



Letterkenny Northern Network Project

Ground Investigation Contract
Part 3 - The Scope

Donegal County Council

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Donegal County Council

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TABLE OF CONTENTS

THE SCOPE	1
SPECIFICATION	3
SPECIFICATION - SCHEDULES	5
Schedule 1: Information and Site Specific Requirements	6
Schedule 2: Exploratory Holes and Testing for Contract	36
Schedule 3: Investigation Supervisor's Facilities for Contract.....	43
Schedule 4: Specification Amendments	44
Schedule 5: Specification Additions	47
APPENDIX I – GROUNDWATER STANDPIPES AND PIEZOMETERS.....	56
APPENDIX II – GROUND GAS MONITORING STANDPIPE	57
BILL OF QUANTITIES FOR GROUND INVESTIGATION (ANNEX 1)	58
Preamble to Bill of Quantities	59
Bill of Quantities	61
Summary of Quantities.....	63
Bill of Quantities - Appendix A to Bill of Quantities	65
Appendix A - Rates for Geotechnical and Other Personnel.....	66
CONTRACT DRAWINGS	67

THE SCOPE

The Scope

The Scope of the Works is as described in the following Specification, Appendices to the Specification, Bill of Quantities and Contract Drawings:

- **Specification**
- **Schedules**
 - Schedule 1: Information and site-specific requirements
 - Schedule 2: Exploratory Holes and Testing for Contract
 - Schedule 3: Investigation Supervisor's facilities for Contract
 - Schedule 4: Specification amendments
 - Schedule 5: Specification additions
- **Appendix I - Groundwater Standpipes and Piezometers**
- **Appendix II - Ground Gas Monitoring Standpipe**
- **Bill of Quantities for Ground Investigation (Annex 1)**
 - Preamble to Bill of Quantities
 - Bill of Quantities
 - Summary of Bill of Quantities
 - Appendix A: Rates for Ground Practitioners and Other Personnel
- **Contract Drawings**
 - LNNP-ROD-VGT-SW_AE-DR-GI-500600-500604

SPECIFICATION

Specification

The Specification shall be the 'Specification and Related Documents for Ground Investigation in Ireland', Engineers Ireland, Second Edition 2016, Technical Specification and Bill of Quantities, as extended by the following Schedules and Appendices:

- Schedules 1 to 5
- Appendix I - Groundwater Standpipes and Piezometers
- Appendix II - Ground Gas Monitoring Standpipe

Where there is a conflict between the information given in the Schedules and the Specification or Standards referred to in the Specification, the requirements of the Schedules shall take precedence.

SPECIFICATION - SCHEDULES

Schedule 1: Information and Site Specific Requirements

S1.1 Name of Contract

The contract shall be named the 'Letterkenny Northern Network Project – Ground Investigation Contract'.

S1.2 Investigation Supervisor

The Investigation Supervisor shall be:

Paul Kissane, CEng MIEI
Roughan & O'Donovan Consulting Engineers
The Chase, Arkle Rd, Sandyford, Dublin 18, D18 Y3X2

The Investigation Supervisor shall have delegated powers to amend schedule depths, exploratory hole type, plan position and extent of field exploratory holes and surveys plus numbers and type of laboratory tests.

S1.3 Description of the Site

As part of the overall Letterkenny Active Travel Project the LNNP provides a connection from the L-1152-1 Windy Hall Road and L-5914-1 Long Lane to L-1512-6 / L-1174-3 Glencar Road and L-1174-1 The Grange in the west and the Knocknamona Roundabout in the east, which further connects to the N56 National Secondary Road and R-229-1 Kilmacrennan Road.

The route creates an opportunity to deliver a permeability link between the environs of Glencar/West Letterkenny Urban Area and the Business Park Area located on the N56 to the east, home to some of the County's largest employers. The route shall also provide an attractive active travel link to the future Atlantic Technological University Sports Hub to be located adjacent to the N56 Business Park Road as well as existing primary and secondary schools in the area. The LNNP connects directly with the NTA Kilmacrennan Road active travel project, currently under construction, and this link will provide connectivity to other areas and prominent destinations within Letterkenny through the Letterkenny Active Travel Programme currently being developed.



Figure 1 General location of the site (Google Earth)

S1.4 Main Works Proposed and Purpose of the Contract

The project involves the gathering, manipulation and compilation of ground investigation data to gain information of the likely ground conditions to be encountered to inform the design and construction of the scheme.

The Investigation provides for boreholes, trial pits, slit trenches, dynamic core penetrometer, pavement cores, in-situ testing, laboratory testing and preparation of a factual report in paper and digital (AGS) format in accordance with the Specification.

S1.5 Scope of Investigation

The scope of the works envisaged under this ground investigation is as follows: -

- a) Vertical open hole rotary drilling, sampling and in situ testing;
- b) Rotary Core boreholes, rock coring and in situ testing;
- c) Trial pits, sampling and *in situ* testing;
- d) Slit trenching to verify the underground services;
- e) Dynamic core penetrometer;
- f) Pavement coring and sampling;
- g) Plate Bearing Tests as *in situ* testing;
- h) Monitoring of groundwater levels in standpipes and piezometers;
- i) Determine the location, details and water levels of ground water wells and establish a register of wells located within 200m of the scheme centreline.
- j) Detailed borehole and coring, and logs as described in IS EN ISO 14688-1:2018; IS EN ISO 14689:2018; and BS5930:2015 and the specification;

- k) The ground investigation should be carried out in accordance with British Standard 10175:2001+A2:2017, Investigation of Potentially Contaminated Sites: Code of Practice and the EPA Landfill Manual: Investigations for landfill.
- l) Laboratory testing of soil and rock samples for engineering properties, behaviour and suitability;
- m) Laboratory testing of soil for environmental contamination;
- n) Preparation of detailed Main Factual Report as per SI.21.8 and cl 16.8 of the Specification, together with the production of Digital Data to AGS Version 4.0 Format as per S1.21.10 and cl. 16.5;
- o) Liaison with Donegal County Council and external bodies including landowners;
- p) Liaison with PSCS and other contractors and/or undertaking PSCS duties;
- q) Arrangement of access routes and reinstatement;
- r) Provision of temporary traffic management.

The full scope of investigation and the obligations of the Contractor are to be ascertained by reference to the Contract as a whole.

S1.6 Geology and Ground Conditions

Overview of Geology

GSI Quaternary sediment mapping indicates that the easternmost part of the scheme is underlain by bedrock of the Lower Crana Quartzite Formation, consisting of psammitic schist and some marble beds. The majority of the scheme are underlain by bedrock of the Termon formation, comprised of banded semi-pelitic and psammitic schist. Both bedrock types originate in the Precambrian, with the geological cross section showing the site along the syncline associated with Lough Foyle and other faulting to the southwest. There are also small patches of bare rock adjacent to the scheme. The mapping shows mineral observations from such outcrops in surrounding kilometres comprising quartz veins, talc and pyrite, with galena also observed further to the east.

Overview of Superficial Deposits

The study area is largely associated with Till derived from Metamorphic rocks along with local deposits of made ground in and along the developed housing estates and around Kilmacrennan Road. The soils are predominantly acidic mineral soils that are poorly draining, with bedrock outcrop or subcrop appearing frequently indicating thin deposits.

Overview of Soft Ground

While deposits of alluvial or peat material are not present in the site, wet soils are still anticipated in many areas, due to the shallow rock and sloping ground, with several springs or wells and even an old open reservoir in the vicinity. Weathered glacial till is anticipated where moisture levels are higher. Blanket peat is observed a little further uphill in places so some organic materials could be present locally.

Contaminated Land/ Made ground

There is no evidence of contamination near the study area as per EPA maps and there are no mineral locations or quarries according to GSI.

S1.7 Schedules of Drawing(s) and Documents

Contract Documents/ Drawings comprising:

Part 2: Form of Tender, Schedule and Conditions of Contract

Part 3: The Scope comprising:

- **Schedules**
 - Schedule 1: Information and site-specific requirements
 - Schedule 2: Exploratory Holes and Testing for Contract
 - Schedule 3: Investigation Supervisor's facilities for Contract
 - Schedule 4: Specification amendments
 - Schedule 5: Specification additions
- **Appendix I - Groundwater Standpipes and Piezometers**
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S1.8 Particular Contract Restrictions

Sequencing of Works

All the planned exploratory holes should be set out and marked with pegs to facilitate a walk over survey by the Investigation Supervisor or nominated representative prior to the commencement of the site works.

Access routes shall be extended from either end, with ad-hoc additional temporary access routing agreed with Donegal County Council. Ground investigations will be able to use most of these routes however obstacles will need to be crossed in some positions that will be for the ground investigation contractor to manage following consultation with the Investigation Supervisor. Examples include existing fencing, watercourses (streams), ditches, paved areas.

1.8.1 Quality Management Systems (Cl. 3.3)

All work shall be carried out in accordance with a quality management system established in accordance with IS EN ISO 9001, IS EN ISO 14001 and ISO 45001. Records to demonstrate compliance shall be made available to the Investigation Supervisor on request.

1.8.2 Professional Attendance (Cl. 3.5.2)

The Contractor shall provide a Senior Geotechnical Engineer or Engineering Geologist approved by the Employer's Representative with a minimum of 5 years' experience in ground investigation and geotechnical works to direct the field works and develop the relevant factual report. The Senior Geotechnical Engineer or Engineering Geologist shall be a Chartered Engineer or Professional Geologist (or equivalent) and subject to the approval of the Employer's Representative, but this approval may be withdrawn at any time. The name and CV of the Senior Geotechnical Engineer or Engineering Geologist shall be indicated in the Tender submission. The Senior Geotechnical Engineer or Engineering Geologist shall be in the employ of the Geotechnical Contractor.

The Senior Geotechnical Engineer or Engineering Geologist shall be responsible for preparation of a daily plus weekly summary reports and perform other supervision and technical duties as required by the Contract whenever site works are being undertaken. He shall be responsible for ensuring adherence to proper excavation, sampling and in-situ testing methods and for reporting / logging and photography on site of the rock cores within 48 hours of core extraction, and ensuring all logging shall be in accordance with IS EN14688-1:2018, IS EN 14689-1:2018 and BS5930:2015. This Senior Geotechnical Engineer or Engineering Geologist shall co-ordinate the work of the other Logging Engineers, ensuring the continuity and quality of the description and approach to testing in the field and involved in the investigation.

The Senior Geotechnical Engineer/Engineering Geologist shall also be responsible for liaison with all relevant authorities including, but not limited to, Donegal County Council, An Garda Síochána and utility providers. The Senior Geotechnical Engineer or Engineering Geologist shall prepare the Ground Investigation Factual Report upon completion of the exploratory works.

For the purpose of general supervision of exploratory hole crews in addition to other staff listed, the Contractor shall supply at least 1 Geotechnical Engineer or Engineering Geologist of minimum of 5 years' experience full time on site. The number of crews may vary but each professional should supervise no more than three operating rigs / trial pit crews at any one time. Each trial pit/ slit trench crew should be attended by similarly experienced staff.

Traffic Management Engineer

The Contractor shall nominate a Traffic Management Engineer to coordinate works along or adjacent to existing roads. The Engineer shall possess a valid CSCS SLG (Signing, lighting and guarding on roads) certification. This appointment shall be subject to the approval of the Investigation Supervisor.

Contractor's Foreman

At all times during the progress of works, the Contractor shall be represented on site by a competent Foreman, experienced in the type of work to be carried out under the Contract. The Foreman shall ensure that the exploratory hole logs are at all times kept fully up to date and are available for inspection by the Investigation Supervisor or his site representative.

1.8.3 Provision of ground practitioners and other personnel (Cl. 3.6.1 & 3.6.2)

As described under Professional Attendance above.

1.8.4 Hazardous ground, land affected by contamination and notifiable and invasive weeds (Cl. 3.7.1 & 3.22)

The site generally is categorised as GREEN defined by the British Drilling Association "Guidance for Safe Intrusive Activities on Contaminated or Potentially Contaminated Land" (2008).

No information regarding invasive species is available at this stage.

1.8.5 Additional information on services not shown on Contract drawings (Cl. 3.7.2)

The Contractor shall consult with all the relevant Public Utility and Private Service owners before commencing any work in their vicinity and shall satisfy himself as to the exact position of existing services which may affect or be affected by the Works. The Contractor shall take all measures required by any statutory undertaker for the support

and full protection of all services or supplies in accordance with the relevant code of practice or special requirement of the statutory undertakers. He shall keep the Investigation Supervisor's site representative informed of such liaison and measures.

1.8.6 Known / suspected mine workings, mineral extractions, etc. (Cl. 3.7.3)

Not known

1.8.7 Protected Species (Cl. 3.7.4)

There are a number of protected sites within 5km, most notably Lough Swilly SAC, Lough Swilly SPA, River Swilly Valley Woods pNHA and Lough Swilly, including Big Isle, Blanket Nook and Inch Lake pNHA. An AA screening accompanying this report indicates three Natura 2000 sites that are hydrologically connected to the proposed site of works.

During a site visit in December 2022, no protected bird species associated with nearby SPA's (Lough Swilly SPA, 004075) were observed. Potential habitats for Common frog were found. No habitats protected under the Lough Swilly SAC or vital to any Qualifying Interests of Lough Swilly SAC and SPA were noted.

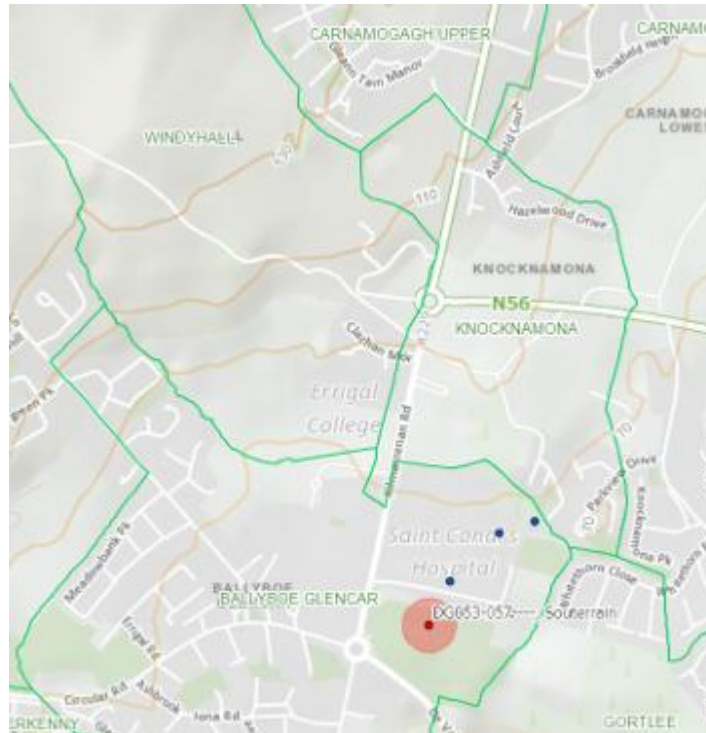
During previous site visits no evidence of protected mammal species was found inside the development footprint. Surveys of aquatic fauna were not carried out at that time. No protected invertebrate species of highly specialised habitat for these species was identified during surveys.

1.8.8 Archaeological Remains (Cl. 3.7.5)

Letterkenny's built heritage is a fundamental part of its cultural heritage and for example includes: St Eunan's Cathedral, Conwal Parish Church, St Eunan's College, Mount Southwell Terrace, the Ecclesiastical Quarter Architectural Conservation Area (ACA) (also now referred to as the Cathedral Quarter ACA), Ballymacool House, St Conal's Hospital, historic streetscapes, and various other structures on the Record of Protected Structures (RPS) and the National Inventory of Architectural Heritage (NIAH). The nearest sites are listed in below;

- DG053-057 Souterrain at Ballyboe, Glencar – Underground Structure RMP
- 40905317 St Conal's Psychiatric Hospital at Ballyboe, Glencar – Hospital / Infirmary – NIAH regional
- 40905318 St Conal's Psychiatric Hospital, hospital grounds, high road at Ballyboe, Glencar – Hospital / Infirmary / College – NIAH regional
- 40905319 St Conal's Psychiatric Hospital Graveyard at Ballyboe, Glencar – Graveyard Cemetery – NIAH regional.

The figure below provides an extract from the Historic Environment Viewer. The pink shaded area denotes Zone of Notification; Blue Dots indicate sites on the National Inventory of Architectural Heritage (NIAH) and Red Dots indicates Sites and Monuments Recorded Locations (SMR).



Archaeological and architectural heritage sites should be considered as archaeological constraints and avoided. Where avoidance is not possible it shall be communicated to the Investigation Supervisor for further review and suitable relocation.

1.8.9 Security of site (Cl. 3.11)

All fences, gates, walls and barriers breached or otherwise disturbed during the execution of site operations shall be immediately repaired or replaced to the same standard.

In areas of ongoing advanced works, liaison with the PSCS, Investigation Supervisor and Employer's Representative shall be required to determine where the Contractor may remove obstacles for the purposes of progressing access routes to locations.

1.8.10 Traffic Management Measures (Cl. 3.12)

1. General

The Contractor will be responsible for the design of the temporary traffic management plan including the preparation of risk assessments which shall be submitted to the PSDP. Any significant changes to the temporary traffic management plan shall be communicated to the PSDP.

The traffic management plan shall be submitted to the Investigation Supervisor for approval at least 1 week prior to the commencement of works on or adjacent to the existing road.

The Contractor will be responsible for the provision, maintenance and proper positioning of all warning and advisory signs, traffic cones, signals and warning lamps which may be necessary for the temporary management of traffic and to minimise inconvenience to the general public caused by his operations.

Before commencing work on the site investigations, the Contractor should ascertain the requirements of the Donegal County Council, An Garda Síochána and emergency

services with respect to the control of traffic during construction work. The Contractor shall be responsible for all liaisons with these authorities during the progress of the works. The Contractor must maintain traffic flow at all times. In addition, pedestrian traffic along footpaths and pedestrian access to any dwelling or place of business cannot be impeded. The Contractor shall submit the all-in rate for providing, erecting and maintaining temporary traffic management on the site.

It is the responsibility of the Contractor to obtain all relevant Road Opening/Road Use Licences from the Local Authority.

The Contractor shall obtain the necessary permissions and licenses to open the road during the slit trenching operations.

The following general guidelines are issued with respect to traffic control, and the Contractor must include in his rates for strict adherence to these at all times.

2. Site Layout, Supervision and Accident Prevention

Before any work is undertaken on or near a road by the Contractor, the Traffic Management Engineer must ensure that the following points are observed and that;

- (1) The Contractor complies with Department of Transport Chapter 8 – "Temporary Traffic Measures and Signs for Roadworks" (2010).
- (2) The Gardaí and Donegal County Council are given at least one weeks' notice of your intention to commence any road works.
- (3) A suitable name, address and telephone number are supplied to local Gardaí and the Employer's Representative so that you may be contacted outside normal working hours in an emergency.
- (4) Conformance to conditions or times of working.
- (5) The accesses to the site have adequate sight lines and are kept clear of parked vehicles.
- (6) Advance warning signs for the works both for traffic and pedestrians are placed.
- (7) Only cones and signs of the prescribed shape and size are used.
- (8) As work proceeds along the carriageway, the signs are repositioned as required.
- (9) Where applicable, as work proceeds along the carriageway, the signs are repositioned as required.
- (10) The lenses of lamps are kept clean and the batteries in flashing lamps are replaced before the light goes dim.
- (11) The area of the works is marked out with clearly visible barriers and that the same type of barrier is used throughout.
- (12) Signs for the works and other equipment used are kept clean and are regularly maintained.
- (13) All plant, materials and surplus excavated material are contained within the barriers.
- (14) Mud and other debris deposited on the road surface by vehicles leaving the site is removed in good time.
- (15) The site is kept tidy to increase the safety factor.
- (16) Pedestrian walkways are provided and kept free from obstructions.
- (17) Local residents are considered when work is in progress outside normal working hours (ensuring that access to premises is maintained and that noise is kept to a minimum).

- (18) Workmen or visitors park their private cars away from the confines of the site remembering that their vehicles are not exempt from any parking restrictions in force locally.
- (19) All signs are removed from the carriageway when the work is complete.
- (20) Account taken of additional tourist and other traffic using roadways at weekends and Public Holidays or during sporting events.
- (21) Advance approval from Donegal County Council is gained in advance of establishment of traffic management and/ or temporary diversions.

1.8.11 Restricted Working Hours (Cl. 3.13)

Contractor shall limit working hours to:

- Monday to Friday between 08.00 hrs and 18.00 hrs
- Saturday between 09:00 hrs and 16:30 hrs

Work on site outside of these hours will only be permitted on approval from the Employer's Representative or Investigation Supervisor and on appropriate permissions / possessions as required.

The Contractor shall agree the working hours with the local authority and other stakeholders.

Slit trenches on the existing roads will require one road lane closure at a time and the Contractor shall agree the working hours with local authorities and other stakeholders.

1.8.12 Trainee site operatives (Cl. 3.14.1)

Not used

1.8.13 Contamination Avoidance and / or aquifer protection measures required (Cl. 3.15.2 & 3.15.3)

1. Protection of Surface Water Quality

The Contractor shall undertake the Works in such a manner as to avoid degradation of surface water quality either by pollution from oil spills, or contamination due to works operations. Specific measures to be taken to prevent the above shall include the following:

- a) Contractor's plant, equipment etc. shall be free of any mechanical defects and be well maintained so as to prevent oil or fuel leaks. The use of drip-trays should be considered.
- b) The Contractor shall so arrange that the cleaning out of trucks and equipment does not cause run-off to enter watercourses.

2. Method Statements

The Contractor shall be required to provide specific Method Statements for works in and adjacent to and within watercourses at an early stage in the Contract. These Method Statements are required for Environmental Approvals to carry out the works. Working methods may be subject to conditions such as environmental monitoring.

3. Protection of Groundwater Quality / Aquifer Protection

The Contractor shall undertake the Works in such a manner as to avoid degradation of groundwater quality either by pollution from oil spills, or contamination due to works

operations. Special care should be taken to avoid any pollution when working in proximity of existing water supply wells or boreholes close to the proposed Works.

Boreholes (and trial pits/slit trenches intercepting shallow groundwater) are susceptible to becoming polluted by surface contamination sources such as septic tanks, farmyard runoff or slurry spreading. Should a proposed borehole, trial pit or slit trench be located in an area where such surface contamination sources are identified, the Contractor shall contact the Investigation Supervisor in good time so as to avoid or minimise standing time and permit an alternative location to be proposed (if feasible).

The drilling equipment, methodology and use of casing and grout must meet minimum environmental standards (e.g. BDA "Guidance for Safe Intrusive Activities on Contaminated or Potentially Contaminated Land" 2008; "Technical Report P5-065/TR – Technical aspects of site Investigation Volume 2 Environmental Agency, 2000) and be suitable for use in contaminated groundwater environments.

The drilling equipment and methodology should not cause pollution of groundwater. The Contractors plant and equipment shall be free of any mechanical defects and be well maintained so as to prevent oil or fuel leaks. The equipment used should be clean and should not introduce any polluting matter into the ground or the groundwater aquifer.

Artesian ground water conditions whenever encountered or suspected must be notified immediately to the Investigation Supervisor or his site representative and drilling suspended in accordance with Clause 4.4 of the Specification.

Boreholes which are no longer required for any purpose should be sealed (decommissioned) by backfilling with cement/bentonite grout pellets

1.8.14 Maximum period for boring, pitting or trenching through hard material, hard stratum or obstruction (Cl. 2.8, 4.3 & 6.4)

Where boulders, rock and other hard strata are encountered, percussion boring using a chisel shall take place in order to penetrate the obstruction and break it up sufficiently for fragments to be recovered and identified. A **detailed** record shall be kept of the time spent chiselling and the rate of penetration through the obstructing objects. The maximum time spent chiselling at any one obstruction shall be one hour unless expressly permitted by the Investigation Supervisor. Chiselling in hard strata will only be paid when the criteria as defined in Section 2.8 of the Specification are met.

1.8.15 Reinstatement Requirements (Cl. 3.16)

Reinstatement works will take place for bituminous surfaced roads, bituminous macadam footways and concrete slabs. Openings to be reinstated are both longitudinal and transverse.

All permanent and temporary road reinstatements will be subject to the approval by Donegal County Council. In existing paved areas within Donegal County Council environs, backfilling of pits and trenches shall be carried out as soon as practicable in accordance with Donegal County Council reinstatement requirements. Reinstatement of roadways shall be in accordance with details provided in TII road construction details, trench reinstatement drawing CC-SCD-00705 with steps as dimensioned for each pavement layer.

The Contractor shall liaise with DCC Roads Maintenance prior to any excavation and reinstatement on the public footway and roadway.

Bituminous macadam shall consist of 50mm dense bitumen macadam to BS4987, in-situ concrete shall be 150mm thick of Grade C25-20mm concrete and P.C.C. slabs 60mm thick shall be laid on 50mm sand on 100mm lean-mix concrete base.

Kerbing shall be reinstated as per existing, lifting and storing existing materials except for in-situ or slipform concrete.

On completion of each exploratory hole all equipment, surplus material and rubbish of every kind shall be cleared away. Surplus material and rubbish shall be removed from the site to a disposal point licensed to accept the waste concerned. The whole of the site and any ancillary works shall be left in a clean and tidy condition.

Paved areas (other than paving slabs and blocks) shall be broken out to the minimum extent necessary for each exploratory hole. After completion of the hole the paved area shall be reinstated.

For access through grassed or agricultural fields, the Contractor shall be required to remove any materials used for temporary haul or access roads where provided. The materials to be provided and their removal shall be proposed by the Contractor as part of liaison to agreeing such access.

1.8.16 Hygiene facilities required (Cl. 2.20 & 3.6.1)

Welfare facilities as specified in SHWW (Construction) Regulations (2013) shall be provided by the Contractor.

1.8.17 Unavoidable damage to be reinstated by Contractor (Cl. 3.16.1)

Any unavoidable damage caused by the works should be made good by the contractor following completion of the works.

1.8.18 Accuracy of exploratory hole locations

The Contractor must ensure that each exploratory hole is sunk at the position shown, unless otherwise directed by the Investigation Supervisor. The Contractor's report shall refer to depths below existing ground level and use the same reference numbers as provided on the plans or as subsequently agreed by the Investigation Supervisor.

The determination of the existing ground level and setting out and surveying the final location of all field works shall be the responsibility of the Contractor.

A full set of marked up drawings showing the actual location of all boreholes, trial pits, slit trenches, dynamic core penetrometer and pavement cores shall be provided by the Contractor and included within the Factual Report. All logs of boreholes, trial pits, slit trenches, pavement cores and DCP shall state the Irish Transverse Mercator (ITM) co-ordinates and ground level related to Malin Head Datum of the final location of each exploratory hole.

The Contractor shall survey the exploratory holes and confirm the accurate co-ordinates to the Irish Transverse Mercator grid and ground levels to Malin Head Datum for the final location of each exploratory hole. The location and elevation of each exploratory hole shall be surveyed with an accuracy of $\pm 0.1\text{m}$. The contractor shall supply the Investigation Supervisor with details of the surveying equipment to be used in setting out and surveying the final location of all exploratory holes prior to setting out/surveying.

1.8.19 Photography requirements (Cl. 3.25)

Photographs of each exploratory hole location shall be taken before commencement of works and following completion of the works. Photographs shall also be taken of the conditions of gates and other primary access routes into private property before works are commenced and after investigation works are completed.

S1.9 Percussion Boring (Section 4) Particular restrictions / relaxations (Not used)

1.9.1 Permitted Methods and Restrictions (Cl. 4.1 to 4.4)

Not used

1.9.2 Backfilling (Cl. 4.5)

Not used

1.9.3 Dynamic Sampling (Cl. 4.6)

Not used.

S1.10 Rotary Drilling (Specification Section 5) and Other Coring Particular Restrictions / Relaxations

1.10.1 Augering requirements and restrictions (Cl. 5.1)

Rotary drilling is required either starting from ground level, or to extend borings which cannot penetrate further, or to prove rock in borings prior to breaking out.

Rotary drilling will normally be required as extensions to cable percussion boreholes. Core drilling will be undertaken to prove rock to the depths indicated in Schedule 2.

1.10.2 Particular rotary drilling techniques (Cl. 5.2)

Rotary coring (of both soil and rock) shall be undertaken using a 'triple tube' coring system, incorporating a removable inner liner. The minimum core diameter shall be 76mm (HW size) but shall be increased as necessary in order to attain the scheduled depth and optimise core recovery. All bits, core barrels, and casing shall conform to BS 4019: Part 3.

The Contractor should make provision for any plant and equipment he considers necessary to maximise core recovery through potentially heavily fractured or broken rock. Specifically, allowance should be made in rotary drilling rates for installation of casing support through unstable zones within the bedrock. Provision should also be made for drillhole enlargement using open holing techniques, if required.

The type and state of drill bit, feed rates and management of the drill shall be such that 100% core recovery in any single run can be obtained where the condition of the rock permits. Core recovery less than 95% in any drill run will not normally be acceptable unless the Investigation Supervisor Representative is satisfied that a greater recovery than 95% is impractical under the prevailing conditions. Where core recovery is less than 95% or the rate of coring indicates a core recovery of less than 95%, a standard penetration test shall be carried out in the rotary core hole.

When any recovery is less than 95% from a drill run then the next drill run shall be reduced to 50% of the previous length, unless otherwise agreed by the Investigation Supervisor, and so on down to a minimum length of 0.5m. The Investigation

Supervisor may specify in situ testing between drill runs. All cores shall be logged and photographed on site.

When traditional methods of boring in soils are unable to proceed, and under instruction from the Investigation Supervisor, rotary drilling using the "Geobor S Polymer Gel Coring", or similar system approved by the Investigation Supervisor, shall be carried out.

The drilling will be commenced at the depth where traditional methods of cable percussion or where open hole drilling are terminated.

Where rotary boreholes are independent of cable tool holes a service inspection pit 1.20 metres deep shall be excavated and a service CAT scan carried out prior to commencement of drilling.

Prior to drilling, polymer gel recycling tanks shall be set up to re-circulate gel solution and minimise impact on surrounding lands. The polymer gel solution shall be biodegradable.

Cores are to be removed in maximum 1.50 metre runs, reducing to 1.0 metres in highly weathered material. The core liner system used shall minimise the disturbance of overburden cores. The coring will terminate when the depths indicated in Schedule 2 have been reached or when instructed by the Investigation Supervisor. The cores are to be packed in suitable boxes and returned to the Contractors premises for logging.

Once the plastic coreliner has been split the overburden and rock cores shall be logged by an Experienced Geologist and detailed core logs presented. Logs are to include descriptions and the standard mechanical indices TCR, SCR and RQD. In addition, a graphical fracture spacing log will be prepared.

The Geobor S Polymer Gel Coring shall be carried out in accordance with BS 5930.

1.10.3 Drilling fluid type and collection (Cl. 5.3)

The drilling fluid shall normally be clean water, air or air mist. However, with the agreement of the Investigation Supervisor, non-toxic drilling muds, additives or foam may be used. Drilling fluid returns must be collected or appropriately controlled.

1.10.4 Rotary core drilling equipment and core diameter (Cl. 5.4.1 & 5.4.2)

Rotary coring (of both soil and rock) shall be undertaken using a 'triple tube' coring system, incorporating a removable inner liner. The minimum core diameter shall be 76mm (HW size) but shall be increased as necessary in order to attain the scheduled depth and optimise core recovery. All bits, core barrels, and casing shall conform to BS 4019: Part 3.

The Contractor should make provision for any plant and equipment he considers necessary to maximise core recovery through potentially heavily fractured or broken rock. Specifically, allowance should be made in rotary drilling rates for installation of casing support through unstable zones within the bedrock. Provision should also be made for drillhole enlargement using open holing techniques, if required.

The type and state of drill bit, feed rates and management of the drill shall be such that 100% core recovery in any single run can be obtained where the condition of the rock permits. Core recovery less than 95% in any drill run will not normally be acceptable unless the Investigation Supervisor is satisfied that a greater recovery than 95% is

impractical under the prevailing conditions. Where core recovery is less than 95% or the rate of coring indicates a core recovery of less than 95%, a standard penetration test shall be carried out in the rotary core hole.

When any recovery is less than 95% from a drill run then the next drill run shall be reduced to 50% of the previous length, unless otherwise agreed by the Investigation Supervisor, and so on down to a minimum length of 0.5m. The Investigation Supervisor may specify in situ testing between drill runs. All cores shall be logged and photographed on site.

1.10.5 Core Logging (Cl. 5.4.6)

Cores shall be prepared for examination by removal of sealing materials and splitting of liners in such a way to avoid damage to the cores or cause injury to the person splitting the liners. Plastic liners shall be cut lengthwise such that at least half of the core circumference is exposed.

Prior to examination or sub-sampling of the core, the contractor shall photograph the cores as specified in Clause 5.8. Depth shall be indicated on the core box by durable markers of a type approved by the Investigation Supervisor at one metre intervals and at all significant changes of strata and at the end of each drill run. The time between commencement of preparation and the examination of the prepared and photographed cores shall be minimised to prevent loss of moisture from core samples. Where there has been failure to achieve 100% recovery, core spacer pieces of appropriate size clearly indicating the missing lengths, shall be placed in the boxes. The location, exploratory hole number and the depth of coring relating to the contents of each box shall be clearly indicated in indelible ink on labels, inside the box, on the top and on each end of the box. All markers and labels shall be such as to facilitate subsequent photography.

Cores shall be examined, described and photographed on site by a Geotechnical Engineer or Engineering Geologist with at least 5 years of relevant experience since graduation. Logging shall be in accordance with BS5930 and contain all the additional fracture details required by the Specification

All core boxes other than those to be retained by the Employer shall remain the property of the Contractor.

1.10.6 Core sub-samples for laboratory testing (Cl. 5.4.7)

The Contractor shall arrange for the secure storage of all rock cores for a period of not exceeding 12 months beyond the date of completion of the works at an approved location.

1.10.7 Address for delivery of selected cores (Cl. 5.4.8 & 5.4.9)

The contractor shall arrange for long term secure storage of materials at the rates provided for in the BOQ. The cores shall be stored for 12 months and then delivered to an address designated by DCC.

1.10.8 Rotary open-hole drilling general requirements (Cl. 5.5.1)

Standard penetration tests shall be undertaken in all rotary open holes at 1.5m centres up to 15m depth and at 3m centres beyond 15m depth.

1.10.9 Rotary open-hole drilling for location mineral seams, mine workings, etc. (Cl. 5.5.2)

Not used

1.10.10 Open Hole Resonance (sonic) drilling (Cl. 5.6.1)

Not used

1.10.11 Resonance (sonic) drilling with sampling or continuous coring (Cl. 5.6.2)

Not used

1.10.12 Backfilling (Cl. 5.7)

Backfilling of rotary core holes shall be carried out in accordance with Clause 5.7.

1.10.13 Core photographic requirements (Cl. 5.8)

Prior to examination or sub-sampling of the core, the contractor shall photograph the cores as specified in Clause 5.8. Depth shall be indicated on the core box by durable markers of a type approved by the Investigation Supervisor at one metre intervals and at all significant changes of strata and at the end of each drill run.

1.10.14 Pavement Coring

Pavement coring is required to establish the thickness of surfacing pavement layers. The cores shall be taken using the method of boring or hand augering and allowance should be made for changing drill, drill bits or tools for the work to be carried out. Delay may be experienced in breaking out hard strata or obstructions when obtaining the cores and in an unlikely event fluids may be encountered. Casing/lining will be necessary for the removal of pavement cores, and the subsequent removal of any temporary casing/lining will also be required.

Everything necessary to provide pavement cores at location specified to allow for inspection and recording and reinstatement of the pavement to its existing condition should be considered by the Contractor.

The pavement cores shall be a minimum of 100mm in diameter.

Permanent immediate reinstatements are to be undertaken in accordance with Donegal County Council requirements once pavement cores have been extracted.

S1.11 Pitting and trenching (Specification Section 6) Particular restrictions/relaxations

1.11.1 Indirect detection of buried services and inspection pits (Cl. 3.8.3 & 6.1)

As per Clause 3.8.3 of the 'Specification and Related Documents for Ground Investigation in Ireland 2nd Edition 2016' document. GPR survey and CAT scanning is to be carried out in advance of exploratory holes in accordance with PAS128: 2022 requirements.

The contractor shall make enquiries of the landowner / occupier to identify the location of any land drains, wells or other domestic utility in proximity to the exploratory hole. Details of such enquiries shall be recorded and the information provided to the Investigation Supervisor in an agreed format.

1.11.2 Restrictions on plant or pitting/trenching methods (Cl. 6.2 and 6.3)

The Contractor shall provide for the excavation of all slit trenches by hand dug methods at locations where utilities are likely to be encountered. Slit trenches shall be excavated to the depth specified in Schedule 2, unless otherwise directed by the Investigation Supervisor, and shall be of a sufficient width such that all services encountered can be accurately recorded and photographed. Slit trenches shall have a maximum length across the road and verge such that one traffic lane can be open to traffic in safe conditions.

The Contractor shall provide for ground shoring where ground conditions found in any excavation require it in order to guarantee its stability.

For the slit trenching excavation, a mini digger shall be used at locations where overhead electricity poles are present adjacent and parallel to the existing road and a minimum safe distance from this utility line cannot be kept.

For excavation of the trial pits, the maximum arm reach for the excavator shall be in excess of the pit depths indicated in Schedule 2 of this Particular Specification. The base of excavated trial pits and observation pits shall not be less than 2m² in plan area.

Trial pits carried out on sidelong ground shall be battered on the uphill side.

The exact locations of the trial pits along the archaeology zones shall be agreed on site with the Employers Representative.

Should any concrete or bituminous paving be encountered, before excavation the edges of slit trenches must be saw-cut to minimise overbreak. The Contractor should allow in rates for logging of strata, recording depth and nature of all services and levelling to Malin Head Datum of all the trenches and services encountered.

All excavated material from trial pits on roads and pavements shall not be required for re-use and the Contractor should make provision for the disposal of the surplus material off site.

Sufficient standing time (a minimum of 1 hour) shall be allowed from the time the pit is excavated to its specified depth to observe whether there is any change in the groundwater table or groundwater flow regime. Unless otherwise directed by the Investigation Supervisor, pits shall be opened, logged by the Contractor and backfilled and pavement reinstated on the same day.

A minimum of three photographs shall be taken at each pit, slit trench or cutting slit trench location using a digital camera, of which at least two shall be of the pit sides and at least one of stockpiled materials.

1.11.3 Entry of personnel (Cl. 6.5)

Only personnel who are appropriately trained shall be permitted to work in observation pit or trench excavations.

1.11.4 Alternative pit and trench dimensions (Cl. 6.7)

As per Clause 6.7 of the 'Specification and Related Documents for Ground Investigation in Ireland 2nd Edition 2016' document.

1.11.5 Abstracted groundwater from land affected by contamination (Cl. 6.9.2)

Not used

1.11.6 Backfilling

Backfilling of the pits and trenches shall be carried out as soon as practicable with material replaced at a similar depth as encountered. The backfill shall be compacted using excavation plant.

1.11.7 Photographic requirements (Cl. 6.12)

A minimum of three photographs shall be taken at each pit, slit trench or cutting slit trench location using a digital camera, of which at least two shall be of the pit sides and at least one of stockpiled materials. A scale and board identifying the individual pit shall be included within all photographs. Photographs shall be supplied in JPG/JPEG format. The digital camera shall have a minimum sensor size of 12MP. GPS locations shall be recorded by the camera and shall be embedded in the photograph metadata. The camera shall also be capable of embedding the exposure date on the output file image and this feature shall be enabled with the date accurately set.

1.11.8 Artificial lighting (Cl. 6.12.2)

Not used

1.11.9 Provision of pitting equipment and crew for Investigation Supervisor's use (Cl. 6.13)

Not used

S1.12 Sampling and monitoring during intrusive investigation (Specification Section 7) Particular restrictions/relaxations

1.12.1 Address for delivery of selected geotechnical samples (Cl 7.6.1)

The contractor shall arrange for long term secure storage of materials at the rates provided for in the BOQ. The samples can be destroyed after 12 months following the end of the contract period.

1.12.2 Retention and disposal of geotechnical samples (Cl. 7.6.2)

Pending review of the geotechnical laboratory test results, retained samples shall be held by the Contractor for the required duration. Preliminary design issues such as earthworks reuse and potential treatment requirements that become evident after the factual reporting may inform aspects for further testing such as lime treatment. The Contractor shall confirm whether the retained samples are still considered representative by comparing the moisture contents of previous testing prior to scheduling of further tests where required.

1.12.3 Frequency of sampling for geotechnical purposes (Cl. 7.6.3 – 7.6.11)

The Contractor shall take samples in Inspection and Trial Pits as follows from:

- a. Small disturbed samples
 - at each change in soil type or consistency
 - at intervals midway between successive tests or bulk samples
 - at each bulk sample in cohesive soils
 - at 0.25 metres centres in selected pits for moisture profile
- b. Bulk disturbed samples
 - at locations immediately following each change in soil type or consistency and at 1 metres intervals
 - (large bulk samples) where earthworks testing may be required, e.g. shear box testing.

c. Undisturbed samples

- Undisturbed Block samples shall be cut by hand from soft or soft to firm cohesive soils where indicated in the testing schedule and agreed with the Investigation Supervisor on site.

1.12.4 Open-tube and piston sample diameter (Cl. 7.6.5)

Not used

1.12.5 Retention of cutting shoe samples (Cl. 7.6.5)

Not used

1.12.6 Thin walled sampling (Cl. 7.6.12)

Not used

1.12.7 Groundwater level measurements during exploratory hole construction (Cl. 7.7)

Where ground water is encountered its level shall be immediately recorded. Ground water observations shall be recorded in accordance with the requirements of the Specification Schedule S1.17.1.

A number of samples should be prepared having a 2:1 water soil extract and these samples should be examined for sulphate content. The main purpose of the sampling is to determine if ordinary Portland cement would be subject to sulphate attack.

Where artesian conditions are encountered, the Contractor shall inform the Investigation Supervisor and consult and agree with him the measures to be taken in accordance with Specification Clause 4.4.

1.12.8 Special geotechnical sampling (Cl. 7.8)

Not used

1.12.9 Address for delivery of selected samples (Cl. 7.9.2)

Selected samples to be disposed of six months after issue of final reporting.

1.12.10 Retention and Disposal of contamination (WAC) Samples (Cl. 7.9.3)

All samples shall be kept for a period of not less than twelve months after the completion of field work and may be discarded after that time only on the instruction of the Investigation Supervisor who may request that some of the samples be retained either by the Contractor or sent elsewhere.

1.12.11 Frequency of sampling (Cl. 7.9.4)

Not used

1.12.12 Sampling method (Cl. 7.9.5)

Not used

1.12.13 Headspace testing (Cl. 7.9.8)

Not used

S1.13 Probing and cone penetration testing (Specification Section 8) Particular restrictions/relaxations

1.13.1 Type(s) and reporting of dynamic probing (Cl. 8.1.1 and 8.1.2)

Not used

1.13.2 Capacity and equipment requirements for cone penetration testing (Cl. 8.2.1)

Not used

1.13.3 Reporting of cone penetration testing parameters (Cl. 8.2.4)

Not used

1.13.4 Seismic cone equipment requirements (Cl. 8.3.1)

Not used

1.13.5 Interpretation of seismic cone tests (Cl. 8.3.4)

Not used

1.13.6 Other cone or specialist probes (Cl. 8.4)

Not used

S1.14 Geophysical Surveying (Specification Section 9) Particular Restrictions / Relaxations

Geophysical surveys shall include Ground Penetrating Radar methods and shall be performed in accordance with BS 5930 BS 7022, PAS 182 and the Geological Society Engineering Group Working Party Report on Engineering Geophysics. Survey areas are shown on the Ground Investigation Contract drawings and consist of areas for ground penetrating radar. The Contractor is to provide overlaps as required. The level of accuracy required for the surveying of the GPR profiles is +/- 1m on the Plan Location and +/- 0.05m of the Ground Elevation.

Selection of GPR apparatus shall be suited to the prevalent ground surface conditions and the objectives of the survey. GPR shall be used on all the area of the investigation works to determine the existing underground services, the thickness of concrete slabs or beams and to indicate the underlying material structure.

1.14.1 Geophysical Survey Objectives (Cl. 9.1.1)

To determine line, level, size and type of utility services that may be impacted by the detailed design and construction of the proposed scheme.

1.14.2 Requirement for competent geophysicist (Cl. 9.1.1)

The Contractor shall provide a Geophysicist in accordance with to assist the Investigation Supervisor in scheduling effective and efficient surveys. This shall be demonstrated by way of trial surveys as outlined in Section 1.14.3, the contractor's programme of surveys and the surveys scheduled for the techniques outlined in Section 1.14.4.

On-site Interpretation

Not used

Quality Control

Not used

1.14.3 Trial Geophysical methods required (Cl. 9.1.1)

Trial Surveys are required in accordance with Clause 9.1.1. The geophysical survey is primarily to investigate and provide information as follows:

- (1) Prove optimal arrangements of survey capture parameters using comparative trials.
- (2) Trials may not be required for all techniques.
- (3) Initial surveys may be compared to determine which technique has been most effective and will be reviewed by the Investigation Supervisor. Where surveys return inadequate resolution it may be required to repeat the surveys with amendments to the techniques.
- (4) Assumed baseline parameters and/or tolerances for each of the proposed techniques are listed in Section 1.14.4.

1.14.4 Types of geophysical methods required (Cl. 9.1.1)

Geophysical surveys shall include Electrical Resistivity, Seismic Refraction or Reflection and Multi-channel Analysis of Surface Waves, Ground Penetrating Radar or Electromagnetic Ground Conductivity techniques which shall be performed in accordance with BS 5930 and the Geological Society Engineering Group Working Party Report on Engineering Geophysics.

1.14.4.1 Ground Penetrating Radar (GPR) (Clause 9.3)

- (1) Observe existing wall profiles and the backfill materials.
- (2) Outline overburden type and strata depths, services, culverts, pipes, and structural features.
- (3) Assess the location and possible extent of the services, culverts, pipes, retaining walls and foundations, and other features.
- (4) The level of accuracy required for the surveying of the GPR profiles is +/- 0.1m on the Plan Location and +/- 0.05m on Elevation.
- (5) Target depth range of profiles will be 0-7 m.
- (6) A continuous GPR profile shall be recorded.

1.14.5 Information Provided (Cl. 9.2)

Refer to S1.6. Drawings showing desktop services tracking completed during earlier project phases are included as Background information (Non-Contract). Updated service tracking requests have not been concluded and there is likely to be uncharted services present on the site.

1.14.6 Horizontal data density (Cl. 9.3)

Not used.

1.14.7 Level datum (Cl. 9.4)

All reading locations will be set out and surveyed to Irish Transverse Mercator (ITM) using DGPS or total station. The level of accuracy required for the surveying of the resistivity and seismic refraction profiles is +/- 1m on the Plan Location and +/- 0.1m of the Ground Elevation.

1.14.8 Geophysical survey report (Cl. 9.7)

Not used

S1.15 In situ Testing (Specification Section 10) Particular Restrictions / Relaxations

1.15.1 Tests in accordance with Irish, UK or European Standards (Cl. 10.3)

The following in situ tests shall be carried out and reported in accordance with BS 1377.

Standard Penetration Test:

In general, the Standard Penetration Test, when carried out in clays, silts and sands is to be performed with a split barrel sampler (SPT) and in gravels and weak rock by plugging the standard tube with a cone end (SPT(C)).

In certain soil types, (i.e. granular material) it may be necessary to carry out the penetration test with the borehole filled with water to ground level to overcome the head of water causing "blowing" of the granular soil.

Standard penetration resistance tests shall be carried out in boreholes / rotary holes as follows:

- at every change and at 1.0m centres for the first 10m and at 1.5m intervals thereafter in granular soils,
- or at 1.5m spacings from 6m depth and 3.0m spacings after 9.0m.

1.15.2 Hand penetrometer and hand vane for shear strength (Cl. 10.4.1)

Hand Shear Vane Tests

Hand shear vane tests shall be undertaken at 0.5m depth and at 1.0m-1.2m depth where predominantly cohesive soil is encountered in trial pit excavations. Hand shear vane tests shall be undertaken by a qualified and experienced Geologist / Geotechnical Engineer / Engineering Geologist. The results of the test (peak and residual undrained shear strength, together with the dimensions of the vane cruciform used) shall be reported on the relevant trial pit log. Copies of current calibration certification shall be forwarded to the Investigation Supervisor.

Field In Situ Vane Test

Field in situ vane testing shall be performed at 1m depth intervals in peat/soft clay deposits, using Geonor (H10) penetration vane. Results (peak and residual undrained shear strength) shall be reported in the relevant borehole log. Copies of current calibration certification shall be forwarded to the Investigation Supervisor.

1.15.3 Self-boring pressuremeter and high pressure dilatometer testing and reporting (Cl. 10.5.1)

Not Used

1.15.4 Driven or push-in pressuremeter testing and reporting requirements (Clause 10.5.2)

Not Used

1.15.5 Menard pressuremeter tests (Cl. 10.5.3)

Not Used

1.15.6 Soil infiltration test (Cl. 10.6)

Percolation tests are to be undertaken in accordance with BRE Digest 365 – Soakaways (BRE, 2016). Test locations are at those trial pits indicating “infiltration test” in Table 2.2 from Schedule 2.

Dimensions of the pits shall be 1m deep and 1m² at its base.

1.15.7 Special in situ testing and reporting requirements (Cl. 10.7)

Not Used

1.15.8 Interface probes (Cl. 10.8)

Not Used

1.15.9 Contamination screening tests (Cl. 10.9)

Not Used

1.15.10 Metal detection (Cl. 10.10)

Not Used

1.15.11 Permeability tests

Not used

1.15.12 In situ CBR / Plate load testing

CBR tests shall be performed in selected trial pits by use of Dynamic Cone Penetrometer test at 0.5m to 1m depth as specified by Investigation Supervisor at trial pit locations listed in Table 2.2.

Plate load tests shall be dynamic plate bearing test and static plate bearing test as described in the schedules of this Specification. These shall be carried out adjacent to each other in the same trench.

S1.16 Instrumentation Requirements (Section 11)

1.16.1 Protective covers for installations (Cl. 11.2)

Not used

1.16.2 Protective fencing (Cl. 11.3)

Not used

1.16.3 Standpipe and standpipe piezometer installations (Cl. 11.4.1 and 11.4.2)

Standpipes or Standpipe Piezometers may be installed at the completion of cable percussion or rotary core boreholes as indicated in Schedule 2 or as directed by the Investigation Supervisor. Standpipes and Piezometers shall be 50mm diameter with locking cap and minimum 0.5m screened interval located in permeable soil or rock stratum. The Contractor shall contact the Investigation Supervisor who will advise the exact length and target depth for each screened interval.

Response zones may be required over specific depths depending on the conditions encountered during drilling. Response zones over the length of the borehole shall not be provided. Standpipe requirements shall target the permeable zones within a single stratum. The Contractor shall contact the Investigation Supervisor for such details in

good time so as to avoid or minimise standing time. The preparation of draft logs for boreholes with piezometer installations shall be prioritised.

A multilevel Piezometer arrangement may be installed at the completion of cable percussion or rotary core boreholes as indicated in Schedule 2 or as directed by the Investigation Supervisor. This arrangement shall include multiple 50mm Piezometers installed in the same borehole with screened intervals or response zones at varying depths. The interval between varying response zones for each Piezometer shall be sealed using bentonite to a minimum depth of 1m to ensure discrete groundwater sampling and level readings at varying depths into the aquifer. The Investigation Supervisor shall provide a detailed installation arrangement for the multilevel Piezometer arrangement prior to the completion of the installation. The Contractor shall contact the Investigation Supervisor for installation details where appropriate and in good time so as to avoid or minimise standing time.

All Standpipes or Standpipe Piezometers shall be fitted with a protective cover and surrounded with timber fence to mitigate damage caused by animals etc.

During site operations the contractor will be required to monitor fortnightly all standpipes and piezometers installed during the current contract, and additionally those installed (and operational) in the previous contracts falling within the Ground Investigation Contract site limits.

The contractor will also be asked to monitor water levels in wells in proximity to the scheme which are identified during liaison with landowner / occupiers. Separate items have been included in the Bill of Quantities.

1.16.4 Other piezometer installations (Clause 11.4.3)

Not Used

1.16.5 Development of standpipes and standpipe piezometers (Clause 11.4.5)

Not Used

1.16.6 Ground gas standpipes (Clause 11.5)

Not Used

1.16.7 Inclinator installations (Clause 11.6)

Not Used

1.16.8 Slip indicators (Clause 11.7)

Not Used

1.16.9 Extensometers and settlement gauges (Clause 11.7)

Not Used

1.16.10 Settlement monuments (Clause 11.9)

Not Used

1.16.11 Removal of installations (Clause 11.10)

Not Used

1.16.12 Other instrumentation (Clause 11.11)

Not Used

S1.17 Installation Monitoring and Sampling (Specification Section 12) Particular Restrictions / Relaxation

1.17.1 Groundwater level readings in installations (Cl. 12.2)

All Standpipes or Standpipe Piezometers if installed by Contractor shall have water levels readings recorded by the Contractor once a week as required by the Investigation Supervisor. Such readings shall be reported to the Investigation Supervisor on a weekly basis during the fieldwork period. Readings shall also be obtained on a monthly basis during return visits to site up to a period of 1 year.

1.17.2 Groundwater sampling from installations (Cl. 12.3.1)

Sampling of groundwater shall be carried out as indicated in Schedule 2 or as directed by the Investigation Supervisor. Groundwater samples shall be obtained utilising a sterilised pump with purging of 3 times the borehole volume taking place prior to the sample being taken. Groundwater samples shall be stored in sterile containers. All groundwater samples shall be stored in an insulated container and transported to an accredited laboratory for testing as soon as possible once taken. Testing of groundwater samples shall be carried out in an accredited laboratory in accordance with Suite F as detailed in S1.20.

1.17.3 Purging/micro – purging (Cl. 12.3.2)

Groundwater samples shall be obtained utilising a sterilised pump with purging of three times the borehole volume taking place prior to the sample being taken.

1.17.4 Ground gas monitoring (Clause 12.4)

Not Used

1.17.5 Sampling from ground gas installations (Clause 12.5)

Not Used

1.17.6 Other monitoring (Clause 12.8)

Particular Requirements for Water Well Observations:

Where discussions with landowners / occupiers reveal a water well within 200m of the scheme centreline, with this distance extended further in the vicinity of crossroads where necessary, its location, depth, construction and any other relevant details shall be recorded on a 'Well Register'. With the consent of the owner / occupier fortnightly water level readings shall be taken at each well and recorded on the 'well register' as detailed in clause S1.16.

S1.18 Particular Daily Records (Specification Section 13) Particular Restrictions / Relaxations

1.18.1 Information for daily records (Cl. 13.1)

Daily Reports of completed works and all associated field logs are to be provided to the Investigation Supervisor's site representative at the end of each working day.

1.18.2 Special in situ tests and instrumentation records (Clause 13.4)

Other than for tests normally reported on the daily driller's report the Contractor shall submit records of the other in situ tests within 48 hours of the completion of the date

on which the test was completed for comment. The information shall be supplied in a format required by the BS covering the test or other standard applying and/or agreed by the Investigation Supervisor. All calculations of derived parameters shall be undertaken and any assumptions stated. The results shall have been reviewed before submission by a Check Engineer within seven days.

At the end of site operations, all individual result sheets shall have been submitted together, revised in the light of other information, together with a sequential tabulation indicating the hole number, test depths, soil type, results summary and remarks on the suitability of each test.

S1.19 Geotechnical Laboratory Testing (Specification Section 14) Particular Restrictions / Relaxations

1.19.1 Investigation Supervisor or Contractor to schedule testing (Cl. 14.1.1)

Preliminary geotechnical logs shall be provided by the Contractor within seven days of completion of fieldwork at a given exploratory location, together with a detailed sample list on an agreed pro-forma laboratory testing sheet. The Investigation Supervisor shall schedule all geotechnical laboratory testing schedules prior to commencement of testing.

1.19.2 Tests required (Cl. 14.1.2)

For each determination of dry density / moisture content relationship ('Proctor Compaction test' – Test 3, Part 5, BS1377 (1990)), two hand vane tests shall be undertaken on samples prepared at different moisture contents in order to determine shear strength / moisture content relationship.

The results of soil relationship tests on each bulk sample shall be presented in tabulated data format. Variations in MCV, CBR, dry density and hand vane shear strength as a function of moisture content shall be plotted on an individual sheet pertaining to each bulk sample tested. The format of these composite plots shall be agreed with the Investigation Supervisor prior to submission of the Draft Factual Report.

Rock testing shall be carried out in accordance with Clause 14.5.

1.19.3 Specifications for tests not covered by BS 1377 and options under BS 1377 (Cl. 14.2.1 and 14.4)

Not used

1.19.4 INAB or UKAS accreditation to be adopted (Cl. 14.3)

All samples to be completed by laboratories with either INAB ISO/IEC 17025 or UKAS ISO/IEC 17025 accreditation. Laboratories are also to be certified to ISO 9001, 14001 and 45001.

1.19.5 Rock testing requirements (Cl. 14.5)

No alternatives are required.

1.19.6 Chemical testing for aggressive ground/groundwater for concrete (Cl. 14.6)

Chemical Testing on potentially aggressive ground or groundwater shall be performed in accordance with BRE Special Digest SD1 Suite A, B, C and D covering all possible cases (Greenfield and Brownfield sites with or without pyrite present).

The Investigation Supervisor shall confirm if the dependent option tests are required regardless of trigger levels having been reached.

1.19.7 Laboratory testing on site (Cl. 14.7)

Not used

1.19.8 Special laboratory testing (Cl. 14.8)

Not used

S1.20 Geoenvironmental Laboratory Testing (Specification Section 15) Particular Restrictions / Relaxations

1.20.1 Investigation Supervisor or Contractor to schedule testing (Cl. 15.1)

The Investigation Supervisor shall schedule all geo-environmental tests. Preliminary geotechnical logs shall be provided by the Contractor within three days of completion of fieldwork at a given exploratory location, together with a detailed sample list on an agreed pro-forma laboratory testing sheet.

1.20.2 Accreditation required (Cl. 15.2)

Chemical laboratory testing should be carried out to International Standard IS EN ISO/IEC 17025. It is recommended that laboratory testing should be undertaken by accredited laboratories (INAB or UKAS)

1.20.3 Chemical testing for contamination (Cl. 15.3)

Testing shall be performed in accordance with Suite E to I as appropriate subject scheduling and approval by the Investigation Supervisor. Detection Limits, Method and Lab Accreditation to be confirmed by Environmental Scientist.

1.20.4 Waste Characterisation (Cl. 15.4)

Not used

1.20.5 Waste Acceptance Criteria (Cl. 15.5)

Testing shall be performed in accordance with Suite H – Inert Waste Landfill WAC and Suite I – Non Hazardous / Hazardous WAC Testing to be decided by the Investigation Supervisor.

1.20.6 Laboratory Testing (Cl. 15.6)

Not Used.

1.20.7 Special Laboratory Testing (Cl. 15.7)

Not Used.

S1.21 Particular Reporting Requirements (Section 16)

1.21.1 Form of exploratory hole logs (Cl. 16.1 and 16.2.1)

The Contractor shall prepare a preliminary log of each exploratory hole presented to a suitable vertical scale. Any water strikes shall be represented graphically in a separate column on logs. This log in draft format will be required for the Investigation Supervisors inspection 48 hours after the completion of the exploratory hole for comment.

For Trial Pits and slit trenches, a simplified version of a log shall be provided detailing the dimensions, strata encountered, sketch of the depth to and the nature of any services encountered together with observations on any groundwater encountered. Elevations showing each face of the pit shall be provided where variations in strata exist. All records are to be prepared on site and reviewed by an appointed Check Engineer.

Final Logs

The exploratory hole logs shall be in the same form as the preliminary logs, and shall include all the information required for Preliminary logs, such information having been updated as necessary in the light of laboratory testing, further examination of samples and cores and re-evaluation of the systematic description or categorisation of the strata.

1.21.2 Information on exploratory hole logs (Cl. 16.2.2)

Not used

1.21.3 Variations to final digital data supply requirements (Cl. 16.5.1)

The Contractor shall provide exploratory hole, in situ test, groundwater monitoring and laboratory test data in AGS digital form and Excel format media as agreed by the Investigation Supervisor. The files shall not be compressed. The digital data files shall comply with the Rules of the Association of Geotechnical Data from Ground Investigations (4th Edition, 2010).

Within 7 days after the Investigation Supervisor gives permission to start the Investigation the Contractor shall submit to the Investigation Supervisor a dummy set of data on disk in the required format.

AGS v4 data for preliminary hole records and laboratory scheduling shall be issued with the preliminary logs on a weekly basis.

At the end of Site Operations the Contractor shall issue to the Investigation Supervisor digital data containing Preliminary Hole Records and in situ test records, fully checked and edited, and incorporating Investigation Supervisors amendments if instructed. On submission of the final Factual Report, the Contractor shall issue to the Investigation Supervisor a full set of digital data clearly marked "Final".

All digital media shall be appropriately labelled and clearly marked for the project and element. The Contractor shall keep, until 12 months after the Investigation is complete and clause 4.4 of the Conditions of Contract is complied with, an identical copy of each project file issued.

For each data file, the index shall detail:

- a) The file name, including the extension '.AGS'
- b) The date and time the file was created;
- c) A general description of the data contained in each file.

The contractor is to pay particular attention to ensure consistent and accurate sample/specimen referencing throughout all AGS data, particularly where more than one laboratory is being used.

AGS v4 data for final hole records and laboratory testing shall be issued in a combined file upon completion of the Final Factual Report.

All drawings contained in the Final factual report shall be submitted in AutoCAD format.

1.21.4 Preliminary digital data (Cl. 16.5.3)

Draft Fieldwork AGS files shall be issued with each set of draft logs and lab schedules. Any corrections to exploratory location ID's shall be advised by the Investigation Supervisor at the time of laboratory scheduling.

1.21.5 Type(s) of reports required (Cl. 16.6)

The Contractor shall schedule and resource their works to ensure the following deadlines:

- **Draft Report** – up to date drafts to be supplied digitally on a weekly basis as work progresses, and
- **Main Factual Report** – Shall be supplied no later than **six weeks** after the completion of the Site Operations.

1.21.6 Electronic report requirements (Cl. 16.6.3)

Not Used

1.21.7 Format and contents of Desk Study Report (Cl. 16.7)

Not Used

1.21.8 Contents of Geotechnical Factual Report

On completion of the works the Contractor shall submit his final Report within 6 weeks of the final exploratory hole. The Report shall comprise of the Factual Report incorporating the Digital Data subdivided in an agreed way with the Investigation Supervisor.

The Report shall be compiled into a single PDF file comprising A4 portrait (and A1/A3 landscape for drawings), or as otherwise directed by the Investigation Supervisor. Each volume of the Report shall begin with a cover page showing the name of the Contract, Date and the names of the Employer, Investigation Supervisor and Contractor. Contents pages shall cover the Report as a whole, and also the specific volume contents. Report pages shall be numbered consecutively.

The general format, arrangement and content shall be agreed with the Investigation Supervisor at the earliest opportunity in the Contract and updated in consultation thereafter.

The Factual Report shall contain the following information where applicable:

- a) A brief factual description of the Investigation, stating the aim of the Investigation, the numbers and types of exploratory holes, time of year and weather conditions encountered a brief description of the Site Operations, list of laboratory tests and a summary of general geology and revealed strata. Summaries of exploratory holes undertaken with co-ordinates and ground levels, lists of in situ test locations and types.
- b) Exploratory hole records, all in numerical order and separately grouped if required, all reported in accordance with BS5930:2015 and BS1377:1990.
- c) All in -situ test records and results.
- d) Standpipe and piezometer records, including permeability test reading and plots, any other relevant groundwater records and sketches of locations. Well identification and observation records

- e) Records and monitoring observations in Groundwater wells.
- f) All laboratory test records and results, including all information described in BS1377: Part 1, Clause 9.1.
- g) Summary sheets of all test results.
- h) Site plans showing locations of all exploratory holes and areas covered by the Investigation, including the Scale and North sign, key plan of drawings.
- i) Photographs of trial pits and rotary cores (soil and rock).
- j) All investigations shall have co-ordinates to Irish Transverse Mercator (ITM) and reduced levels to Malin Head Datum.
- k) Photographic record.

All exploratory holes shall be incorporated. Records shall be of the form utilised for preliminary records. The records shall include all the information set out in the Specification; such information having been updated as necessary in the light of laboratory testing. Laboratory and in situ test results shall be recorded in the exploratory hole records and/or presented in tabular or graphical form as required.

The Contractor shall be required to provide digital laboratory schedules to the Investigation Supervisor for scheduling of sample testing by the Investigation Supervisor. The Contractor shall be required to provide in digital format (AGS) draft results of lab tests on a weekly basis. Summaries of laboratory tests shall be presented in tabular form as numerical borehole order and/or soil types, aggregation for statistical purposes.

Digital data shall be produced in accordance with the Specification. On request the Investigation Supervisor will provide suitable originals of the site plans, longitudinal section and other sections for the plotting of exploratory holes.

All Reports shall be submitted to the Investigation Supervisor for review and comment. Comments shall be incorporated by the Contractor and re-issues provided as necessary within 1 week of receipt of these comments. Each Report shall be a fully checked and edited version, have passed through a documented procedure for approval and signed by a designated representative of appropriate experience and seniority. The final report shall include all relevant information recorded in journals and preliminary records as specified.

1.21.9 Contents of Geotechnical Interpretative or Design Report (Cl. 16.9 and 16.10)

Not Used.

1.21.10 Times to supply of electronic information (Cl. 16.11.1)

Draft AGS Fieldwork files to be submitted with each batch of draft logs for laboratory scheduling. Final Combined AGS Fieldwork and Laboratory results files to be supplied with Final Reporting. All Final Reports shall be submitted as PDF files within 6 weeks of completion of the final exploratory hole.

1.21.11 Electronic information transmission media (Cl. 16.11.2)

File share site and / or emailing of small PDF, Excel and AGS files.

1.21.12 Report approval (Cl. 16.12)

The contractor shall allow one week in his programme of investigation for the Investigation Supervisor to grant approval of the Draft Factual Report and he shall

include amendments, if any, as required by the Investigation Supervisor, in the Final Reports.

Schedule 2: Exploratory Holes and Testing for Contract

1. Schedule of Site Investigations – Boreholes, Rotary Holes, Pavement Cores, DCP

(Schedule of Investigations – see Contract Drawings for locations)

CP = cable percussion; RO = Rotary Open Hole; RC = Rotary Coring with core recovery; TP = Trial Pit; ST = Slit Trenches; DCP: Dynamic cone penetrometer; PC = Pavement Coring.

Table 2.1 Boreholes Schedule

Cable Percussion Boreholes & Rotary Drilling / Coring Drillholes						
Hole ID.	Scheduled Depth (m BGL)			Remarks	Coordinates (ITM)	
	CP	RO	RC into rock		Easting	Northing
RC101	-	2	12	Standpipe	615997.56	913365.20
RC102	-	2	15	Standpipe, Variable head permeability	616104.07	913305.00
RC103	-	2	15	Standpipe	616177.51	913304.35
RC104	-	2	12		616445.61	913207.77
RC105	-	2	15	Standpipe	616544.27	913171.26
RC106	-	2	8	Standpipe, Variable head permeability	616738.40	913214.63

Table 2.2 Trial Pits Schedule

Trial Pit Locations					
Hole ID.	Type	Schedule Depth	Remarks	Coordinates (ITM)	
		(m BGL)		Easting	Northing
TP101	TP	3.0	Shear Vane Test in cohesive material;	614839.46	913448.32
TP102	TP	3.0	Shear Vane Test in cohesive material;	614925.81	913428.01
TP103	TP	3.0	Shear Vane Test in cohesive material;	615029.01	913431.64
TP104	TP	3.0	Shear Vane Test in cohesive material;	615206.71	913463.63
TP105	TP	3.0	Shear Vane Test in cohesive material;	615234.99	913436.78
TP106	TP	3.0	Shear Vane Test in cohesive material;	615302.93	913432.96
TP107	TP	3.0	Shear Vane Test in cohesive material;	615476.42	913436.72
TP108	TP	3.0	Shear Vane Test in cohesive material;	615547.93	913432.43
TP109A	TP	3.0	Shear Vane Test in cohesive material;	615717.62	913462.07
TP109B	TP	3.0	Shear Vane Test in cohesive material;	615709.94	913437.97
TP110	TP	3.0	Shear Vane Test in cohesive material; DCP;	615778.70	913500.58
TP111	TP	3.0	Shear Vane Test in cohesive material; Block sample from soft/firm soils if present	615829.41	913449.38

Trial Pit Locations					
Hole ID.	Type	Schedule Depth	Remarks	Coordinates (ITM)	
		(m BGL)		Easting	Northing
TP112	TP	3.0	Shear Vane Test in cohesive material; Plate Bearing Test	615886.78	913408.83
TP113	TP	3.0	Shear Vane Test in cohesive material;	615953.74	913407.05
TP114	TP	3.0	Shear Vane Test in cohesive material;	615673.03	913396.29
TP115	TP	3.0	Shear Vane Test in cohesive material;	615676.39	913288.59
TP116	TP	3.0	Shear Vane Test in cohesive material;	615723.54	913119.16
TP117	TP	3.0	Shear Vane Test in cohesive material; Block sample from soft/firm soils if present	616013.23	913386.18
TP118	TP	3.0	Shear Vane Test in cohesive material;	616059.07	913344.50
TP119	TP	3.0	Shear Vane Test in cohesive material;	616124.87	913322.40
TP120	TP	3.0	Shear Vane Test in cohesive material; Plate Bearing Test; Block sample from soft/firm soils if present	616201.07	913272.77
TP121	TP	3.0	Shear Vane Test in cohesive material;; Block sample from soft/firm soils if present	616246.34	913320.11
TP122	TP	3.0	Shear Vane Test in cohesive material; Plate Bearing Test	616237.26	913385.07
TP123	TP	3.0	Shear Vane Test in cohesive material;	616210.34	913186.68
TP124	TP	3.0	Shear Vane Test in cohesive material; Plate Bearing Test	616202.18	913152.77
TP125	TP	3.0	Shear Vane Test in cohesive material; Infiltration Test	616281.43	913078.32
TP126	TP	3.0	Shear Vane Test in cohesive material;	616272.79	913247.81
TP127	TP	3.0	Shear Vane Test in cohesive material; Plate Bearing Test	616325.86	913247.88
TP128	TP	3.0	Shear Vane Test in cohesive material;	616371.36	913221.90
TP129	TP	3.0	Shear Vane Test in cohesive material; Infiltration Test	616443.13	913232.11
TP130	TP	3.0	Shear Vane Test in cohesive material; Plate Bearing Test	616467.67	913168.25
TP131	TP	3.0	Shear Vane Test in cohesive material;	616634.58	913179.17
TP132	TP	3.0	Shear Vane Test in cohesive material; Plate Bearing Test; Infiltration Test	616662.70	913112.60
TP133	TP	3.0	Shear Vane Test in cohesive material; Infiltration Test	616688.96	913064.34
TP134	TP	3.0	Shear Vane Test in cohesive material;	616730.02	913132.63
TP135	TP	3.0	Shear Vane Test in cohesive material; Plate Bearing Test	616729.85	913194.11

Trial Pit Locations					
Hole ID.	Type	Schedule Depth	Remarks	Coordinates (ITM)	
		(m BGL)		Easting	Northing
TP136	TP	3.0	Shear Vane Test in cohesive material;	616823.81	913247.73
TP137	TP	3.0	Shear Vane Test in cohesive material; Plate Bearing Test	616844.94	913170.83
TP138	TP	3.0	Shear Vane Test in cohesive material;	616814.23	913138.68
TP139	TP	3.0	Shear Vane Test in cohesive material;	616867.24	913106.41
TP140	TP	3.0	Shear Vane Test in cohesive material;	616820.90	913082.13
TP141	TP	3.0	Shear Vane Test in cohesive material; Infiltration Test	616906.84	913052.80
TP142	TP	3.0	Shear Vane Test in cohesive material; Plate Bearing Test	616928.64	913099.46
TP143	TP	3.0	Shear Vane Test in cohesive material;	616973.41	913089.16
TP144	TP	3.0	Shear Vane Test in cohesive material;	617023.83	913081.98

Table 2.3 Slit Trench Schedule

Slit Trenches Location					
Hole ID.	Min Depth (m)	Remarks	Easting / Northing	Coordinates (ITM Grid)	
				Point 1	Point 2
ST101	1.2	Temporary Traffic Management System required. Depth, dimensions, nature and relative position of each service line / utility shall be recorded	E	614829.50	614832.81
			N	913454.82	913465.17
ST102	1.2		E	614997.91	614998.42
			N	913443.71	913433.60
ST103	1.2		E	615179.13	615180.20
			N	913455.70	913441.04
ST104	1.2		E	615223.07	615237.51
			N	913514.33	913512.63
ST105	1.2		E	615205.79	615218.36
			N	913416.17	913413.80
ST106	1.2		E	615250.44	615250.70
			N	913460.55	913439.74
ST107	1.2		E	615324.66	615311.62
			N	913426.59	913420.56
ST108A	1.2		E	615411.06	615410.36
			N	913451.07	913438.39
ST108B	1.2		E	615536.19	615536.58
			N	913451.42	913437.91

Slit Trenches Location					
Hole ID.	Min Depth (m)	Remarks	Easting / Northing	Coordinates (ITM Grid)	
				Point 1	Point 2
ST108C	1.2		E	615667.03	615666.65
			N	913461.03	913448.77
ST109	1.2		E	615945.08	615946.57
			N	913395.07	913385.04
ST110	1.2		E	616172.78	616164.00
			N	913324.83	913326.74
ST111	1.2		E	616151.64	616140.00
			N	913218.50	913220.23
ST112	1.2		E	616272.43	616263.99
			N	913066.10	913058.11
ST113	1.2		E	616726.62	616721.39
			N	913217.10	913208.75
ST114	1.2		E	617044.07	617036.01
			N	913104.56	913099.14
ST115	1.2		E	617068.06	617068.06
			N	913080.52	617060.64
ST116	1.2		E	617085.19	913072.08
			N	913090.58	913067.35
ST117	1.2		E	614852.70	614852.70
			N	913465.08	913465.08
ST118	1.2		E	615018.87	615018.87
			N	913450.21	913450.21
ST119	1.2		E	615120.88	615120.88
			N	913453.44	913453.44
ST120	1.2		E	615409.10	615409.10
			N	913469.89	913469.89
ST121	1.2		E	615579.96	615579.96
			N	913455.77	913455.77
ST122	1.2		E	615595.63	615595.63
			N	913442.59	913442.59
ST123	1.2		E	615659.66	615659.66
			N	913446.34	913446.34
ST124	1.2		E	615666.44	615666.44
			N	913470.27	913470.27
ST125	1.2		E	615760.52	615760.52

Slit Trenches Location					
Hole ID.	Min Depth (m)	Remarks	Easting / Northing	Coordinates (ITM Grid)	
				Point 1	Point 2
			N	913446.08	913446.08
ST126	1.2		E	615768.50	615768.50
			N	913445.64	913445.64
ST127	1.2		E	615891.93	615891.93
			N	913386.89	913386.89
ST128	1.2		E	616074.85	616074.85
			N	913402.45	913402.45
ST129	1.2		E	616635.20	616635.20
			N	913284.10	913284.10
ST130	1.2		E	616792.65	616792.65
			N	913162.85	913162.85
ST131	1.2		E	616848.14	616848.14
			N	913150.53	913150.53
ST132	1.2		E	617053.26	617053.26
			N	913079.42	913079.42
ST133	1.2		E	617149.28	617149.28
			N	913060.23	913060.23
ST134	1.2		E	617184.79	617184.79
			N	913054.00	913054.00

Table 2.4 Dynamic Cone Penetrometer Schedule

Dynamic Cone Penetrometer Locations					
Hole ID.	Type	Schedule Depth	Remarks	Coordinates (ITM)	
		(m BGL)		Easting	Northing
DCP101	DCP	1.0		615203.665	913433.041
DCP102	DCP	1.0		615215.737	913476.99
DCP103	DCP	1.0		615269.017	913437.608
DCP104	DCP	1.0		615714.653	913420.165
DCP105	DCP	1.0		615660.307	913336.145
DCP106	DCP	1.0		615706.363	913214.089
DCP107	DCP	1.0		615921.86	913420.371
DCP108	DCP	1.0		615957.341	913380.18
DCP109	DCP	1.0		616229.785	913274.755
DCP110	DCP	1.0		616208.928	913225.918
DCP111	DCP	1.0		616195.21	913147.756

Dynamic Cone Penetrometer Locations					
Hole ID.	Type	Schedule Depth	Remarks	Coordinates (ITM)	
		(m BGL)		Easting	Northing
DCP112	DCP	1.0		616338.664	913227.7
DCP113A	DCP	1.0		616442.619	913200.382
DCP113B	DCP	1.0		616431.895	913180.014
DCP113C	DCP	1.0		616463.143	913187.878
DCP114	DCP	1.0		616908.844	913094.299
DCP115	DCP	1.0		616959.05	913086.156

Table 2.5 Pavement Cores Schedule 6

Pavement Cores Location				
Hole ID.	Type	Remarks	Coordinates (ITM)	
			Easting	Northing
PC101	PC	100mm diameter core	614836.092	913459.789
PC102	PC	100mm diameter core	615183.139	913446.283
PC103	PC	100mm diameter core	615232.463	913508.649
PC104	PC	100mm diameter core	615318.504	913438.674
PC105	PC	100mm diameter core	615514.199	913446.173
PC106	PC	100mm diameter core	617081.176	913076.644

Table 2.6 Ground Penetrating Radar (GPR)

Ground Penetrating Radar (GPR)		
Reference Number	Area (m ²)	Targeted features
GPR	26182	Thickness of pavement, presence of utilities and trenches In accordance with PAS128:2022

Notes

1. CP = Cable Percussion, RO = Rotary Open Holing, RC = Rotary Core, TP = Trial Pit, ST = Slit Trench, DCP = Dynamic Cone Penetrometer, PC = Pavement Core, GPR = Ground Penetrating Radar, SR = Seismic Refraction.
2. Coordinates to Irish Transverse Mercator (ITM) and reduced levels to Malin Head Datum required for all locations.
3. If boreholes are taken to the scheduled depth without encountering rock the Contractor shall contact the Employer's Representative to determine if coring to a greater depth is required.
4. Where Rotary Core is required Rotary Open hole drilling shall be used to reach the bedrock level.
5. Rotary Open hole drilling shall not reach excessive depth into the weathered rock. Weathered rock cores shall be obtained.
6. SPT tests shall be carried out in Rotary Core holes in weak rock every 3m.
7. For boreholes with a standpipe/ standpipe piezometer, the Investigation Supervisor will specify the Response Zones based on descriptions and observations from the borehole.

8. In-situ hand shear vane tests to be performed in all Trial Pits. Hand shear vane tests shall be undertaken at 0.5m depth and at 1.0m-1.2m depth where predominantly cohesive soil is encountered in trial pit excavations.
9. DCP CBR shall be performed at 1m depth in selected trial pits.
10. Pavement Cores shall be 100mm in diameter and at least 400mm in thickness.
11. Slit trenching shall aim to identify the type, size, depth and position of each service/utility found.
12. Infiltration tests shall be performed at those trial pits indicated in Table 2.2.
13. Variable head permeability tests shall be performed at those cable percussion holes and rotary drillholes indicated in Table 2.1.
14. Groundwater samples are to be taken from the boreholes identified in Table 2.1 on a quarterly basis after the field works are completed. Also, surface water samples shall be obtained from pond water sources encountered during this investigation as specified by the Employer's Representative.

The above Schedule of Investigations and the Particular Requirements for Sampling and Testing in Schedule 1 may be subject to review on receipt of the completed Bill of Quantities.

Schedule 3: Investigation Supervisor's Facilities for Contract

Suitable facilities shall be provided for the Investigation Supervisor, including site accommodation and necessary amenities, where required. Access to essential services, including lighting and electricity to support the use of onsite equipment and computers shall be provided. Appropriate personal protective equipment (PPE) shall also be provided in accordance with site safety requirements.

Schedule 4: Specification Amendments

The following clauses are amended:

At several locations:

For: "Conditions of Contract"

Read: "Contract"

When Reading the Following Documents:-

Specification and Related Documents for Ground Investigation in Ireland (2nd Edition 2016)

The word "Engineer" shall read "Investigation Supervisor"

The following clauses are amended:

Clause 3.8.3 Indirect Detection of Buried Services

Add the following text:

"The Contractor shall satisfy himself as to the position of any underground services or field drains at each location before excavations and tests commence. Where necessary, test locations shall be relocated to avoid contact with any buried utilities. The Investigation Supervisor and appropriate authority shall be notified immediately of any damage to existing services.

Clause 3.9 Notice of Entry

Delete the first sentence and add the following text:

"The Contractor is required to submit weekly programmes in advance. A notice period of five working days before entry is required to obtain the necessary permissions.

In addition to any notices required to be given under the Conditions of Contract, the Contractor must provide a **minimum of two days notice to the landowner and/or occupier** before accessing their lands".

Clause 3.10 Access Routes

Title description to be changed from 'Access Routes' to 'Access to Site'

Delete the first sentence and add the following text:

"Access to the site for the purpose of carrying out geotechnical investigations will be agreed with the Employer and the Investigation Supervisor and the Contractor shall co-ordinate access requirements with the Investigation Supervisor. The Contractor shall provide sufficient notice to the Employer to arrange access to Site. The Contractor shall provide details of dates when access is required to carry out the investigations and the method statements required to carry out the Works.

The Contractor will comply with the following conditions for access onto lands:

- (i) Access to exploratory holes(s) shall be along route(s) agreed between the Contractor and the Landowners.
- (ii) All exploratory hole(s) shall be backfilled in fully compacted layers immediately on completion. Any exploratory holes required to be left open overnight shall be fenced off and fully protected.

- (iii) All ground disturbed by the work shall be made good levelled and re-seeded if necessary.
- (iv) Any damage to fences, hedges, walls, gates or any other property found to be due to the execution of the work shall be made good.
- (v) The owner shall be fully indemnified against any claim arising from or relating to the carrying out of this work.
- (vi) The Contractor shall include in his rates for all access difficulties and for reinstatement of access routes damaged during the course of the investigations. In some instances, it may be necessary to lift items of plant over walls as no alternative access exists. Any damage to fences, hedges, walls, gates or any other property due to the execution of the works shall be made good. In some instances, exploratory holes may be scheduled in areas of soft ground, the Contractor is deemed to have included for difficult access and set up in his rates."
- (vii) The Contractor shall provide appropriate plant and experienced personnel to complete any site clearance to enable the ground investigation Contract to commence. The Contractor shall be deemed to have included this in his rates.

Clause 3.16.3 Paved areas

Insert the following before the first sentence:

"Prior to excavation, the edges of the exploratory hole must be saw cut to minimise over break."

Delete the text in second paragraph and replace with the following:

'Reinstatement of existing paved areas and the backfilling of trial holes, core-holes and the like shall be in accordance with the requirements of the Department of Transport, Tourism and Sport (DTTS), Guidelines for Managing Opening in Public Roads, Guidelines for the Opening, Backfilling and Reinstatement of Opening in Public Roads – Second Edition April 2017 available as the DTTS website, www.rmo.ie.

Permanent immediate reinstatements shall be undertaken after pavement coring works in accordance with the aforementioned guidelines.

Backfilling of pits and trenches in paved areas shall be carried out as soon as practicable in accordance with CC-PAV-04007 *Requirements for the Reinstatement of Openings in National Roads*. The Contractor shall liaise with Donegal County Council before excavation and reinstatement works on the public footway and roadway.'

Clause 5.4.5 Core boxes, packing, labelling, storing

Add the following paragraph:

"Access for the inspection of the cores by the Investigation Supervisor or his site representative shall be provided by the Contractor for the duration of the Contract".

Clause 5.4.6 Preparation of cores for examination

Delete the reference to "a ground practitioner meeting the requirements of Clause 2.3 item (b)" in the third paragraph and replace with the following:

"The cores shall be examined, described and photographed on site by a senior Geotechnical Engineer or Engineering Geologist with at least 5 years of relevant experience since graduation. Logging shall contain all the additional fracture details required by the Specification and Schedule S1.10.5."

Clause 6.2 Trial pits and trenches

Add the following text:

"The Contractor shall ensure that samples taken from trial pits and trenches are sufficiently large to undertake extensive classification and earthworks testing."

Clause 6.9 Groundwater

Add the following text:

"Sufficient standing time (a minimum of 1 hour) shall be allowed from the time the pit is excavated to its specified depth to observe whether there is any change in the groundwater table or groundwater flow regime."

Clause 6.10 Backfilling

Add the following text:

"Unless otherwise directed by the Investigation Supervisor or his site representative, pits and trenches shall be opened, logged by the Contractor and backfilled on the same day."

Clause 6.12.3 Photographs

Delete and replace with the following:

"A minimum of three photographs shall be taken in the pit and trench using a digital camera, of which at least two shall be of the pit and trench sides and at least one shall be of the arisings. Additional photographs shall be taken following completion of the fieldwork and after any reinstatement works."

Clause 7.1 General

Add the following text:

"The Contractor shall be deemed to have included for taking samples large enough to carry out each test as ordered by the Investigation Supervisor. All onsite testing shall be carried out by the Contractor. An offsite laboratory which has the approval of the Investigation Supervisor may undertake testing which is unable to be undertaken on site. The Contractor shall submit the address of the laboratory and the qualifications of the personnel involved in the supervision and testing of the samples, and also in the preparation of the report, to the Investigation Supervisor for his approval".

Clause 7.7.1 Encountering groundwater

Add the following text after the first sentence:

"If sufficient water enters the borehole over this period, a groundwater sample should be taken. If groundwater is encountered in the cutting boreholes, the Investigation Supervisor shall specify in-situ permeability falling / rising head tests and/or standpipe installation response zone detailing".

Clause 11.3 Fencing

Add the following text:

"The fencing shall be maintained in place until such time as the standpipe or piezometer is no longer required, and the equipment and protruding pipework removed. Sheep wire shall be securely fixed to the fencing where the adjacent land use warrants its use or where requested by the Investigation Supervisor."

Schedule 5: Specification Additions

The following clauses are added to the Specification:

Clause 3.8 General Safety Requirements

"The Contractor shall provide the name and contact number of a locally based member of staff who can be contacted (24 hours, 7 days) by the Investigation Supervisor, the local Authority and An Gardaí Síochána in the event of an emergency in connection with the works".

"Unless the Contractor obtains the Investigation Supervisor's written permission, each borehole or rotary core location must be fenced off from the commencement of work at that location until restoration is completed. All rutting must be made good immediately, all gates must be kept closed and site kept free of all loose stones, holes, debris or other obstructions. The Contractor shall be deemed to have included this in his rates".

18. Planning Permissions and Health and Safety and Environmental Consents

The following Condition is deemed to be incorporated in the Contract:

"The Contractor acknowledges and agrees that insofar as Planning Permission, a Waste License, or other consents or permits (including, without prejudice to the generality of the foregoing, licenses, permits or consents under or pursuant to any planning, health and safety or environmental legislation, regulation or enactment), may be required to be obtained in relation to the development of any quarry or other source of materials required for carrying out and completion of the Investigation and/or in relation to any dump site intended to be used by the Contractor for the disposal of material relating to the Investigation, or in relation to any activity involved in the carrying out and completion of the Investigation that the Contractor shall be responsible to obtain, at its own cost, all such permission, licences, consents or permits. Further, the Contractor acknowledges and agrees that it shall not be entitled, notwithstanding any other provisions of the Contract, to any extension of time for the completion of the Investigation by reason of any necessity to obtain, or delay in obtaining any such Planning Permissions, Waste Licence or other licence consents or permits."

19. Programme of Work

The Contractor shall provide a programme of work and resources schedules showing as a minimum the following:

- Traffic Management equipment;
- Rotary coring rig with ODEX capability or similar system;
- One Mechanical Excavator (Minimum 13 tonne);
- One mini digger (at locations where slit trenches are proposed adjacent to existing overhead electricity lines / poles and a safe distance cannot be kept)
- One Dumper (Minimum 6 tonne);
- Pavement Coring equipment;
- Groundwater monitoring of standpipes and standpipe piezometers;
- Geophysical Equipment capable of undertaking the required surveys;
- Reinstatement.

The programme shall be no less favourable than the programme submitted in accordance with Clause 3.1 of the Contract Conditions.

In addition, the Contractor should take into account the time required for monitoring water ingress in each exploratory hole, chiselling through obstructions, moving rigs and setting up at each borehole location and the standing time included in the Bill of Quantities into his programme.

20. Water for Works

The Contractor shall make his own arrangements for bringing water to the site of each borehole, and shall supply all pipes, tanks, transport, etc., that he may require for this purpose. The Contractor shall be deemed to have included this in his rates.

21. Staging, Platforms etc.

The Contractor shall supply, erect and remove on completion all staging, platforms, benching, etc., and required for the trial pits in the prevailing topography. The Contractor shall be deemed to have included this in his rates.

22. Prevention of the Spread of Animal Diseases

The contractor should adhere to the Animal Health and Welfare Act 2013 and follow the code of practices and also comply with the DOELG Code of Practice for Farm visits.

23. Protection of the Environment

The Contractor shall follow the Protection of the Environment Act 2003 by following the necessary Code of Practices. The Contractor shall comply with the requirements included in clause 26 of Schedule 5.

24. Management of Contract

In order to provide the appropriate level of management of the Site Investigation Contract a Principal Chartered Geotechnical Engineer / Professional Engineering Geologist or similar approved by the Employer's Representative shall be appointed by the Contractor to manage all aspects of the Contract as required by the Contract. The name and CV of the Principal Chartered Geotechnical Engineer / Professional Engineering Geologist shall be indicated in the Tender submission and shall be subject to approval by the Employer's Representative which approval may be withdrawn at any time. The Principal Chartered Geotechnical Engineer / Professional Engineering Geologist shall have not less than 10 years' experience in ground investigation and geotechnical works, in both field operations and reporting and shall be a permanent employee of the Geotechnical Contractor.

The Principal Chartered Geotechnical Engineer / Professional Engineering Geologist shall be responsible for the technical direction and output of the whole investigation, including logging samples and cores, and providing preliminary borehole, trial pit and dynamic probe records, supervision of in situ tests and specialist sampling. The Principal Chartered Geotechnical Engineer / Professional Engineering Geologist shall sign the final factual report.

25. PSCS Coordinator of other Works and Activities

The successful tenderer for the ground investigations shall be the PSCS for the entire site and will be responsible for ensuring that the works are co-ordinated in a safe manner with a view to protecting persons at work and preventing accidents and injury to health. It is anticipated that weekly PSCS/PSDP coordination meetings will take place on site.

26. Particular Environmental Requirements (Section 3)

The Contractor must prevent, manage and/or minimise significant environmental impacts during the execution of the contract. The Contractor will be required to provide a Method Statement for Environmental Protection to the Investigation Supervisor at least 1 week prior to the commencement of works on site. The Contractor shall adopt any reasonable measures instructed by the Investigation Supervisor to achieve the required level of environmental protection for this project. Special attention will be required at the works in or near the Special Area of Conservation.

The Contractor shall note the statutory restriction on vegetation clearance - Section 46(a) of the Wildlife (Amendment) Act 2000 makes it an offence "for a person to cut, grub, burn or otherwise destroy, during the period beginning on the 1st day of March and ending on the 31st day of August in any year, any vegetation growing on any land not then cultivated." However, this requirement is waived for the purposes of road or other construction works or in the development or preparation of sites on which any building or other structure is intended to be provided as per 46(c) of the Wildlife (Amendment) Act, 2000. Notwithstanding this waiver, the Contractor shall note that vegetation clearance proceeds in compliance with concomitant statutory requirements of the Wildlife Act.

In the event that the Contractor schedules to undertake vegetation clearance or felling works within the restricted period for the purposes of site preparation, access, construction, and or ancillary works, this may occur only after site inspections are undertaken by the Project Ecologist to ensure all reasonable efforts are made to protect the intrinsic value of hedgerows/trees as vitally important habitats for protected fauna. The Contractor shall send the Investigation Supervisor and the Project Ecologist a drawing indicating the locations of areas where vegetation clearance or felling works are required 1 week prior to the commencement of such works.

The contractor should make reasonable efforts to avoid the felling of trees and minimise the extent of vegetation clearance while undertaking the Scope of Works.

Tenderers should note especially the sensitivity of watercourses. Threats to watercourses and associated habitats can potentially include wash-down water from mechanical excavators and other plant, fuels, lubricants and hydraulic fluids, wastewater from on-site toilet and wash facilities, and suspended sediments due to soil runoff from construction areas.

Measures for the protection of watercourses could include, but are not limited to, the following examples.

- No excavations, plant or vehicles shall be permitted within 10m of any waterbody apart from marine boreholes (i.e. stream, river, pond or lake).
- No stockpiling or soil management shall be permitted within 30m of any waterbody.
- No fuel, lubricants or other chemicals will be stored within 30m of any waterbody.
- Refuelling of plant and vehicles will not take place within 10m of any waterbody.
- Storage areas, machinery depots and site offices shall not be located within 50 m of waterbodies.
- Surface water runoff will be controlled by bunding, sheeting and/or sandbags, and by hay bales or other silt/filter fences as agreed with the Employers Representative.

- Surface water shall not be discharged directly into any river, stream or any other waterbody.
- Only existing crossing points on rivers and watercourses may be used.
- Clearance of vegetation within 5m of any watercourses will be undertaken by hand only.
- In wet or soft ground appropriate matting will be required for access by vehicles and mechanical excavators. (Matting may be rotated to reduce the total amount required.)
- Vehicles and plant shall be properly maintained. Any fuel or oil drips will be monitored on an ongoing basis and addressed immediately.
- Oil/fuel soak up granules will be present on site to deal with any incidents, and all vehicles should carry spill kits with the operators trained in their use.

For further information, the Contractor should refer to the *Environmental Assessment and Construction Guidelines* and the *Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan* which are available from www.tii.ie

27. Landowners and Water Wells

The contractor shall make enquiries of the landowner / occupier to identify the location of any land drains, wells or other domestic utility in proximity to the exploratory hole. Details of such enquires shall be recorded and the information provided to the Investigation Supervisor in an agreed format.

28. Land Geophysical Survey

Conduct and Process Ground Penetrating Radar (GPR) Utility Surveys in accordance with PAS 128.

1. Ground Penetrating Radar/EML Utility Survey

1.1. General

All surface and sub-surface utility services, apparatus and feature within the designated site should be accurately located and identified in accordance with PAS 128: 2022 Type B.

1.2. Survey Requirements

The Utility Survey is to be carried out in accordance with the requirements of a Type B: Detection Survey as per PAS128:2022 (BSI Publication).

The detection method is to be minimum of M4P (as per Table 2 of PAS128:2022) using a high-density array GPR and the Survey Output Quality Level is to be QL-B1P as per Table 1 of PAS128:2022. Other detection methods, as outlined in Table 3 of PAS 128, shall be used to achieve a high level of detection.

In the event that requirements contained in this Specification are contradictory with the above requirement. PAS128:2022 shall take precedent.

The service provider shall provide manhole data sheets for each chamber within the survey areas. The data sheet shall have a minimum of:

- 2 number photographs that clearly show the cabling within the manhole or chamber;
- Internal dimensions of the chamber;
- Depth of the chamber;
- No. of ducts and/or pipes;

Type of Cabling within the chamber as identified by the utility chamber owner during site visits required under section 3.6 of this Specification.

A sketch showing the location of the incoming and outgoing ducts and/or pipes in the chamber.

1.3. Features to be Surveyed

The following is a non-exhaustive list of items which will be surveyed;

1.3.1. Surface Water Drainage

- All drains and drain connections with invert levels;
- All manholes which are within the survey area;
- Upstream and downstream manholes outside the survey area;
- Material and diameter of pipe work;
- Connections to storm/foul and combined water sewers.
- Depth below ground shall be annotated at each surface feature and at significant changes of depth.
- Internal dimensions of manholes and invert levels of manholes and their connection pipes.
- Culverts, manholes, access pits, headwalls and inspection chambers.
- Connection to buildings.
- Downpipes,

1.3.2. Foul Sewerage

- All sewers and sewer connections with invert levels,
- All manholes within the survey area and also immediate upstream or downstream manholes outside the survey area,
- Type and diameter of pipe work,
- Connections to foul/storm and combined water sewers,
- Depth below ground shall be annotated at each surface feature and at significant changes of depth,
- Internal dimensions of manholes and invert levels of manholes and their connection
- Pipes,
- Culverts, manholes, access pits, headwalls and inspection chambers,
- Connection to buildings.

1.3.3. Water Mains (including cooling water mains)

- Pipe routes including fire mains with levels.
- Valve and meter pits.
- Diameters and material specifications.
- Classification (i.e. salt water, fresh water, cooling water, etc)
- Owner/operator.
- Connections to building.

- Depth below ground shall be annotated at each surface feature and at significant changes of depth.
- Dimensions and levels of the thrust blocks & concrete surrounds (if available).
- Internal dimensions of valve and meter pits.

1.3.4. Telecommunications

- Cable routes with levels, numbers and sizes of ducts.
- Cable draw pits and manholes including data sheets.
- Owner/operator.
- Connections to buildings.
- Depth below ground shall be annotated at each surface feature and at significant changes of depth.
- Number and configuration of cables/ducts.
- Dimensions and levels of concrete surrounds (if available).
- Internal dimensions of cable draw pits and manholes.
- Fibre Optic routes and levels.

1.3.5. Ventilation Ducts

- Grilles and underground ventilation ducts including duct routes, levels and sizes,
- Depth below ground shall be annotated at each surface feature and at significant change of depth,
- Connection to buildings.

1.3.6. Heating Pipes

- Grilles and underground heating pipes including routes, levels and sizes,
- Depth below ground shall be annotated at each surface feature and at significant change of depth,
- Connection to buildings.

1.3.7. Electricity

- Cable routes and levels.
- Cable draw pits and manholes including those associated with traffic
- Control and street lighting.
- Voltages classified as: Low (0-11kv), High (over 11kv-66kv) and Transmission (66kv or over). If applicable.
- Connections to buildings.
- Depth below ground shall be annotated at each surface feature and at significant changes of depth.
- Dimensions and levels of concrete surrounds (if available).
- Internal dimensions of cable draw pits and manholes

1.3.8. Cable T.V.

- Cable routes with levels and junction boxes,
- Owner/operator,

- Connections to buildings,
- Depth below ground shall be annotated at each surface feature and at significant change of depth,
- Dimensions and levels of concrete surrounds (if available).

1.3.9. Combined Services Ducts

- Internal box dimensions of ducts and access points,
- All pipes and cables identified and surveyed as for individual services,
- Dimensions and levels of concrete surrounds (if available),
- Traffic monitoring and signalling, including cable routes for CCTV masts.

1.3.10. Gas (GNI or other including medical gases)

- Pipe routes with levels;
- Valve and meter pits;
- Diameters, material specifications and working pressures;
- Depth below ground shall be annotated at each surfaced feature and at significant changes of depth.
- Dimensions and levels of concrete surrounds (if available).
- Internal dimensions of valve and meter pits.

1.3.11. Other Services

- Other services including abandoned services which are located during the survey shall be recorded with any available information regarding the identity or type of materials or services.
- Depth below ground shall be annotated at each surfaced feature and at significant changes of depth.

1.3.12. Street Lighting

- Public lighting routes & associated chambers
- Depth below ground shall be annotated at each surfaced feature and at significant
- Changes of depth

1.3.13. Other Underground Buried Features

- Other underground features including cellars, foundations, tanks, conduits, abandoned services and services undetected using radio detection etc. shall be recorded using ground penetrating radar methods.

1.4. **Accuracies**

The service provider shall achieve a Quality Level of QL-B1P in accordance with Table 1 of PAS 128 for all utilities. Each utility identified shall clearly indicate the Quality Level of the survey outputs. The detection method used to undertake the survey shall be M4P high density array GPR in accordance with PAS 128. Other methods outlined in Table 3 of PAS 128 shall be used to ensure all utility are identified and located.

Underground services which can be located without excavation, such as cables and connected metal pipes which can be located by surface detection equipment, and

drains, manholes, chambers and drawpits shall be located and investigated to the accuracies given below.

Underground services shall be located continuously and recorded in three dimensions (if applicable) at intervals not exceeding 1 meter within the GPR survey area as identified on the Contract Drawings, and at each surface feature and change of direction.

The position and level of locatable services, at the recorded points and intervals defined above, shall be related to grid control points and bench marks to better than ± 100 mm root mean square error on the ground. 90% of a representative sample of points on locatable services shall be within ± 150 mm or $0.15d$ (depth) whichever is bigger.

Positions and levels shall be related to the centre of metallic pipes or cables, crown of ducts and inverts of sewers and drains.

Any known underground services or information which cannot be investigated to the accuracies stated above, other than by excavation, shall be entered in unique layers defined as "unreliable", as approved by the Employer. The Contractor shall itemise in drawings the types of services which have been classified as "unreliable" and other circumstances, such as local areas of interference, where the specified accuracies cannot be achieved. The Contractor shall make his best judgment to provide details of these "unreliable" services or information as requested by the Employer. The Contractor shall specify in their drawings the reasons of such services or information cannot be investigated. Wherever full details of underground services cannot be determined without excavation, these details shall be deduced from the utility undertakers' record drawings and entered into the drawing in a unique layer defined as 'records'. Wherever access is available from the surface, The Contractor shall check the depth to underground services.

Positions of exact measurements shall be noted in the Drawings.

1.5. Private and Publicly Owned Services or Supplies

The service provider shall conform to the requirements of private or public utility service companies or Statutory Authorities involved as far as access to their assets is concerned.

The service provider shall carry out a site walkover with a representative of each private and publicly owned service provider or supplier in order to identify the location and owner of chambers and services within the survey areas. The service provider shall provide a schedule of dates and times of meetings on site and contact details for the representative that attend the site.

Below is a non-exhaustive list of utility providers that shall be contacted:

Aurora;
BT;
COLT Telecoms;
Local Authority Drainage;
Local Authority Traffic Signals;
Local Authority Water Services;
EIR;
ESB LV;
ESB MV;
ESB HV;

Enet;
EU Networks;
GNI;
Irish Water;
Virgin;
Vodafone.

2. Deliverables

2.1.1. General

Drawings shall be submitted in digital format only with no paper copies necessary.
Drawing shall be supplied in AutoCAD DWG format (2013 version).
Drawings shall be provided in the Irish Transverse Mercator (ITM) coordinate system.
All manhole detail sheets shall be provided in Microsoft Excel format.

All photos shall be provided .jpg format or equivalent.

2.1.2. Drawings

The following Utility Survey drawings are required:

- One 2D file (ITM) with all features identified in the utilities survey plotted with polylines reflecting the survey x,y coordinates and annotated appropriately.
- One 3D file (ITM) with all features identified in the utility survey plotted with 3D polylines reflecting the survey x,y & z coordinates and annotated appropriately.

2.1.3. Reports

Control Verification Report

A control verification report shall be submitted to the Clients Representative in draft format in accordance with Clause 4 of this specification.

Utility Survey Report

The Utilities Survey Report shall be in accordance with PAS128: 2022 including manhole data sheets.

APPENDIX I – GROUNDWATER STANDPIPES AND PIEZOMETERS

As in Appendix I of “Specification and Related Documents for Ground Investigation in Ireland’,
Engineers Ireland, Second Edition October 2016”

APPENDIX II – GROUND GAS MONITORING STANDPIPE

Not Used.

BILL OF QUANTITIES FOR GROUND INVESTIGATION (ANNEX 1)

Preamble to Bill of Quantities

The Preamble for this Bill of Quantities is set out in the "Specification and Related Documents for Ground Investigations in Ireland 2nd Edition 2016 – Annex 1 Bill of Quantities for Ground Investigation"

Preamble amendments and additions

Clause (11) add:

'and taking measures to prevent damage in environmentally designated areas and other sensitive locations. In particular compliance with the requirements of Clause 26 of schedule 5'.

Clause (9) (f) replace:

"Volume calculated as measured length by measured depth by specified width for trial and observation trenches" with "Rates for depths to include for the excavation of the full volume of the trial hole or slit trench."

Clause (10) add:

"(f) Immediate permanent reinstatement of paved cores."

Section 1.10.14 add:

"The number of pavement cores undertaken shall be used as the unit of measurement in the Bill of Quantities. The pavement cores shall be a minimum of 100mm in diameter and 400mm in thickness."

Clause (12.8)/ Section 1.17.6 add:

Liaison with Donegal County Council and Landowners to compile water well register

Units	37	The units of measurement shall be: (i) Liaison with Donegal County Council and Landowners to compile water well register item	
Measurement	38	Liaison with Donegal County Council and Landowners to compile water well register shall each be measured once only.	
Itemisation	39	The item shall provide for Liaison and compiling register:	
		Group	Feature
		I	1 Liaison with Donegal County Council and Landowners to compile water well register
Liaison with Donegal County Council and Landowners to compile water well register Item Coverage	40	The item for Liaison with Donegal County Council and Landowners to compile water well register shall in accordance with the Preambles to the Bill of Quantities General Directions include for: Consultation and Liaison with Donegal County Council and Landowners to compile water well register and furnishing such details as the Investigation Supervisor may require; a) Compliance with all requirements of the landowners with respect to works involving or affecting their properties b) Compliance with the relevant Clauses of the Conditions of Contract c) Awaiting the Investigation Supervisor's consent to proposals	

		d) Keeping the Investigation Supervisor informed of any arrangements made with Donegal County Council and landowners.
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Road Opening Licence Application

Units	41	The units of measurement shall be: - i) Obtaining all necessary Road Opening LicencesNo.	
Itemisation	42	Separate items shall be provided for Obtaining all necessary Road Opening Licences in accordance with the Preamble to the Bill of Quantities and the following:	
		Group	Feature
		I	1 Obtaining all necessary Road Opening Licences
Obtaining all necessary Road Opening Licences Item Coverage	43	Items for Obtaining all necessary Road Opening Licences shall in accordance with the Preamble to the Bill of Quantities include for the following: i) Preparation of Licence Application. ii) Cost of Licence Application. iii) Submission of Licence Application to County Council Road Authority iv) Providing Investigation Supervisor with copies of Road Opening Licence. v) Attending meetings with County Council if necessary. vi) Revision of Licence Application if necessary. vii) Handling charges.	

Bill of Quantities

Annex 1 Bill of Quantities for Ground Investigation

Number	Item Description	Unit	Quantity	Rate	Amount €
A	General Items and Provisional Sum				
A1	Offices and stores for the Contractor	sum	1		
A2.2	Establish on site rotary drilling plant and equipment for a Green Category site	sum	1		
A2.4	Establish on site trial pitting and trenching plant and equipment for a Green Category site	sum	1		
A2.5	Establish on site in situ test and sampling equipment for a Green Category site	sum	1		
A2.7	Establish on site dynamic sampling and probing plant and equipment for a Green Category site	sum	1		
A2.8	Establish on site geophysical survey equipment for a Green Category site	sum	1		
A2.9	Establish instrumentation equipment on site as required for Green Category site	sum	1		
A6	Appropriate storage, transport and off-site disposal of excess contaminated arisings from borehole, trial pit or slit trench to EPA regulated landfill site (includes any PPE equipment but excludes laboratory testing on suspected contaminated materials). Note Item to be re-measured with delivery dockets and records maintained by the Contractor	provisional sum	1	750	
A6.1	Contractor's uplift on Item A6	% Uplift	%		
A7	Professional attendance to meet the contract requirements	sum	1		
A8	Set out the location at each exploratory hole or point	nr	146		
A8.1	Establish the location and elevation (X, Y, Z) of the ground at each 'as-built' exploratory hole or point	nr	146		
A9	Preparation of Health and Safety documentation and Safety Risk Assessment	sum	1		
A13	Deliver selected cores and samples to specified Client address	provisional sum	1	500	
A14	Special additional testing and sampling required by Investigation Supervisor	provisional sum	1	750	
A15	Traffic safety and management to include preparation of traffic management (TM) drawings for investigations on roads or pavement areas	sum	1		
A16	Provision of road opening licenses and road damages bond	sum	1		
A17	Contractors Uplift on items A15 and A16	% Uplift	%		
A19a	One Electronic copy of Interim Ground Investigation Report (Factual)	sum	1		
A19	One master copy of Ground Investigation Report (Factual)	sum	1		
A19.1	Additional copy of Ground Investigation Report (Factual)	nr	1		
A19.2	Electronic Copy of Ground Investigation Report (Factual)	sum	1		
A20	One master copy of Geophysical Survey Report (Factual)	sum	1		
A20.2	Electronic Copy of Geophysical Survey Report (Factual)	sum	1		
A22	Digital field/engineering logs in AGS transfer format	sum	1		
A23	Digital laboratory test data in AGS transfer files	sum	1		
A24	Digital copy of trial pit, slit trench or core photographs	nr	283		

Number	Item Description	Unit	Quantity	Rate	Amount €
A25	Storage of samples (geotechnical or environmental) following completion of fieldworks	wk	52		
A26	Storage of core boxes following completion of fieldworks	wk	52		
A27	Provision of water supply for the fieldworks	sum	1		
A28	Provision of Insurances (including Meath County Council as named insured)	sum	1		
A30	Perform the role of PSCS	sum	1		
A31	Contractor liaison with external bodies and landowners	sum	1		
A32	Liaison with Donegal County Council and Landowners to compile water well register	sum	1		
	Section A Total taken to General Summary				

Number	Item Description	Unit	Quantity	Rate	Amount €
C	Rotary Drilling				
	Rotary drilling with and without core recovery				
C15	Move rotary drilling plant and equipment to the site of each exploratory drillhole and set up on gradient less than 20%	nr	6		
C16	Extra over Item C15 for setting up drilling plant on gradient greater than 20%	nr	2		
C18	Break out surface obstructions where present at exploratory drillhole	h	6		
C19	Standing time for rotary drilling plant, equipment and crew	h	6		
C20	Provide aquifer protection measures at a single aquiclude/aquifer boundary in a drillhole	nr	6		
	Drilling without cores				
C21	Rotary drill in materials other than hard strata at the minimum 76 mm diameter, from which cores are not required, between 0 and 10 m depth openhole drilling)	m	12		
C22	As Item C21 but between 10 and 20m depth	m	Rate only		
C33	Backfill rotary drillhole with cement/bentonite grout or bentonite pellets (where standpipe or piezometer is not installed)	m ³	1		
	Drilling to obtain cores				
C41	Rotary drill in hard strata to obtain cores of minimum 76mm diameter between existing ground level and 10m depth	m	48		
C42	As Item C41 but between 10 and 20m depth	m	29		
C43	As Item C41 but between 20 and 30m depth	m	Rate only		
C48	Backfill rotary drillhole with cement/bentonite grout or bentonite pellets (where standpipe or piezometer is not required)	m ³	3		
C49	Core box to be retained by client	nr	26		
	Reinstatement of Rotary Drillholes				
C85	Disposal of excess or surplus inert arisings from rotary drilling operations (where standpipe or piezometer is not installed)	m ³	3		
	Pavement Cores				
C86	Moving of equipment to the site of each exploratory hole for coring	nr	6		
C87	100mm dia. Coring through road pavement (bitumen) up to 400mm depth	nr	6		
C88	Reinstatement of existing pavement following completion of pavement cores	nr	6		
	Section C Total taken to General Summary				

Number	Item Description	Unit	Quantity	Rate	Amount €
D	Pitting and Trenching				
	Trial pits and trenches (non paved areas)				
D3	Move equipment to the site of each trial pit or trench of not greater than 4.5m depth	nr	45		
D4	Extra over Item D3 for setting up on a slope of gradient greater than 20%	nr	4		
D6	Excavate trial pit between existing ground level and 3.0m depth	m	135		
D7	As Item D6 but between 3.0 and 4.5m depth	m	5		
	Trial pits and trenches (paved areas)				
D13	Set up slit trench in road area to include erection of traffic management systems (works supervised by Engineer/Geologist with valid CSCS Card for Signing, Lighting and Guarding at Roadworks)	nr	36		
D14	Saw cut paved areas in advance of works	lin m	1066		
D15	Breaking out hard material or surface obstructions	h	72		
D18	Excavate slit trench in paved areas between ground level and 1.2m depth (works by either hand excavation or hand assisted machine excavation)	m ³	309		
D20	Standing time for excavation plant, equipment and crew for machine dug trial pit or trench	h	5		
	General				
D44	Bring pump to the position of each exploratory pit or trench	nr	81		
D45	Pump water from pit or trench	h	10		
D46	Extra over Item D45 for temporary storage and disposal of contaminated groundwater from trial pit or trench	sum	1		
D47	Leave open slit trench as instructed by Investigation Supervisor	day	1		
D48	Leave open trial pit as instructed by Investigation Supervisor	day	1		
	Trial pit / slit trench backfill & reinstatement works				
D49	Backfill trial pit or trench excavation with arisings/ excavated materials	nr	81		
D50	Reinstate grassed surface to include replacing of sod and reseeded	nr	45		
D51	Backfill trenches and trial pits in paved areas with imported granular fill (CL 804 sub-base)	m ³	294		
D53	Reinstatement of asphalt/bituminous pavement	m ²	258		
D54	Repair of road markings	lin m	50		
D55	Disposal of excess or surplus inert arisings from trial pits or trenches (where imported granular fill or lean mix concrete is used as backfill)	m ³	309		
	Section D Total taken to General Summary				

Number	Item Description	Unit	Quantity	Rate	Amount €
E	Sampling and monitoring during intrusive investigation				
	Samples for geotechnical analysis				
E1	Jar sample	nr	150		
E2	Tub sample	nr	150		
E3	Bulk sample	nr	120		
E4	Large bulk sample	nr	10		
E9	Groundwater sample	nr	12		
	Samples for environmental / contamination analysis				
E12	Environmental / contamination sample for Suite E	nr	6		
E13	Environmental / contamination sample for Suite F	nr	6		
E15	Environmental / contamination sample for Suite H	nr	6		
E16	Environmental / contamination sample for Suite I	nr	6		
	(Note sample rate includes provision of specialist containers)				
	Other				
E17	Cut block sample from trial pit	nr	4		
	Section E Total taken to General Summary				

Number	Item Description	Unit	Quantity	Rate	Amount €
G	Geophysical Surveying				
G10	Geophysical utility survey to PAS128 by ground penetrating radar (GPR) and other methods in accordance with the specification	m2	26182		
	Section G Total taken to General Summary				

Number	Item Description	Unit	Quantity	Rate	Amount €
H	In situ testing				
H2.1	Standard penetration test in rotary drillhole, depth range 0 to 10m	nr	10		
H4	California Bearing Ratio by plate bearing test by plunger method	nr	9		
H4.1	California Bearing Ratio by TRL DCP Method	nr	18		
H8	Hand vane test (set of 3 readings)	nr	45		
	Permeability testing				
H12	Set up, execute and dismantle variable head permeability test in rotary drillhole	hr	8		
	Soil infiltration test (BRE Digest 365)				
H18	Set up at each test location, excavate trial hole and prepare test area	nr	5		
H19	Backfill test hole with clean imported gravel where excavation sidewalls unstable	m ³	5		
H20	Install 50mm standpipe in H18 to allow for monitoring of water levels	nr	5		
H21	Carry out pre-soaking of test areas	nr	5		
H22	Carry out soakaway tests in accordance with BRE Digest 365 (3 Cycles)	nr	5		
H23	Provision of water supply for infiltration testing	sum	1		
H24	Protection and temporary fencing of works area as instructed by Investigation Supervisor	nr	5		
H25	Calculation of infiltration rate for each test location	nr	5		
	Section H Total taken to General Summary				

Number	Item Description	Unit	Quantity	Rate	Amount €
I	Instrumentation				
	Standpipes and piezometers				
I1	Backfill exploratory hole with cement / bentonite grout or bentonite pellets	m	23		
I6	Provide and install proprietary slotted standpipe (50mm internal diameter)	m	42		
I7	Provide and install gravel pack to I6	m	42		
I8	Provide and install proprietary casing/plain standpipe (50mm internal diameter)	m	23		
I9	Provide and install bentonite seals to I8	m	23		
I16	Provide and install protective cover (flush)	nr	1		
I17	Provide and install protective cover (raised)	nr	5		
I19	Supply and erect protective stock proof fencing around standpipe or piezometer installation	nr	5		
I20	Supply and erect 1.5 m high marker posts (3 x 1.5m)	nr	5		
	Standpipe and piezometer development / purging				
I21	Supply equipment and personnel to carry out purging	sum	1		
I22	Develop standpipe or piezometer by purging (3 well volumes)	h	8		
I26	Disposal of purged water	litre	100		
	Section I Total taken to General Summary				

Number	Item Description	Unit	Quantity	Rate	Amount €
J	Installation monitoring and sampling (during fieldwork period)				
J1	Reading of water level in standpipe or standpipe piezometer (installations to be read weekly during fieldworks)	nr	20		
J5	Provide Engineer/Geologist to take water sample from standpipe or standpipe piezometer (rate not including purging or micro-purging)	nr	10		
J6	Extra over Item J5 for purging or micro-purging in excess of 3 well volumes	h	8		
	Installation monitoring and sampling (post fieldwork period)				
J9	Return visit to site following completion of fieldwork for field instrumentation	nr	5		
J10	Extra over Item J9 for groundwater measurements in standpipe or standpipe piezometer during return visit	nr	25		
J14	Extra over Item J9 for water sample from standpipe or standpipe piezometer during return visit to site, including purging 3 volumes or micro-purging up to 3.0 hours	nr	15		
J26	Reading of water level in Ground Water Wells	nr	16		
	Section J Total taken to General Summary				

Number	Item Description	Unit	Quantity	Rate	Amount €
K	Geotechnical laboratory testing				
K1	Classification				
K1.1	Moisture content	nr	60		
K1.2	Liquid and plastic limit	nr	40		
K1.9	Particle size distribution by wet sieving	nr	40		
K1.10	Particle size distribution by dry sieving	nr	20		
K1.12	Sedimentation by hydrometer	nr	10		
K2	Chemical and electrochemical				
K2.1	Organic matter content	nr	15		
K2.2	Mass loss on ignition	nr	8		
K2.3	Acid soluble sulphate content of soil sample	nr	20		
K2.4	Water soluble sulphate content of soil sample (2;1 water / soil extract)	nr	20		
K2.5	Total sulphur content of soil sample	nr	20		
K2.6	Sulphate content of groundwater sample	nr	5		
K2.7	Carbonate content of groundwater sample	nr	5		
K2.8	Chloride content of groundwater sample	nr	5		
K2.12	pH value	nr	30		
K3	Compaction related				
K3.1	Dry density/moisture content relationship using 2.5 kg rammer (5 pt)	nr	15		
K3.2	Dry density/moisture content relationship using 4.5 kg rammer (5 pt)	nr	5		
K3.4	Extra over Items K3.1, K3.2 and K3.3 for use of CBR mould	nr	20		
K3.5	Moisture Condition Value at natural moisture content	nr	20		
K3.6	Moisture Condition Value/moisture content relationship (5 pt)	nr	8		
K3.8	California Bearing Ratio on re-compacted disturbed sample	nr	30		
K3.9	Extra over Item K3.8 for soaking	day	1		
K4	Compressibility, permeability and durability				
K4.1	One-dimensional consolidation properties, test period 5 days	nr	2		
K4.2	Extra over Item K4.1 for test period in excess of 5 days	day	2		
K4.7	Permeability by constant head method	nr	2		
K5	Consolidation and permeability in hydraulic cells				
K6	Shear strength (total stress)				
K6.1	Shear strength by laboratory vane method (set of 3)	nr	12		
K6.2	Shear strength by hand vane (set of 3)	nr	16		

Number	Item Description	Unit	Quantity	Rate	Amount €
K6.4	Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	nr	6		
K6.6	Shear strength of a single 300mm x 300mm square specimen by direct shear, test duration not exceeding 1 day	nr	4		
K6.8	Residual shear strength of a set of three 60 mm square specimens by direct shear, test duration not exceeding 4 days per specimen	nr	6		
K6.15	Undrained shear strength of a set of three 38 mm diameter specimens in triaxial compression without the measurement of pore pressure	nr	2		
K6.16	Undrained strength of a single 100 mm diameter specimen in triaxial compression without the measurement of pore pressure	nr	2		
K7	Shear strength (effective stress)				
K7.1	Consolidated undrained triaxial compression test with measurement of pore pressure (set of three 38mm specimens), test duration not exceeding 4 days per specimen	nr	2		
K7.2	As K7.1 but single-stage or multi-stage test using 100mm diameter specimen	nr	4		
K7.3	Consolidated drained triaxial compression test with measurement of volume change (set of three 38mm specimens), test duration not exceeding 4 days per specimen	nr	1		
K7.4	As Item K7.3 but single-stage or multi-stage test using 100mm diameter specimen, test duration not exceeding 4 days	nr	4		
K7.5	Extra over Items K7.1 and K7.3 for test duration in excess of 4 days per specimen	sp.day	6		
K8	Rock and aggregate testing				
K8.14	Uniaxial compressive strength	nr	15		
K8.18	Point Load Strength Index on rock core (axial or diametral)	nr	30		
K8.19	Point load strength index on irregular lump sample (set of ten individual determinations)	nr	50		
	Special tests on rock core or trial pit samples to assess potential for pyrite induced expansion or swelling				
K9.2	Chemical analysis on rock core or bulk sample (test methods to TRL 447 and test suite to include Total Sulphur, Acid Soluble Sulphate & Water Soluble Sulphate and derivation of Oxidisable Sulphide & Equivalent Pyrite content)	nr	6		
	Section K Total taken to General Summary				

Number	Item Description	Unit	Quantity	Rate	Amount €
L	Geoenvironmental laboratory testing				
	(Contamination testing of soil, groundwater, gas and fill material)				
L1	Test Suite E	nr	6		
L2	Test Suite F	nr	6		
L4	Test Suite H	nr	6		
L5	Test Suite I	nr	6		
	Section L Total taken to General Summary				

Summary of Quantities

Number	Item Description	Unit	Quantity	Rate	Amount €
Summary of Bill of Quantities					
Section					
A.	General Items and Provisional Sum				€ -
B.	Cable Percussion Boring				not used
C.	Rotary Drilling				€ -
D.	Pits and Trenches				€ -
E.	Sampling and monitoring during intrusive investigation				€ -
G.	Geophysical Surveying				€ -
H.	In situ testing				€ -
I.	Instrumentation				€ -
J.	Installation Monitoring and Sampling (during fieldwork period)				€ -
K.	Geotechnical Laboratory Testing				€ -
L.	Geoenvironmental Laboratory Testing				€ -
			Total tender		

Bill of Quantities - Appendix A to Bill of Quantities

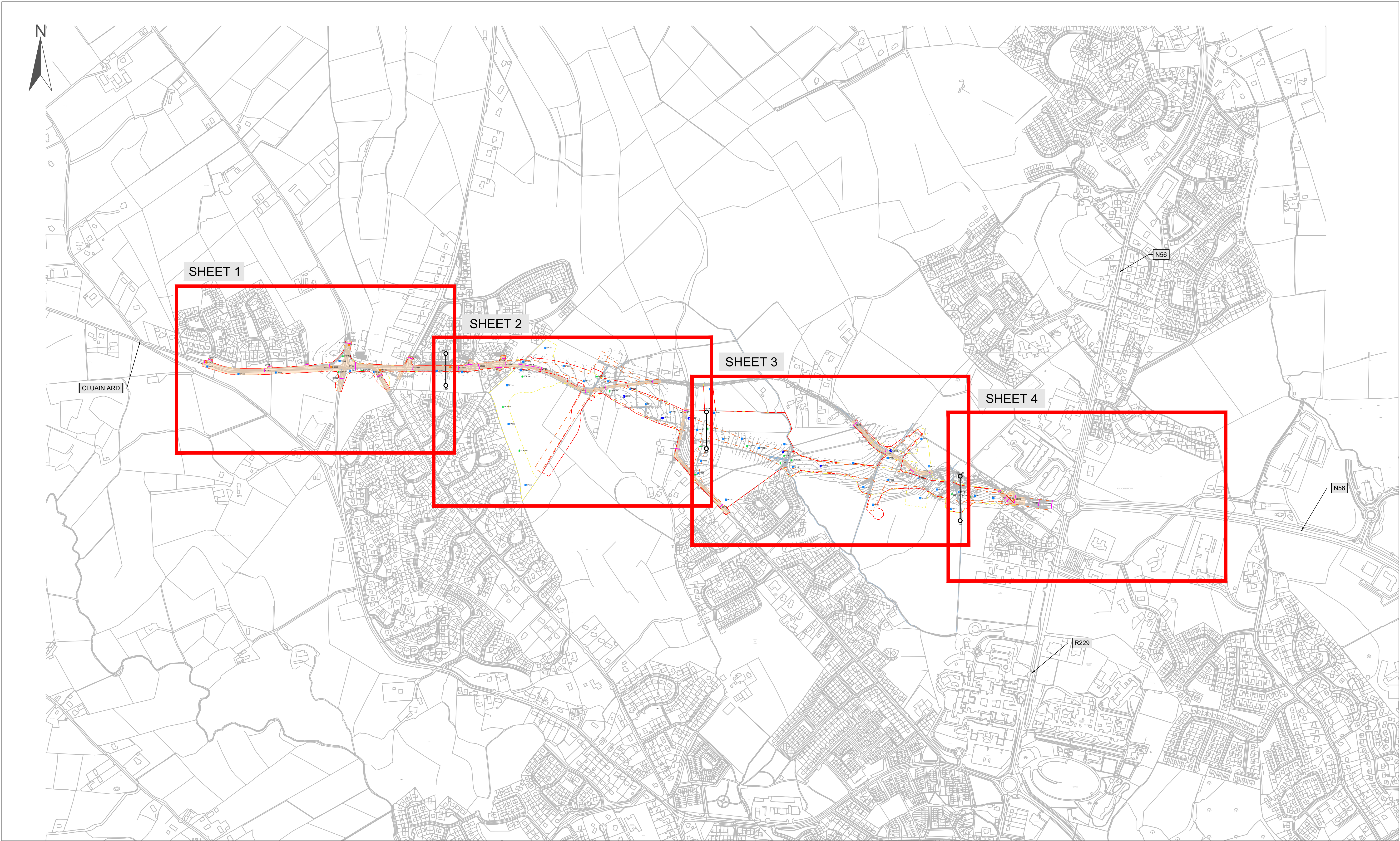
Appendix A - Rates for Geotechnical and Other Personnel

Rates shall be entered for the various grades of staff listed, who will be employed by agreement with the Investigation Supervisor to provide advice or assistance during the course of the investigation and/or the Geotechnical Interpretative or Design Report all in accordance with Specification Clauses 3.6.1 and 3.6.2 and Schedule S1.8.3.

These services exclude the contract management superintendence and technical direction required under the Conditions of Contract and the requirements of Specification Clause 3.5.1, which has been included in the general rates and prices of the main Bill of Quantities (see Clause 1 of the Preamble to the Bill of Quantities).

Item	Item Description	Unit	Rate
			€ (Euro)
1	Technician	h	
2	Engineer / Geologist	h	
3	Chartered Engineer / Professional Geologist	h	
4.1	Senior Chartered Engineer / Professional Geologist (5 years' experience post charter)	h	
4.2	Ecologist / Environmental Scientist (8 years' experience)	h	
4.3	Geophysicist (10 years' experience)	h	
5	Expenses incurred by staff on site visits or who are resident by agreement with the Investigation Supervisor	day	
6	Rate per kilometre from Contractor's premises and return for Items 1 and 2	km	
7	As above but for Items 3 and 4	km	
8	All other expenses incurred in conjunction with a site visit where a return journey is made on the same day for Items 1 and 2	visit	
9	As above but for Items 3 and 4	visit	
10	All other expenses incurred in connection with visit where an overnight stay is necessary for Items 1 and 2	overnight	
11	As above but for Items 3 and 4.	overnight	

CONTRACT DRAWINGS



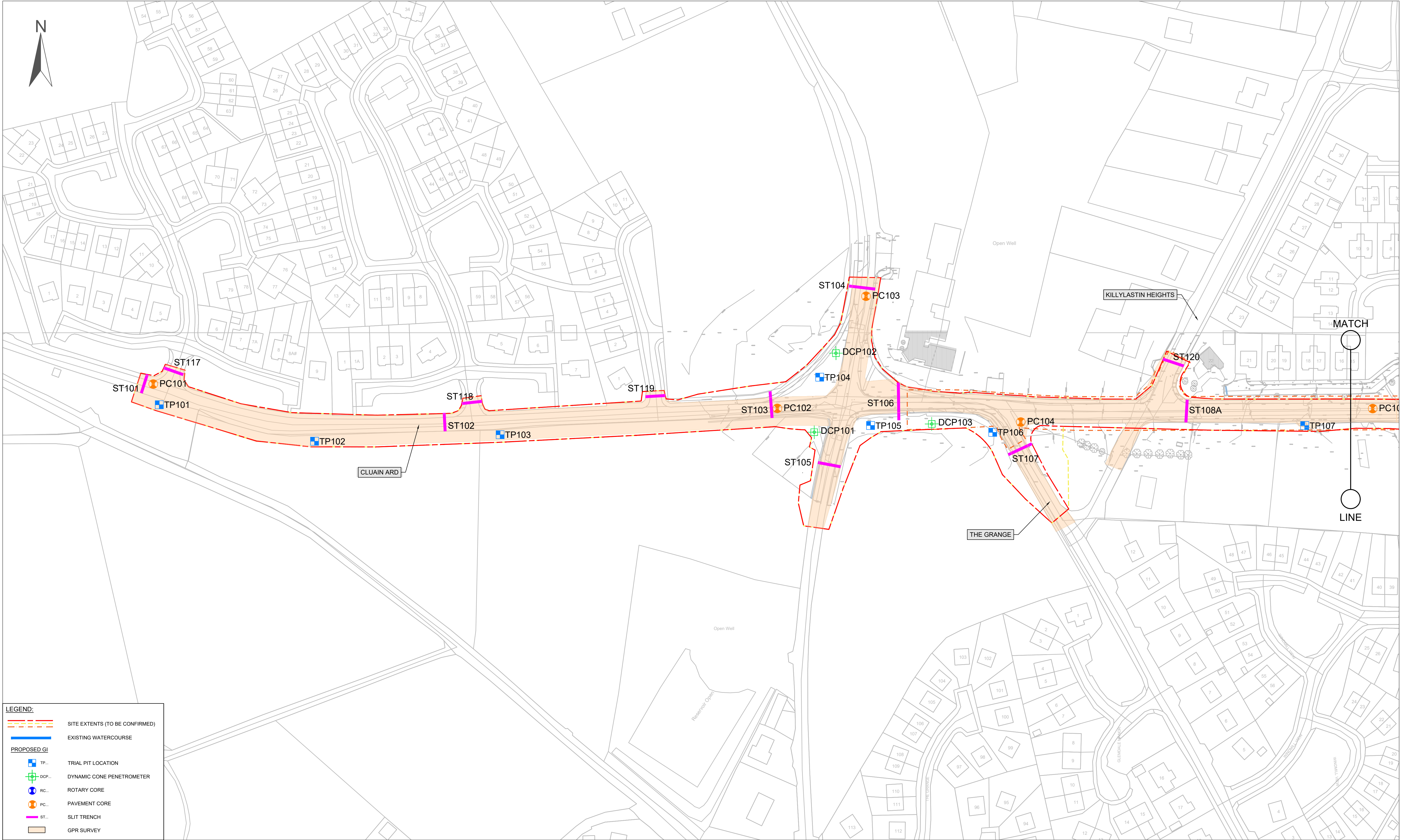
No.	Revision	Date	By	Chk'd	App'd
P02	MINOR AMENDMENTS	30/07/2026	PK	MB	RMJ



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UK - t +44 (0) 113 360 1720

Drawn	Designed	Checked	Approved	Suitability Code - Description
PC	PK	MB	RMJ	S3 - Review & Comment

Project Stage	DETAILED DESIGN				
Project Title	LETTERKENNY NORTHERN NETWORK PROJECT				
Drawing Title	GROUND INVESTIGATION CONTRACT SHEET LAYOUT				
Drawing Number	Project	Originator	Volume	Location	Type Role Number
LNNP	ROD	VG	SW	AE	DR - GI - 500600
Scale (A1)	1:5000	Date:	July 2026	Job No:	26,142 Rev: P02



LEGEND:

- SITE EXTENTS (TO BE CONFIRMED)
- EXISTING WATERCOURSE
- PROPOSED GI**
- TP... TRIAL PIT LOCATION
- DCP... DYNAMIC CONE PENETROMETER
- RC... ROTARY CORE
- PC... PAVEMENT CORE
- ST... SLIT TRENCH
- GPR SURVEY



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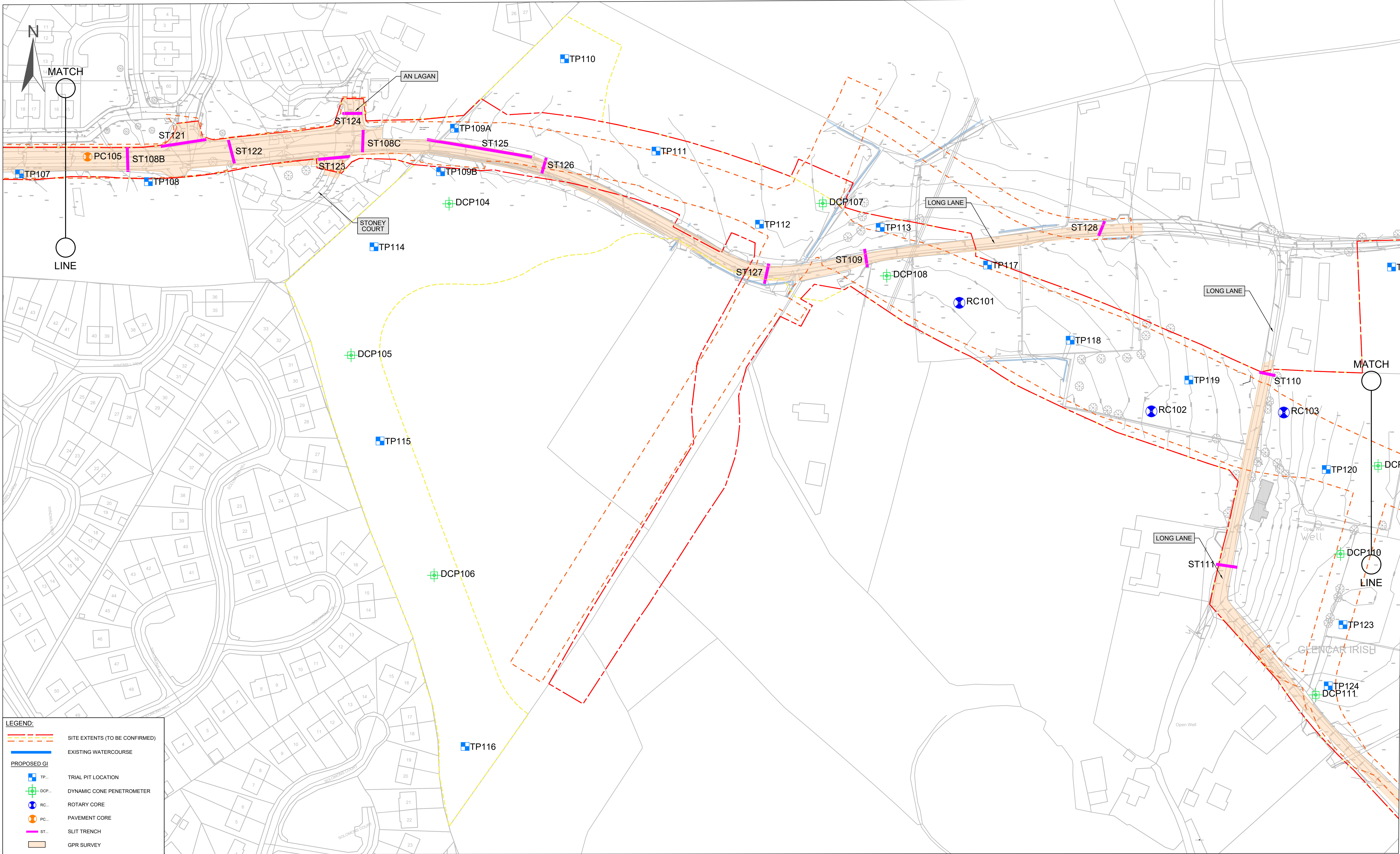


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Drawn	Designed	Checked	Approved	Suitability Code - Description
PC	PK	MB	RMJ	S3 - Review & Comment

Project Stage	DETAILED DESIGN
Project Title	LETTERKENNY NORTHERN NETWORK PROJECT
Drawing Title	GROUND INVESTIGATION CONTRACT SHEET 01
Drawing Number	Project Originator Volume Location Type Role Number LNNP - ROD - VGT - SW_AE - DR - GI - 500601
Scale (A1)	1:1000
Date	July 2026
Job No.	26.142
Rev.	P02



LEGEND:

--- SITE EXTENTS (TO BE CONFIRMED)

--- EXISTING WATERCOURSE

PROPOSED GI

- TP... TRIAL PIT LOCATION
- DCP... DYNAMIC CONE PENETROMETER
- RC... ROTARY CORE
- PC... PAVEMENT CORE
- ST... SLIT TRENCH
- GPR SURVEY



No.	Revision	Date	By	Chk'd	App'd
P02	MINOR AMENDMENTS	30/07/2026	PK	MB	RMJ

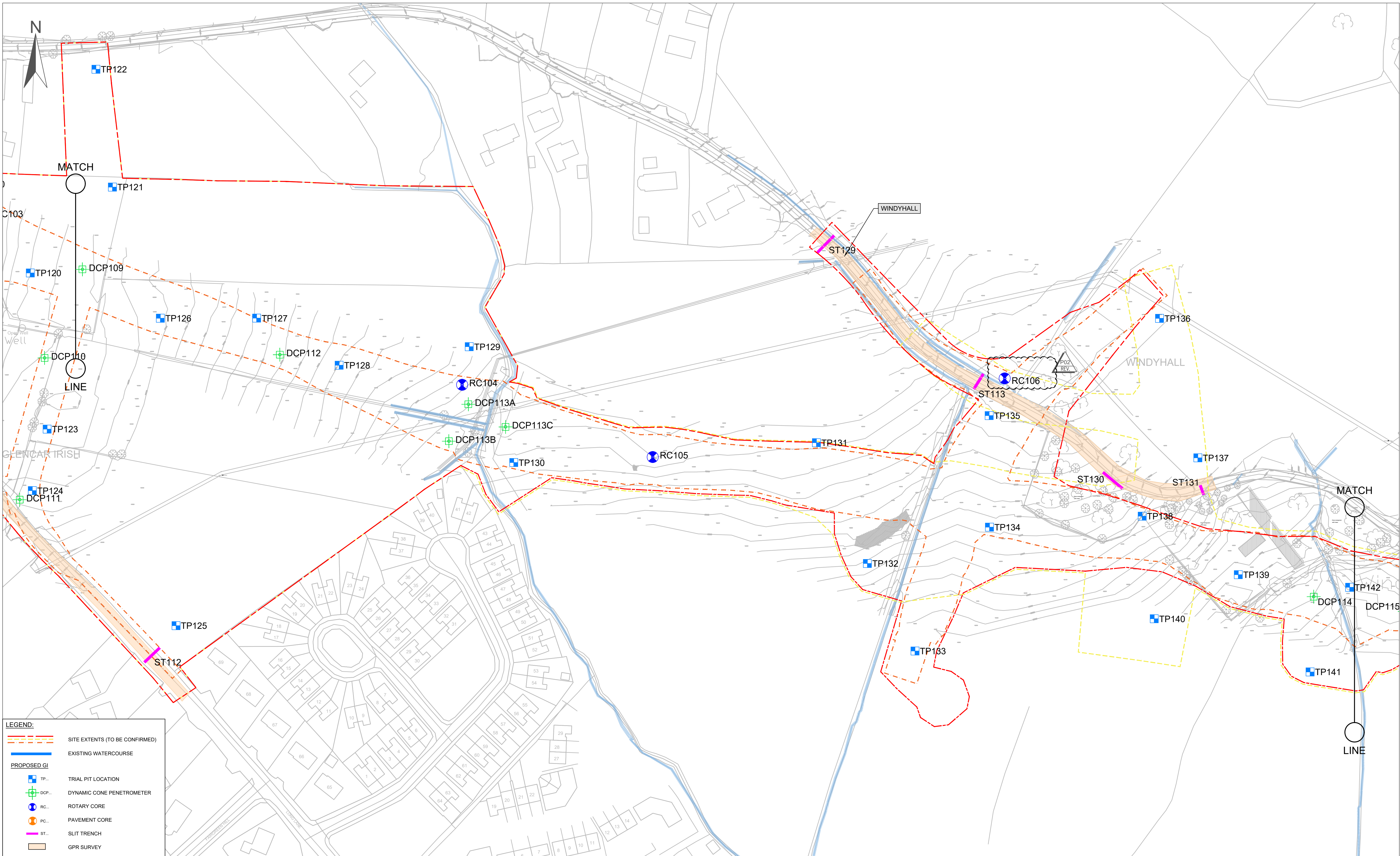


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Drawn	Designed	Checked	Approved	Suitability Code - Description
PC	PK	MB	RMJ	S3 - Review & Comment

Project Stage	DETAILED DESIGN
Project Title	LETTERKENNY NORTHERN NETWORK PROJECT
Drawing Title	GROUND INVESTIGATION CONTRACT SHEET 02
Drawing Number	Project Originator Volume Location Type Role Number LNNP - ROD - VGT - SW_AE - DR - GI - 500602
Scale (A1)	1:1000
Date	July 2026
Job No.	26.142
Rev.	P02

DO NOT SCALE USE FIGURED DIMENSIONS ONLY



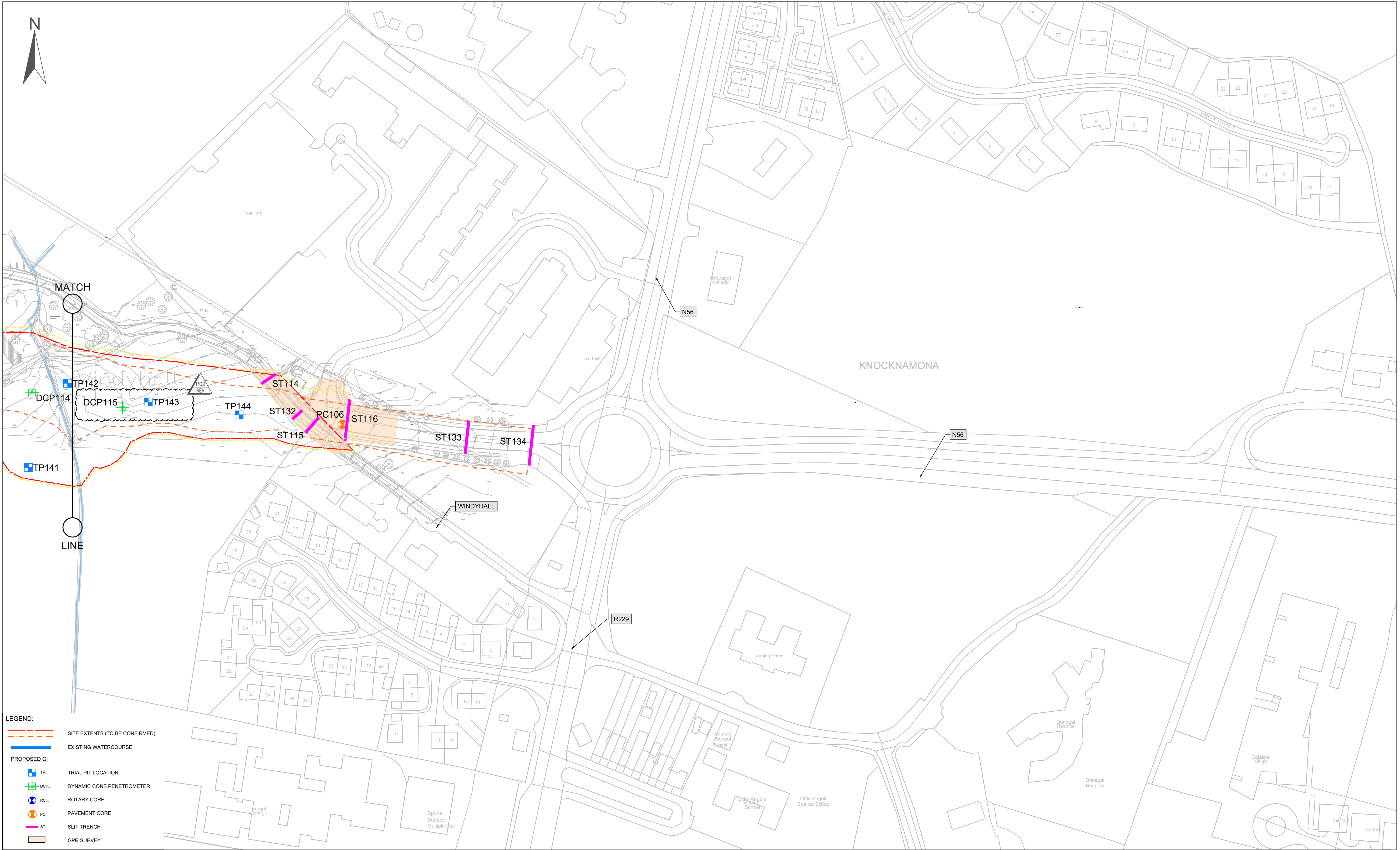
No.	Revision	Date	By	Chk'd	App'd
P02	MINOR AMENDMENTS	30/07/2026	PK	MB	RMJ



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Drawn	Designed	Checked	Approved	Suitability Code - Description
PC	PK	MB	RMJ	S3 - Review & Comment

Project Stage	DETAILED DESIGN
Project Title	LETTERKENNY NORTHERN NETWORK PROJECT
Drawing Title	GROUND INVESTIGATION CONTRACT SHEET 03
Drawing Number	Project Originator Volume Location Type Role Number LNNP - ROD - VGT - SW_AE - DR - GI - 500603
Scale (A1)	1:1000
Date	July 2026
Job No.	26.142
Rev.	P02



LEGEND:

--- SITE EXTENTS (TO BE CONFIRMED)

--- EXISTING WATERCOURSE

PROPOSED GI

- TP... TRIAL PIT LOCATION
- DCP... DYNAMIC CONE PENETROMETER
- RC... ROTARY CORE
- PC... PAVEMENT CORE
- ST... SLIT TRENCH
- GPR SURVEY



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No.	Revision	Date	By	Chk'd	App'd
P02	MINOR AMENDMENTS	30/07/2026	PK	MB	RMJ



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Drawn	Designed	Checked	Approved	Suitability Code - Description
PC	PK	MB	RMJ	S3 - Review & Comment

Project Stage						
DETAILED DESIGN						
Project Title						
LETTERKENNY NORTHERN NETWORK PROJECT						
Drawing Title						
GROUND INVESTIGATION CONTRACT SHEET 04						
Drawing Number	Project	Originator	Volume	Location	Type	Role
LNNP	-	ROD	-	VGT	-	SW_AE
Number						
Scale (A1)	1:1000	Date:	July 2026	Job No:	26.142	Rev: P02