

Laois County Council
Residential Development at
Derry Road, Durrow

Stage 2 Application – Civil and Structural Engineering
Report

40-05-HA-XX-XX-RP-CS-002

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00	Stage 2 Application	FF	NS	NJ	22.09.23

1.0 Introduction

1.1 Scope of Report

This report summarises the Drainage, Geotechnical and Structural Engineering inputs into a Stage 2 application in relation to a proposed housing development at Derry Road, Durrow, County Laois for Laois County Council. Stage 1 approval for the project was granted on 18th October 2021. The report addresses specific items highlighted in that approval namely:

- Connection to Irish Water Infrastructure
- Site Flood Risk

Note: The design of the roads within the development has been completed by Roadplan Consulting Engineers.

1.2 Project Description

The proposed development consists of 24 dwellings made up of a mix of houses and duplexes on a site of approximately 1.2 ha, including all associated site works such as access and circulation roads, boundary structures and 2 public open spaces. It is also proposed to provide 4 Serviced sites along Derry Road.

2.0 Stage 2 Application – Civil and Structural Engineering Items

2.1 Irish Water Pre-connection Enquiry

Foul and Surface Sewer designs have been completed for the site and are indicated on the drawings attached. A pre-connection enquiry was submitted to Irish Water in March 2023 based on a previous site layout. The road layout has since been adjusted and the current drainage drawings reflect those changes.

Confirmation of Feasibility, ref CDS23001911 was received from Irish Water on 25th April 2023 subject to the conditions described below.

- *Requirement to upgrade approximately 400m of existing watermain in the town.*
Following a detailed review by Irish Water, it has since been confirmed that this is upgrade is not required for this project.

- *No storm water shall be permitted to discharge to the Irish Water Wastewater network.*

Since submission of the application, Laois County Council has confirmed that there is a separate surface water drain available for connection to in the N77. The updated drawings indicate that surface water runoff from the new development will discharge to this drain. Attenuation and flow control to limit discharge to the Greenfield run off from the site have been incorporated into the design.

2.2 Geotechnical Investigations

Geotechnical Investigations consisting of Boreholes, Trial Pits, infiltration, and laboratory testing of samples the site was completed in 2 phases between March 2022 and March 2023. The investigations indicated that there is a suitable bearing stratum at approximately 1.2m below existing ground level. The material above this level has a tendency to become loose during excavations and thus excavations for foundations will need to be battered to a safe angle or otherwise stabilised. Suspended ground floor slabs will also be required as a result of potential soft zones occurring where material has been excavated for foundations.

2.3 Flood Risk Assessment

The Housing Agency has completed a Stage 1 Flood Risk Assessment and Justification test for the site. This indicates that low residual risk of fluvial flooding. Appropriate drainage measures will be incorporated into the design to ensure an acceptable risk of pluvial flooding.

2.4 Structural Details

The houses are a mix of simple one and two storey structures which may be constructed using traditional domestic construction or off-site/pre-fabrication.

The duplex/apartment units are likely to be load bearing blockwork with precast concrete first floor slabs and prefabricated roofs.

2.5 Boundaries

The various boundary types are indicated on the drawings included with the submission.

They consist of

- Boundary with existing dwelling along the N77 and the Scout's Den - RC retaining walls.
- Between rear gardens - A mix of blockwork walls and concrete post and plank fencing
- Front Gardens – low brick walls with railings

3.0 Irish Water Correspondence

Fiona Fleming
 53-54 Mount Street Upper
 Dublin 02
 Dublin
 D02KT73
 Ireland

20 September 2023

Re: CDS21007900 pre-connection enquiry - Subject to contract | Contract denied
Connection for Housing Development of 22 unit(s) at Derry Road, Durrow, Laois

Dear Sir/Madam,

Irish Water has reviewed your pre-connection enquiry in relation to a Water & Wastewater connection at Derry Road, Durrow, Laois (the **Premises**). Based upon the details you have provided with your pre-connection enquiry and on our desk top analysis of the capacity currently available in the Irish Water network(s) as assessed by Irish Water, we wish to advise you that your proposed connection to the Irish Water network(s) can be facilitated at this moment in time.

SERVICE	<p align="center">OUTCOME OF PRE-CONNECTION ENQUIRY</p> <p align="center"><u>THIS IS NOT A CONNECTION OFFER. YOU MUST APPLY FOR A CONNECTION(S) TO THE IRISH WATER NETWORK(S) IF YOU WISH TO PROCEED.</u></p>
Water Connection	Feasible subject to comments below
Wastewater Connection	Feasible without infrastructure upgrade by Irish Water
<p align="center">SITE SPECIFIC COMMENTS</p>	
Water Connection	<p>To facilitate the proposed connection, Irish Water require site investigation (2 slit trenches) to confirm the diameter of red highlighted mains in figure 2. Reporting the finding to Irish water for review network. Following confirmation of that this section is 75mm or greater a connection to the Derry road watermain would be feasible. Figure 1 (green line)</p> <p>The confirmation of feasibility to connect to the Irish Water infrastructure does not extend to your fire flow requirements and you should provide adequate fire storage capacity within your development</p>
Wastewater Connection	

The design and construction of the Water & Wastewater pipes and related infrastructure to be installed in this development shall comply with the Irish Water Connections and Developer Services Standard Details and Codes of Practice that are available on the Irish Water website. Irish Water reserves the right to supplement these requirements with Codes of Practice and these will be issued with the connection agreement.

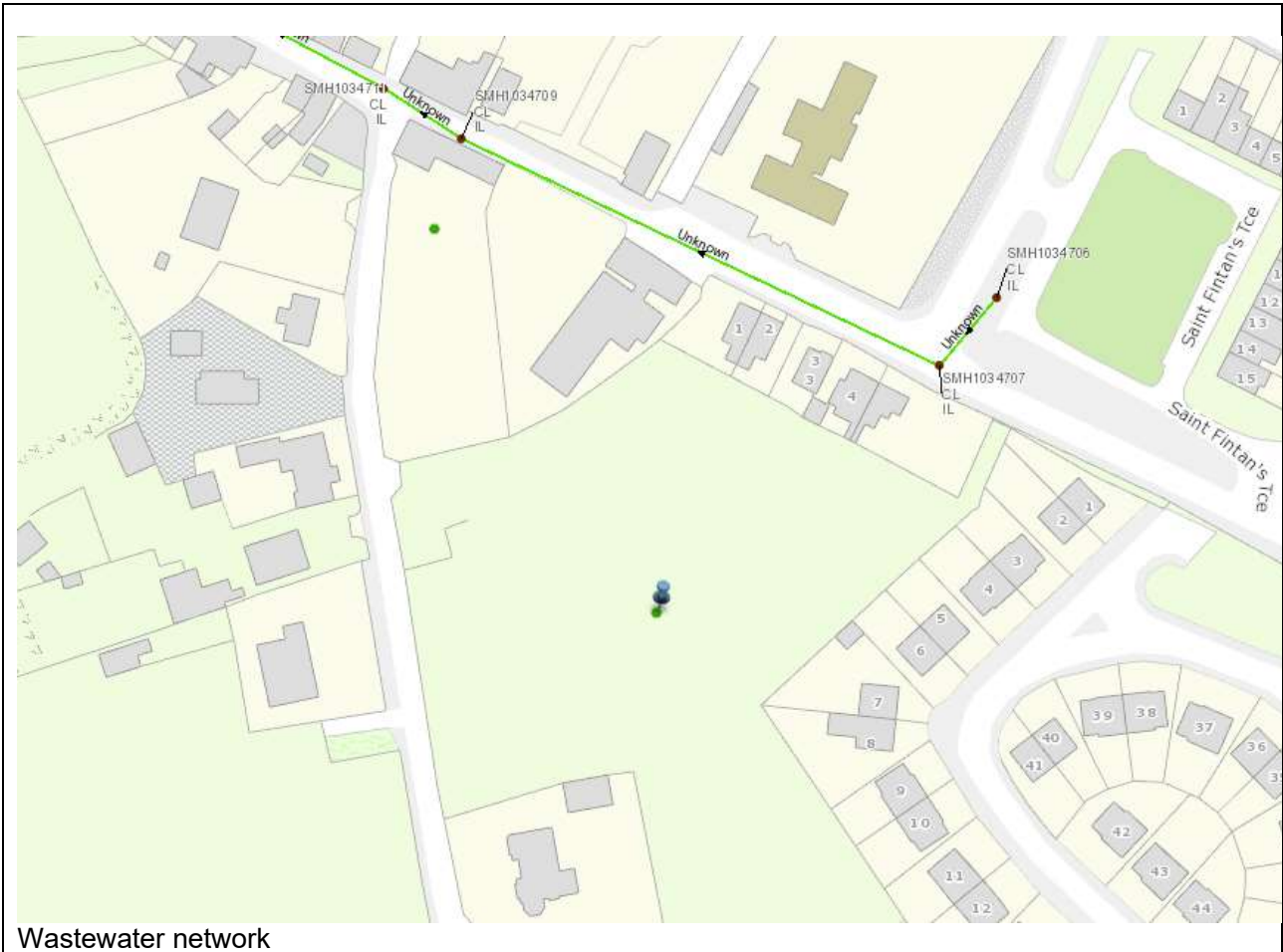
The map included below outlines the current Irish Water infrastructure adjacent to your site:



Figure 1 – water network



Figure 2 - Water Network



Wastewater network

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Whilst every care has been taken in its compilation Irish Water gives this information as to the position of its underground network as a general guide only on the strict understanding that it is based on the best available information provided by each Local Authority in Ireland to Irish Water. Irish Water can assume no responsibility for and give no guarantees, undertakings or warranties concerning the accuracy, completeness or up to date nature of the information provided and does not accept any liability whatsoever arising from any errors or omissions. This information should not be relied upon in the event of excavations or any other works being carried out in the vicinity of the Irish Water underground network. The onus is on the parties carrying out excavations or any other works to ensure the exact location of the Irish Water underground network is identified prior to excavations or any other works being carried out. Service connection pipes are not generally shown but their presence should be anticipated.

General Notes:

- 1) The initial assessment referred to above is carried out taking into account water demand and wastewater discharge volumes and infrastructure details on the date of the assessment. **The availability of capacity may change at any date after this assessment.**
- 2) This feedback does not constitute a contract in whole or in part to provide a connection to any Irish Water infrastructure. All feasibility assessments are subject to the constraints of the Irish Water Capital Investment Plan.
- 3) The feedback provided is subject to a Connection Agreement/contract being signed at a later date.
- 4) A Connection Agreement will be required to commencing the connection works associated with the enquiry this can be applied for at <https://www.water.ie/connections/get-connected/>

- 5) A Connection Agreement cannot be issued until all statutory approvals are successfully in place.
- 6) Irish Water Connection Policy/ Charges can be found at <https://www.water.ie/connections/information/connection-charges/>
- 7) Please note the Confirmation of Feasibility does not extend to your fire flow requirements.
- 8) Irish Water is not responsible for the management or disposal of storm water or ground waters. You are advised to contact the relevant Local Authority to discuss the management or disposal of proposed storm water or ground water discharges
- 9) To access Irish Water Maps email datarequests@water.ie
- 10) All works to the Irish Water infrastructure, including works in the Public Space, shall have to be carried out by Irish Water.

If you have any further questions, please contact Kyle Jackson from the design team on email kyle.jackson@water.ie For further information, visit www.water.ie/connections.

Yours sincerely,



Yvonne Harris

Head of Customer Operations

4.0 Geotechnical Report Extract



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Ground Investigations Ireland

Derry Road Durrow

Laois county Council

Ground Investigation Report

March 2022





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DOCUMENT CONTROL SHEET

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A	Final	A. Mc Donnell	A. Mc Donnell	C. Finnerty	Dublin	07 March 2022

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



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GROUND INVESTIGATIONS IRELAND
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APPENDICES

Appendix 1	Site Location Plan
Appendix 2	Trial Pit Records
Appendix 3	Soakaway Results
Appendix 4	Cable Percussion Borehole Records
Appendix 5	Rotary Core Records
Appendix 6	TRL Results
Appendix 7	Laboratory Results



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1.0 Preamble

On the instructions of Laois County Council, a site investigation was carried out by Ground Investigations Ireland Ltd., in December 2021 at the site of the proposed residential development in Durrow, Co Laois.

2.0 Overview

2.1. Background

It is proposed to construct a new residential development with associated services, access roads and car parking at the proposed site. The site is currently greenfield however a portion in one corner of the site is occupied by a temporary car park. The proposed construction is envisaged to consist of conventional foundations and pavement make up with some local excavations for services and plant.

2.2. Purpose and Scope

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

- Visit project site to observe existing conditions
- Carry out 9 No. Trial Pits to a maximum depth of 2.5m BGL
- Carry out 4 No. Soakaways to determine a soil infiltration value to BRE digest 365
- Carry out 9 No. Cable Percussion boreholes to a maximum depth of 4.70m BGL
- Carry out 4 No. Rotary Core Boreholes to a maximum depth of 6.9m BGL
- Installation of 4 No. Groundwater monitoring wells
- Geotechnical & Environmental Laboratory testing
- Report with recommendations

3.0 Subsurface Exploration

3.1. General

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

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

3.2. Trial Pits

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

3.3. Soakaway Testing

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

3.4. Cable Percussion Boreholes

The Cable Percussion Boreholes were drilled using a Dando 2000 drilling rig with regular in-situ testing and sampling undertaken to facilitate the production of geotechnical logs and laboratory testing.

The standard method of boring in soil for site investigation is known as the Cable Percussion method. It consists of using a Shell in non cohesive soils and a clay cutter in cohesive soils, both operated on a wire cable. Very hard soils, boulders and other hard obstructions are broken up by chiselling and the fragments removed with the Shell. Where ground conditions made it necessary, the borehole was lined with 200mm diameter steel casing. While the use of the Cable Percussion method of boring gives the maximum data on soil conditions, some mixing of laminated soil is inevitable. For this reason, thin lenses of granular material may not be noticed. Disturbed samples were taken from the boring tools at suitable depths, so that there is a representative sample at the top of each change in stratum and thereafter at regular intervals down the borehole until the next stratum was encountered. The disturbed samples were then sealed and sent to the laboratory where they were visually examined to confirm the description of the relevant strata. Standard Penetration Tests were carried out in the boreholes. The results of these tests, together with the depths at which the tests were taken are shown on the accompanying borehole records. The test consists of a thick wall sampler tube, 50mm external diameter, being driven into the soil by a monkey weighing 63.5kg and with a free drop of 760mm. For gravels and glacial till the driving shoe was replaced by a solid 60° cone. The Standard Penetration Test number referred to as the 'N' value is the number of blows required to drive the tube 300mm, after an initial penetration of 150mm. The number gives a guide to the consistency of the soil and can also be used to estimate the relative strength/density at the depth of the test and also to estimate the bearing capacity and compressibility of the soil. The cable percussion borehole logs are provided in Appendix 4 of this Report.

3.5. Rotary Boreholes

The rotary coring was carried out by a track mounted T44 Beretta rig at the locations shown on the location plan in Appendix 1. The rotary boreholes were completed from the ground surface or alternatively, where noted on the individual borehole log, from the base of the cable percussion borehole where a temporary liner was installed to facilitate follow-on rotary coring.

The T44 Beretta is equipped with rubber tracks which allow for short travel on pavement surfaces avoiding any damage to the surface. The T44 Beretta utilises a triple tube core barrel system operated using a wireline drilling process. The outer barrel is rotated by the drill rods and at its lower end, carries the coring bit. The inner barrel is mounted on a swivel so that it does not rotate during the process. The third barrel or liner is placed within the second one to retain the core intact and to preserve as much as possible the fabric of the drilling stratum. The core is cut by the coring bit and passes to the inner liner. The core is brought up to the surface within the inner barrel on a small diameter wire rope or line attached to the "overshoot" recovery tool which is then placed into a core box in order of recovery. A drilling fluid, typically air mist or water flush is passed from the surface through hollow drill rods to the drill bit, and is used to cool the drill bit. Temporary casing is used in some situations to support unstable ground or to seal off fissures or voids. It should be noted that the rotary coring can only achieve limited recovery in overburden, particularly granular or weakly cemented strata due to the flushing medium washing away the cohesive fraction during coring. The recovery achieved, where required is noted on the borehole logs and core photographs are provided to allow assessment of the core recovered. The rotary borehole logs are provided in Appendix 5 of this Report.

3.6. Surveying

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

3.7. Groundwater Monitoring Installations

Groundwater Monitoring Installation were installed upon the completion of the boreholes to enable sampling and the determination of the equilibrium groundwater level. The typical groundwater monitoring installation consists of a 50mm uPVC/HDPE slotted pipe with a pea gravel response zone and bentonite seal installed to the Engineers specification. Where required the standpipe is sealed with a gas tap and finished with a durable steel cover fixed in place with a concrete surround. The installation details are provided on the exploratory hole logs in the appendices of this Report.

3.8. TRL Dynamic Cone Penetrometer

The TRL DCP tests were carried out at locations specified by the Consulting Engineer to determine a CBR design value for the design of external pavements. The testing was carried out below the Topsoil or existing

pavement at the depths detailed on the test report. The test consists of dropping a 10kg weight on an anvil to drive a small diameter cone and recording the blows for a given penetration. The results of the DCP testing is included in Appendix 6 of this Report.

3.9. Laboratory Testing

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

Environmental & Chemical testing as required by the specification, including the Rilta Suite, organic matter, pH and sulphate testing was carried out by Element Materials Technology Laboratory in the UK. The Rilta suite testing includes both Solid Waste and Leachate Waste Acceptance Criteria.

Geotechnical testing consisting of moisture content, Atterberg limits and Particle Size Distribution (PSD) tests were carried out in NMTL's Geotechnical Laboratory in Carlow.

The results of the laboratory testing are included in Appendix 7 of this Report.

4.0 Ground Conditions

4.1. General

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

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

- Topsoil/Surfacing
- Made Ground
- Granular Deposits
- Cohesive Deposits
- Bedrock

TOPSOIL/SURFACING: Topsoil was encountered in the majority of the exploratory holes and was present to a maximum depth of 0.4m BGL. Concrete surfacing was present in TP04 only to a depth of 0.15m BGL.

MADE GROUND: Made Ground deposits were encountered either beneath the Topsoil or from surface in TP04 and BH01 only and were present to a relatively consistent depth of between 0.6m and 0.9m BGL. These deposits were described either as *brown sandy slightly gravelly CLAY with fragments of concrete*, or *Grey very sandy fine to coarse Gravel*.

COHESIVE DEPOSITS: Cohesive deposits were encountered beneath the Made Ground or topsoil in some locations and were described typically as *brown sandy gravelly CLAY with occasional cobbles and*

boulders. The secondary sand and gravel constituents varied across the site and with depth, with granular lenses occasionally present in the glacial till matrix. The strength of the cohesive deposits typically increased with depth and was firm to stiff or stiff below 1.2m BGL in the majority of the exploratory holes. These deposits had some, occasional or frequent cobble and boulder content where noted on the exploratory hole logs.

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

Based on the SPT N values the deposits are typically medium dense or Dense. It should be noted that many of the trial pits where granular deposits were encountered, experienced instability. This was described either as side wall spalling or as side wall collapse in the remarks section at the base of the trial pit logs.

BEDROCK: The rotary core boreholes recovered Strong grey fine grained LIMESTONE interbedded with weak black fine grained mudstone. This is Ballyadamas Formation, which is noted on the geological mapping to underlie the proposed site.

The depth to rock varies from 2.20m BGL in RC08 to a maximum of 2.60m BGL in RC04. The total core recovery is good, typically 100% with some of the uppermost runs dropping to 77% or 93%. The SCR and RQD both are relatively poor in the upper weathered zone, often recovered as non-intact, however both indices show an increase with depth in each of the boreholes.

4.2. Groundwater

No groundwater was noted during the investigation however we would point out that these exploratory holes did not remain open for sufficiently long periods of time to establish the hydrogeological regime and groundwater levels would be expected to vary with the time of year, rainfall, nearby construction and other factors. For this reason, standpipes were installed in RC01, RC04, RC07 and RC08 to allow the equilibrium groundwater level to be determined.

4.3. Laboratory Testing

4.3.1. Geotechnical Laboratory Testing

The geotechnical testing carried out on soil samples recovered generally confirm the descriptions on the logs with the primary constituent of the cohesive deposits found to be a CLAY of low plasticity. The Particle Size Distribution tests confirm that generally the cohesive deposits are well-graded with percentages of sands and gravels ranging between 20.4% and 45% generally with fines contents of 29% to 35.4%.

The Particle Size Distribution tests confirm that generally the granular deposits are well-graded/gap graded with percentages of sands and silt/clay typically between 4.9% and 32.4% with a gravel content of typically 55.1% to 67.2%.

4.3.2. Chemical Laboratory Testing

The pH and sulphate testing carried out indicate that pH results are near neutral and that the water soluble sulphate results is low when compared to the guideline values from BRE Special Digest 1:2005. The samples tested classify the soil as a Design Sulphate Level DS-1.

4.3.3. Environmental Laboratory Testing

A number of samples were analysed for a suite of parameters which allows for the assessment of the sampled material in terms of total pollutant content for classification of materials as *hazardous* or *non-hazardous*. The suite also allows for the assessment of the sampled material in terms of suitability for placement at licenced landfills (inert, stable non-reactive, hazardous etc.). The parameter list for the suite includes analysis of the solid samples for arsenic, barium, cadmium, chromium, copper, cyanide, lead, nickel, mercury, zinc, speciated aliphatic and aromatic petroleum hydrocarbons, pH, sulphate, sulphide, moisture content, soil organic matter and an asbestos screen.

The suite also includes those parameters specified in the EU Council Decision establishing criteria for the acceptance of waste at Landfills (Council Decision 2003/33/EC), which for the solid samples are total organic carbon (TOC), speciated aliphatic and aromatic petroleum hydrocarbons, BTEX, phenol, polychlorinated biphenyls (PCB) and PAH.

As part of the suite a leachate is generated from the solid sample which is analysed for antimony, arsenic, barium, cadmium, chromium, copper, lead, mercury, molybdenum, nickel, selenium, zinc, chloride, fluoride, soluble sulphate, sulphide, phenols, dissolved organic carbon (DOC) and total dissolved solids (TDS).

While the laboratory report provides a comparison with the waste acceptance criteria limits it does not provide a waste classification of the material sampled nor does it comment on any potentially hazardous properties of the materials tested. The possibility for contamination, not revealed by the testing undertaken should be borne in mind particularly where Made Ground deposits are present or the previous site use or location indicate a risk of environmental variation. A waste classification report is recommended to be carried out to provide an interpretation of the laboratory data should any material be required to be disposed of off site.

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

5.0 Recommendations & Conclusions

5.1. General

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

5.2. Foundations

An allowable bearing capacity of 125 kN/m² is recommended for conventional strip or pad foundations on the Medium dense Granular material or the stiff cohesive deposits at a depth of 1.2m BGL.

A ground bearing floor slab is recommended to be based on the firm to stiff cohesive or Medium dense Granular deposits with an appropriate depth of compacted hardcore specified by the consulting engineer and in accordance with the limits and guidelines in SR21:2014 +A1:2016 and/or NRA SRW CL808 Type E granular stone fill.

The pH and sulphate testing completed on samples recovered from the exploratory holes indicates the pH results are near neutral and the sulphate results are low, when compared to the guideline values from BRE Special Digest 1:2005. No special precautions are required for concrete foundations to prevent sulphate attack. The samples tested were below the limits of DS1 in the BRE Special Digest 1:2005.

5.3. External Pavements

The proposed pavements are recommended to be designed in accordance with the CBR test results included in the Appendices of this Report. The low CBR test results indicate that a capping layer or a sufficient depth of crushed stone fill may be required. Plate bearing tests are recommended at the time of construction to verify the design assumptions for the proposed pavement make up and to verify adequate compaction has been achieved.

The use of a geogrid and separation membrane may improve the performance of the proposed pavement and enable a more economical pavement design to be achieved, a specialist supplier is recommended to advise of the required strength, depth and type of geotextile for the proposed design.

5.4. Excavations

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

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

Excavations in the upper cohesive deposits are expected to be excavatable with conventional excavation. Any waste material to be removed off site should be disposed of to a suitably licenced landfill.

5.5. Soakaway Design

Infiltration rates of $f=4.48 \times 10^{-5}$ m/s, $f=1.228 \times 10^{-5}$ m/s and 1.388×10^{-5} m/s respectively were calculated for the soakaway locations SA01, SA05 and SA07. At the locations of SA03, the water level dropped too slowly to allow calculation of 'f' the soil infiltration rate. These locations are therefore not recommended as suitable for soakaway design and construction.

The recommendations provided in this report should be verified in the design of the proposed buildings, using the full details of the loading conditions and taking into consideration the allowable tolerable settlements/movements that the building can accommodate. The founding strata should be inspected and verified by a suitably qualified engineer prior to construction of the building foundations.

APPENDIX 1 - Site Location Plan



640725E 640800E 640875E 640950E 641025E

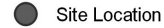



677100N
677025N

675950N
676875N

640725E 640800E 640875E 640950E 641025E

Legend

-  Indicative Site Boundary
-  Site Location

Client:
 **Laois County Council**
 Áras an Chontae, Portlaoise, Co. Laois

Project Code:
11122-10-21

Project Title:
Derry Road

Drawing Title:
Figure 1 Site Location


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Drawn By: Tmcl	Date: 13/12/21
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