV	DATE	DESCRIPTION	BY	CHK	APD



LETTERKENNY ACTIVE TRAVEL
SCHEME 8

EXISTING UTILITIES
NORTHERN NETWORK PROJECT
SHEET 5 OF 8

APPROVED FOR INFORMATION	FOR REVIEW AND COMMENTS	DATE FOR REVIEW
20/01/2024	1/2024	A1
DATE OF ISSUE	1/2024	1/2024

LKAT-CCC-UC-L08-DR-C-0005 100

FOR INFORMATION

CH 1+290 - START OF PHASE 1 OF WORKS (TO BE DELIVERED BY DEVELOPER)

PROPOSED CUTTING - RISK THAT WATERMAIN WILL BE AFFECTED FOR LENGTH OF SIDE ROAD 6 CH.000 TO CH.110,
SEE SECTION C ON DRAWING LKAT-CCC-XS-L08-DR-C-0001 FOR TYPICAL CROSS-SECTION

PROPOSED CUTTING - RISK THAT WATERMAIN WILL BE AFFECTED ACROSS FULL WIDTH OF SIDE ROAD 3.
SEE SECTION B1 ON DRAWING LKAT-CCC-XS-L08-DR-C-0001 FOR TYPICAL CROSS-SECTION

PLAN 6
Scale 1:500

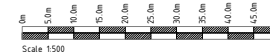
Scale 1500

0+000 0+100 0+200 0+300 0+400 0+500 0+600 0+700 0+800 0+900 1+000 1+100 1+200 1+300 1+400 1+500 1+600 1+700 1+800 1+900 2+000 2+100 2+200 2+300 2+400 2+500 2+600 2+700 2+800 2+900 3+000 3+100 3+200 3+300 3+400 3+500 3+600 3+700 3+800 3+900 4+000 4+100 4+200 4+300 4+400 4+500 4+600 4+700 4+800 4+900 5+000 5+100 5+200 5+300 5+400 5+500 5+600 5+700 5+800 5+900 6+000 6+100 6+200 6+300 6+400 6+500 6+600 6+700 6+800 6+900 7+000 7+100 7+200 7+300 7+400 7+500 7+600 7+700 7+800 7+900 8+000 8+100 8+200 8+300 8+400 8+500 8+600 8+700 8+800 8+900 9+000 9+100 9+200 9+300 9+400 9+500 9+600 9+700 9+800 9+900 10+000 10+100 10+200 10+300 10+400 10+500 10+600 10+700 10+800 10+900 11+000 11+100 11+200 11+300 11+400 11+500 11+600 11+700 11+800 11+900 12+000 12+100 12+200 12+300 12+400 12+500 12+600 12+700 12+800 12+900 13+000 13+100 13+200 13+300 13+400 13+500 13+600 13+700 13+800 13+900 14+000 14+100 14+200 14+300 14+400 14+500 14+600 14+700 14+800 14+900 15+000 15+100 15+200 15+300 15+400 15+500 15+600 15+700 15+800 15+900 16+000 16+100 16+200 16+300 16+400 16+500 16+600 16+700 16+800 16+900 17+000 17+100 17+200 17+300 17+400 17+500 17+600 17+700 17+800 17+900 18+000 18+100 18+200 18+300 18+400 18+500 18+600 18+700 18+800 18+900 19+000 19+100 19+200 19+300 19+400 19+500 19+600 19+700 19+800 19+900 20+000 20+100 20+200 20+300 20+400 20+500 20+600 20+700 20+800 20+900 21+000 21+100 21+200 21+300 21+400 21+500 21+600 21+700 21+800 21+900 22+000 22+100 22+200 22+300 22+400 22+500 22+600 22+700 22+800 22+900 23+000 23+100 23+200 23+300 23+400 23+500 23+600 23+700 23+800 23+900 24+000 24+100 24+200 24+300 24+400 24+500 24+600 24+700 24+800 24+900 25+000 25+100 25+200 25+300 25+400 25+500 25+600 25+700 25+800 25+900 26+000 26+100 26+200 26+300 26+400 26+500 26+600 26+700 26+800 26+900 27+000 27+100 27+200 27+300 27+400 27+500 27+600 27+700 27+800 27+900 28+000 28+100 28+200 28+300 28+400 28+500 28+600 28+700 28+800 28+900 29+000 29+100 29+200 29+300 29+400 29+500 29+600 29+700 29+800 29+900 30+000 30+100 30+200 30+300 30+400 30+500 30+600 30+700 30+800 30+900 31+000 31+100 31+200 31+300 31+400 31+500 31+600 31+700 31+800 31+900 32+000 32+100 32+200 32+300 32+400 32+500 32+600 32+700 32+800 32+900 33+000 33+100 33+200 33+300 33+400 33+500 33+600 33+700 33+800 33+900 34+000 34+100 34+200 34+300 34+400 34+500 34+600 34+700 34+800 34+900 35+000 35+100 35+200 35+300 35+400 35+500 35+600 35+700 35+800 35+900 36+000 36+100 36+200 36+300 36+400 36+500 36+600 36+700 36+800 36+900 37+000 37+100 37+200 37+300 37+400 37+500 37+600 37+700 37+800 37+900 38+000 38+100 38+200 38+300 38+400 38+500 38+600 38+700 38+800 38+900 39+000 39+100 39+200 39+300 39+400 39+500 39+600 39+700 39+800 39+900 40+000 40+100 40+200 40+300 40+400 40+500 40+600 40+700 40+800 40+900 41+000 41+100 41+200 41+300 41+400 41+500 41+600 41+700 41+800 41+900 42+000 42+100 42+200 42+300 42+400 42+500 42+600 42+700 42+800 42+900 43+000 43+100 43+200 43+300 43+400 43+500 43+600 43+700 43+800 43+900 44+000 44+100 44+200 44+300 44+400 44+500 44+600 44+700 44+800 44+900 45+000 45+100 45+200 45+300 45+400 45+500 45+600 45+700 45+800 45+900 46+000 46+100 46+200 46+300 46+400 46+500 46+600 46+700 46+800 46+900 47+000 47+100 47+200 47+300 47+400 47+500 47+600 47+700 47+800 47+900 48+000 48+100 48+200 48+300 48+400 48+500 48+600 48+700 48+800 48+900 49+000 49+100 49+200 49+300 49+400 49+500 49+600 49+700 49+800 49+900 50+000 50+100 50+200 50+300 50+400 50+500 50+600 50+700 50+800 50+900 51+000 51+100 51+200 51+300 51+400 51+500 51+600 51+700 51+800 51+900 52+000 52+100 52+200 52+300 52+400 52+500 52+600 52+700 52+800 52+900 53+000 53+100 53+200 53+300 53+400 53+500 53+600 53+700 53+800 53+900 54+000 54+100 54+200 54+300 54+4

PROPOSED CUTTING - RISK
THAT WATERMAIN WILL BE
AFFECTED ACROSS FULL
WIDTH OF SIDE ROAD 3.

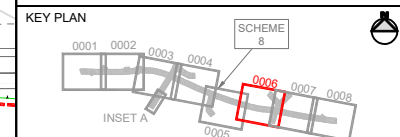
SEE SECTION B1 ON DRAWING
LKAT-CCC-XS-L08-DR-C-0001
FOR TYPICAL CROSS-SECTION

PLAN 6
Scale 1:500



LEGEND

	Boundary Extent		
	EIR Overhead		
	Eir Telecoms Underground		
	BT Telecoms Underground		
	ENET Telecoms Underground		
	Telecoms Underground Colt / Magnet / Virgin		
	Telecom Pole		
	BT / ENET Chamber		
	Eir Chamber		
	GAS Distribution Pipe (Medium Pressure)		
	GAS Distribution Pipe with 110mm Telco Duct		
	GAS Valve		
	Surface Water Carrier Drain		
	Gully and Gully Tall		
	Drainage Chamber		
	Foul / Combined Sewer		
	Mini-Pillar		
	Sub Station		
	ESB Medium Voltage Underground		
	ESB Medium Voltage overhead		
	ESB 38kV Underground (Abandoned)		
	ESB Low Voltage Underground		
	ESB Pole		
	Watermain		
	Air Valve		Existing Pumping Station
	Scour Valve		Existing Discharge Point
	Sluice valve		Manhole Sewer
	Hydrant		
	Meter		



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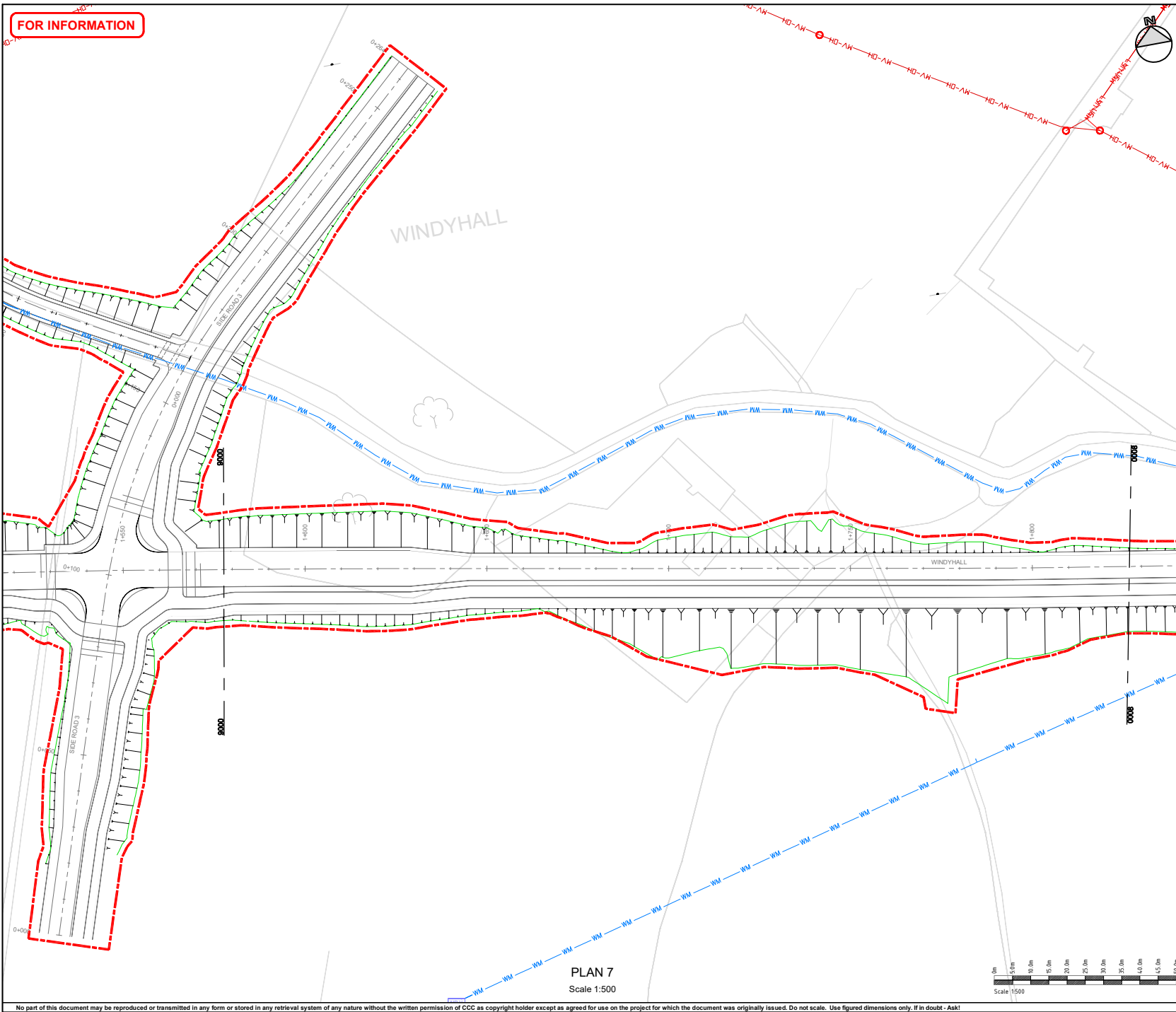


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LETTERKENNY ACTIVE TRAVEL
SCHEME 8

EXISTING UTILITIES
NORTHERN NETWORK PROJECT
SHEET 6 OF 8

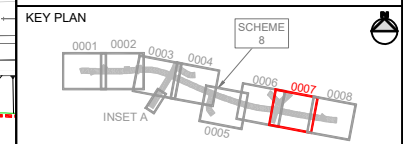
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DATE 26/01/2024	FOCUS 1:500	SCALE A1
GROUND NUMBER LKAT-CCC-UC-L08-DR-C-0006		ALIAS 100



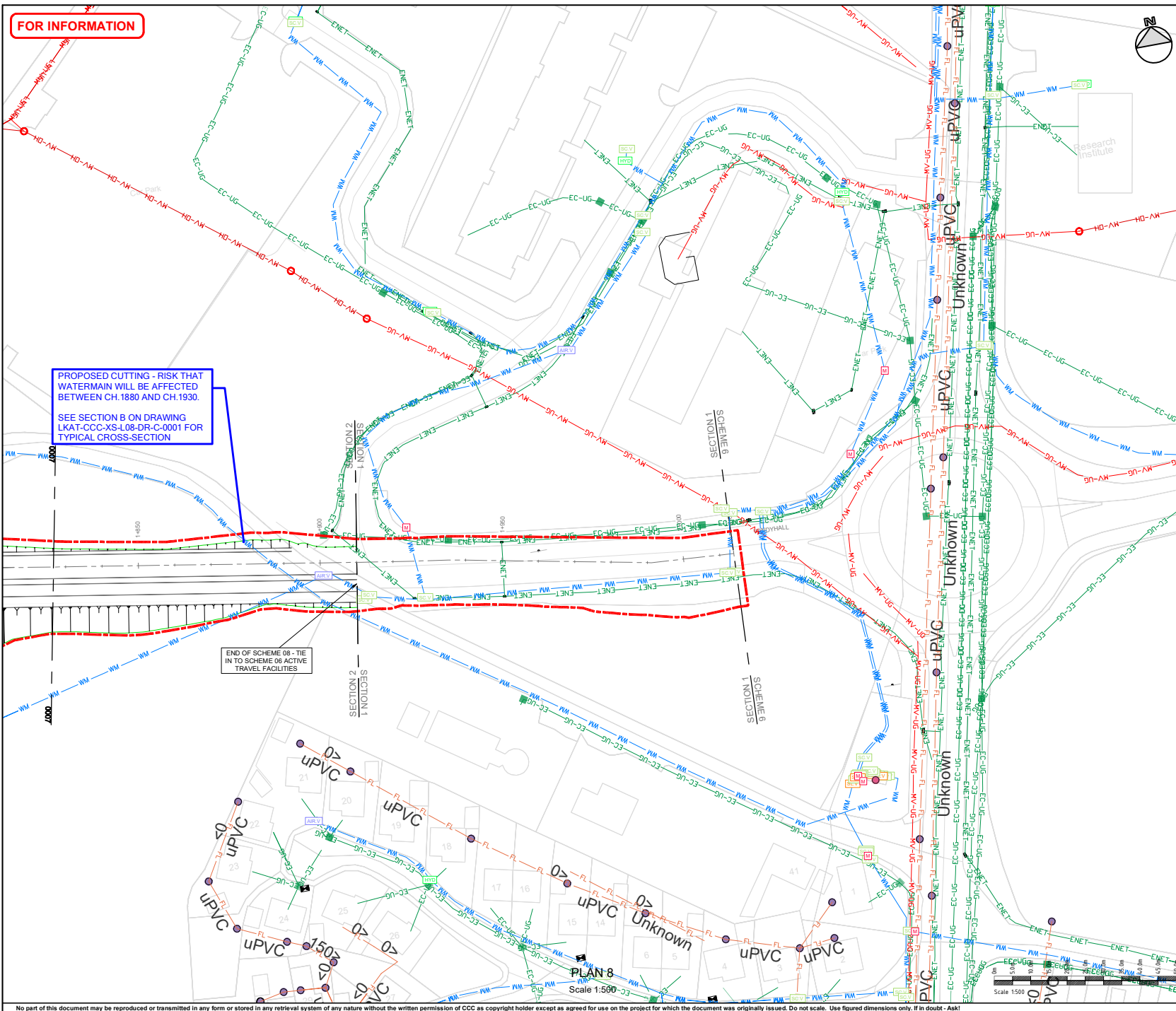
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 - Hydrant
 - Meter
 - Existing Pumping Station
 - Existing Discharge Point
 - Manhole Sewer



000	02/02/2024	DETAILED DESIGN	YC	MMK	BC
REV	DATE	DESCRIPTION	BY	CHK	APD
LETTERKENNY ACTIVE TRAVEL					
SCHEME 8					
EXISTING UTILITIES					
NORTHERN NETWORK PROJECT					
SHEET 7 OF 8					
APPROVED FOR REVIEW AND COMMENTS			DATE FOR REVIEW		
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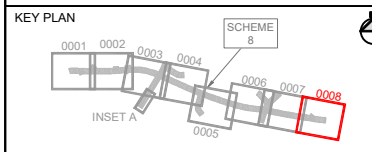
FOR INFORMATION

PROPOSED CUTTING - RISK THAT WATERMAIN WILL BE AFFECTED BETWEEN CH.1880 AND CH.1930.
SEE SECTION B ON DRAWING LKAT-CCC-XS-L08-DR-C-0001 FOR TYPICAL CROSS-SECTION

END OF SCHEME 08 - TIE IN TO SCHEME 06 ACTIVE TRAVEL FACILITIES

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 - Meter
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 - Existing Discharge Point
 - Manhole Sewer



000	01/02/2024	DETAILED DESIGN	YC	MMK	BC
REV	DATE	DESCRIPTION	BY	CHK	APD



LETTERKENNY ACTIVE TRAVEL
SCHEME 8

EXISTING UTILITIES
NORTHERN NETWORK PROJECT
SHEET 8 OF 8

APPROVED FOR INFORMATION	APPROVED FOR REVIEW AND COMMENTS	DATE	SCALE	AS
20/01/2024	1:500			
DRWING NO.	100			
LKAT-CCC-UC-L08-DR-C-0008				

LETTERKENNY ACTIVE TRAVEL, SCHEME 8 – GROUND INVESTIGATION



CAUSEWAY
— GEOTECH

Letterkenny Active Travel, Scheme 8 – Ground Investigation

Client: Donegal County Council

Client's Representative: Clandillon Civil Consulting

Report No.: 24-0362

Date: May 2024

Status: Final for Issue

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Document Control Sheet

Note on: Methods of describing soils and rocks & abbreviations used on exploratory hole logs

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APPENDICES

Appendix A	Site and exploratory hole location plans
Appendix B	Borehole logs
Appendix C	Core photographs
Appendix D	Indirect in-situ CBR test results
Appendix E	Geotechnical laboratory test results
Appendix F	SPT hammer energy measurement report

Document Control Sheet

Report No.:		24-0362			
Project Title:		Letterkenny Active Travel			
Client:		Donegal County Council			
Client's Representative:		Clandillon Civil Consulting			
Revision:	A00	Status:	Final for Issue	Issue Date:	28 th May 2024
Prepared by:		Reviewed by:		Approved by:	
 Niamh Webb MICE		 Carin Cornwall BSc MSc PhD		 Stephen Franey BSc MSc MEnvSc CEnv	

The works were conducted in accordance with:

UK Specification for Ground Investigation 3rd Edition, published by ICE Publishing (2022)

British Standards Institute (2015) BS 5930:2015+A1:2020, Code of practice for ground investigations.

BS EN 1997-2: 2007: Eurocode 7 - Geotechnical design - Part 2 Ground investigation and testing.

Geotechnical Society of Ireland (2016), Specification & Related Documents for Ground Investigation in Ireland

Laboratory testing was conducted in accordance with:

British Standards Institute BS 1377:1990 parts 2, 4, 5, 7 and 9

METHODS OF DESCRIBING SOILS AND ROCKS

Soil and rock descriptions are based on the guidance in BS5930:2015+A1:2020, The Code of Practice for Ground Investigation.

Abbreviations used on exploratory hole logs	
U	Nominal 100mm diameter undisturbed open tube sample (thick walled sampler).
UT	Nominal 100mm diameter undisturbed open tube sample (thin walled sampler).
P	Nominal 100mm diameter undisturbed piston sample.
B	Bulk disturbed sample.
LB	Large bulk disturbed sample.
SB	Sonic bulk disturbed sample.
D	Small disturbed sample.
C	Core sub-sample (displayed in the Field Records column on the logs).
L	Liner sample from dynamic sampled borehole.
W	Water sample.
ES / EW	Soil sample for environmental testing / Water sample for environmental testing.
SPT (s)	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.
(Y for Z/ Y for Z)	Incomplete standard penetration test where the full test length was not achieved. The blows 'X' represent the total blows for the given seating or test length 'Z' (mm).
N=X	SPT blow count 'N' given by the summation of the blows 'X' required to drive the full test length (300mm).
HVP / HVR	In situ hand vane test result (HVP) and vane test residual result (HVR). Results presented in kPa.
V	Shear vane test (borehole). Shear strength stated in kPa.
VR	V: undisturbed vane shear strength VR: remoulded vane shear strength
Soil consistency description	In cohesive soils, where samples are disturbed and there are no suitable laboratory tests, N values may be used to indicate consistency on borehole logs – a median relationship of $N \times 5 = C_u$ is used (as set out in Stroud & Butler 1975).
dd-mm-yyyy	Date at the end and start of shifts, shown at the relevant borehole depth. Corresponding casing and water depths shown in the adjacent columns.
▽	Water strike: initial depth of strike.
▼	Water strike: depth water rose to.
Abbreviations relating to rock core – reference Clause 36.4.4 of BS 5930: 2015+A1:2020	
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.
(xxx/xxx/xxx)	Spacing between discontinuities (minimum/average/maximum) measured in millimetres.

Letterkenny Active Travel, Scheme 8

1 AUTHORITY

On the instructions of Clandillon Civil Consulting, (“the Client’s Representative”), acting on the behalf of Donegal County 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 new roadway.

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 ground 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 recorded during the investigation. No responsibility can be taken for conditions not encountered through the scope of work commissioned, for example between exploratory hole points, or beneath the termination depths achieved.

This report was prepared by Causeway Geotech Ltd for the use of the Client and the Client’s Representative in response to a particular set of 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, soil sampling, in-situ and laboratory testing, and the preparation of a factual report on the findings.

3 DESCRIPTION OF SITE

As shown on the site location plan in Appendix A, the works were conducted on a site, located in the Windyhall area in Letterkenny, Co. Donegal. The site is bordered by Windy Hall Road to the north, Optum Ireland to the east along with residential property and fields to the south and west.

4 SITE OPERATIONS

4.1 Summary of site works

Site operations, which were conducted between 3rd and 9th April 2024, comprised:

- two boreholes by rotary drilling
- indirect CBR tests at four locations.

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

4.2 Boreholes

Two boreholes (RB01-02) were put down by rotary drilling techniques only. The boreholes were completed using a Comacchio 205 tracked rotary drilling rig.

Hand dug inspection pits were carried out between ground level and 1.0-1.20m depth to ensure boreholes were put down at locations clear of services or subsurface obstructions.

The core was extracted in up to 1.0m lengths using a metric T2-101 core barrel, which produced core of nominal 84mm diameter, and was placed in triple channel wooden core boxes.

The core was subsequently photographed and examined by a qualified and experienced Engineering Geologist, thus enabling the production of an engineering log in accordance with *BS 5930: 2015+A1:2020: Code of practice for ground investigations*.

Appendix B presents the borehole logs, with core photographs presented in Appendix C.

4.3 Indirect CBR tests (DCP)

An indirect CBR test was conducted at four locations (DCP01-DCP04) using a Dynamic Cone Penetrometer (DCP). The equipment was developed in conjunction with the UK Transport Research Laboratory, and is discussed in Highways England CS229 (2020) which refers to the methodology described in TRL Overseas Road Note 18 (1999).

The test results are presented in Appendix D in the form of plots of the variation with depth of the penetration per blow. Straight lines have been fitted to the plots and the CBR for each depth range estimated using the following relationship, which is taken from TRRL Overseas Road Note 8 (1990), *A user's manual for a program to analyse dynamic cone penetrometer data*.

$$\text{Log CBR} = 2.48 - 1.057 \text{ Log (mm/blow)}$$

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.

4.4 Surveying

The as-built exploratory hole positions were surveyed following completion of site operations by a Site Engineer from Causeway Geotech. Surveying was carried out using a Trimble R10 GPS system employing VRS and real time kinetic (RTK) techniques.

The plan coordinates (Irish Transverse Mercator) and ground elevation (mOD Malin) at each location are recorded on the individual exploratory hole logs. The exploratory hole location plan presented in Appendix A shows these as-built positions.

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 rock

Laboratory testing of rock sub-samples comprised:

- point load index
- unconfined compressive strength (UCS) tests

Test	Test carried out in accordance with
Point load index	ISRM Suggested Methods (1985) Suggested method for determining point-load strength. Int. J. Rock Mech. Min. Sci. Geomech. Abstr. 22, pp. 53–60
Uniaxial compression strength tests	ISRM Suggested Methods (1981) Suggested method for determining deformability of rock materials in uniaxial compression, Part 2 and ISRM (2007) Ulusay R, Hudson JA (eds) The complete ISRM suggested methods for rock characterization, testing and monitoring, 2007

The test results are presented in Appendix E.

6 GROUND CONDITIONS

6.1 General geology of the area

Published geological mapping indicate the superficial deposits underlying the site comprise glacial till. These deposits are underlain by Banded semi-pelitic & psammitic schist of the Termon Formation.

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:

- **Topsoil:** encountered in 200mm thickness across the site.
- **Glacial Till:** sandy gravelly clay, frequently with cobble and boulder content and bands of weathered rock, typically firm or stiff in upper horizons, becoming very stiff with increasing depth.
- **Bedrock (Mudstone, Psammite and Semi-pelite):** Rockhead was encountered at depths ranging from 1.00m in RBH02 and 1.0m in RBH01.

6.3 Groundwater

Groundwater was not noted during drilling at any of the borehole locations. However, it should be noted that the casing used in supporting the borehole walls during drilling may have sealed out any groundwater strikes and the possibility of encountering groundwater during excavation works should not be ruled out.

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

Seasonal variation in groundwater levels should also be factored into design considerations.

7 REFERENCES

Geotechnical Society of Ireland (2016), Specification & Related Documents for Ground Investigation in Ireland.

IS EN 1997-2: 2007: Eurocode 7 - Geotechnical design - Part 2 Ground investigation and testing. National Standards Authority of Ireland.

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

BS 5930: 2015+A1:2020: Code of practice for ground investigations. British Standards Institution.

BS EN ISO 14688-1:2018: Geotechnical investigation and testing. Identification and classification of soil. Part 1 Identification and description.

BS EN ISO 14688-2:2018: Geotechnical investigation and testing. Identification and classification of soil. Part 2 Principles for a classification.

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

BS EN ISO 14689-1:2018: Geotechnical investigation and testing. Identification and classification of rock. Identification and description.



CAUSEWAY
— GEOTECH

APPENDIX A
SITE AND EXPLORATORY HOLE LOCATION PLANS





Legend Key	
Project No.	24-0362
Client	Donegal County Council
Client's Rep	Clandillon Civil Consulting
Site Location Plan	
Letterkenny Active Travel – Scheme 08	
	
Last Revision	28/05/2024
Scale	1:15000



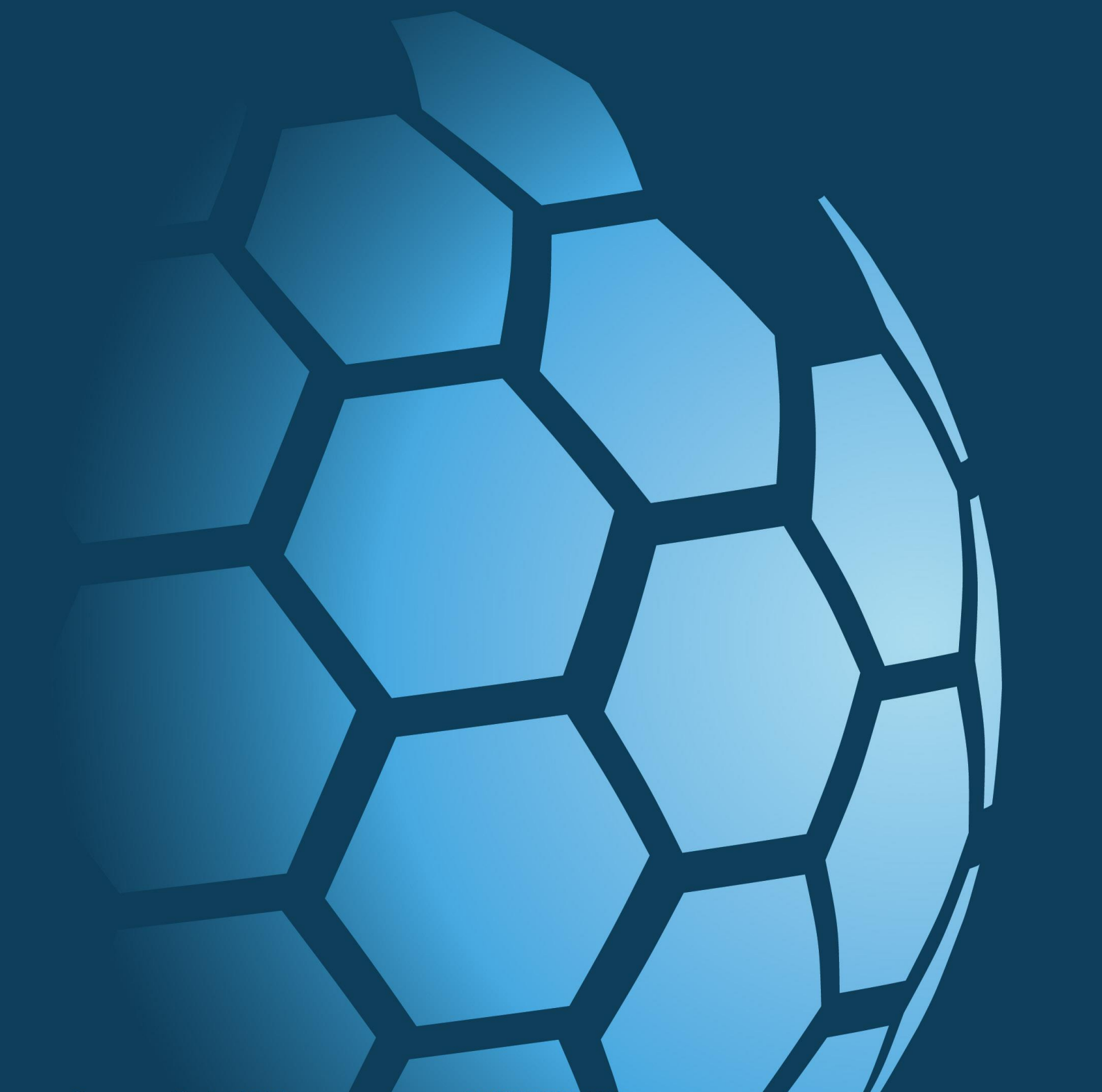
- Legend Key
- Locations By Type - DCP
 - Locations By Type - RC

Project No.	24-0362
Client	Donegal County Council
Client's Rep	Clandillon Civil Consulting
Exploratory Hole Location Plan	
Letterkenny Active Travel – Scheme 08	
	
Last Revision	28/05/2024
Scale	1:3000

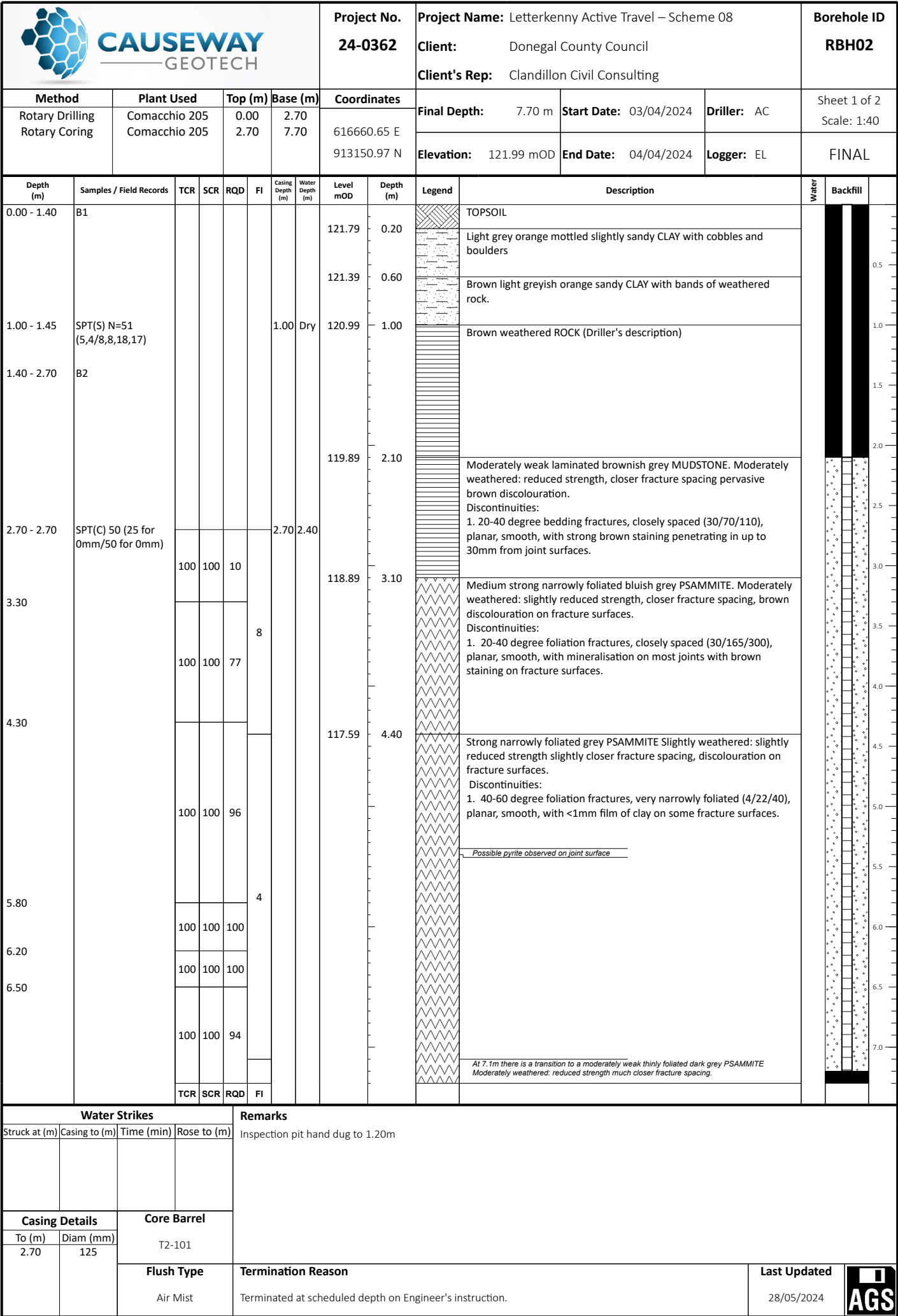


CAUSEWAY
— GEOTECH

APPENDIX B
BOREHOLE LOGS



 CAUSEWAY GEOTECH										Project No. 24-0362		Project Name: Letterkenny Active Travel – Scheme 08				Borehole ID RBH01																																																																																																																																													
Method Rotary Percussion Rotary Coring		Plant Used Comacchio 205 Comacchio 205		Top (m) 0.00 1.30		Base (m) 1.30 4.30		Coordinates 616814.39 E 913128.56 N		Final Depth: 4.30 m		Start Date: 08/04/2024		Driller: PJ		Sheet 1 of 1 Scale: 1:40																																																																																																																																													
										Elevation: 114.64 mOD		End Date: 09/04/2024		Logger: EL		FINAL																																																																																																																																													
<table><tr><th>Depth (m)</th><th>Samples / Field Records</th><th>TCR</th><th>SCR</th><th>RQD</th><th>FI</th><th>Casing Depth (m)</th><th>Water Depth (m)</th><th>Level mOD</th><th>Depth (m)</th><th>Legend</th><th>Description</th><th>Water</th><th>Backfill</th></tr><tr><td>0.00 - 0.50</td><td>B1</td><td></td><td></td><td></td><td></td><td></td><td></td><td>114.44</td><td>0.20</td><td></td><td>TOPSOIL</td><td></td><td></td></tr><tr><td>0.50 - 1.00</td><td>B2</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>Soft brown slightly sandy gravelly CLAY Sand is medium to coarse. Gravel is subangular fine to coarse. (Driller's description)</td><td></td><td></td></tr><tr><td>1.20 - 1.65</td><td>SPT(C) N=50 (5,7/10,12,12,16)</td><td></td><td></td><td></td><td></td><td>1.20</td><td></td><td>113.34</td><td>1.30</td><td></td><td>Medium strong very thinly foliated fine grained well cemented PSAMMITE. Moderately weathered: slightly reduced strength, slightly closer fracture spacing, with frequent orangish brown discolouration on fracture surfaces penetrating outward from fracture surfaces by 10-25mm.</td><td></td><td></td></tr><tr><td>2.80</td><td></td><td>100</td><td>100</td><td>86</td><td>4</td><td></td><td></td><td></td><td></td><td></td><td>Discontinuities: 1. 0-10 degree foliation fractures, closely spaced (90/140/250), planar, rough, with strong orangish brown staining penetrating outward 10-25mm from most fracture surfaces.</td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td>8</td><td></td><td></td><td>111.49</td><td>3.15</td><td></td><td>Moderately weak very thinly foliated dark grey SEMI-PELITE. Partially weathered: reduced strength, closer fracture spacing, faint orangish brown discolouration on some fracture surfaces.</td><td></td><td></td></tr><tr><td></td><td></td><td>100</td><td>96</td><td>83</td><td>5</td><td></td><td></td><td></td><td></td><td></td><td>Discontinuities: 1. 1 no. 0-10 degree joint at 3.50m, planar, rough and unstained. 2. 30-50 degree foliation fractures, very closely spaced (50/70/120), planar, smooth, with faint orangish brown staining on some fracture surfaces.</td><td></td><td></td></tr><tr><td>4.30</td><td></td><td></td><td></td><td></td><td>7</td><td></td><td></td><td>110.64</td><td>4.00</td><td></td><td>Medium strong thinly foliated fine grained well cemented grey PSAMMITE. Slightly weathered: slightly reduced strength and patchy orangish brown discolouration on some fracture surfaces.</td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>110.34</td><td>4.30</td><td></td><td>Discontinuities: 1. 20-40 degree foliation fractures, probably closely spaced, planar, smooth, with patchy orangish brown staining on some fracture surfaces.</td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>End of Borehole at 4.30m</td><td></td><td></td></tr></table>																		Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill	0.00 - 0.50	B1							114.44	0.20		TOPSOIL			0.50 - 1.00	B2										Soft brown slightly sandy gravelly CLAY Sand is medium to coarse. Gravel is subangular fine to coarse. (Driller's description)			1.20 - 1.65	SPT(C) N=50 (5,7/10,12,12,16)					1.20		113.34	1.30		Medium strong very thinly foliated fine grained well cemented PSAMMITE. Moderately weathered: slightly reduced strength, slightly closer fracture spacing, with frequent orangish brown discolouration on fracture surfaces penetrating outward from fracture surfaces by 10-25mm.			2.80		100	100	86	4						Discontinuities: 1. 0-10 degree foliation fractures, closely spaced (90/140/250), planar, rough, with strong orangish brown staining penetrating outward 10-25mm from most fracture surfaces.								8			111.49	3.15		Moderately weak very thinly foliated dark grey SEMI-PELITE. Partially weathered: reduced strength, closer fracture spacing, faint orangish brown discolouration on some fracture surfaces.					100	96	83	5						Discontinuities: 1. 1 no. 0-10 degree joint at 3.50m, planar, rough and unstained. 2. 30-50 degree foliation fractures, very closely spaced (50/70/120), planar, smooth, with faint orangish brown staining on some fracture surfaces.			4.30					7			110.64	4.00		Medium strong thinly foliated fine grained well cemented grey PSAMMITE. Slightly weathered: slightly reduced strength and patchy orangish brown discolouration on some fracture surfaces.											110.34	4.30		Discontinuities: 1. 20-40 degree foliation fractures, probably closely spaced, planar, smooth, with patchy orangish brown staining on some fracture surfaces.														End of Borehole at 4.30m		
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<table><tr><th colspan="4">Water Strikes</th><th colspan="14">Remarks</th></tr><tr><td>Struck at (m)</td><td>Casing to (m)</td><td>Time (min)</td><td>Rose to (m)</td><td colspan="14">Inspection pit hand dug to 1.20m.</td></tr><tr><td></td><td></td><td></td><td></td><td colspan="14"></td></tr><tr><td colspan="4">Casing Details</td><td colspan="4">Core Barrel</td><td colspan="10">Termination Reason</td><td colspan="2">Last Updated</td></tr><tr><td>To (m)</td><td>Diam (mm)</td><td colspan="2"></td><td colspan="4">T2-101/T2-101</td><td colspan="10" rowspan="2">Terminated at scheduled depth on Engineer's instruction.</td><td colspan="2" rowspan="2">28/05/2024</td></tr><tr><td>1.30</td><td>125</td><td colspan="2"></td></tr><tr><td colspan="4">Flush Type</td><td colspan="14"></td><td colspan="2">AGS</td></tr><tr><td colspan="4">Air Mist</td><td colspan="14"></td><td colspan="2"></td></tr></table>																		Water Strikes				Remarks														Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	Inspection pit hand dug to 1.20m.																																Casing Details				Core Barrel				Termination Reason										Last Updated		To (m)	Diam (mm)			T2-101/T2-101				Terminated at scheduled depth on Engineer's instruction.										28/05/2024		1.30	125			Flush Type																		AGS		Air Mist																					
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Air Mist																																																																																																																																																													





CAUSEWAY
— GEOTECH

APPENDIX C
CORE PHOTOGRAPHS





RBH01 Box:1 1.30m to 4.30m



RBH02 Box:1 2.70m to 5.80m



RBH02 Box:2 5.80m to 7.70m



CAUSEWAY
— GEOTECH

APPENDIX D

INDIRECT IN-SITU CBR TEST RESULTS



Dynamic Cone Penetrometer (DCP) test results and estimated CBR

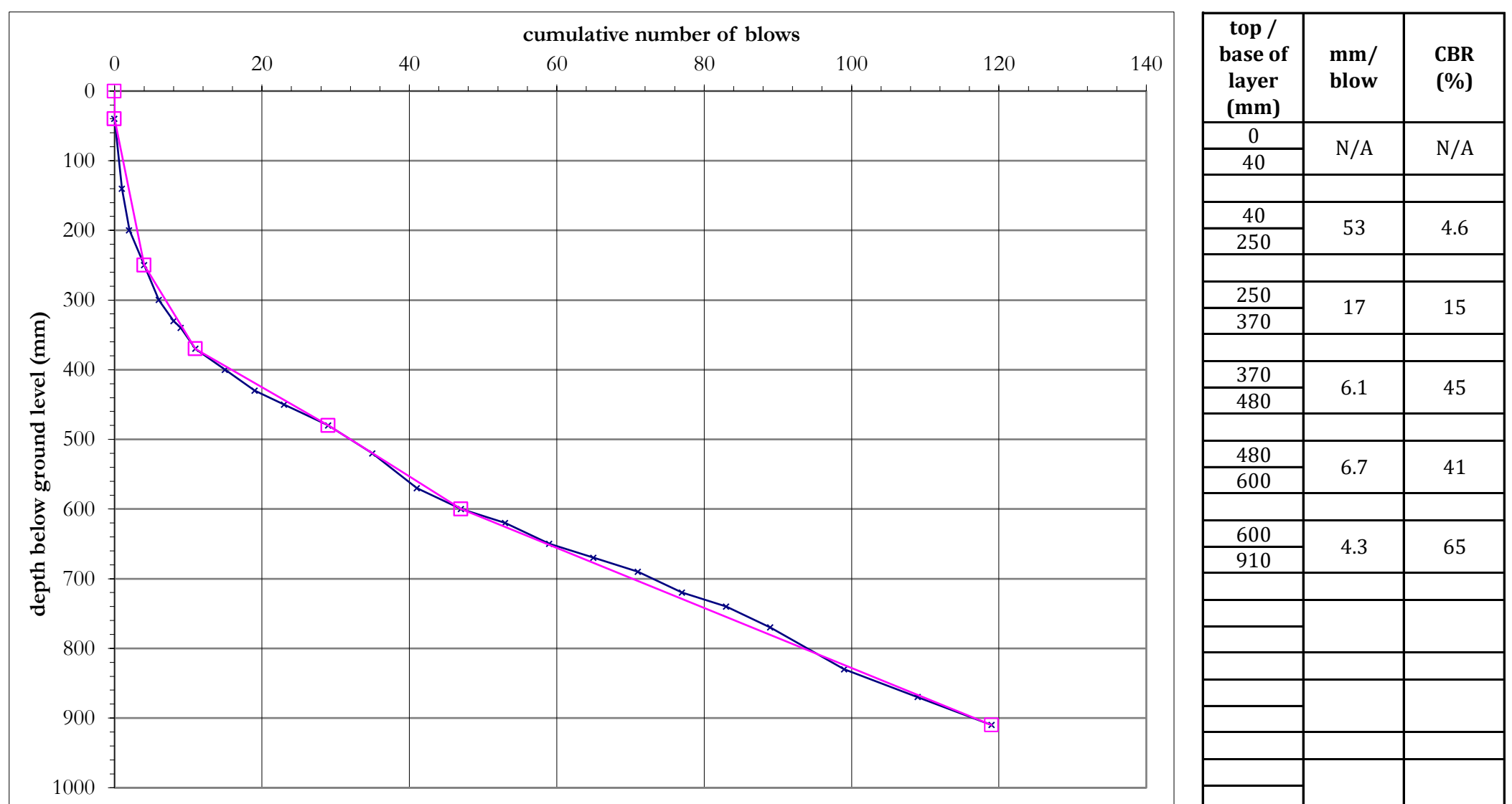
Project Number	24-0362
Project Name	Letterkenny Active Travel – Scheme 08
Site Location	



Test Number	DCP01	Date Tested	27/03/2024
Depth bgl (m)	0.00	Weather	Dry

Test conducted in accordance with Documented In-House Technical Procedure IMS TP7-4 and DMRB CS 229 Rev 0
CBR calculated using the TRRL CBR DCP relationship: $\log_{10}(\text{CBR}) = 2.48 - 1.057 \times \log_{10}(\text{mm/blow})$ in accordance with DMRB CS 229 Rev 0

Surface preparation	Description of surface material at test depth
None	Topsoil



CBR Range	Min: 4.6	The self-weight penetration at the start of the test (shown above) has not been included in the minimum and maximum values shown to the left. 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. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. This report should not be reproduced except in full without the written approval of the laboratory.
	Max: 65	

Deviation(s) from standard procedure	None
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Observations and comments	
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Approved Name and Appointment		
Darren O'Mahony Director		April 2024



Dynamic Cone Penetrometer (DCP) test results and estimated CBR

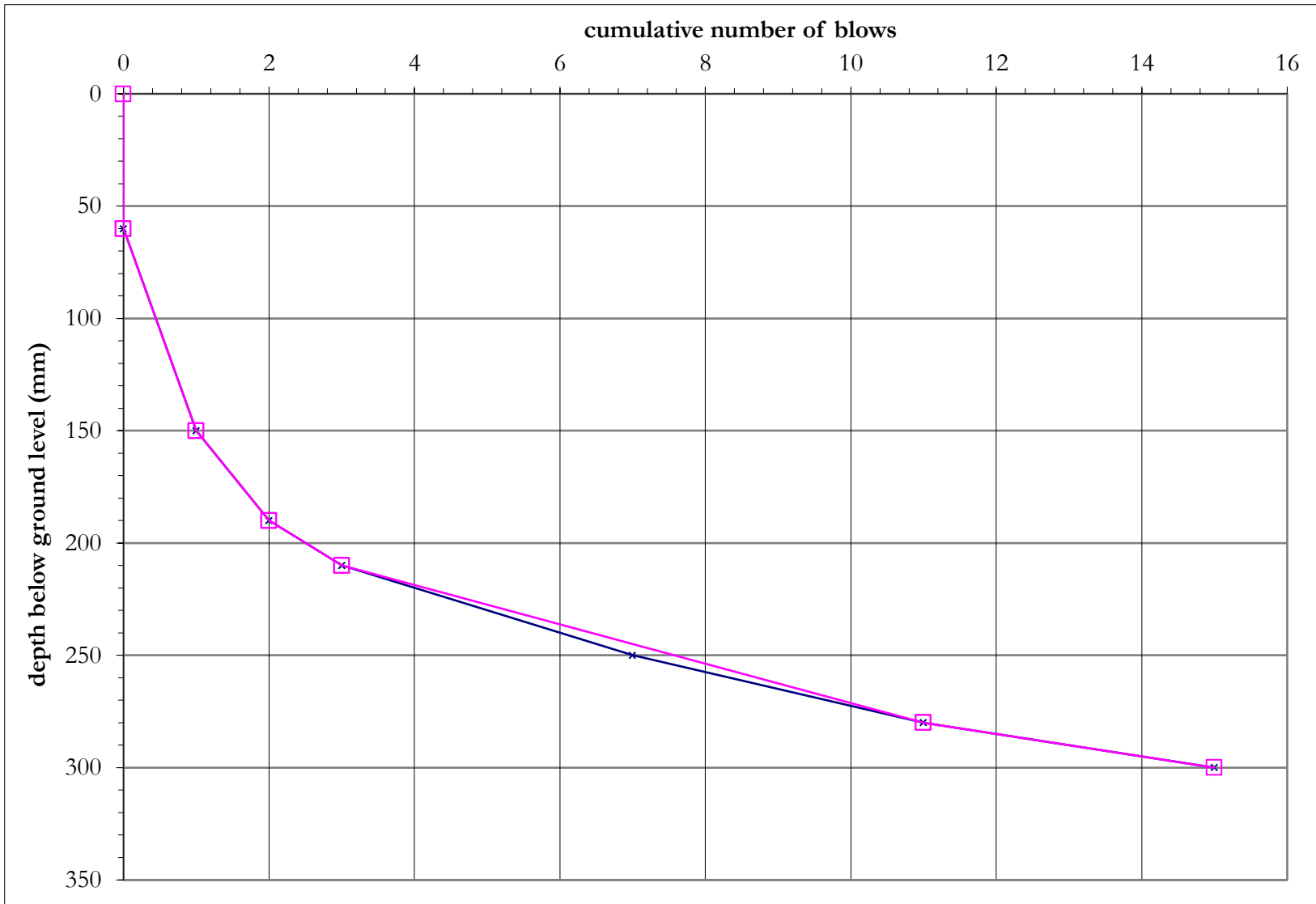
Project Number	24-0362
Project Name	Letterkenny Active Travel – Scheme 08
Site Location	



Test Number	DCP02 - Test 1	Date Tested	27/03/2024
Depth bgl (m)	0.00	Weather	Dry

Test conducted in accordance with Documented In-House Technical Procedure IMS TP7-4 and DMRB CS 229 Rev 0
CBR calculated using the TRRL CBR DCP relationship: $\log_{10}(\text{CBR}) = 2.48 - 1.057 \times \log_{10}(\text{mm/blow})$ in accordance with DMRB CS 229 Rev 0

Surface preparation	Description of surface material at test depth
None	Topsoil

[illegible]

CBR Range	Min: 2.6	The self-weight penetration at the start of the test (shown above) has not been included in the minimum and maximum values shown to the left. 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. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. This report should not be reproduced except in full without the written approval of the laboratory.
	Max: 55	

Deviation(s) from standard procedure	None
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Observations and comments	
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Approved Name and Appointment		
Darren O'Mahony Director		April 2024



Dynamic Cone Penetrometer (DCP) test results and estimated CBR

Project Number	24-0362
Project Name	Letterkenny Active Travel – Scheme 08
Site Location	



Test Number	DCP02 - Test 2
Depth bgl (m)	0.00

Date Tested	27/03/2024
Weather	Dry

Test conducted in accordance with Documented In-House Technical Procedure IMS TP7-4 and DMRB CS 229 Rev 0
CBR calculated using the TRRL CBR DCP relationship: $\log_{10}(\text{CBR}) = 2.48 - 1.057 \times \log_{10}(\text{mm/blow})$ in accordance with DMRB CS 229 Rev 0

Surface preparation	Description of surface material at test depth
None	Topsoil

[illegible]

CBR Range	Min: 11	The self-weight penetration at the start of the test (shown above) has not been included in the minimum and maximum values shown to the left. 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. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. This report should not be reproduced except in full without the written approval of the laboratory.
	Max: 44	

Deviation(s) from standard procedure	None
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Observations and comments	
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Approved Name and Appointment		
Darren O'Mahony Director		April 2024



Dynamic Cone Penetrometer (DCP) test results and estimated CBR

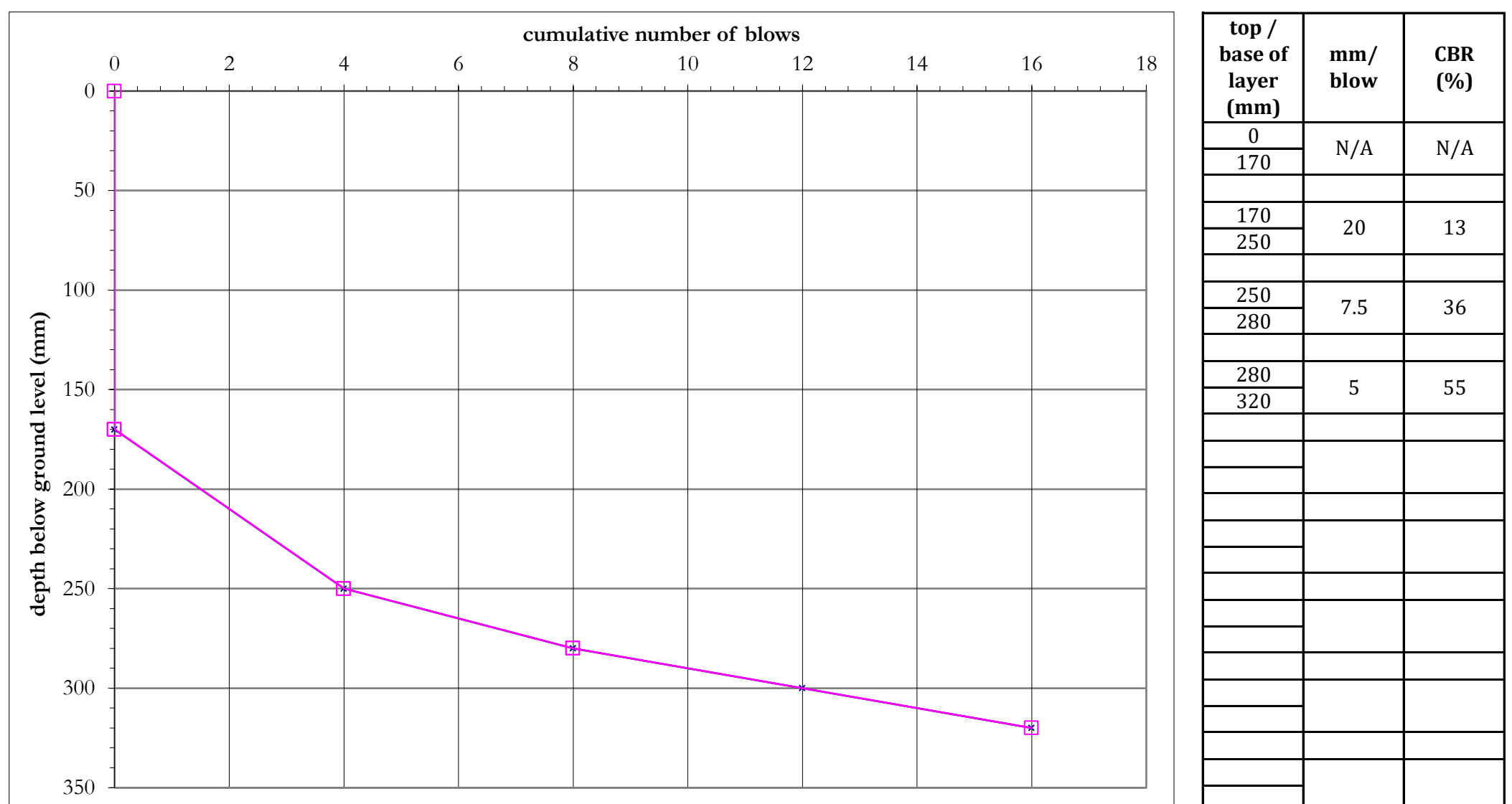
Project Number	24-0362
Project Name	Letterkenny Active Travel – Scheme 08
Site Location	



Test Number	DCP02 - Test 3	Date Tested	27/03/2024
Depth bgl (m)	0.00	Weather	Dry

Test conducted in accordance with Documented In-House Technical Procedure IMS TP7-4 and DMRB CS 229 Rev 0
CBR calculated using the TRRL CBR DCP relationship: $\log_{10}(\text{CBR}) = 2.48 - 1.057 \times \log_{10}(\text{mm/blow})$ in accordance with DMRB CS 229 Rev 0

Surface preparation	Description of surface material at test depth
None	Topsoil



CBR Range	Min: 13	The self-weight penetration at the start of the test (shown above) has not been included in the minimum and maximum values shown to the left. 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. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. This report should not be reproduced except in full without the written approval of the laboratory.
	Max: 55	

Deviation(s) from standard procedure	None
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Observations and comments	
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Approved Name and Appointment		
Darren O'Mahony Director		April 2024



Dynamic Cone Penetrometer (DCP) test results and estimated CBR

Project Number	24-0362
Project Name	Letterkenny Active Travel – Scheme 08
Site Location	



Test Number	DCP03	Date Tested	27/03/2024
Depth bgl (m)	0.00	Weather	Dry

Test conducted in accordance with Documented In-House Technical Procedure IMS TP7-4 and DMRB CS 229 Rev 0
CBR calculated using the TRRL CBR DCP relationship: $\log_{10}(\text{CBR}) = 2.48 - 1.057 \times \log_{10}(\text{mm/blow})$ in accordance with DMRB CS 229 Rev 0

Surface preparation	Description of surface material at test depth
None	Topsoil



CBR Range	Min: 1.9 Max: 21	The self-weight penetration at the start of the test (shown above) has not been included in the minimum and maximum values shown to the left. 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. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. This report should not be reproduced except in full without the written approval of the laboratory.
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Deviation(s) from standard procedure	None
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Observations and comments	
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Approved Name and Appointment		
Darren O'Mahony Director		April 2024



Dynamic Cone Penetrometer (DCP) test results and estimated CBR

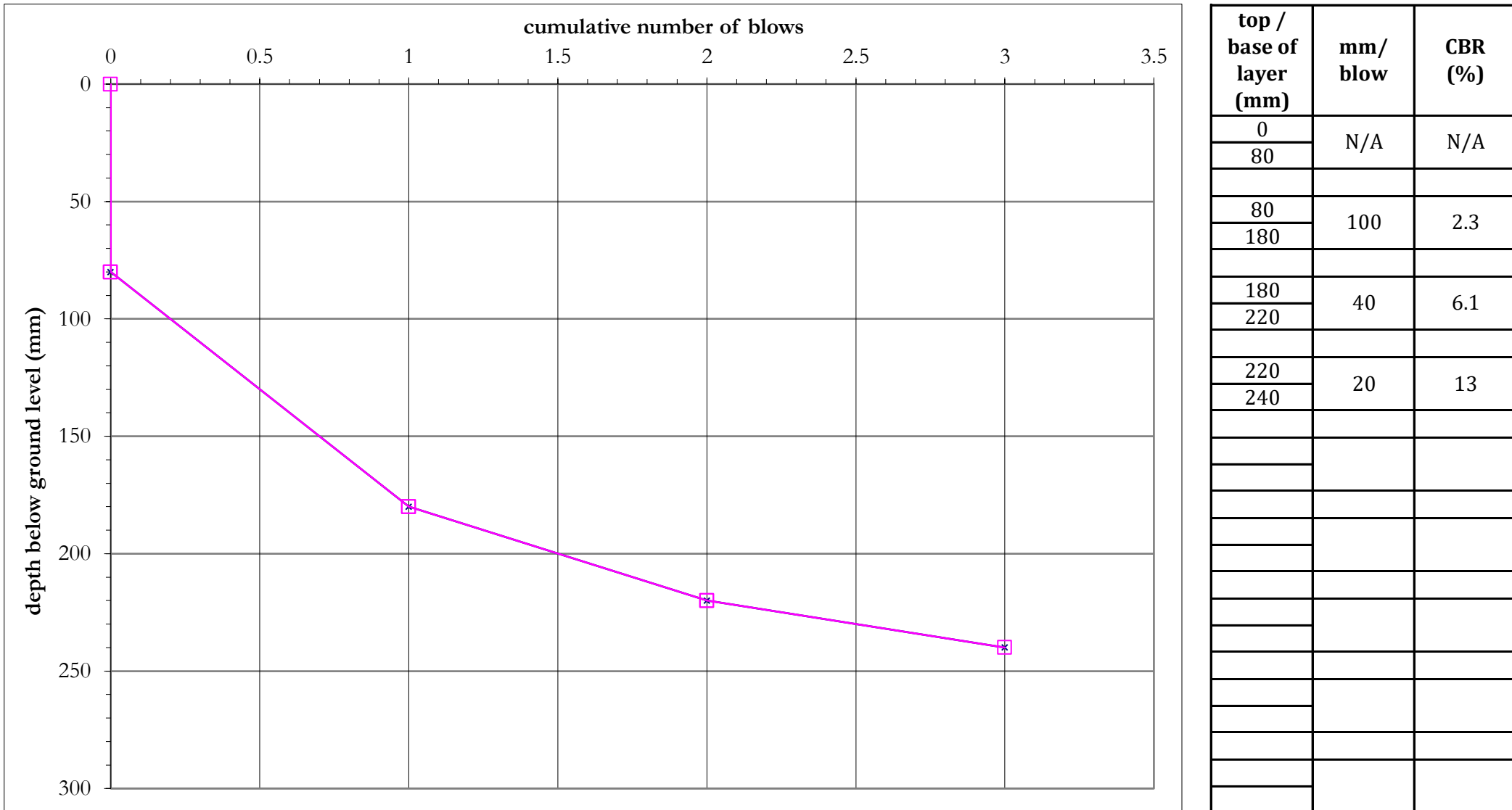
Project Number	24-0362
Project Name	Letterkenny Active Travel – Scheme 08
Site Location	



Test Number	DCP03 - Test 1	Date Tested	27/03/2024
Depth bgl (m)	0.00	Weather	Dry

Test conducted in accordance with Documented In-House Technical Procedure IMS TP7-4 and DMRB CS 229 Rev 0
CBR calculated using the TRRL CBR DCP relationship: $\log_{10}(\text{CBR}) = 2.48 - 1.057 \times \log_{10}(\text{mm/blow})$ in accordance with DMRB CS 229 Rev 0

Surface preparation	Description of surface material at test depth
None	Topsoil



CBR Range	Min: 2.3	The self-weight penetration at the start of the test (shown above) has not been included in the minimum and maximum values shown to the left. 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. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. This report should not be reproduced except in full without the written approval of the laboratory.
	Max: 13	

Deviation(s) from standard procedure	None
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Observations and comments	
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Approved Name and Appointment		
Darren O'Mahony Director		April 2024



Dynamic Cone Penetrometer (DCP) test results and estimated CBR

Project Number	24-0362
Project Name	Letterkenny Active Travel – Scheme 08
Site Location	



Test Number	DCP04 - Test 2	Date Tested	27/03/2024
Depth bgl (m)	0.00	Weather	Dry

Test conducted in accordance with Documented In-House Technical Procedure IMS TP7-4 and DMRB CS 229 Rev 0
CBR calculated using the TRRL CBR DCP relationship: $\log_{10}(\text{CBR}) = 2.48 - 1.057 \times \log_{10}(\text{mm/blow})$ in accordance with DMRB CS 229 Rev 0

Surface preparation	Description of surface material at test depth
None	Topsoil



CBR Range	Min: 1.6 Max: 9.4	The self-weight penetration at the start of the test (shown above) has not been included in the minimum and maximum values shown to the left. 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. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. This report should not be reproduced except in full without the written approval of the laboratory.
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Deviation(s) from standard procedure	None
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Observations and comments	
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Approved Name and Appointment		
Darren O'Mahony Director		April 2024





CAUSEWAY
— GEOTECH

APPENDIX E
GEOTECHNICAL LABORATORY TEST RESULTS



**SOIL AND ROCK SAMPLE ANALYSIS
LABORATORY TEST REPORT**

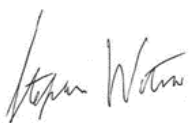
17 May 2024

Project Name:	Letterkenny Active Travel
Project No.:	24-0362
Client:	Donegal County Council
Engineer:	CLANDILLON CIVIL CONSULTING

We are pleased to attach the results of laboratory testing carried out for the above project. This memo and its attachments constitute a report of the results of tests as detailed in the Contents page(s). This testing was performed between 15/05/2024 and 17/05/2024.

The attached results complete the testing requested and we would therefore wish to confirm that samples will be retained without charge for a period of 28 days from the above date after which they will be appropriately disposed of unless we receive written instructions to the contrary prior to that date.

We trust our report meets with your approval but if you have any queries or require additional information, please do not hesitate to contact the undersigned.



Stephen Watson

Laboratory Manager

Signed for and on behalf of Causeway Geotech Ltd

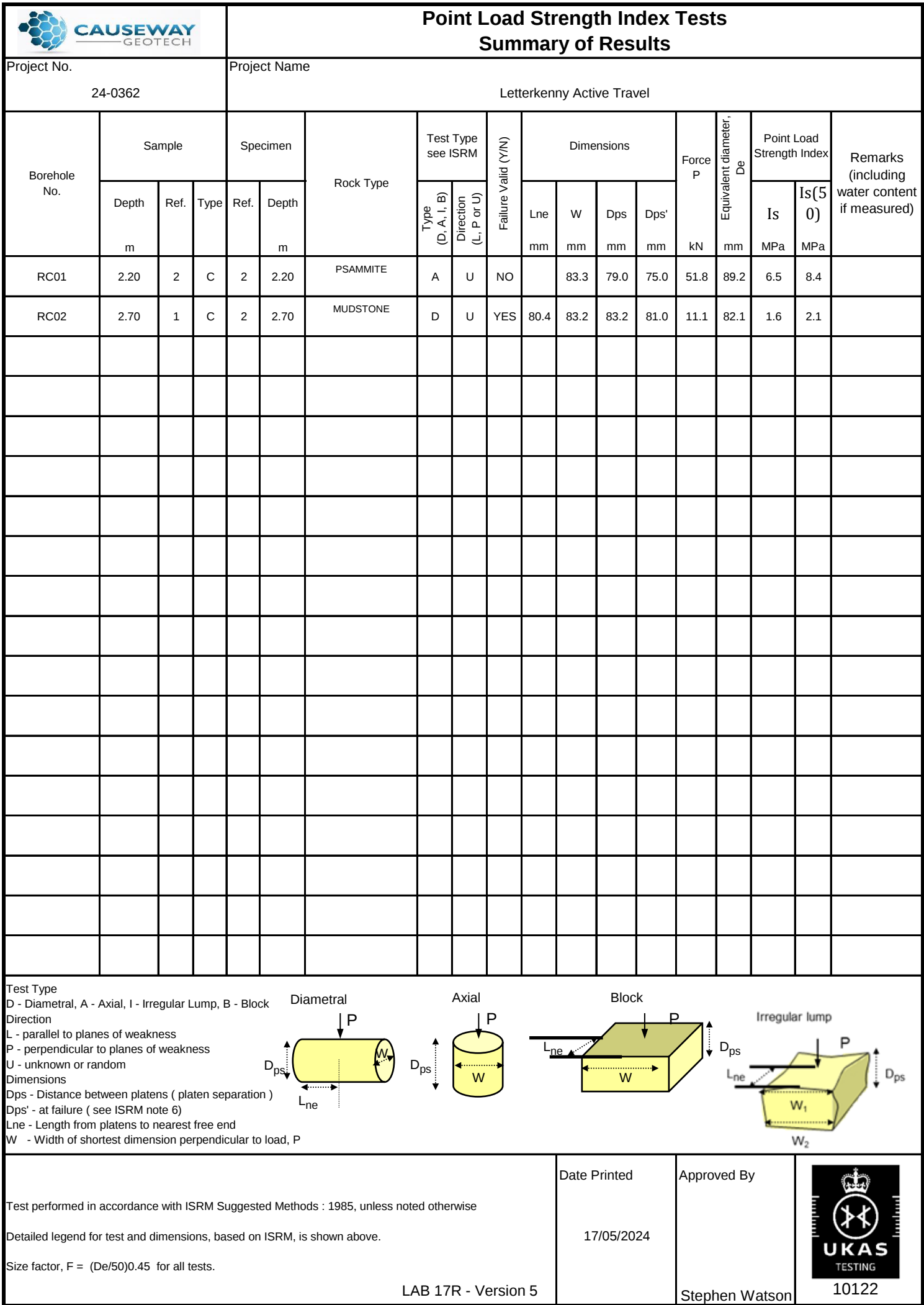
Project Name: Letterkenny Active Travel

Report Reference: Schedule 1

The table below details the tests carried out, the specifications used, and the number of tests included in this report. Tests marked with* in this report are not United Kingdom Accreditation Service (UKAS) accredited and are not included in Causeway Geotech Limited's scope of UKAS Accreditation Schedule of Tests.

The results contained in this report relate to the sample(s) as received. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. This report shall not be reproduced other than in full, without the prior written approval of the laboratory.

Material tested	Type of test/Properties measured/Range of measurement	Standard specifications	No. of results included in the report
ROCK	Point load index	<i>ISRM Commission on Testing Methods. Suggested Method for Determining Point Load Strength 1985</i>	2
ROCK	Uniaxial Compressive Strength (UCS)	<i>The Complete ISRM Suggested Methods – Rock Characterization Testing and Monitoring 1974 – 2006, Editors: R Ulusay & J A Hudson</i>	2





UNIAXIAL COMPRESSIVE STRENGTH
ISRM Suggested Methods - Rock Characterization Testing and Monitoring 1974 - 2006

Site Name	Letterkenny Active Travel			Project number	24-0362
Sample Description	PSAMMITE			Location ID	RC01
Sample Type	C	Sample number	1	Top Depth	1.30
Date of sampling	NOT KNOWN	Date of receipt	15/05/2024	Base Depth	1.55
Test Method	International Society for Rock Mechanics, The complete ISRM suggested methods for Rock Characterization Testing and Monitoring, 2007, p153, part 1			Keylab ID	Caus2024051635

Specimen Details

Test number	1	
Diameter	83.3	mm
Height	192.4	mm
Water Content	0.1	%
Sample Mass	2808	g
Bulk Density	2.68	Mg/m3
Dry Density	2.68	Mg/m3
Length to Diameter Ratio	2.3	

Specimen Remarks

Test Results

Load Frame	LF01	
Test Supplier	Impact Test Equipment	
Test Machine	CT341	
Test Date	16/05/2024	
Test Duration	103.0	Secs
Orientation of sample	VERTICAL	
Rate of Strain	0.75	MPa/s
Strain at Failure	690.7	kN
Unconfined Compressive Strength	127.0	MPa
Mode of failure	Fragmented	

Test Remarks

Approved

Stephen Watson



10122



UNIAXIAL COMPRESSIVE STRENGTH
ISRM Suggested Methods - Rock Characterization Testing and Monitoring 1974 - 2006

Site Name	Letterkenny Active Travel			Project number	24-0362
Sample Description	PSAMMITE			Location ID	RC02
Sample Type	C	Sample number	2	Top Depth	3.3
Date of sampling	NOT KNOWN	Date of receipt	15/05/2024	Base Depth	3.6
Test Method	International Society for Rock Mechanics, The complete ISRM suggested methods for Rock Characterization Testing and Monitoring, 2007, p153, part 1			Keylab ID	Caus2024051638

Specimen Details

Test number	1	
Diameter	83.3	mm
Height	169.4	mm
Water Content	0.1	%
Sample Mass	2464	g
Bulk Density	2.69	Mg/m3
Dry Density	2.69	Mg/m3
Length to Diameter Ratio	2	

Specimen Remarks

Test Results

Load Frame	LF01	
Test Supplier	Impact Test Equipment	
Test Machine	CT341	
Test Date	16/05/2024	
Test Duration	35.0	Secs
Orientation of sample	VERTICAL	
Rate of Strain	0.75	MPa/s
Strain at Failure	155.6	kN
Unconfined Compressive Strength	28.8	MPa
Mode of failure	Fragmented	

Test Remarks

Approved

Stephen Watson





CAUSEWAY
— GEOTECH

APPENDIX F

SPT HAMMER ENERGY MEASUREMENT REPORT



OBJECT: Penetrometer SPT

We hereby declare that the penetrometer manufactured by us and mounted on the GEO 205 drilling machine serial number 4709 is equipped with:

- An hammer weight of 63,5 kg $\pm$ 0,5
- Falling height of 76 cm $\pm$ 1

in compliance to following standard:

- EN ISO 22476-2
- EN ISO 22476-3
- ASTM D-1586-08

Riese Pio X, 04 August 2023

Technical Office
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COMACCHIO

sales@comacchio.com
comacchio.com

COMACCHIO

SPT Hammer Ref: 2110259
Test Date: 10/05/2023
Report Date: 12/05/2023
File Name: 2110259.spt
Test Operator: TOBI

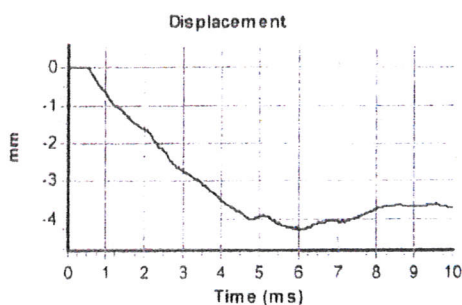
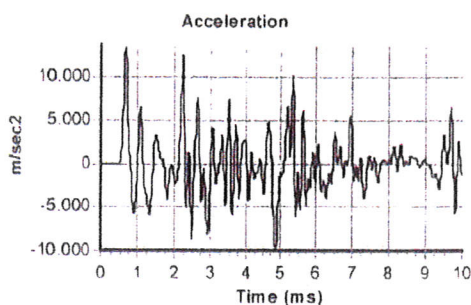
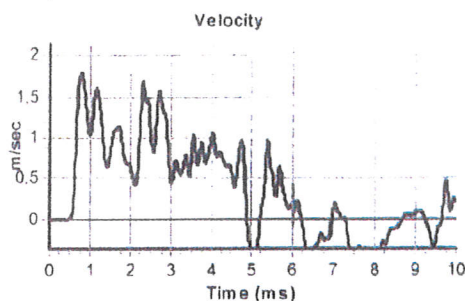
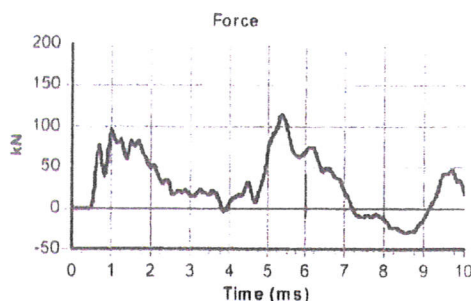
Instrumented Rod Data

Diameter d_r (mm): 54
Wall Thickness t_r (mm): 6,0
Assumed Modulus E_a (GPa): 200
Accelerometer No.1:
Accelerometer No.2:

SPT Hammer Information

Hammer Mass m (kg): 63,5
Falling Height h (mm): 760
SPT String Length L (m): 11,0

Comments / Location



Calculations

Area of Rod A (mm²): 905
Theoretical Energy E_{theor} (J): 473
Measured Energy E_{meas} (J): 340

Energy Ratio E_r (%): **72**

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