

Project Title:	N4 Active Travel – Collooney to Castlebaldwin Project_Site Investigation		
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1. Specification and Schedules

Specification

The specification is in accordance with the Specification and Related Documents for Ground Investigation in Ireland (2nd Edition) published by Engineers Ireland, with information, amendments and additions as described in the schedules.

Schedule 1: Information and site-specific requirements

Schedule 2: Exploratory holes

Schedule 3: Investigation Supervisor's facilities (Not used)

Schedule 4: Specification amendments (Not used)

Schedule 5: Specification additions (Not used)

1.1. Schedule 1: Information

S1.1, Name of Contract:

N4 Active Travel – Collooney to Castlebaldwin Project_Site Investigation

S1.2, Investigation Supervisor:

The Employer for the site investigation works is Sligo County Council (SCC). The Employer's Representative shall be DBFL Consulting Engineers, Ormond House, Upper Ormond Quay, Dublin 7.

A suitable Investigation supervisor is to be appointed by the nominated contractor. The nominated candidate must have suitable competency and experience as outlined in Section 2.2 of the Specification.

A recent CV shall be submitted as part of the Tender. Notwithstanding Section 2.2 of the Specification, the nominated candidate shall as a minimum be a Geotechnical Engineer with a minimum of 3 years relevant experience.

S1.3, Description of Site:

The N4 Active Travel Scheme, Collooney to Castlebaldwin, is envisaged to eventually link to the proposed Sligo Greenway network. The Site Investigation works are located along the N4 corridor, extending from Doorly to Castlebaldwin in the south.

The proposed works comprise approximately 5.1km of new active travel route and approximately 4.7km of upgrades to existing road surfaces, together with associated crossings, drainage, attenuation, utilities and ancillary infrastructure.

The investigation area includes greenfield lands, existing service access roads, overpasses and watercourse crossings along the Doorly to Castlebaldwin section of the corridor. The general topography is relatively flat, with locally steep areas associated with the constructed embankments of the adjacent N4 and natural undulations.

Access shall be coordinated with affected landowners. Sligo County Council and DBFL will assist the Contractor in arranging access where possible.

S1.4, Main works proposed and purpose of contract:

The purpose of the Site Investigation Contract is to provide extensive site investigation works to inform the proposed detailed design activities for the N4 Active travel Scheme – Collooney to Castlebaldwin.

The proposed infrastructure consists of an active travel route along the N4 to connect with an existing active travel route in Doorly to the north and Castlebaldwin in the south.

The N4 active travel route will generally be comprised of the following infrastructure:

- Approx. 5.1km of New Active travel surface, with:
 - Pedestrian Crossings
 - Traffic Signals
 - Miscellaneous ancillary works
- Drainage infrastructure
- Surface water attenuation
- Utility infrastructure
- Approx. 4.7km of upgrades to existing road surfaces
- 2 No. new active travel bridge crossings
- Several short span ditch crossings
- 6 no. new priority-controlled junctions

The works outlined in SI.5 are the main geotechnical and geoenvironmental investigations for the proposed development.

S 1.5 Scope of Investigation

Site investigation locations are indicated on the following drawings:

- 230122-X-01-Z00-DTM-DR-DBFL-CE-1101 Site Investigation Layout Sheet 1; and
- 230122-X-01-Z00-DTM-DR-DBFL-CE-1121 Site Investigation_Aerial imagery Sheet 1

Continuing sequentially through to:

- 230122-X-01-Z00-DTM-DR-DBFL-CE-1117 Site Investigation - Sheet 17
- 230122-X-01-Z00-DTM-DR-DBFL-CE-1137 Site Investigation_Aerial imagery - Sheet 17

The associated site investigation schedules, including the coordinates of each investigation location, are provided on:

- 230122-X-01-Z00-DTM-DR-DBFL-CE-1118 Site Investigation Schedules

Indicated locations of exploratory holes are approximate and intended to allow only for the removal of scrub and avoid any destruction/removal of hedgerows. If any hedgerows are found in the indicated position of required investigative works, the exploratory hole may be repositioned as per Schedule Specification S1.8, subject to the approval of DBFL/Employers Representative.

Any clearance of scrub and hedges required to undertake site investigations must be pre-approved by SCC.

Ground Investigations include:

Trial Pits – 19 No.

Trial pits shall be taken to a depth of 3.0m or to refusal. Indicated locations and required depths are as stated in Schedule 2. A minimum 13 tonne hydraulic excavator with a toothed bucket shall be used for excavations. The pits shall record ground conditions and other obstructions with associated photographs. The pits shall be logged in accordance with the specification to identify the local geology and ground make up.

Plate load tests and Geonor H-10 Field Vane Shear test to be undertaken as described in schedule S1.15.1. For sampling requirements refer to schedule S1.12.3.

Percussion Boreholes and follow-on Rotary Cores - 10 No.

Cable percussion boreholes with follow-on rotary cores shall be taken at locations and required depths as stated in Schedule 2.

The boreholes should record ground conditions and other obstructions with associated photographs. The boreholes will be logged in accordance with the specification to identify the local geology and ground make up. Boreholes to be commenced as cable percussive boreholes.

Should refusal of cable percussive boreholes be encountered before the specified depth, the borehole is to be completed to the scheduled depth using rotary coring.

Rock is expected at shallow depths generally ranging from 3m – 8m below ground. Refer to existing Site Investigation Report undertaken in 2021. Rock cores shall be recovered at 1m increments.

The boreholes should record ground conditions and other obstructions with associated photographs. The boreholes will be logged in accordance with the specification to identify the local geology and ground make up. Cores are to be retrieved.

Sampling to be in accordance with schedule S1.12.3. SPT's shall be undertaken at 1m intervals as per schedule S1.15.1

Slit Trenches - 16 No.

The slit trenches are of varying lengths, ranging from approximately 4 m to 15 m, as detailed in Schedule 2.

Slit trenches shall be excavated at the locations indicated on the accompanying drawing set to identify and verify the position of existing services as well as logging the ground encountered.

All trenches shall be logged in accordance with this Specification to record ground conditions, local geology and ground composition. Services encountered shall be recorded on a properly scaled drawing and accompanied by photographs. For clarity, all identified services shall be highlighted using road marking paint prior to photography.

Upon completion of the works, **a 3D AutoCAD survey (ITM coordinates) of all identified services shall be provided to the Engineer and the Client, including start and end coordinates as well as level.**

For sampling requirements, refer to Schedule S1.12.3.

Individual Plate Load (CBR) Tests – 17 No.

In situ plate load tests shall be taken to investigate California Bearing Ratio (CBR) of underlying ground conditions indicative of available foundation or subgrade quality fill.

In situ tests are to be taken along the proposed road route at depths up to 0.5m below ground level or below the topsoil layer as indicated on drawings as per Schedule S1.15.1

Additional plate load tests shall take place in trial pits at depths and frequency as indicated in Schedule 2.

S1.6, Geology and ground conditions:

The site consists of existing roads and undeveloped lands (mainly greenfield with scrub, existing hardstanding areas and access roads.

The Geological Survey of Ireland describes the subsoil to consist of till derived from limestones as however large pockets of Peat are also expected. The bedrock is described as strong to very strong limestone based on a previous Ground investigation.

A previous ground investigation was undertaken in September 2021 for the construction of the N4 which has been included in the information pack.

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

- Topsoil
- Cohesive Deposits / Peat
- Bedrock

S1.7, Schedule of drawing(s) and documents:

- Specification
- Bill of Quantities
- Drawings 230122-X-01-Z00-DTM-DR-DBFL-CE-1101 – 1117 and 230122-X-01-Z00-DTM-DR-DBFL-CE-118
- Drawings 230122-X-01-Z00-DTM-DR-DBFL-CE-1101 – 230122-X-01-Z00-DTM-DR-DBFL-CE-1117
- Information Pack

S1.8, General Requirements:

The programme for delivery of the Site Investigation shall be as follows:

Commence on site:	14 Calander days from appointment
Duration of site works:	30 Calander days from commencement
Issue interim data:	50 Calander days from commencement
Issue of final reports:	60 Calander days from commencement

Contractor to agree programme, method statement, risk assessment and security/traffic management proposals with SCC/DBFL and relevant landowners before works takes place on site. Access must be coordinated with affected landowners. Sligo County Council and DBFL will assist the contractor to make access arrangements where possible.

The contractor is to provide their own scheduled programme for the required investigative works to enable adequate coordination with respective effected landowners, personal and indicated

timing of works in sensitive areas as described in the specification and Preliminary Safety & Health Plan.

To allow flexibility to adapt to local site conditions and access restrictions the contractor shall allow for the locations of the exploratory holes changing by up to 10m in any direction subject to the approval of the Employer's Representative.

The contractor shall ensure that all traffic management meets the requirement of Chapter 8 of the Traffic Signs Manual.

Several slit trenches located adjacent to the N4 will require road opening licences. The Contractor shall allow for the necessary licence applications and plan and schedule the works accordingly. Reinstatement all areas to match existing. Within public roads, reinstatement to be in accordance with Guidelines for the Opening, Backfilling and Reinstatement of Trenches in Public Roads and the requirements of the contractors Road Opening Licence. Any soil tracked onto paved or gravel areas to be cleared.

Utility maps of existing services are included as a general indicator to approach with suitable caution. Investigation techniques suitable for locating services shall be employed such as a CAT and Genny system before any intrusive investigation takes place. No assurances are given to its accuracy. The Contractor shall obtain up to date service records.

Due diligence shall be applied to locate vulnerable underground services before any intrusive investigation takes place, suitable investigation techniques such as a CAT and Genny systems or other technique subject to the approval of the Employer's Representative.

Coordinates of all indicated ground investigations are to be recorded in Irish Transverse Mercator (ITM) with levels in Ordnance Datum, Malin Head (m OD) and included in the logs in the reports.

S1.8.1 - Works to be carried out in accordance with a quality management system as described in the specification Section 3.3. Accreditation to IS EN ISO 9001, IS EN ISO 14001 and IS OSHAS 18001 is required.

S1.8.2 - The Contractor shall provide all necessary Technical Supervision for the relevant investigation tasks, indicative of services of a full time Investigation Supervisor as outlined in S1.2

S1.8.3 - Not Required.

S1.8.4 – Mitigation measures shall be employed during investigative works to minimise the spread and impact of non-native invasive species.

Indicated locations of exploratory holes are approximate and intended to allow only for the removal of scrub and avoid any destruction/removal of hedgerows. If any hedgerows are found in the indicated position of required investigative works, the exploratory hole may be repositioned as per Schedule Specification S1.8, subject to the approval of DBFL/Employers Representative.

S1.8.5 – There are significant ESB High Voltage overhead power lines and underground cables within the site, the Contractor shall liaise with ESB Networks before undertaking any works on site. All works to be undertaken in accordance with the ESB Codes of practice included in the information pack. Exploratory holes can be relocated in coordination with DBFL and ESB Networks. Supervision may be required by ESB Networks.

Existing utility records are provided in the Information Pack; the Contractor shall obtain up to date utility information from utility companies.

S1.8.6 – Not Required.

S1.8.7 – Mitigation measures shall be included for the prevention of loss of habitat and disturbance of vulnerable fauna within the site areas.

The placement of exploratory holes should ensure that habitats are not displaced, and fauna is minimally affected. Indicated locations of exploratory holes are approximate and intended to allow only for the removal of scrub and avoid any destruction/removal of hedgerows. If any hedgerows are found in the indicated position of required investigative works, the exploratory hole may be repositioned as per Schedule Specification S1.8, subject to the approval of DBFL/Employers Representative.

S1.8.8 – Not Required.

S1.8.9 – The security of the site will be the responsibility of the SI Contractor

S1.8.10 – Compliance with Department of Transport Temporary Traffic Measures and Signs for Roadworks, 2010 and Chapter 8 of the Traffic Signs Manual.

S1.8.11 – 8am to 6pm Monday to Friday and 8am to 6pm on Saturday except as required for excavations in existing roads as outlined in S1.8 and as per the conditions of the

Contractors Road Opening Licence. No work is permitted on Sunday and/or Bank Holidays. Work outside these hours only permitted subject to the approval of Sligo County Council (SCC).

S1.8.12 – Trainee site operatives not permitted.

S1.8.13 –Not required.

S1.8.14 –Not Required.

S1.8.15 – Reinstatement all areas to match existing conditions. Exploratory holes in green areas shall be backfilled with excavated material with topsoil reinstated and seeded. Exploratory holes in existing roads, footpaths and traffic islands shall be reinstated in accordance with the relevant requirements of the Contractors' Road Opening License. The Contractor shall reinstate footpaths over the extent of entire bays (typically 3m long). If unavailable, procedures of reinstatement of road areas should follow '*Guidelines for managing Openings in Public Roads – Guidelines for the Opening, Backfilling and Reinstatement of Openings in Public Roads Second Edition (Rev 1) (April 2017) and Construction Standards for Road and Street Works in Dublin City Council*'. Footpaths shall be backfilled with Clause 808 sub-base material and reinstated in accordance with Standard Drawing SD12. Roads shall be backfilled with Grade C15 CBGM material to Clause 821 and reinstated in accordance with *Standard Drawing SD06*.

S1.8.16 –Not Required.

S1.8.17 – Unavoidable damage to be reinstated by Contractor (Clause 3.16.1)

S1.8.18 – Accuracy of exploratory hole locations (Clauses 3.19 and 3.20)

S1.8.19 – Where specified in Schedule S 1.8.19, colour photographs shall be taken and supplied by the Contractor. Each photograph shall clearly show all necessary details and contain a graduated scale which shall be the same in every photograph of a particular type. A standard colour chart and monochrome step wedge shall also be included in each photograph. Photos shall be available in JPEG file formats, and others is requested.

S1.9, Percussion boring (Specification Section 4) Particular restrictions / relaxations:

S1.9.1 – All cable percussion holes shall have a minimum diameter of 200mm. A hand dug inspection pit shall be excavated to 1.2m deep to ensure no utilities or obstacles will be encountered before the borehole is commenced.

S1.9.2 – Not Required (Clause 4.5)

S1.9.3 – Not Required. (Clause 4.6)

S1.10, Rotary drilling (Specification Section 5) Particular restrictions / relaxations:

S1.10.1 – Photographs shall be taken of the condition of the pavement/footpath before excavation, the open exploratory hole and once re-instatement has been completed. Rotary Drilling to be undertaken to achieve depths specified in Schedule 2 at all borehole locations where cable percussion boring is not capable of penetrating the ground to the required depth. (Clause 5.1)

S1.10.2 – Suitable investigation techniques shall be employed such as a CAT and Genny system to locate underground services before any intrusive investigation takes place. The Contractor shall also obtain up to date service records. (Clause 5.2)

Inspection pit shall be excavated to a minimum 1.2m deep at each boring location to ensure no utilities will be encountered before the borehole is commenced.

S1.10.3 – Not Required. (Clause 5.3)

S1.10.4 – Rotary drilling hole diameter to be advised on by Contractor based on conditions identified onsite. The core diameter shall be large enough to retrieve bulk samples for testing.

S1.10.5 – All cores shall be logged in accordance with the Specification.

S1.10.6 – Any and all core sub-samples for laboratory testing shall be stored and transported accordingly, with adequate labelling and organising to ensure no samples get swapped or misplaced.

S1.10.7 – Not Required. (Clause 5.4.8 and 5.4.9).

S1.10.8 – Not Required. (Clause 5.5.1).

S1.10.9 – Not Required. (Clause 5.5.2).

S1.10.10 – Not Required. (Clause 5.6.1).

S1.10.11 – Not Required. (Clause 5.6.2).

S1.10.12 – Pavements shall be reinstated with asphalt to match existing if and where applicable. (Clause 5.7)

S1.10.13 – Recorded cores shall be photographed with an appropriate scale measure. (Clause 5.8)

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

S1.11.1 – As per Clauses 3.7.2, 3.8.3 and 6.1 of the specification.

S1.11.2 – Trial Pits are to be undertaken with a 13-tonne hydraulic excavator with a toothed bucket.

S1.11.3 – Specification of personnel entry not required.

S1.11.4 – The width of slit trench inspection pits shall be limited to 600mm by the lengths and depths indicated in Schedule 2.

S1.11.5 – Not required.

S1.11.6 – Reinstatement all areas to match existing conditions. Exploratory holes in green areas shall be backfilled with excavated material with topsoil reinstated and seeded.

Exploratory holes in existing roads, footpaths and traffic islands shall be reinstated in accordance with the relevant requirements of the Contractors' Road Opening License.

If unavailable, procedures of reinstatement of road areas should follow 'Guidelines for managing Openings in Public Roads – Guidelines for the Opening, Backfilling and Reinstatement of Openings in Public Roads Second Edition (Rev 1) (April 2017).

Footpaths shall be backfilled with Clause 808 sub-base material and reinstated in accordance with Standard Drawing SD12.

Roads shall be backfilled with Grade C15 CBGM material to Clause 821 and reinstated in accordance with Standard Drawing SD06.

S1.11.7 – Photographs shall be taken of the condition of the pavement/footpath before excavation, the open exploratory hole including utilities and once re-instatement has been completed.

S1.11.8 – Not required.

S1.11.9 – Trial Pits and Trenches to be excavated to depths as stated in Schedule 2. A suitably qualified and competent Ground Practitioner meeting the requirements of Clause 2.3 item (b) is required for sampling/logging.

S1.12, Sampling and monitoring during intrusive investigation (Specification Section 7)

Particular restrictions/relaxations:

S1.12.1 – Address for delivery of selected geotechnical samples supplied by contractor (Clause 7.6.1).

S1.12.2 – The retention and disposal of geotechnical samples shall be until the receipt of the factual report (Clause 7.6.2)

S1.12.3:

Slit Trenches, Infiltration Pits & Trial Pits:

Sampling in trial pits shall be as described in Clause 7.6.11 of the Specification.

Samples to be sent for laboratory testing conducted as described in S1.19.2, S1.19.6 & S1.20.5.

Boreholes:

Sampling in boreholes shall be as described in Clause 7.6.4 of the Specification.

SPT's shall be carried out at 1.0m intervals and disturbed samples taken in accordance with Clause 7.6.6.

S1.12.4 –Not Required. (Clause 7.6.5).

S1.12.5 –Not Required. (Clause 7.6.5).

S1.12.6 –Not Required. (Clause 7.6.12).

S1.12.7 – See S1.17.1

S1.12.8 – Thin walled UT100 samplers to be used where laboratory strength and compressibility testing is specified.

S1.12.9 – Address for delivery of selected samples specified by contractor (Clause 7.9.2).

S1.12.10 –Not Required. (Clause 7.9.3)

S1.12.11 – 2 No. environmental samples to be taken in each trial pit spaced 1m apart.

S1.12.12 – Not Required. (Clause 7.9.5)

S1.12.13 – Not Required. (Clause 7.9.8)

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

S1.13.1 – Not Required.

S1.13.2 – Not Required. (Clauses 8.1.1)

S1.13.3 – Not Required. (Clause 8.2.4)

S1.13.4 – Not Required. (Clause 8.3.1)

S1.13.5 – Not Required. (Clause 8.3.4)

S1.13.6 – Not Required. (Clause 8.4)

S1.14 - Geophysical Surveying (Specification Section 9) Particular restrictions / relaxations:

Not Required.

S1.15, In-situ testing (Specification Section 10) Particular restrictions / relaxations:

Boreholes (Cable Percussion):

In each borehole at depth intervals described in sampling specification conduct:

- A Standard Penetration Test in accordance with clause 7.6.4 of the specification

Trial Pits / Slit Trenches

Following identification of services (e.g. GPR or similar and review of utility records), in each Trial Pit conduct:

- 1 No. in-situ plate bearing tests are to be conducted within each Trial Pit to determine California Bearing Ratio (CBR). The plate bearing test is to be undertaken below the topsoil (depth varies between 0.3-0.5m below ground) and shall be conducted using a 600mm diameter plate. A CBR and a modulus of subgrade reaction value (K) are to be determined. Alternatives to plate load testing shall only be permitted with prior written approval from the Employer's Representative

Individual Plate Load (CBR) Tests In situ Plate Bearing tests (outside of trial pits) to determine California Bearing Ratio (CBR) shall be carried out as indicated on drawings.

A small excavation shall be formed at each location so that the test is undertaken below topsoil level (0.3-0.5m below ground) using a 600mm diameter plate.

Sod/soil displaced to form excavation should be retained and replaced.

S1.15.2 – Trial Pits

Geonor H-60 Hand Vane Shear tests are to be undertaken at in each Trial Pit within any encountered soft/firm cohesive stratum.

S1.15.3 – Not Required. (Clause 10.5.1)

S1.15.4 – Not Required. (Clause 10.5.2)

S1.15.5 – Not Required. (Clause 10.5.3)

S1.15.6 – Infiltration Test Pits

Not Required.

S1.15.7 – Not Required. (Clause 10.7)

S1.15.8 – Not Required. (Clause 10.8)

S1.15.9 – Not Required. (Clause 10.9)

S1.15.10 – Not Required. (Clause 10.10)

S1.16, Instrumentation (Specification Section 11) Particular restrictions / relaxations

S1.16.1 –Not Required. (Clause 11.2)

S1.16.2 –Not Required. (Clause 11.3)

S1.16.3 – Not Required

S1.16.4 –Not Required. (Clause 11.4.3)

S1.16.5 –Not Required. (Clause 11.4.5)

S1.16.6 –Not Required. (Clause 11.5)

S1.16.7 –Not Required. (Clause 11.6)

S1.16.8 –Not Required. (Clause 11.7)

S1.16.9 –Not Required. (Clause 11.8)

S1.16.10 –Not Required. (Clause 11.9)

S1.16.11 – Not Required

S1.16.12 –Not Required. (Clause 11.11)

S1.17, Installation monitoring & Sampling (Specification Section 12) Particular restrictions / relaxations:

S1.17.1 – Not Required

S1.17.2 – Not Required

S1.17.3 – Purging required in accordance with Clause 12.3.2 of the Specification. Purging/ ground water samples to be taken as advised by the Investigation Supervisor.

S1.17.4 –Not Required. (Clause 12.3.2)

S1.17.5 –Not Required. (Clause 12.5)

S1.17.6 – Not Required. (Clause 12.8)

S1.17.7 –Not Required. (Clause 12.9)

S1.18, Daily report requirements (Specification Section 13) Particular restrictions / relaxations:

S1.18.1 - Not Required.

S1.19, Geotechnical laboratory testing (Specification Section 14)

Particular restrictions / relaxations:

S1.19.1 – Testing schedules shall be in accordance with this specification and schedules. Testing schedules shall be provided within 5 working days of the receipt of the relevant preliminary logs as detailed in Clauses 16.1 and 16.2. The Contractor shall inform DBFL within 5 working days from the receipt of the testing schedule if a sample referred to in the Schedule is not available for testing.

S1.19.2 – Minimum geotechnical laboratory testing shall be carried out in accordance with the requirements outlined below and those specified in Series K of the accompanying Bill of Quantities.

Trial Pits and Slit Trenches

The following laboratory testing shall be carried out on the samples taken from trial pits & slits trench as described in schedule S 1.12.3:

- Water Content
- Atterberg Limits
- Density
- Organic matter content
- Mass loss on ignition
- Particle Size Distribution
- Sedimentation by hydrometer
- Laboratory CBR
- Dry Density/OMC
- Moisture Condition Value/MCR Relationship
- Acid soluble sulphate content
- Water soluble sulphate content
- Total sulphur
- pH Value

During the investigation phase the level of geotechnical testing may be reduced at the discretion of the Employers Representative and Investigation Supervisor.

Slit Trenches.

The following laboratory testing shall be carried out on the bulk samples of existing granular sub-base taken from core holes & slit trenches as described in schedule S 1.12.3.

- Geological classification / simplified petrography on hardcore bulk sample to IS EN 933.

- Chemical analysis on hardcore 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)

Boreholes

The following laboratory testing will be carried out on samples taken from boreholes as indicated in the schedules:

- Consolidated Undrained Triaxial test (soil)
- Consolidated Drained Triaxial test (soil)
- Oedometer Consolidation Test (soil)
- Uniaxial Compressive strength (rock)
- Point Load Strength Index (rock)

An allowance for further testing to be carried out at the discretion of the Employers Representative has been included in the Bill of Quantities for this document.

S1.19.3 – Not Required.

S1.19.4 – Laboratory tests to be carried out by a laboratory accredited by the Irish National Accreditation Board (INAB) to IS or BS EN ISO/IEC 17025

S1.19.5 – Not Required.

S1.19.6 – The following laboratory testing will be carried out on the samples taken from trial pits; infiltration test pits, boreholes & slit trenches as described in schedule S 1.12.3.

- Chemical Tests as per Suite B as outlined in Schedule 1.19.6. Tendering Contractor to indicate which method(s) can be offered.

S1.19.7 – Not Required. (Clause 14.7)

S1.19.8 – Not Required. (Clause 14.8)

S1.20, Geoenvironmental Laboratory testing (Specification Section 15) Particular restrictions / relaxations:

S1.20.1 – Not Required. (Clause 15.1)

S1.20.2 – Laboratory tests to be carried out by a laboratory accredited by the Irish National Accreditation Board (INAB) to IS or BS EN ISO/IEC 17025.

S1.20.3 –Chemical tests for contamination shall be as per Suite E for soil samples and Suite F for water samples as outlined in Schedule 1.20.3 of the Specification.

S1.20.4 –Not Required. (Clause 15.4)

S1.20.5 – Waste Acceptance Criteria tests shall be carried out to Test Suite I. See Schedule 1.20.5 in the main specification.

S1.20.6 –Not Required. (Clause 15.6)

S1.20.7 –Not Required. (Clause 15.7)

S1.21, Reporting (Specification Section 16) Particular restrictions / relaxations:

S1.21.1 –. Not Required. (Clauses 16.1 and 16.2.1)

S1.21.2 – Soil Classification is required. Contractor to advise on fracture index or fracture spacing.

S1.21.3 – Variations to final digital data supply requirements Not Required. (Clause 16.5.1)

S1.21.4 – A copy of digital preliminary data shall be emailed to the Investigation Supervisor who in turn shall manage the data and submit it to the Employer's Representative. See NG 16.11.2.

S1.21.5 – Geotechnical Factual Report, a Geotechnical Interpretative Report, and Waste Classification Report are Required. All to be prepared by the Site Investigation Contractor.

S1.21.6 – All Electronic reports are required as a PDF file saved directly from a word file, and not as a printed sheet scanned and saved as a PDF file. (Clause 16.6.3)

S1.21.7 – To be prepared by the Site Investigation Contractor per Clause 16.7.

S1.21.8 – To be prepared by the Site Investigation Contractor per Clause 16.8.

S1.21.9 – To be prepared by the Site Investigation Contractor per Clause 16.9 and shall include the following:

- Geology and ground conditions.
- Groundwater.
- Engineering properties of soil.

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- Geotechnical design parameters.
 - Ground Assessment.
 - Foundation Recommendations.
 - Groundwater control.
 - Ground retention and Temporary Works.
 - Earthworks and Reusability (reuse of subsoils, rock, and existing pavement buildup).
 - Rock breakability.
 - Pavement Foundation Assessment.

A separate Waste Classification Report shall be provided with recommendations on the disposal class of the existing material discovered on site and appropriate licenced facilities for disposal.

S1.21.10 – Preliminary electronic information shall be submitted to the Employer's Representative as received by the Contractor.

S1.21.11 – Preliminary information to be submitted via email or shared folder.

S1.21.12 – One electronic copy (via media as per S1.21.11) to be submitted. One week's approval time will be required between the receipt of the draft report(s) and comments returned which are to be incorporated in final report(s).

1.2. Schedule 2: Exploratory Holes

Number	Position X / Start X	Position Y / Start Y	Position End X	Position End Y	Distance (m)	Remarks
BH001	569699.554	821964.022				
BH002	569919.164	821378.740				
BH003	569924.787	821366.917				
BH004	570536.779	820170.877				
BH005	571542.789	818829.154				
BH006	573540.111	816930.901				
BH007	573590.409	816940.673				
BH008	574021.223	816790.129				
BH009	574041.879	816796.111				
BH010	574790.275	815949.512				
CBR001	569332.084	822902.978				
CBR002	569354.576	822793.634				
CBR003	569386.145	822688.203				
CBR004	569419.105	822580.939				
CBR005	569447.424	822488.963				
CBR006	569491.336	822376.167				
CBR007	572563.231	817552.450				
CBR008	572653.537	817401.777				
CBR009	572983.696	817087.552				
CBR010	573176.599	817040.390				
CBR011	573625.480	816932.573				
CBR012	573688.539	816929.078				
CBR013	573922.009	816843.037				
CBR014	574007.406	816791.091				
CBR015	574100.990	816789.778				
CBR016	574177.926	816737.744				
CBR017	574322.112	816601.847				
CBR018	574387.071	816512.162				
CBR019	574440.168	816325.359				
CBR020	574501.734	816256.492				
CBR021	574586.395	816203.047				
CBR022	574651.188	816131.524				
CBR023	574713.924	816053.765				
CBR024	574773.500	815974.337				
TP001	569955.687	821445.097				

TP002	569960.143	821400.906				
TP003	569926.617	821276.138				
TP004	570434.712	820281.550				
TP005	570570.502	820071.639				
TP006	571435.985	818967.973				
TP007	571496.194	818895.400				
TP008	572520.805	817696.629				
TP009	572544.276	817594.484				
TP010	572602.693	817484.092				
TP011	573146.684	817043.364				
TP012	573225.797	817031.487				
TP013	573736.052	816925.310				
TP014	573965.503	816818.329				
TP015	574241.496	816684.767				
TP016	574356.669	816551.930				
TP017	574462.341	816417.192				
TP018	574471.071	816275.195				
TP019	574551.822	816223.512				
ST001	569816.142	821707.527	569824.905	821695.353	15	
ST002	570991.424	819339.469	571004.697	819332.481	15	
ST003	570987.066	819324.512	570996.664	819321.707	10	
ST004	572748.390	817255.529	572756.826	817250.160	10	
ST005	573427.833	817014.888	573436.182	817020.393	10	
ST006	573872.097	816871.099	573882.085	816870.600	10	
ST007	574133.639	816744.050	574141.444	816750.301	10	
ST008	574747.493	815517.741	574751.027	815519.614	4	
ST009	574820.112	815385.920	574823.603	815387.872	4	
ST010	574896.280	815256.698	574899.720	815258.739	4	
ST011	574972.831	815127.702	574976.271	815129.743	4	
ST012	575032.105	815025.934	575036.404	815028.486	5	
ST013	575036.230	815027.800	575038.788	815023.504	5	
ST014	575069.927	814964.208	575074.227	814966.760	5	
ST015	575126.523	814870.062	575129.963	814872.103	4	
ST016	575208.661	814744.549	575211.799	814747.030	4	

1.3. Bill of quantities for Ground Investigations

1. In the Bill of Quantities, the sub-headings and item descriptions identify the work covered by the respective items. The exact nature and extent of the work to be performed shall be ascertained by reference to the Conditions of Contract, the Specification and the Schedules and Appendices to the Specification, as appropriate. The rates and prices entered in the Bill of Quantities shall be deemed to be the full inclusive value of the work covered by the several items, including the following unless stated otherwise:
 - a) Contract management and superintendence, labour, and all costs in connection therewith.
 - b) The supply of materials, goods, storage, facilities and services and all costs in connection therewith, including wastage and delivery to site.
 - c) plant and all costs in connection therewith.
 - d) fixing, erecting, and installing or placing of materials and goods in position
 - e) all temporary works
 - f) all general obligations, requirements, liabilities, and risks involved in the execution of the investigation as set forth or implied in the documents on which the tender is based.
 - g) establishment charges, overheads, and profit
 - h) bringing plant and sampling, in situ testing and monitoring equipment to the site of each exploratory hole, erecting, dismantling, and removing on completion
 - i) on completion, removal of all equipment and services from site and disposal of arisings
 - j) site supervision as required under schedule 1 of the contract.
2. Unless identified as Not required, all items in section A of the Bill of Quantities (general items, provisional services and additional items), and also all items in subsequent sections against which quantities are entered shall be priced.
3. If lump-sum items are not required by the Contractor, this shall be stated against the rate item in the Bill of Quantities and €0.00 entered in the amount. Where rates are not priced, they shall have €0.00 placed against them and €0.00 entered in the amount.
4. When full- or part-time professional attendance on site is required in accordance with Clause 3.5.2, this shall normally be paid for under Item A7 of the Bill of Quantities. Unless otherwise detailed in Schedule S1.8.2, the onsite professional attendance services provided by the technical staff shall comprise the technical supervision of site activities, site liaison, logistics, logging, in situ testing and sampling, photography and the preparation of daily records and preliminary logs (except where any of the above activities are carried out by site operatives and boring/drilling operatives). When individuals are not carrying out their specific duties or are otherwise away from site, then daily rates will not apply, and these costs will be deemed to be covered under general items.
5. The rate entered under Item A5 shall include for the provision of any additional PPE, ground surface protection measures, additional welfare and hygiene facilities and plant and equipment decontamination facilities required as a direct result of the contamination or hazard(s) detailed in Schedule S1.8.4 and/or S1.8.6.

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6. The item for photographs shall allow for the standing time of associated plant and supply of negatives, enprints and bound volume or electronic equivalents.
 7. Rates for moving plant and equipment to the site of each exploratory hole shall allow for the formation of access routes and working areas and making good avoidable damage to access routes and working areas on completion as required by the Contract.
 8. The rates for moving rotary drilling plant to the site of each hole shall be for setting up over a new location.

Payment for forming exploratory holes shall be based on:

- a) full thickness of strata investigated and described in accordance with the Specification
 - b) depths measured from ground level,
 - c) depth measured from original ground level where an inspection pit has been excavated,
 - d) that part of a drillhole below the bottom of a borehole where a drill hole has been ordered to continue from the bottom of a borehole,
 - e) core recovery of at least 90% in any core run, unless the Investigation Supervisor is satisfied it cannot be achieved,
 - f) volume calculated as measured length times measured depth times specified.
9. Rates for forming exploratory hole shall allow for:
 - a) temporary casing installation, where necessary, and removal,
 - b) dealing with surface water,
 - c) backfilling with arisings,
 - d) taking information and supply of daily record for works carried by site operatives,
 - e) additional site supervision of non-qualified operatives.
 10. Rates for aquifer protection measures shall allow for the measures detailed in Schedule S1.8.13.
 11. Standing time shall be measured as the duration of time for which plant, equipment and personnel are standing on the instruction of the Investigation Supervisor, clients representative or in accordance with the Specification. Standing time shall be paid for interruption of the formation of exploratory holes to record groundwater entry in accordance with Clause 7.7. The rates for standing time shall include for:
 - a) plant equipment and personnel,
 - b) consequential costs,
 - c) changes in the programme of working,
 - d) recording information and preparing daily record.
 12. The rates for daily provision of dynamic sampling and probing, hand auger auguring and pitting and trenching crews and equipment at locations as directed by the Investigation Supervisor shall allow for compliance with the requirements of the Contract, including preparation of records (unless the Investigation Supervisor takes responsibility for the logging and preparation of records).
 13. The rates for dynamic sampling Items shall include for the provision of liners. The rates for sampling shall allow for the standing time of associated plant. The rates for sampling shall also

include for the costs of the sample containers and transport and storage of the samples up to the specified time limits. The rate for taking a U100 or UTI 00 sample does not include for recovery of a sample from the cutting shoe. The rates for each of the Items shall include for all necessary containers and collected samples for an individual determination of the specified contamination or WAC suite.

14. The rates for in situ testing shall allow for the standing time of associated plan and for interpretation and presentation of the results on preliminary logs/exploratory hole logs or on separate agreed report forms using the same dates of presentation as the exploratory hole to which they refer. In the case of the self-boring pressure meter, high pressure dilatometer or Menard pressure meter, the rates shall also allow for the mutual standing of the respective boring/ drilling plant and specialist testing equipment and crews during the combined process. Where in situ testing is paid for on an hourly basis, the time measured shall be the actual time taken to carry out the test in accordance with the Investigation Supervisor's instruction and/or the Specification but excluding the time taken to erect and dismantle test equipment where this is itemised separately. The rate for carrying out an SPT (whether using a split spoon or solid cone) does not include for recovery of an associated sample.
15. The rates for cone penetration tests Items shall allow for provision of daily records and for interpretation and presentation of the results on agreed report forms/ exploratory hole logs in accordance with BS 1377 and Schedules 51.13.3 or S1.13.4. For the seismic cone, the recorded and presented data shall include the specified CPT data recorded between seismic test depths.
16. The rates for dynamic probing shall allow for undertaking and reporting torque measurements at the prescribed vertical intervals if required by the Investigation Supervisor.

The rates for installation of instruments shall allow for:

- a) clearing and keeping the hole free of unwanted materials,
 - b) all costs associated with equipment, installation, specified seals, surround and backfill materials excluding backfill,
 - c) proving correct functioning,
 - d) delays due to installations, including the setting time for grout,
 - e) recording information and preparing daily record and additional reports.
17. The rates for monitoring and sampling of installations during the fieldwork period shall allow for:
- a) purging and dealing with disposal of recovered water,
 - b) all costs associated with consumables and provision of data recording equipment to site,
 - c) proving correct calibration and recalibration,
 - d) recording information, preparing, updating and submitting additional reports successively and at the completion of monitoring, including notification of any unexpected readings and/or variation in readings,
 - e) delays due to interruptions of other site activities.
18. The rates for monitoring and sampling of installations during the post-fieldwork period shall allow for:
- a) Items (a) to (d) above,

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- b) All costs associated with remobilising the appropriate (number and experience) staff to, site and all travelling and accommodation expenses. The rates for recording of water level, ground gas or other monitoring measurements shall allow for notices of re-entry to the Investigation Supervisor, owners or occupiers affected by the location or access route.
 - c) The rates for laboratory testing shall include for:
 - a) The supply of a copy of the preliminary test results to the Investigation Supervisor,
 - b) Notification of unavailable test samples, failed tests and/or deviating samples (e.g. samples not correctly preserved),
 - c) The cost of determining a parameter (e.g. moisture content or density) where that parameter forms part of the information to be reported for the specified test (e.g. undrained shear strength, consolidation test or unconfined compressive strength),
 - d) The disposal of samples in accordance with the relevant regulations.
19. The provisional sum, where needed, for the off-site disposal of contaminated waste shall include for temporary storage and for organising the transport and disposal by a suitably licenced waste disposal contractor. Payment shall be made only against receipted invoices. The costs of laboratory testing to determine the nature of the waste shall be covered by laboratory testing rates for tests completed and to an agreed schedule. Those sums shall be offset against the Provisional sum Item A6.
20. Bill of Quantities (Rates for Ground Practitioners and other Personnel) shall be priced. The rates given will be used by the Investigation Supervisor to make an initial estimate of costs, where applicable, of employing the Contractor's staff.
21. Items for the supply of the master and copies of the Desk Study Report, Ground Investigation Report and/or Geotechnical Interpretative Design Report shall include for the printing and supply of the specified number of draft and final copies (Specification Clause 16.12 and Schedule S1.21.12). All other duties associated with compiling, preparing and checking the draft and final reports shall normally be paid for under Items A18, A19, A20 and A21 of the Bill of Quantities.
22. The following abbreviations shall be used for the units of measurements:
- **Millimetres:** mm
 - **Metre:** m
 - **Kilometre:** km
 - **Square millimetres:** mm²
 - **Square metre:** m²
 - **Cubic metre:** m³
 - **Square metre per day:** m² / day
 - **Linear metre:** lin.m
 - **Kilogramme:** kg
 - **Tonne:** t
 - **Sum:** sum
 - **Number:** nr
 - **Hour:** h
 - **Week:** wk
 - **Vehicle week:** v. wk
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- **Item:** item
 - **Day:** day
 - **Specimen day:** sp.day
 - **Person day:** p.day