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Amenity Lands at Sallins, Co. Kildare

Engineering Report in Support of

Planning Application

December 2021

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1. Introduction

Cathal O'Meara Landscape Architects are providing integrated design team services to Kildare County Council for a Part 8 planning application for the development of amenity lands located to the west of Sallins, Co. Kildare. This Engineering planning design report has been prepared by Donnachadh O'Brien & Associates Consulting Engineers (DOB&A) on behalf of Cathal O'Meara Landscape Architects in support of the Part 8 application.

The proposed development includes GAA and soccer playing pitches, car parking, walkways, allotments, constructed wetlands, play areas and a potential future community building as indicated on Cathal O'Meara's drawings.

1.1 Existing Site

The existing 18.7Ha greenfield site is bounded to the northwest by the River Liffey, to the west by the newly constructed Sallins Bypass, to the south and to the east by the Grand Canal. The topography of the overall lands falls from south to north towards the River Liffey from levels of approx. +74.50m OD to +71.00m OD. The existing site layout is indicated on drawing C-0010 while the proposed site layout is indicated on drawing C-0050. The site location is included in Figure 1 below.

Figure 1 – Site location (highlighted in red)

1.2 Report Overview

This report outlines the preliminary engineering design associated with the proposed Part 8 planning submission under the following headings:

- Surface Water Drainage
- Flooding
- Foul Water Drainage
- Water Supply
- Roads Infrastructure

This report should be read in conjunction with the following engineering drawings, which are submitted in support of the planning application:

C-0010	Topographical Survey
C-0020 – C0024	Proposed Surface Water Drainage Layout (5 Sheets)
C-0030	Proposed Foul Drainage and Watermain Layout
C-0050 – C0054	Proposed Site Layout (5 Sheets)
C-0060 – C0061	Proposed Road Markings, Signs and Visibility Splay (2 Sheets)
C-0062	Typical Crossing Layout
C-0070	Proposed Autotrack Analysis
C-0080	Typical Netting Elevations
C-0100	Typical Manhole Details
C-0110	Proposed Attenuation Details
C-0120	Proposed Typical Siteworks Details
C-0130	Typical Watermain Details

2. Surface Water Drainage

2.1 Existing Surface Water Drainage

An existing watercourse flows through the site from south to north towards the River Liffey which is located at the northwest site boundary. The local topography falls towards the existing watercourse. As such, the runoff from the existing site discharges to the existing watercourse (refer to drawings C-0010 & C-0020 for existing watercourses).

Kildare County Council records do not indicate any public surface water drainage network adjacent to the proposed site. Kildare County Council maps are included in Appendix A of this report.

2.2 Preliminary Site Investigation

IGSL were commissioned by DOB&A on behalf of Kildare County Council to carry out preliminary site investigations including trial pits and soakaway tests (refer to Appendix B for the full report).

Trial Pits to 2.5m BEGL: The ground conditions encountered in the trial pits excavated on site consisted of sandy gravelly clay, with significant bands of sandy gravel noted in about 40% of the trial pits. Fill or made ground has been encountered in over 50% of the locations, with depths varying from 0.50m to 2.00m. Ground water has been noted in the more granular soils. Bedrock was not encountered.

BRE365 soakaway tests: 7 no. infiltration tests were carried out on the site to a depth up to 1.5m. One test failed and the other infiltration tests indicated infiltration rate varying from 8×10^{-5} m/s to 4×10^{-6} m/s which are moderate rates and are suitable for amenity uses matching the existing greenfield runoff conditions.

The site investigation demonstrates that some implementation of SUDS infiltration techniques (filter drains, soakaways, infiltration trenches, permeable paving, etc.) are suitable in certain locations while flow control and attenuation is more suitable where infiltration techniques were not feasible.

2.3 Proposed Surface Water Drainage

The design and management of surface water for the proposed development will comply with the policies and guidelines of Kildare County Council and outlined in the Greater Dublin Strategic Drainage Study (GDSDS) and Sustainable Drainage Systems (SuDS) Strategy. Pipe sizes and gradients will be designed to achieve self-cleansing velocities as per the requirements of the Building Regulations Part "H".

The layout of the proposed surface water drainage is included on the following drawings:

C-0020 – C0024	Proposed Surface Water Drainage Layout (5 Sheets)
C-0110	Proposed Attenuation Details

2.3.1 SuDS Measures

Infiltration measures have been utilised where favourable infiltration rates have been identified in the site investigation report. The surface water strategy includes the following:

- Porous asphalt is proposed in the car parking bays within the proposed development. The permeable pavement will be left unsealed to utilise any infiltration which may be available. An overflow pipe has been provided towards the surface water network due to poor infiltration results identified in this area (see drawing C-0110 for a typical detail of permeable paving);
- Planted bio-swales are proposed to the rear of the parking bays which will receive any overflows from the parking areas. An underdrain will be provided beneath the swale allow with an overflow towards the piped network;
- The internal road gullies will discharge to infiltration trenches which will treat the runoff and maximise any infiltration available (Note: infiltration identified as poor in this area during site investigations). A high-level overflow pipe will connect to the main surface water drainage network (see drawing C-0110 for a typical detail of filter drain/swale);
- The runoff from the car parking area, internal roads and roof area for the community building (Catchment 1) will be restricted to Qbar for that catchment and attenuated underground via 40% void crushed rock for storm events in up to a 1 in 30 year rainfall event + 20% climate change. Storage for up to a 1 in 100 year event will be available in the infiltration trenches upstream of the hydrobrake;
- The remaining hard standing areas (tennis courts, skate park, basketball courts) will discharge to infiltration trenches where favourable infiltration values were obtained which have been designed to discharge storm events in excess of 1 in 100 year rainfall event + 20% climate change to ground. A high-level overflow pipe connecting to the surface water outfall has been provide for storm events in excess of a 1 in 100 year event (see drawing C-0110 for a typical detail of the proposed infiltration trench);
- Maintenance of the infiltration trenches and swales will be provided by use of a rigid perforated pipe through the trench with a silt trap manhole provided at each end;
- Interception storage is provided for the first 5mm rainfall within permeable paving, infiltration trenches and the open graded granular material beneath the underground attenuation system;

- A bypass petrol interceptor will intercept flows prior to discharge from the site to the existing stream (see drawing C-0110 for typical detail of the petrol interceptor).

2.3.2 Attenuation

An underground attenuation tank will be provided for Catchment 1 (see Figure 2 below) which includes the proposed hardstanding areas located to the northeast of the site where the site investigation has demonstrated that infiltration rates are not favourable. The discharge from Catchment 1 to the existing stream will be restricted to Qbar (10.20l/s) using a hydrobrake. The runoff will be treated and attenuated via permeable paving, bio-swales and infiltration trenches prior to discharging to the hydrobrake and stored in the attenuation system.

Volumes up to 1 in 30 year rainfall event + 20% climate change will be attenuated in an underground attenuation system with 40% voids with volumes up to a 1 in 100 year event stored in infiltration trenches upstream of the hydrobrake. Refer to Appendix C for Surface Water Calculations.

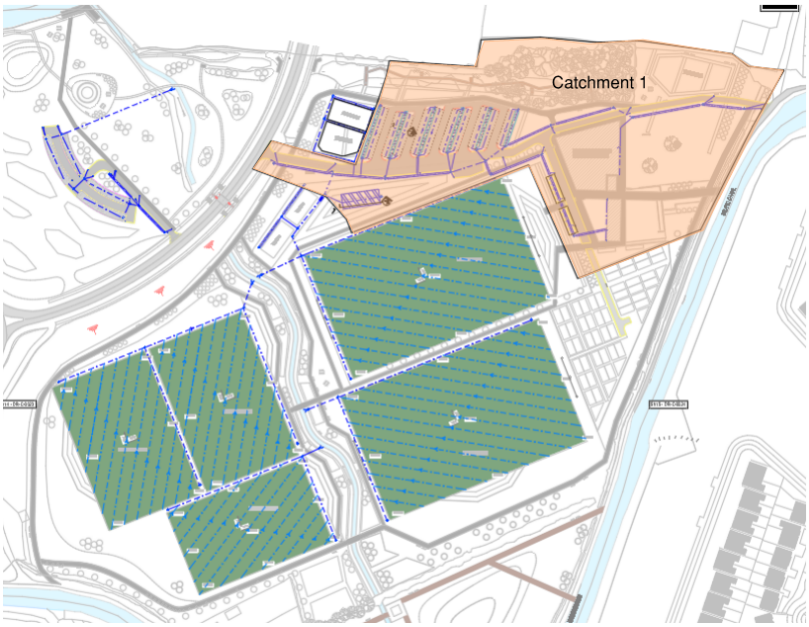


Figure 2 – Catchment 1

The design of the surface water network in Catchment 1 has been carried out using the Microdrainage design software. The design parameters included are as follows:

- Return period for storm frequency 5 years

- Return period for surface water attenuation 30 years
- Qbar 10.20 l/s
- Time of entry 5 minutes
- Standard Annual Average Rainfall 846mm
- M5-60 16.30mm
- Ratio r 0.284
- Climate Change 20%

2.3.3 Proposed Pitches

The proposed pitches construction will incorporate infiltration land drains installed at 8m cc which will discharge to ground to match the existing greenfield conditions. Infiltration rates identified during the site investigations suggested reasonable rates in the areas of the proposed pitches. Perimeter collector pipes will allow for runoff to be distributed to areas with more favourable infiltration. The drainage trenches and pitches subbase will be filled using 40% void stone and will discharge volumes up to a 1 in 100 year storm event + 20% climate change to ground.

2.4 GDSDS Summary of Design Criterion

GDSDS summarises the design criteria for the design of drainage systems under four criterions in Section 6.3.4 as follows:

1. Criterion 1 – River water quality protection
2. Criterion 2 – River regime protection
3. Criterion 3 – Level of service (Flooding) for the site
4. Criterion 4 – River flood protection

2.4.1 Criterion 1 – River water quality protection

The first 5mm rainfall event on site will be intercepted without discharging to existing stream through the provision of permeable paving, infiltration trench and a 150mm layer of 40% voids stone beneath the underground attenuation system. The total interception volume for the 5mm rainfall event has been calculated as follows:

Impermeable area = 1.145 ha

Required Interception Volume = 1.145 x10000 x 5mm/1000 = 57.25m^3

150mm depth of 40% void stone beneath attenuation tank@ 255m^2 = 15.30m^3

150mm depth of 40% void stone beneath permeable paving @ 2358m^2 = 141.48m^3

150mm depth of 40% void stone beneath infiltration trenches @ 346m^2 = 20.76m^3

Provided Interception Volume = 177.54 m^3

2.4.2 Criterion 2 – River regime protection

Discharge from the Catchment 1 site will be via a Hydrobrake to the existing stream crossing the site. The greenfield run off rates have been calculated in accordance with GDSDS based on the following calculation:

$$QBAR_{rural} = 0.00108AREA^{0.89}SAAR^{1.17}SOIL^{2.17}$$

The SOIL type has been assumed as partially Type 2 and partially Type 3 based on the infiltration characteristics of the existing subsoils outlined in the site investigation results. Qbar for the total site has been calculated as 10.20 l/s. The calculations are included in Appendix C.

2.4.3 Criterion 3 – Level of service (Flooding) for the site

The underground attenuation on site has been designed to store volumes up to 1 in 30 year rainfall event + 20% climate change with no flooding on the site. The Microdrainage analysis indicates that no overland surcharging will occur in the site.

2.4.4 Criterion 4 – River flood protection

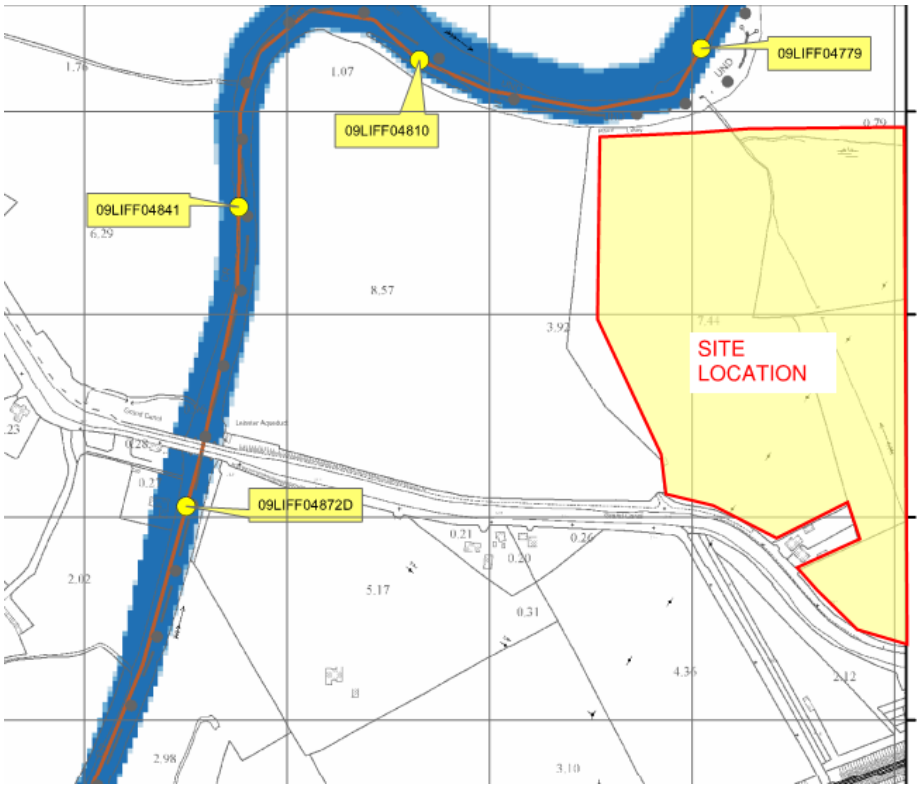
Infiltration SuDS techniques have been proposed in all catchments on site which will provide interception and long term storage of runoff. High level overflows have been provided in areas where infiltration rates were and attenuation has been designed to accommodate flood volumes up to a 1 in 30 year rainfall event + 20% climate change at greenfield runoff rates (Qbar).

The SW calculations are included in Appendix C.

3. Flooding

The Catchment Flood Risk Assessment and Management (CFRAM) Study carried out by the Office of Public Works (OPW) produced informative maps of areas indicating their susceptibility to flooding up to and including the 0.1% AEP event (1 in 1000 chance of occurrence in any given year) which is the upper limit of the study. The CFRAMs mapping (as shown in Appendix D), available from www.floodinfo.ie, indicates that the site is outside the floodplain estimated for the 1 in 1,000 year event (0.1% Annual Exceedance Period).

It has been established from CFRAMS that the estimated 1 in 1,000 flood water level adjacent to the proposed development is +70.56m at the node 09LIFF04779 (as shown in Figure 3 below). The minimum proposed ground level for the development is +73.00m OD Malin, approximately 2.4m above the predicted 1:1000 year flood level. It is therefore clear that the site is in a Flood Zone C and there is no risk of flooding to the existing site or the proposed development and no further detailed assessment of fluvial flood risk is deemed required.



Node Label	Water Level (OD) 10% AEP	Flow (m³/s) 10% AEP	Water Level (OD) 1% AEP	Flow (m³/s) 1% AEP	Water Level (OD) 0.1% AEP	Flow (m³/s) 0.1% AEP
09LIFF04779	69.66	94.23	70.13	126.51	70.56	159.93

Figure 3 – Extract from CFRAM Map

3.1 Sequential Approach and Justification Tests

The sequential approach and Justification tests procedures are outlined in 'The Planning System and Flood Risk Management Guidelines for Planning Authorities' 2009 and is summarised and adopted below.

3.1.1 Flood Zones

A sequential approach is a key tool in ensuring that development, particularly new development, is first and foremost directed towards land that is at low risk of flooding. The philosophy used in this approach is:

1. Avoid – preferably choose lower risk flood zones for new development
2. Substitute – Ensure the type of development proposed is not especially vulnerable to the adverse impact of flooding
3. Justify – Ensure that the development is being considered for strategic reasons

4. Mitigate – Ensure flood risk is reduced to minimal levels

5. Proceed – Only where Justification Test passed and emergency planning measures are in place

Figure 4 sets out the mechanism for the use of the sequential approach to development in flood areas from the planning perspective.

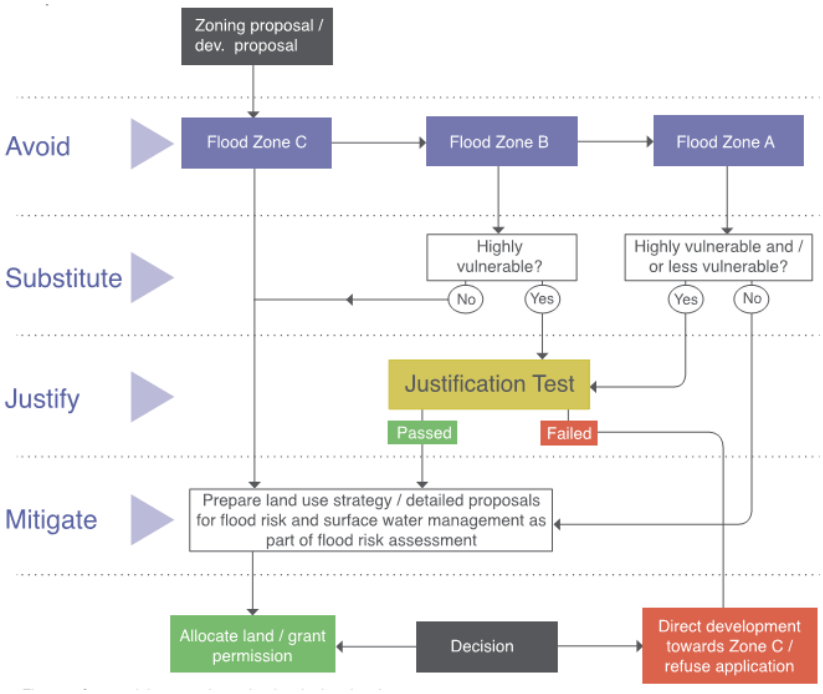


Figure 4 Sequential approach mechanism in the planning process

The sequential approach makes use of flood risk assessment and of prior identification of flood zones for river and coastal flooding and classification of the vulnerability to flooding of different types of development as outlined in the sections below.

i. Flood Zones

Flood zones are geographical areas within which the probability of flooding is in a particular range and they are a key tool in flood risk management within the planning process as well as in flood warning and emergency planning.

There are three types or levels of flood zones defined for the purposes of the guidelines:

Flood Zone A – where theprobability of flooding from rivers and the sea is highest (greater than 1% or 1 in 100 for river flooding or 0.5% or 1 in 200 for coastal flooding);

Flood Zone B – where the probability of flooding from rivers and the sea is moderate (between 0.1% or 1 in 1000 and 1% or 1 in 100 for river flooding and between 0.1 or 1 in 1000 year and 0.5% or 1 in 200 for coastal flooding);

Flood Zone C – where the probability of flooding from rivers and the sea is low (less than 0.1% or 1 in 1000 for both river and coastal flooding). Flood Zone C covers all areas of the plan which are not in zones A or B.

The proposed development has been located in a Flood Zone 'C' based on the site specific survey information. The proposed minimum floor level of the future building is approximately 3m above the 0.1% AEP flood level adjacent to the site.

ii. Vulnerability Classes

The vulnerability class of different types of developments are outlined in the below table (Figure 5). The development type (leisure / non-residential) is of a 'Less Vulnerable' category.

Vulnerability class	Land uses and types of development which include*:
Highly vulnerable development (including essential infrastructure)	Garda, ambulance and fire stations and command centres required to be operational during flooding; Hospitals; Emergency access and egress points; Schools; Dwelling houses, student halls of residence and hostels; Residential institutions such as residential care homes, children's homes and social services homes; Caravans and mobile home parks; Dwelling houses designed, constructed or adapted for the elderly or, other people with impaired mobility; and Essential infrastructure, such as primary transport and utilities distribution, including electricity generating power stations and sub-stations, water and sewage treatment, and potential significant sources of pollution (SEVESO sites, IPPC sites, etc.) in the event of flooding.
Less vulnerable development	Buildings used for: retail, leisure, warehousing, commercial, industrial and non-residential institutions; Land and buildings used for holiday or short-let caravans and camping, subject to specific warning and evacuation plans; Land and buildings used for agriculture and forestry; Waste treatment (except landfill and hazardous waste); Mineral working and processing; and Local transport infrastructure.
Water-compatible development	Flood control infrastructure; Docks, marinas and wharves; Navigation facilities; Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location; Water-based recreation and tourism (excluding sleeping accommodation); Lifeguard and coastguard stations; Amenity open space, outdoor sports and recreation and essential facilities such as changing rooms; and Essential ancillary sleeping or residential accommodation for staff required by uses in this category (subject to a specific warning and evacuation plan).
*Uses not listed here should be considered on their own merits	

Figure 5 Classification of Vulnerability of different types of development

Figure 6 illustrates those types of development which would be appropriate to each flood zone and those which would be required to meet the Justification test.

	Flood Zone A	Flood Zone B	Flood Zone C
Highly vulnerable development (including essential infrastructure)	Justification Test	Justification Test	Appropriate
Less vulnerable development	Justification Test	Appropriate	Appropriate
Water-compatible development	Appropriate	Appropriate	Appropriate

Figure 6 Vulnerability of Development vs. Flood Zone

In order to pass the first level of the sequential approach the site needs to be assessed under the avoidance criteria. This is outlined below:

The site is located in a Flood Zone C. As such, the proposed community building finished floor level is to be set approximately 3m above the predicted 0.1% AEP flood level in the flood zone.

3.2 Conclusion

The CFRAM maps and the site specific topographical survey has identified the flood extents on the existing site. The exercise indicates that the proposed development and community building are located in a Flood Zone C outside the extents of a flood event up a 0.1% AEP event (1 in 1,000 year).

The proposed community building floor level is approximately 3m above the predicted CFRAMS 1 in 1,000 year flood level of +70.56m.

As such, in our opinion, the proposed extension is located above the predicted flood zone up to a 0.1% AEP event and does not present any significant additional flooding risk to adjoining properties and does not significantly impact on the current overland flow path or flood storage volume.

4. Foul Drainage

4.1 Existing Foul Drainage

Kildare County Council and Irish Water records indicate an existing 300mm diameter foul sewer serving the Millbank residential estate located to the north east of the site. The existing gravity foul network flows towards the existing Sallins Pump Station which then discharges via a pumped rising main along the east boundary of the site towards Osberstown WWTP.

Kildare County Council and Irish Water maps are included in Appendix A of this report.

4.2 Irish Water Confirmation of Feasibility

A pre connection enquiry was submitted to Irish Water for a new wastewater connection for the proposed development. Irish Water have confirmed that a new connection to the existing network is feasible subject to extension by the applicant of the network to the existing public foul network and subject to completion of the Upper Liffey Valley Contract 2B to increase the capacity of the network which is scheduled to be completed by Q3 2022 by Irish Water.

The confirmation of feasibility letters for the development is included in Appendix E.

4.3 Proposed Foul Drainage

The proposed foul network will collect effluent from the new community buildings via a piped gravity network which will discharge to the existing foul manhole located at the north east boundary of the site. The design of the new foul network will be in compliance with the Irish Water Code of Practice and Standard Details for Wastewater Infrastructure.

The proposed discharge from the future community buildings connecting into the existing foul public network has been calculated in accordance with Irish Water standards using a peak flow factor of 6DWF.

Estimated Maximum Occupancy = 250 persons (Conservative)

Average Daily Discharge = (250 x 30 l/person/day) / (24 x 60 x 60) = 0.08 l/s

Average Daily Discharge = 0.08 l/s

Peak Daily Discharge = 0.08 x 6 DWF = 0.48 l/s

The layout of the proposed foul water drainage is included on drawing C-0030 (Proposed Foul Drainage and Watermain Layout).

5. Water Supply

5.1 Existing Water Supply

Kildare County Council and Irish Water records indicate an existing 150mm uPVC public water serving the Millbank residential estate located to the north east of the site. Kildare County Council and Irish Water maps are included in Appendix A of this report.

5.2 Proposed Water Supply

It is proposed to branch off the existing public water main located in the adjacent public estate and extend it to provide a 100mm watermain ring around the proposed community building. A new boundary box for the development will be located at the site entrance as per the Irish Water standards. A firefighting hydrant has been located to be within 46m of the proposed building in accordance with Part B of the Building regulation TGDs and Irish Water standards.

The layout of the proposed water main is included on the following drawings:

C-0030	Proposed Foul Drainage and Watermain Layout
C-0130	Typical Watermain Details

5.3 Irish Water Confirmation of Feasibility

A pre connection enquiry was submitted to Irish Water for new water connection for the proposed application development. Irish Water have confirmed that a new connection to the existing network is feasible subject network extension of watermain by the applicant to the existing public water supply. The confirmation of feasibility letter is included in Appendix E

5.4 Water Demand Calculations

Estimate Occupancy = 250 persons

Consumption = 30 litres / person / day x 250 persons = 7,500 litres / day

Average Daily Demand = 7,500 litres / day x 1.25 = 9,375 l / day/ (24x60x60) = 0.11 litres / second

Peak Daily Demand = 0.11 x 5 = 0.55 litres / second

6. Roads Infrastructure

6.1 Existing Arrangements

The new Sallins bypass extends along the western boundary of the site. A new link road to Sallins, constructed as part of the bypass, has been constructed adjacent to the proposed development site. The new link road is 7m wide road with 1.5m verge, 2m cycle path and 1.8m wide footpath on either side.

The existing site is currently accessed via an existing agricultural entrance off the canal tow path to the east of the site.

The proposed development includes a new vehicular and pedestrian access off the new Sallins bypass, GAA and soccer playing pitches, car parking, walkways, allotments, constructed wetlands, play areas and a potential future community building as indicated on Cathal O'Meara's drawings.

6.2 Traffic & Transport Assessment

A traffic and transport assessment was carried out by NRB Consulting Engineers for the proposed development. The traffic and transport assessment provided information about the traffic surveys of the adjacent road network during 2021 with a 'summertime/Covid factor' applied to reflect non-pandemic times and information about the trip generation generated as a result of the development. It was concluded that the proposed development will have a negligible impact on the local traffic conditions and surrounding road network has the capacity to accommodate the vehicular traffic generated by the proposed development.

6.3 Road Safety Audit

Traffico were commissioned to carry out a Stage 1 / 2 Road Safety Audit (RSA) on the proposed development layout. The design team have amended the site layout to take account of the recommendations from the Road Safety Audit and the feedback form has been signed off by the designer and the auditor accepting the recommendations and changes.

6.4 Proposed Arrangements

6.4.1 DMURS Compliance

The proposed road layout has been designed in accordance with the Design Manual for Urban Roads and Streets (DMURS):

- 6m wide site access road including minimum 2m wide footpaths across the site;

- Turning area within the development to permit private vehicles and bus manoeuvring within the development;
- Raised tables are proposed at the entrances to the development off the Sallins Link Road to provide a priority crossing of pedestrian and cycling movements;
- 6m corner radii are proposed for the junctions with the Sallins Link road to promote lower speeds;
- Max. 1 in 20 and min. 1 in 200 longitudinal gradients are proposed along the site access road
- Tactile paving and dropped kerbs will be provided at all proposed pedestrian crossing locations
- A toucan crossing is proposed along the Sallins Link road to allow for pedestrian and cyclists crossing between the proposed development sites.

The layout of the proposed road layout and road markings are included on the following drawings:

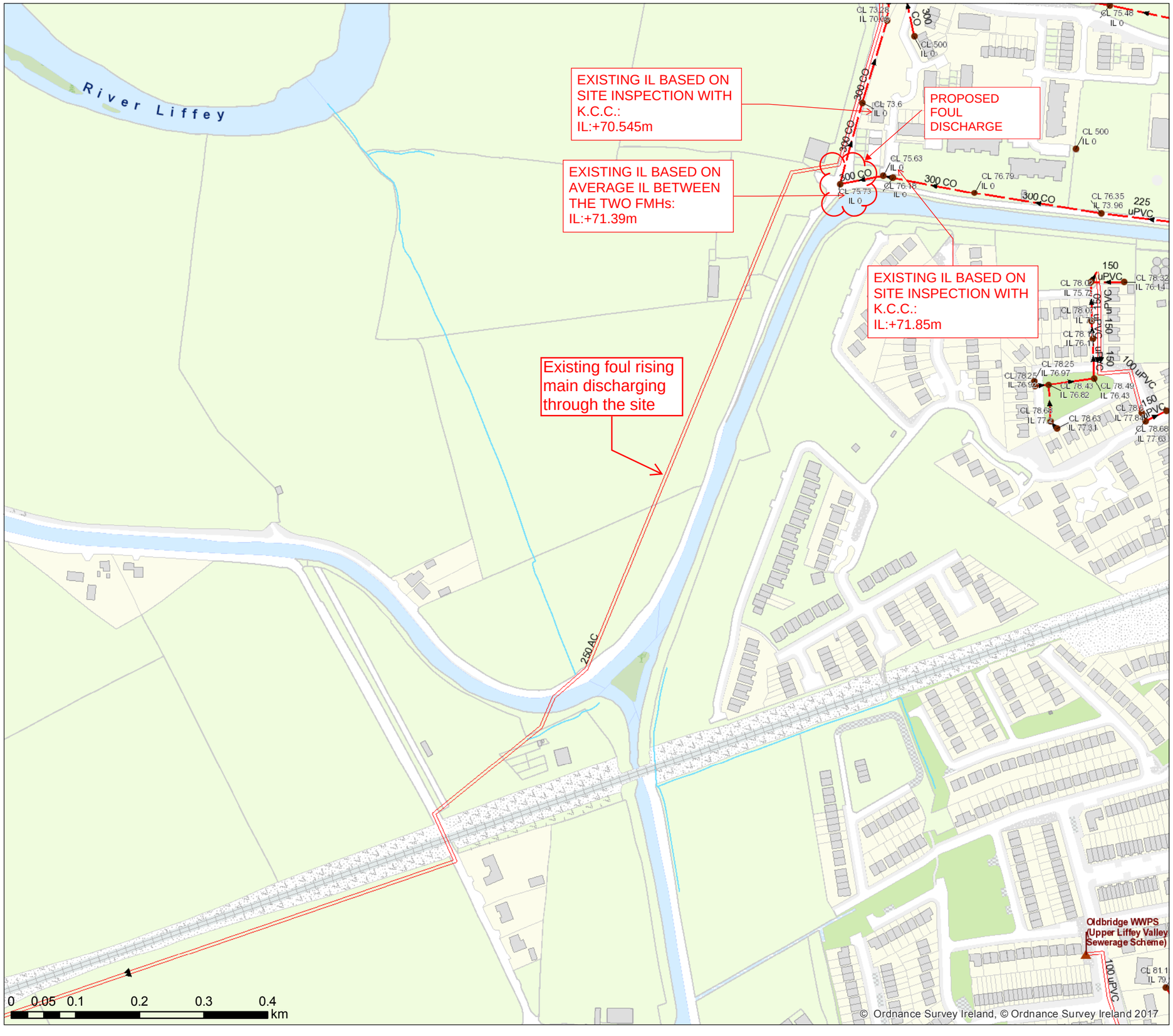
C-0050 – C-0054	Proposed Site Layout (5 Sheets)
C-0060 – C-0061	Proposed Road Markings, Signs and Visibility Splay (2 Sheets)
C-0062	Proposed Typical Crossing Layout

6.5 Autotrack

An Autotrack exercise was carried out for a bus manoeuvre at the bus set down area and also for private cars reversing at the car parking. The Autotrack analysis is indicated on drawing C-0070.

Appendix A – Kildare Co. Co. / IW Drainage Maps

Irish Water Web Map



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'Code of Practice For Avoiding Danger From Underground Services' which is available from the Health and Safety Authority (1890 28 93 89) or can be downloaded free of charge at www.hsa.ie."

Water Distribution Network
- Water Treatment Plant
- Water Pump Station
- Storage Cell/Tower
- Dosing Point
- Meter Station
- Abstraction Point
- Telemetry Kiosk

Reservoir
- Potable
- Raw Water

Water Distribution Mains
- Irish Water
- Private

Trunk Water Mains
- Irish Water
- Private

Water Lateral Lines
- Irish Water
- Non IW
- Water Casings
- Water Abandoned Lines
- Boundary Meter
- Bulk/Check Meter
- Group Scheme
- Source Meter
- Waste Meter
- Unknown Meter ; Other Meter
- Non-Return
- PRV
- PSV
- Sluice Line Valve Open/Closed
- Butterfly Line Valve Open/Closed
- Sluice Boundary Valve Open/Closed
- Butterfly Boundary Valve Open/Closed
- Scour Valves
- Single Air Control Valve
- Double Air Control Valve
- Water Stop Valves
- Water Service Connections
- Water Distribution Chambers
- Water Network Junctions
- Pressure Monitoring Point
- Fire Hydrant
- Fire Hydrant/Washout

Water Fittings
- Cap
- Reducer
- Tap
- Other Fittings

Sewer Foul Combined Network
- Waste Water Treatment Plant
- Waste Water Pump station

Sewer Mains Irish Water
- Gravity - Combined
- Gravity - Foul
- Gravity - Unknown
- Pumping - Combined
- Pumping - Foul
- Pumping - Unknown
- Syphon - Combined
- Syphon - Foul
- Overflow

Sewer Mains Private
- Gravity - Combined
- Gravity - Foul
- Gravity - Unknown
- Pumping - Combined
- Pumping - Foul
- Pumping - Unknown
- Syphon - Combined
- Syphon - Foul
- Overflow
- Sewer Lateral Lines
- Sewer Casings

Sewer Manholes
- Standard
- Backdrop
- Cascade
- Catchpit
- Bifurcation
- Hatchbox
- Lamphole
- Hydrobrake
- Other; Unknown

Discharge Type
- Outfall
- Overflow
- Soakaway
- Standard Outlet
- Other; Unknown

Cleanout Type
- Rodding Eye
- Flushing Structure
- Other; Unknown

Sewer Inlets
- Catchpit
- Gully
- Standard
- Other; Unknown

Sewer Fittings
- Vent/Col
- Other; Unknown

Storm Water Network

Surface Water Mains
- Surface Gravity Mains
- Surface Gravity Mains Private
- Surface Water Pressurised Mains
- Surface Water Pressurised Mains Private

Inlet Type
- Gully
- Standard
- Other; Unknown

Storm Manholes
- Standard
- Backdrop
- Cascade
- Catchpit
- Bifurcation
- Hatchbox
- Lamphole
- Hydrobrake
- Other; Unknown
- Storm Culverts
- Storm Clean Outs
- Stormwater Chambers

Discharge Type
- Outfall
- Overflow
- Soakaway
- Other; Unknown

Gas Networks Ireland
- Transmission High Pressure Gasline
- Distribution Medium Pressure Gasline
- Distribution Low Pressure Gasline

ESB Networks

ESB HV Lines
- HV Underground
- HV Overhead
- HV Abandoned

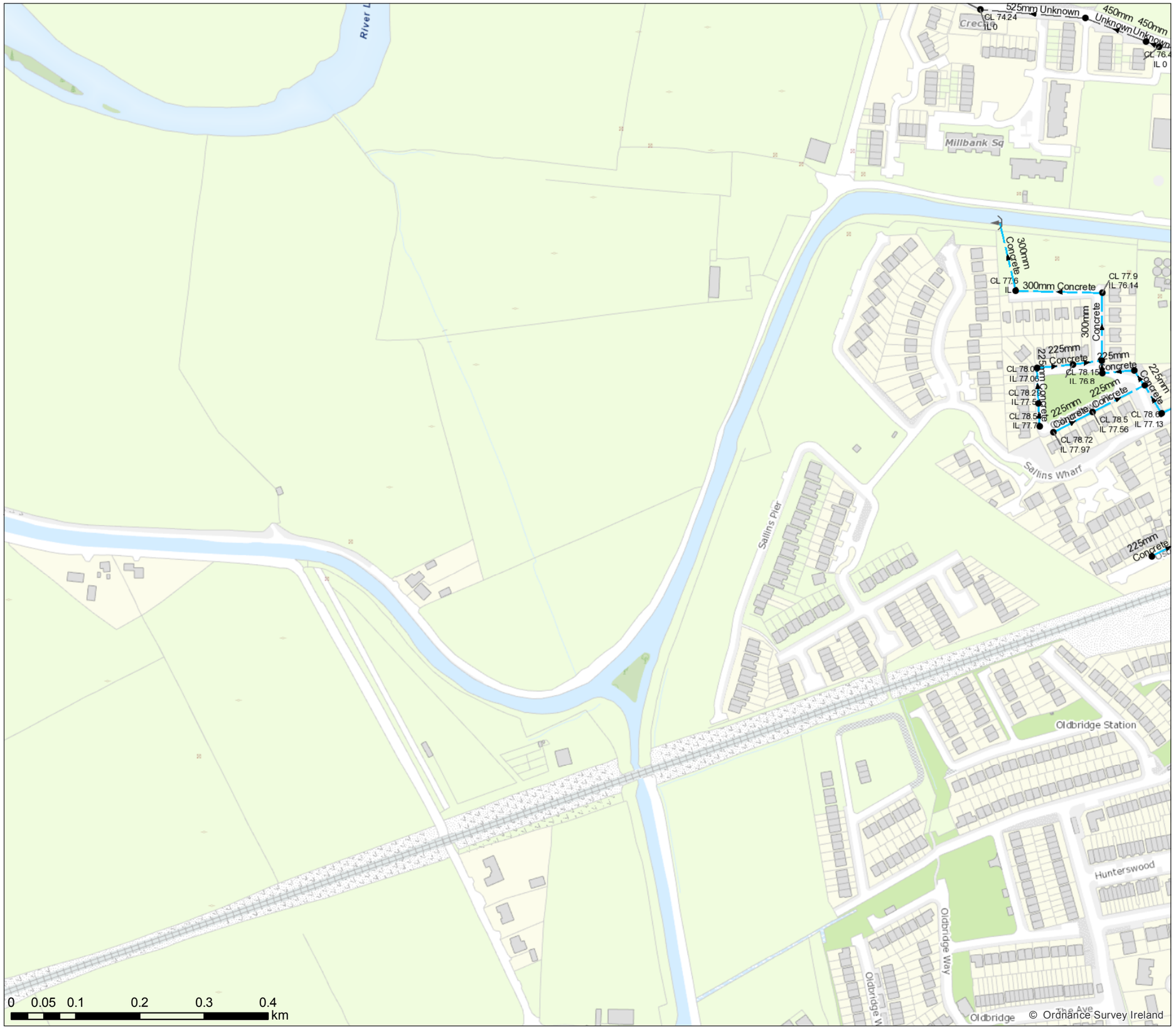
ESB MVLV Lines
- MV Overhead Three Phase
- MV Overhead Single Phase
- LV Overhead Three Phase
- LV Overhead Single Phase
- MVLV Underground
- Abandoned

Non Service Categories
- Proposed
- Under Construction
- Out of Service
- Decommissioned

Water Non Service Assets
- Water Point Feature
- Water Pipe
- Water Structure

Waste Non Service Assets
- Waste Point Feature
- Sewer
- Waste Structure

Irish Water Web Map



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Service connection pipes are not generally shown but their presence should be anticipated.

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'Code of Practice For Avoiding Danger From Underground Services' which is available from the Health and Safety Authority (1890 28 93 89) or can be downloaded free of charge at www.hsa.ie."

Water Distribution Network
- Water Treatment Plant
- Water Pump Station
- Storage Cell/Tower
- Dosing Point
- Meter Station
- Abstraction Point
- Telemetry Kiosk

Reservoir
- Potable
- Raw Water

Water Distribution Mains
- Irish Water
- Private

Trunk Water Mains
- Irish Water
- Private

Water Lateral Lines
- Irish Water
- Non IW
- Water Casings
- Water Abandoned Lines
- Boundary Meter
- Bulk/Check Meter
- Group Scheme
- Source Meter
- Waste Meter
- Unknown Meter ; Other Meter
- Non-Return
- PRV
- PSV
- Sluice Line Valve Open/Closed
- Butterfly Line Valve Open/Closed
- Sluice Boundary Valve Open/Closed
- Butterfly Boundary Valve Open/Closed
- Scour Valves
- Single Air Control Valve
- Double Air Control Valve
- Water Stop Valves
- Water Service Connections
- Water Distribution Chambers
- Water Network Junctions
- Pressure Monitoring Point
- Fire Hydrant
- Fire Hydrant/Washout

Water Fittings
- Cap
- Reducer
- Tap
- Other Fittings

Sewer Foul Combined Network
- Waste Water Treatment Plant
- Waste Water Pump station

Sewer Mains Irish Water
- Gravity - Combined
- Gravity - Foul
- Gravity - Unknown
- Pumping - Combined
- Pumping - Foul
- Pumping - Unknown
- Syphon - Combined
- Syphon - Foul
- Overflow

Sewer Mains Private
- Gravity - Combined
- Gravity - Foul
- Gravity - Unknown
- Pumping - Combined
- Pumping - Foul
- Pumping - Unknown
- Syphon - Combined
- Syphon - Foul
- Overflow
- Sewer Lateral Lines
- Sewer Casings

Sewer Manholes
- Standard
- Backdrop
- Cascade
- Catchpit
- Bifurcation
- Hatchbox
- Lamphole
- Hydrobrake
- Other; Unknown

Discharge Type
- Outfall
- Overflow
- Soakaway
- Standard Outlet
- Other; Unknown

Cleanout Type
- Rodding Eye
- Flushing Structure
- Other; Unknown

Sewer Inlets
- Catchpit
- Gully
- Standard
- Other; Unknown

Sewer Fittings
- Vent/Col
- Other; Unknown

Storm Water Network

Surface Water Mains
- Surface Gravity Mains
- Surface Gravity Mains Private
- Surface Water Pressurised Mains
- Surface Water Pressurised Mains Private

Inlet Type
- Gully
- Standard
- Other; Unknown

Storm Manholes
- Standard
- Backdrop
- Cascade
- Catchpit
- Bifurcation
- Hatchbox
- Lamphole
- Hydrobrake
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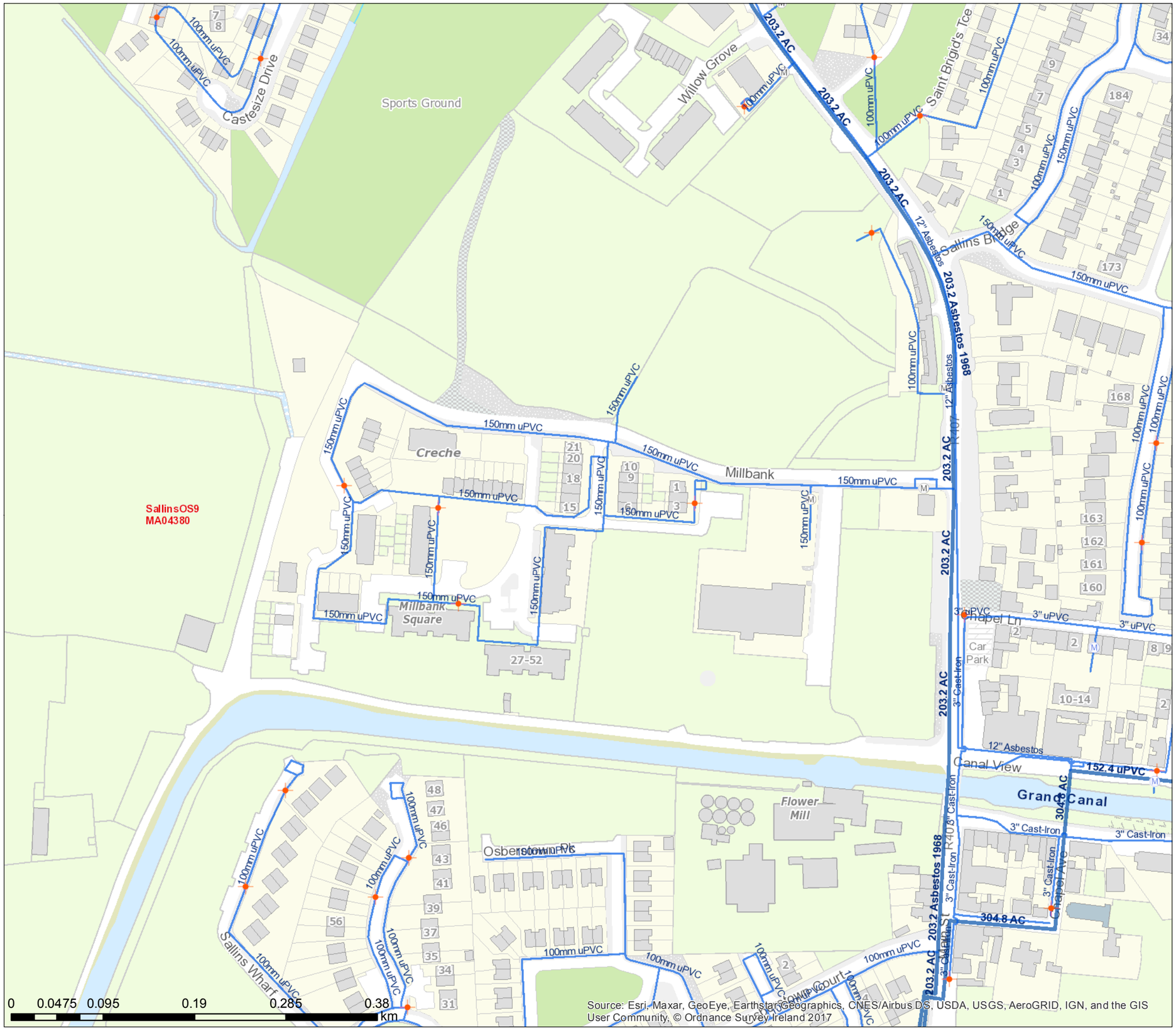

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Print Date: 01/06/2021

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- Pumping - Unknown
- Syphon - Combined
- Syphon - Foul
- Overflow

Sewer Mains Private
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- Gravity - Foul
- Gravity - Unknown
- Pumping - Combined
- Pumping - Foul
- Pumping - Unknown
- Syphon - Combined
- Syphon - Foul
- Overflow
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- Sewer Casings

Sewer Manholes
- Standard
- Backdrop
- Cascade
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- Bifurcation
- Hatchbox
- Lamphole
- Hydrobrake
- Other; Unknown

Discharge Type
- Outfall
- Overflow
- Soakaway
- Standard Outlet
- Other; Unknown

Cleanout Type
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- Flushing Structure
- Other; Unknown

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Water Non Service Assets
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- Water Pipe
- Water Structure

Waste Non Service Assets
- Waste Point Feature
- Sewer
- Waste Structure

Appendix B – Preliminary Site Investigation Report

IGSL Limited

IGSL Report No 23046

Sallins Amenity Lands
Sallins, Co Kildare

On Behalf of

Kildare County Council
(Client)
&
Donnachadh O'Brien & Assoc
Consulting Engineers

Report Date
19th February 2021

Geotechnical Report

M7 Business Park
Naas
Co. Kildare
Ireland

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W: www.igsl.ie

DEVELOPMENT. OF
AMENITY LANDS
AT SALLINS

KILDARE CO. COUNCIL

DONNACHADH O'BRIEN
CONSULTING ENGINEERS

CONTENTS

APPENDICES

FOREWORD

The following Conditions and Notes on Site Investigation Procedures should be read in conjunction with this report.

General.

Recommendations made, and opinions expressed in the report are based on the strata observed in the exploratory holes, together with the results of in-situ and laboratory tests. No responsibility can be held for conditions which have not been revealed by exploratory work, or which occur between exploratory hole locations. Whilst the report may suggest the likely configuration of strata, both between exploratory hole locations, or below the maximum depth of the investigation, this is only indicative, and liability cannot be accepted for its accuracy.

Unless specifically stated, no account has been taken of possible subsidence due to mineral extraction below or close to the site.

Standards

The ground investigation works for this project have been carried out by IGSL in accordance with Eurocode 7 - Part 2: Ground Investigation & Testing (EN 1997-2:2007). This has been used together with complementary documents such as BS 5930 (2015), BS 1377 (Parts 1 to 9) and Engineers Ireland Specification & Related Documents for Ground Investigation in Ireland (2006). The following Irish (IS) and European Standards or Norms are referenced:

- IS EN 1997-2 Eurocode 7: 2007 – Geotechnical Design – Part 2: Ground Investigation & Testing
- IS EN ISO 22475-1:2006 Geotechnical Investigation and Sampling – Sampling Methods & Groundwater Measurements
- IS EN ISO 14688-1:2002 Geotechnical Investigation and Testing – Identification and Classification of Soil, Part 1: Identification and Description
- IS EN ISO 14688-2:2004 Geotechnical Investigation and Testing – Identification and Classification of Soil, Part 2: Classification Principles

Routine Sampling.

Undisturbed samples of soils, predominantly cohesive in nature are obtained unless otherwise stated by a 104mm diameter open-drive tube sampler or Piston Sampler. In granular soils, and where undisturbed sampling is inappropriate, disturbed samples are collected. Smaller disturbed samples are also recovered at intervals to allow a visual examination of the full strata section.

In-Situ Testing.

Standard penetration tests were conducted strictly in accordance with Section 4.6 of IS EN 1997-2:2007. The SPT equipment (hammer energy test) has been calibrated in accordance with EN ISO 22476-3:2005 to obtain the Energy Ratio (E) of each hammer. A calibration certificate is available upon request. The E_r is defined as the ratio of the actual energy E_{mes} (measured energy during calibration) delivered to the drive weight assembly into the drive rod below the anvil, to the theoretical energy (E_{mes}) as calculated from the drive weight assembly. The recorded number of blows (N) reported on the engineering logs are uncorrected. In sands, the energy losses due to rod length and the effect of the overburden pressure should be taken into account (see IS EN ISO 22476-3:2005).

Groundwater

The depth of entry of any influx of groundwater is recorded during the course of boring operations. However, the normal rate of boring does not usually permit the recording of an equilibrium level for any one water strike. Where possible drilling is suspended for a period of twenty minutes to monitor the subsequent rise in water level. Groundwater conditions observed in the borings or pits are those appertaining to the period of investigation. It should be noted however, that groundwater levels are subject to diurnal, seasonal and climatic variations and can also be affected by drainage conditions, tidal variations etc.

Engineering Logging

Soil and rock identification has been based on the examination of the samples recovered and conforms with IS EN ISO 14688-1:2002 and IS EN ISO 14689-1:2004.

Where peat has been encountered during site works, samples have been logged in accordance with the Von Post Classification (ref. Von Post, L. 1992. Sveriges Gologiska Undersoknings torvinventering och nogra av dess hittils vunna resultat (SGU peat inventory and some preliminary results) Svenska Mosskulturforeningens Tidskrift, Jonkoping, Swedden, 36, 1-37 & Hobbs N. B. Mire morphology and the properties of some British and foreign peats. QJEG, Vol. 19, 1986).

Retention of Samples.

After satisfactory completion of all the scheduled laboratory tests on any sample, the remaining material is discarded unless a period of retention of samples is agreed, it is our normal practice to discard all soil samples one month after submission of our final report.

Reporting

Recommendations made and opinions expressed in this report are based on the strata observed in the exploratory holes, together with the results of in-situ and laboratory tests. No responsibility can be held by IGSL Ltd for ground conditions between exploratory hole locations.

The engineering logs provide ground profiles and configuration of strata relevant to the investigation depths achieved and caution should be taken when extrapolating between exploratory points. No liability is accepted for ground conditions extraneous to the investigation points. Unless specifically stated, no account has been taken of possible subsidence due to mineral extraction, mining works or karstification below or close to the site.

This report has been prepared for the project client and the information should not be used without prior written permission. Any recommendations developed in this report specifically relate to the proposed development. IGSL Ltd accepts no responsibility or liability for this document being used other than for the purposes for which it was intended.

REPORT ON A SITE INVESTIGATION
FOR A PROPOSED DEVELOPMENT
AT AMENITY LANDS
SALLINS COUNTY KILDARE
ON BEHALF OF
KILDARE COUNTY COUNCIL (CLIENT)
&
DONNACHADH O'BRIEN AND ASSOCIATES
CONSULTING ENGINEERS

Report No. 23046 **FEBRUARY 2021**

I Introduction

A major new amenity development is proposed for Kildare County Council on lands located in Sallins, County Kildare.

An investigation of sub soil conditions in the area of the new development has been carried out by IGSL for DOBA Consulting Engineers, on behalf of Kildare County Council. The works were carried out during a lockdown period following approval from the local authority. All field operations were completed in accordance with HSE safety guidelines related to COVID 19.

The scheduled site investigation included the following elements:

- Trial Pits 15 nr.
- Infiltration Tests (BRE Digest 365) 7 nr.
- In Situ CBR by Plate Test 4 nr.
- Environmental Laboratory Testing

This report includes all factual data from field operations and laboratory and discusses the findings relative to foundation and infrastructural design for the new development.

II Fieldwork

The development is to take place on a greenfield / brownfield site bounded to the south and east by the Grand Canal (Liffey Aqueduct). The site and the exploratory locations are noted on the drawing enclosed in Appendix V. The drawing was provided by DOBA.

The various elements of the investigation are detailed in the following paragraphs. All field works were supervised by experienced geotechnical engineers who carefully recorded stratification, recovered samples as required and prepared detailed records.

Each location was scanned electronically (CAT) to ensure that existing services were not damaged. The locations were also referenced to National Grid Co-ordinates and OD levels were established.

Trial Pits

Fifteen trial pits were opened using a light tracked excavator under engineering supervision. Trial Pits were referenced TP01 to TP15, the findings were logged and detailed geotechnical records are enclosed in Appendix I with supporting photographs.

The records reflect some variation in stratification over the site area.

MADE GROUND was found in nine locations. The fill varies in thickness from about 0.50 to in excess of 2.00 metres and generally comprises gravelly CLAY with varying amounts of building rubble. In six of the above trial pits a stratum of grey brown sandy gravelly CLAY (TILL) underlies the fill and excavations continued to completion in the gravelly CLAY at about 2.50 metres BGL. In three trial pits TP02, TP07 and TP 11, the FILL overlies a stratum of sandy GRAVEL which was penetrated to final depths of 2.50 metres.

Naturally occurring soils were encountered in the remaining six locations. In four of these, topsoil overlies brown to grey brown sandy gravelly SILT/CLAY. In the remaining two locations (TP14 and TP15) topsoil overlies sandy GRAVEL

Ground water was noted in the majority of trial pits, fully detailed on the individual records. Water ingress was recorded as seepage or light flow and in the areas where gravel was encountered was associated with trench collapse.

All trial pits were terminated in either cohesive or granular soils. Bedrock was not encountered during this limited depth investigation.

Infiltration Tests (BRE Digest 365)

Tests were scheduled at seven locations to establish soil permeability. Tests were carried out in accordance with BRE Digest 365. Trial Pts were opened to approximately 1.50 metres deep and the stratification was recorded. The open excavations are filled with water and the dissipation of this water over time is recorded.

Testing is normally carried out over two cycles following the initial soakage. If there is no fall in water level during the initial cycle the test is deemed a failure and a second cycle is not requited.

Details of each test are presented in Appendix II and the results are summarised as follows:

Test No.	**Infiltration Rate (f). Metres/ Minute**		
	1st Cycle	**2nd Cycle**	**3rd Cycle**
SA01		0.00093	
SA02	0.00509	0.00454	
SA03	0.00000		
SA04	0.0000475		
SA05	0.0000285		
SA06	0.0000590		
SA07	0.00285	0.00283	0.00267

Results from SA02 and SA07, carried out in gravel, indicate suitability for dispersion of surface water. The remaining tests were carried out in impermeable cohesive soils with little or no permeability recorded.

In Situ CBR by Plate Bearing Test

The in-situ CBR value of the soils at shallow depth was determined using plate bearing test apparatus.

A steel plate is loaded incrementally and its' deflection under load is recorded. The load is then removed and soil recovery is measured. Testing is carried out over two cycles. The equivalent CBR value is calculated in accordance with NRA HD25-26/10.

Detailed results are presented in Appendix III and summarised as follows:

Test No.	Depth	Stratum.	CBR% Load Cycle.	CBR% Re-load Cycle
CBR 01	G.L.	Fill	0.2	0.4
CBR02	0.50	Clay	0.4	1.1
CBR 03	G.L	Fill	2.1	7.9
CBR04	0.30	Clay	0.9	1.6

III. Laboratory Testing

All samples recovered during the course of the investigation were returned to IGSL for initial assessment. Detailed laboratory analysis to confirm soil classification and behavioural characteristics was not required.

A number of samples were however selected for environmental analysis to RILTA (WAC) parameters. This environmental testing was carried out in the UK by EUROFINS and detailed test results are presented in Appendix IV to this report.

RILTA Environmental

Five soil samples were submitted for detailed environmental analysis to RILTA (WAC) parameters.

The results all fall below the INERT classification parameters indicating suitability for disposal of excavated material either on-site or to a suitable INERT Landfill facility. No ASBESTOS traces were recorded.

IV. Discussion:

The lands outlined in the site location plan and examined during this geotechnical investigation are to be developed for amenity purposes by Kildare County Council.

Note is taken of the Grand Canal forming much of the site boundary to the south and east.

The investigation carried out comprised four elements:

1. Trial Pit Investigation to identify soil composition.
2. Infiltration Tests to establish suitability for dispersion of surface water.
3. In Situ CBR Tests to provide data for pavement design.
4. Environmental Tests to establish possible contamination.

Summary Stratification

The subsoils identified over much of the site consist of brown and grey silty sandy gravelly CLAY, with significant bands of sandy GRAVEL noted in about 40% of the trial pit locations. FILL or MADE GROUND has been identified in more than 50% of the locations, the thickness of the FILL varies from about 0.50 to 2.00 metres.

Ground water has been noted in most locations with excavation instability observed generally in the more granular soils. Investigation depth was generally 2.50 metres BGL. Bedrock was not encountered.

The trial pitting operation, while identifying the stratification, does not define soil strength. Visual assessment by the field engineers would indicate that the cohesive soils in the depth range GL to 2.50 metres would be classed as FIRM while the granular soils present as loose to medium dense.

Infiltration Tests

Seven tests were carried out and very low permeability characteristics were exhibited in those tests carried out in the gravelly silty CLAY stratum. This is typical of the glacial till or boulder clay deposition of the general area.

Tests carried out in the GRAVEL soils indicate that this material will be suitable for dispersion of storm or surface water in conventional soakaways.

CBR

In situ CBR values were established by plate bearing test at four location. Two tests were carried out at surface on FILL material. Results of 0.2% and 2.1% were obtained at load cycle, increasing to 0.4 and 7.9% at reload.
Two tests were taken on gravelly clay below the top soil, results here ranged from 0.4 to 1.6%, increasing marginally on re-load.

The low CBR values obtained may well reflect the very wet nature of the site following adverse winter weather. CBR values will increase as moisture content decreases, this may be assisted by site drainage and drier ground conditions.

Environmental Tests

Five samples were tested in accordance with RILTA SUITE parameters. No evidence of elevated contamination was found and no traces of Asbestos were identified. No issues arise with safety of personnel and excavated material can be utilised on site for non-engineering purposes.

IGSL/JC
February 2021

Appendix I Trial Pit Records

TRIAL PIT RECORD

REPORT NUMBER 23046

CONTRACT	Amenity Lands, Sallins,	**TRIAL PIT NO.**	**TP01**
		SHEET	Sheet 1 of 1
LOGGED BY	P.Cummins	**CO-ORDINATES**	
		DATE STARTED	08/01/2021
		DATE COMPLETED	08/01/2021
CLIENT	Kildare County Council	**GROUND LEVEL (m)**	
ENGINEER	DOBA	**EXCAVATION METHOD**	3 tonne Mini Digger

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 MADE GROUND (comprised of brown gravelly sandy silty clay, with concrete, plastic, roots, branches and red brick)					AA148204	B	0.50-1.50		
1.0									
2.0 Brown/grey slightly gravelly silty CLAY		2.00		(Seepage)	AA143205	B	2.00-2.50		
End of Trial Pit at 2.50m		2.50							
3.0									
4.0									

Groundwater Conditions
Moderate collapse from 0 -2.0

Stability
Seepage at 2.0m all directions

General Remarks

TRIAL PIT RECORD

REPORT NUMBER 23046

CONTRACT	Amenity Lands, Sallins,	**TRIAL PIT NO.**	**TP02**
		SHEET	Sheet 1 of 1
LOGGED BY	P.Cummins	**CO-ORDINATES**	
		DATE STARTED	08/01/2021
		DATE COMPLETED	08/01/2021
CLIENT	Kildare County Council	**GROUND LEVEL (m)**	
ENGINEER	DOBA	**EXCAVATION METHOD**	3 tonne Mini Digger

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
MADE GROUND (comprised of moist - dry, brown gravelly sandy silty clay - class 2 fill)		0.20							
Orange very gravelly sandy silty CLAY, Gravel is predominately metamorphic rock type of limestone and slate (possibly made ground)		0.50							
Dark grey to grey silty SAND with fine gravel, infrequent rootlets, rare large gravel clasts and lenticular sand lensing					AA148205	B	0.50		
Grey, sandy GRAVEL, medium cobble content and low boulder content, (sand and gravel lensing)		1.05			AA148206	B	1.00		
					AA143206	B	1.50		
					AA143207	B	2.00-2.50		
End of Trial Pit at 2.50m		2.40		1 (Seepage)					

0.0 1.0 2.0 3.0 4.0

Groundwater Conditions
Slight seepage at base

Stability
Moderate collapse in GRAVEL Unit

General Remarks

IGSL TP LOG 23046.GPJ IGSL.GDT 14/1/21

TRIAL PIT RECORD

REPORT NUMBER 23046

CONTRACT	Amenity Lands, Sallins,
LOGGED BY	M.Kluj
CO-ORDINATES	
CLIENT	Kildare County Council
ENGINEER	DOBA
GROUND LEVEL (m)	
TRIAL PIT NO.	TP03
SHEET	Sheet 1 of 1
DATE STARTED	21/12/2020
DATE COMPLETED	21/12/2020
EXCAVATION METHOD	3 T exavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL		0.10							
MADE GROUND (comprised of firm brown slightly gravelly sandy Clay with mediu cobble and boulder content. Sand is fine to coarse. Gravel is fine to coarse angular to subrounded of various lithologies. Contains fagments of bricks, pottery, glass and black top)					AA147531	Env	0.20		
					AA147532	B	0.50		
Brown slightly gravelly slightly sandy silty CLAY. Sand is fine to coarse. Gravel is fine to medium subanular to subrounded predominanly of limestone.		0.70							
1.0					AA142532	B	1.00		
Grey brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse angular to subrounded predominantly of limestone. Cobbles are subrounded of limestone.		1.10		1 (Seepage)					
					AA142533	B	1.50		
2.0 End of Trial Pit at 2.00m		2.00							
3.0									
4.0									

Groundwater Conditions
Water strike at 1.4

Stability
TP unstable below 1.4 . Collapse at 2.00m

General Remarks

IGSL TP LOG 23046.GPJ IGSL.GDT 14/1/21

TRIAL PIT RECORD

REPORT NUMBER 23046

CONTRACT	Amenity Lands, Sallins,	**TRIAL PIT NO.**	**TP04**
		SHEET	Sheet 1 of 1
LOGGED BY	M.Kluj	**CO-ORDINATES**	
		DATE STARTED	18/12/2020
		DATE COMPLETED	18/12/2020
CLIENT	Kildare County Council	**GROUND LEVEL (m)**	
ENGINEER	DOBA	**EXCAVATION METHOD**	3 T exavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL									
Brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular to subrounded is fine to medium of various lithologies. Possible made ground		0.25			AA147529	B	0.50		
1.0 Dark grey to brown slightly sandy very clayey fine to coarse angular to subrounded GRAVEL predominantly of limestone. Sand is fine to coarse.		1.00			AA142529	B	1.00		
Light brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse subraunded predominantly of limestone. Low cobble content		1.30							
Light brown slightly sandy slightly gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse subrounded to rounded predominantly of limestone. Cobbles are rounded of limestone.		1.60			AA147530	B	1.50		
2.0					AA142530	B	2.00		
Grey brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse angular to subrounded predominantly of limestone. Cobbles are subrounded of limestone.		2.30							
End of Trial Pit at 2.60m		2.60			AA142531	B	2.50		
3.0									
4.0									

Groundwater Conditions
TP dry

Stability
TP stable

General Remarks

IGSL TP LOG 23046.GPJ IGSL.GDT 14/1/21

TRIAL PIT RECORD

REPORT NUMBER 23046

CONTRACT	Amenity Lands, Sallins,	**TRIAL PIT NO.**	**TP05**
		SHEET	Sheet 1 of 1
LOGGED BY	M.Kluj	**CO-ORDINATES**	
		DATE STARTED	21/12/2020
		DATE COMPLETED	21/12/2020
CLIENT	Kildare County Council	**GROUND LEVEL (m)**	
ENGINEER	DOBA	**EXCAVATION METHOD**	3 T exavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL									
MADE GROUND (comprised of brown slightly gravell sandy Clay. Sand is fine to coarse. Gravel is fine to coarse angular to subrounded of varius lithologies.)		0.25			AA142542	Env	0.30-0.40		
					AA147542	B	0.50		
Light grey brown slightly sandy slightly gravelly silty CLAY with widely spaced medium layers of silt. Sand is fine to coarse. Gravel is fine to coarse subrounded predominantly of limestone.		0.70							
1.0					AA142543	B	1.00		
2.0 End of Trial Pit at 2.00m		2.00			AA147543	B	2.00		
3.0									
4.0									

Groundwater Conditions
TP dry

Stability
TP unstable

General Remarks

IGSL TP LOG 23046.GPJ IGSL.GDT 14/1/21

TRIAL PIT RECORD

REPORT NUMBER 23046

CONTRACT	Amenity Lands, Sallins,	**TRIAL PIT NO.**	**TP06**
		SHEET	Sheet 1 of 1
LOGGED BY	M.Kluj	**CO-ORDINATES**	
		DATE STARTED	22/12/2020
		DATE COMPLETED	22/12/2020
CLIENT	Kildare County Council	**GROUND LEVEL (m)**	
ENGINEER	DOBA	**EXCAVATION METHOD**	3 T exavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL									
Light brown slightly sandy slightly gravelly silty CLAY with widely spaced medium layers of silt. Sand is fine to coarse. Gravel is fine to coarse subrounded predominantly of limestone.		0.25			AA147549	Env	0.20		
Grey brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse subangular to subraunded predominantly of limestone. Low cobble and small boulder content.		0.60			AA142549	B	0.50		
1.0					AA147550	B	1.00		
2.0					AA142550	B	2.00-2.50		
Grey brown slightly clayey sandy fine to coarse aubangular to subrounded GRAVEL predominantly of limestone. Sand is fine to coarse.		2.20							
End of Trial Pit at 2.50m		2.50							
3.0									
4.0									

Groundwater Conditions
TP dry

Stability
TP stable

General Remarks

IGSL TP LOG 23046.GPJ IGSL.GDT 14/1/21

TRIAL PIT RECORD

REPORT NUMBER 23046

CONTRACT	Amenity Lands, Sallins,	**TRIAL PIT NO.**	**TP07**
		SHEET	Sheet 1 of 1
LOGGED BY	M.Kluj	**CO-ORDINATES**	
		DATE STARTED	21/12/2020
		DATE COMPLETED	21/12/2020
CLIENT	Kildare County Council	**GROUND LEVEL (m)**	
ENGINEER	DOBA	**EXCAVATION METHOD**	3 T exavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
TOPSOIL		0.0			AA147533	Env	0.10-0.25		
MADE GROUND (comprised of brown slightly gravell sandy Clay. Sand is fine to coarse. Gravel is fine to coarse angular to subrounded of varius lithologies.)		0.25		1 (Seepage)	AA142534	Env	0.50		
		1.0			AA147534	Env	1.00		
Grey brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse angular to subrounded predominantly of limestone. Cobbles are subrounded of limestone.		1.30							
Brown grey slightly silty sandy fine to coarse subangular to subrounded GRAVEL predominantly of limestone. Low cobble and boulder content. Sand is fine to coare. Cobbles and boulders are subrounded pedominantly of limestone.		1.60			AA142535	B	1.50		
		2.0			AA147535	B	2.00		
End of Trial Pit at 2.60m		2.60							
		3.0							
		4.0							

Groundwater Conditions
Water strike at 0.4

Stability
TP stable

General Remarks

IGSL TP LOG 23046.GPJ IGSL.GDT 14/1/21

TRIAL PIT RECORD

REPORT NUMBER 23046

CONTRACT	Amenity Lands, Sallins,	**TRIAL PIT NO.**	**TP08**
		SHEET	Sheet 1 of 1
LOGGED BY	M.Kluj	**CO-ORDINATES**	
		DATE STARTED	21/12/2020
		DATE COMPLETED	21/12/2020
CLIENT	Kildare County Council	**GROUND LEVEL (m)**	
ENGINEER	DOBA	**EXCAVATION METHOD**	3 T exavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL									
MADE GROUND (comprised of brown slightly gravell sandy Clay. Sand is fine to coarse. Gravel is fine to coarse angular to subrounded of varius lithologies.)		0.25			AA147540	Env	0.50		
Light grey brown slightly sandy slightly gravvelly silty CLAY. Sand is fine to coarse. Gravel is fine to coarse subrounded predominantly of limestone. Becoming more gravelly with depth.		0.90		(Slow)	AA142541	B	1.00		
1.0									
2.0					AA147541	B	2.00		
End of Trial Pit at 2.50m		2.50							
3.0									
4.0									

Groundwater Conditions
several water strikes at 0.90

Stability
TP becoming unstable with depth

General Remarks

IGSL TP LOG 23046.GPJ IGSL.GDT 14/1/21

TRIAL PIT RECORD

REPORT NUMBER 23046

CONTRACT	Amenity Lands, Sallins,	**TRIAL PIT NO.**	**TP09**
		SHEET	Sheet 1 of 1
LOGGED BY	P.Cummins	**CO-ORDINATES**	
		DATE STARTED	07/01/2021
		DATE COMPLETED	07/01/2021
CLIENT	Kildare County Council	**GROUND LEVEL (m)**	
ENGINEER	DOBA	**EXCAVATION METHOD**	3 tonne Mini Digger

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
TOPSOIL with frequent rootlets		0.00							
Orangish brown gravelly sandy very silty CLAY, frequent rootlets		0.30							
Mottled grey and orange gravelly silty CLAY. Gravel is predominately limestone		0.50			AA143202	B	0.50		
		1.00			AA148203	B	1.00		
				1 (Rapid)					
					AA143204	B	2.00		
End of Trial Pit at 2.50m		2.50							
		3.00							
		4.00							

Groundwater Conditions
Significant at base, flow from the south, (increases 30cm over 10 mins) Possible water table

Stability
Minor collapse from 1.8 -1.9m

General Remarks
Stopped due to large boulders and excessive water

IGSL TP LOG 23046.GPJ IGSL.GDT 14/1/21

TRIAL PIT RECORD

REPORT NUMBER 23046

CONTRACT	Amenity Lands, Sallins,	**TRIAL PIT NO.**	**TP10**
		SHEET	Sheet 1 of 1
LOGGED BY	P.Cummins	**CO-ORDINATES**	
		DATE STARTED	07/01/2021
		DATE COMPLETED	07/01/2021
CLIENT	Kildare County Council	**GROUND LEVEL (m)**	
ENGINEER	DOBA	**EXCAVATION METHOD**	3 tonne Mini Digger

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
TOPSOIL with frequent rootlets		0.40							
Orange brown, gravelly sandy silty CLAY. Gravel is (fine - course) sub rounded to sub angular of limestone and weathered mudstone, infrequent organics, rootlets, (subsoil)		0.90			AA148201	B	0.50		
Yellow grey gravelly sandy very silty CLAY. Gravel is sub rounded to sub angular of predominately limestone					AA143201	B	1.50		
				1 (Moderate)	AA148202	B	2.00		
End of Trial Pit at 2.50m		2.50							

0.0 1.0 2.0 3.0 4.0

Groundwater Conditions
Intermediate flow from base (increases 20cm over 15mins)

Stability
Significant collapse from 1.3m to base

General Remarks
Stopped due to large boulders and excessive water

IGSL TP LOG 23046.GPJ IGSL.GDT 14/1/21

TRIAL PIT RECORD

REPORT NUMBER 23046

CONTRACT	Amenity Lands, Sallins,	**TRIAL PIT NO.**	**TP11**
		SHEET	Sheet 1 of 1
LOGGED BY	M.Kluj	**CO-ORDINATES**	
		DATE STARTED	21/12/2020
		DATE COMPLETED	21/12/2020
CLIENT	Kildare County Council	**GROUND LEVEL (m)**	
ENGINEER	DOBA	**EXCAVATION METHOD**	3 T exavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL									
MADE GROUND (comprised of brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular to subrounded is fine to medium of various lithologies.)		0.20			AA147536	B	0.50		
1.0					AA142536	B	1.00		
Brown slightly gravelly slightly sandy silty CLAY. Sand is fine to coarse. Gravel is fine to medium subanular to subrounded predominanly of limestone.		1.20							
Brown grey slightly silty sandy fine to coarse subangular to subrounded GRAVEL predominantly of limestone. Low cobble and boulder content. Sand is fine to coare. Cobbles and boulders		1.50			AA147537	B	1.50		
2.0					AA142537	B	2.00		
End of Trial Pit at 2.60m		2.60			AA142538	B	2.50		
3.0									
4.0									

Groundwater Conditions
TP dry

Stability
TP stable

General Remarks

IGSL TP LOG 23046.GPJ IGSL.GDT 14/1/21

TRIAL PIT RECORD

REPORT NUMBER 23046

CONTRACT	Amenity Lands, Sallins,	**TRIAL PIT NO.**	**TP12**
		SHEET	Sheet 1 of 1
LOGGED BY	M.Kluj	**CO-ORDINATES**	
		DATE STARTED	21/12/2020
		DATE COMPLETED	21/12/2020
CLIENT	Kildare County Council	**GROUND LEVEL (m)**	
ENGINEER	DOBA	**EXCAVATION METHOD**	3 T exavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL		0.25							
MADE GROUND (comprised of brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular to subrounded is fine to medium of various lithologies.)		0.70			AA147538	Env	0.50		
Grey brown slightly sandy slightly gravelly silty CLAY with widely spaced medium layers of laminated silt. Sand is fine to coarse. Gravel is fine to coarse subrounded predominantly of limestone					AA142539	B	1.00		
1.0					AA147539	B	1.50		
2.0				1 (Seepage)	AA142540	B	2.00		
End of Trial Pit at 2.50m		2.50							
3.0									
4.0									

Groundwater Conditions
Water strike at 2.20

Stability
TP unstable below 2.20

General Remarks

IGSL TP LOG 23046.GPJ IGSL.GDT 14/1/21

TRIAL PIT RECORD

REPORT NUMBER 23046

CONTRACT	Amenity Lands, Sallins,	**TRIAL PIT NO.**	**TP13**
		SHEET	Sheet 1 of 1
LOGGED BY	M.Kluj	**CO-ORDINATES**	
		DATE STARTED	22/12/2020
		DATE COMPLETED	22/12/2020
CLIENT	Kildare County Council	**GROUND LEVEL (m)**	
ENGINEER	DOBA	**EXCAVATION METHOD**	3 T exavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
MADE GROUND (comprised of brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular to subrounded is fine to medium of various lithologies.)		0.20			AA147546	Env	0.10-0.20		
Light brown slightly gravelly slightly sandy silty CLAY. Sand is fine to coarse. Gravel is subangular to subrounded is fine to medium predominantly of limestone.		0.50			AA142547	B	0.50		
Brown grey slightly sandy very clayey fine to coarse angular to subrounded GRAVEL predominantly of limestone. Sand is fine to coarse.									
Grey brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse subraunded predominantly of limestone. Low cobble content		1.10			AA147547	B	1.00		
					AA142548	B	1.50		
					AA147548	B	2.00		
End of Trial Pit at 2.50m		2.50							

Groundwater Conditions
TP dry

Stability
TP unstable

General Remarks

IGSL TP LOG 23046.GPJ IGSL.GDT 14/1/21

TRIAL PIT RECORD

REPORT NUMBER 23046

CONTRACT	Amenity Lands, Sallins,	**TRIAL PIT NO.**	**TP14**
		SHEET	Sheet 1 of 1
LOGGED BY	M.Kluj	**CO-ORDINATES**	
		DATE STARTED	22/12/2020
		DATE COMPLETED	22/12/2020
CLIENT	Kildare County Council	**GROUND LEVEL (m)**	
ENGINEER	DOBA	**EXCAVATION METHOD**	3 T exavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL		0.25							
Light brown slightly gravelly slightly sandy silty CLAY. Sand is fine to coarse. Gravel is subangular to subrounded is fine to medium predominantly of limestone.		0.55			AA147544	B	0.50		
Brown grey slightly silty slightly clayey silty fine to coarse subangular to subrounded GRAVEL predominantly of limestone. Sand is fine to coase.				1 (Seepage)	AA142544	B	1.00		
1.0									
End of Trial Pit at 1.50m		1.50							
2.0									
3.0									
4.0									

Groundwater Conditions
Water strike at 1.3

Stability
TP very unstable. Collapse at 1.50m

General Remarks

IGSL TP LOG 23046.GPJ IGSL.GDT 14/1/21

TRIAL PIT RECORD

REPORT NUMBER 23046

CONTRACT	Amenity Lands, Sallins,	**TRIAL PIT NO.**	**TP15**
		SHEET	Sheet 1 of 1
LOGGED BY	M.Kluj	**CO-ORDINATES**	
		DATE STARTED	22/12/2020
		DATE COMPLETED	22/12/2020
CLIENT	Kildare County Council	**GROUND LEVEL (m)**	
ENGINEER	DOBA	**EXCAVATION METHOD**	3 T exavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL		0.30							
Brown grey slightly silty slightly clayey sandy fine to coarse subangular to subrounded GRAVEL predominantly of limestone. Sand is fine to coase.				(Seepage)	AA147545	Env	0.50		
1.0					AA142545	B	1.00		
End of Trial Pit at 1.50m		1.50			AA142546	B	1.50		
2.0									
3.0									
4.0									

Groundwater Conditions
Water strike at 1.1

Stability
TP very unstable.Collapse at 1.50m

General Remarks

IGSL TP LOG 23046.GPJ IGSL.GDT 14/1/21

Appendix II BRE Digest 365 Percolation

Soakaway Design f -value from field tests

IGSL

Contract: Amenity Lands, Sallins, Co.Kildare — Contract No. 23046
Test No. SA1
Engineer Donnachadh O'Brien & Assoc
Date: 08/01/2021

Summary of ground conditions

from	to	Description	Ground water
0.00	0.05	Soft to firm, Moist brown Gravelly sandy silty clay, MADE GROUND (class 2C)	NONE
0.50	0.80	Soft to firm, Moist, Grey sandy silty CLAY with frequent orgainics and rootlets	
0.80	1.40	Medium dense, Moist, Brown, Gravelly silty clayey SAND	

Notes: Field samples taken at stratum changes

Field Data

Depth to Water (m)	Elapsed Time (min)
1.000	0.00
1.000	1.00
1.000	2.00
1.015	3.00
1.020	4.00
1.035	5.00
1.035	7.00
1.040	9.00
1.050	10.00
1.065	15.00
1.095	20.00
1.100	25.00
1.120	32.00
1.160	50.00
1.170	60.00
1.230	100.00
1.310	160.00
1.360	200.00

Field Test

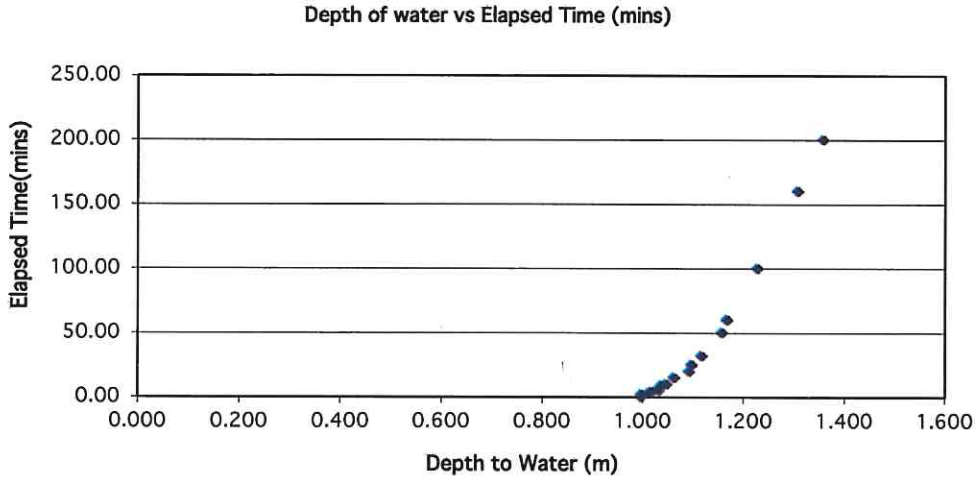
Depth of Pit (D)	1.40	m
Width of Pit (B)	0.60	m
Length of Pit (L)	2.20	m
Initial depth to Water =	1.00	m
Final depth to water =	1.360	m
Elapsed time (mins)=	200.00	
Top of permeable soil		m
Base of permeable soil		m

No fall in water level below 0.68 m

Base area=	1.32	m2
*Av. side area of permeable stratum over test perio	1.232	m2
Total Exposed area =	2.552	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 0.00093 m/min or 1.55172E-05 m/sec



Soakaway Design f -value from field tests IGSL

Contract: Amenity Lands, Sallins, Co.Kildare Contract No. 23046
Test No. SA02 (CYCLE1)
Engineer DOBA
Date: 18/12/2020

Summary of ground conditions

from	to	Description	Ground water
0.00	0.10	TOPSOIL	
0.10	0.60	Soft, brown, sandy gravelly CLAY	
0.60	0.90	Loose, dark grey, clayey sandy fine to coarse GRAVEL	DRY
0.90	1.60	Loose, grey, sandy fine to medium GRAVEL	

Field Data

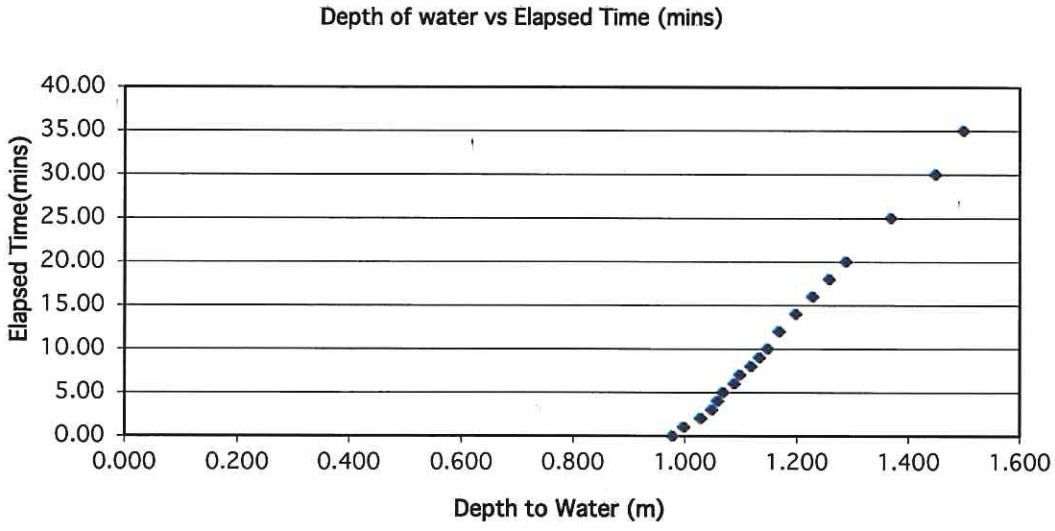
Depth to Water (m)	Elapsed Time (min)
0.980	0.00
1.000	1.00
1.030	2.00
1.050	3.00
1.060	4.00
1.070	5.00
1.090	6.00
1.100	7.00
1.120	8.00
1.135	9.00
1.150	10.00
1.170	12.00
1.200	14.00
1.230	16.00
1.260	18.00
1.290	20.00
1.370	25.00
1.450	30.00
1.500	35.00

Field Test

Depth of Pit (D)	1.60	m
Width of Pit (B)	0.50	m
Length of Pit (L)	1.50	m
Initial depth to Water =	0.98	m
Final depth to water =	1.50	m
Elapsed time (mins)=	35.00	
Top of permeable soil		m
Base of permeable soil		m
Base area=	0.75	m2
*Av. side area of permeable stratum over test perio	1.44	m2
Total Exposed area =	2.19	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 0.00509 m/min or 8.4801E-05 m/sec



Soakaway Design f -value from field tests

IGSL

Contract: Amenity Lands, Sallins, Co.Kildare
Contract No. 23046
Test No. SA02 (CYCLE2)
Engineer DOBA
Date: 18/12/2020

Summary of ground conditions

from	to	Description	Ground water
0.00	0.10	TOPSOIL	
0.10	0.60	Soft, brown, sandy gravelly CLAY	
0.60	0.90	Loose, dark grey, clayey sandy fine to coarse GRAVEL	DRY
0.90	1.60	Loose, grey, sandy fine to medium GRAVEL	

Field Data

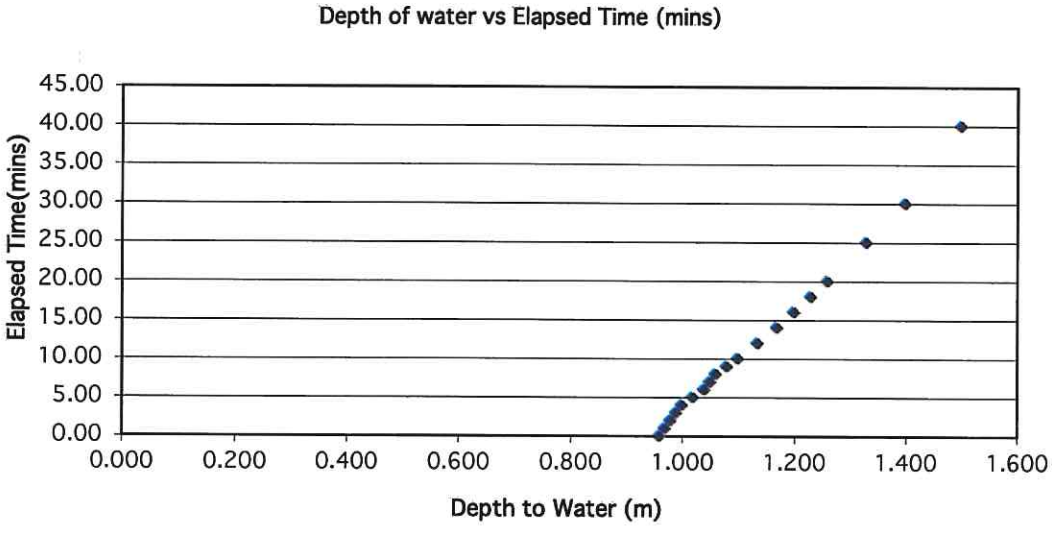
Depth to Water (m)	Elapsed Time (min)
0.960	0.00
0.970	1.00
0.980	2.00
0.990	3.00
1.000	4.00
1.020	5.00
1.040	6.00
1.050	7.00
1.060	8.00
1.080	9.00
1.100	10.00
1.135	12.00
1.170	14.00
1.200	16.00
1.230	18.00
1.260	20.00
1.330	25.00
1.400	30.00
1.500	40.00

Field Test

Depth of Pit (D)	1.60	m
Width of Pit (B)	0.50	m
Length of Pit (L)	1.50	m
Initial depth to Water =	0.96	m
Final depth to water =	1.50	m
Elapsed time (mins)=	40.00	
Top of permeable soil		m
Base of permeable soil		m
Base area=	0.75	m2
*Av. side area of permeable stratum over test perio	1.48	m2
Total Exposed area =	2.23	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 0.00454 m/min or 7.56726E-05 m/sec



Soakaway Design f -value from field tests

IGSL

Contract: Amenity Lands, Sallins, Co.Kildare
Contract No. 23046
Test No. SA03
Engineer DOBA
Date: 21/12/2020

Summary of ground conditions

from	to	Description	Ground water
0.00	0.25	TOPSOIL	
0.25	0.60	Firm, light greyish brown, slightly sandy slightly gravelly silty CLAY with some lens	
		of laminated silt	DRY
0.60	1.50	Firm, greyish brown, slightly sandy gravelly CLAY	

Field Data

Depth to Water (m)	Elapsed Time (min)
0.590	0.00
0.590	1.00
0.590	2.00
0.590	3.00
0.590	4.00
0.590	5.00
0.590	6.00
0.590	7.00
0.590	8.00
0.590	9.00
0.590	10.00
0.590	12.00
0.590	14.00
0.590	16.00
0.590	18.00
0.590	20.00
0.590	25.00
0.590	30.00
0.590	40.00
0.590	50.00
0.590	60.00

Field Test

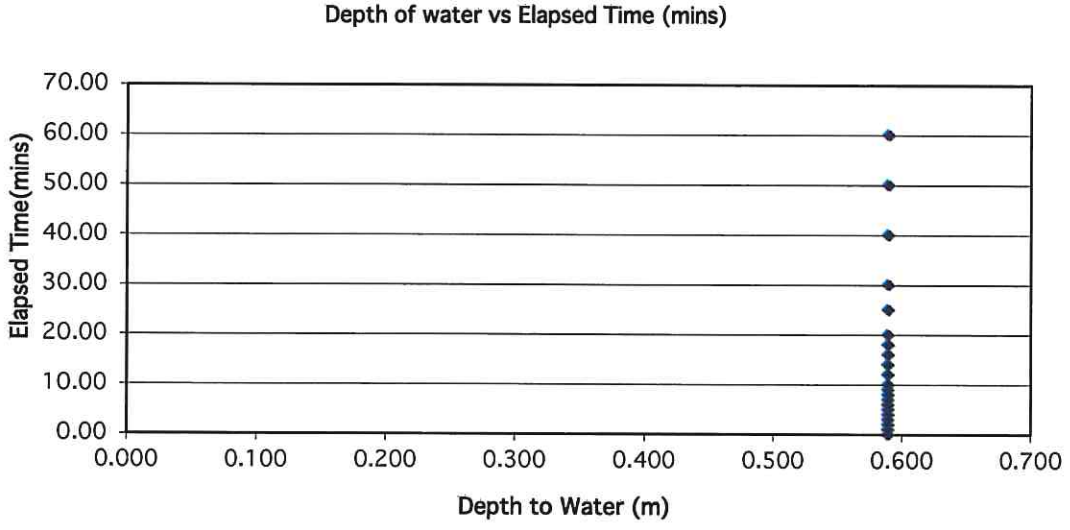
Depth of Pit (D)	1.50	m
Width of Pit (B)	0.50	m
Length of Pit (L)	1.50	m
Initial depth to Water =	0.59	m
Final depth to water =	0.59	m
Elapsed time (mins)=	60.00	
Top of permeable soil		m
Base of permeable soil		m

No any water movement

Base area=	0.75	m2
*Av. side area of permeable stratum over test perio	3.64	m2
Total Exposed area =	4.39	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 0 m/min or 0 m/sec



Soakaway Design f -value from field tests

IGSL

Contract: Amenity Lands, Sallins, Co.Kildare
Contract No. 23046
Test No. SA04
Engineer DOBA
Date: 18/12/2020

Summary of ground conditions

from	to	Description	Ground water
0.00	0.10	TOPSOIL	
0.10	0.60	Soft, brown, sandy gravelly CLAY	
0.60	1.50	Soft to firm, dark grey, slightly sandy silty CLAY with occasional plastic pieces (FIL	DRY

Field Data

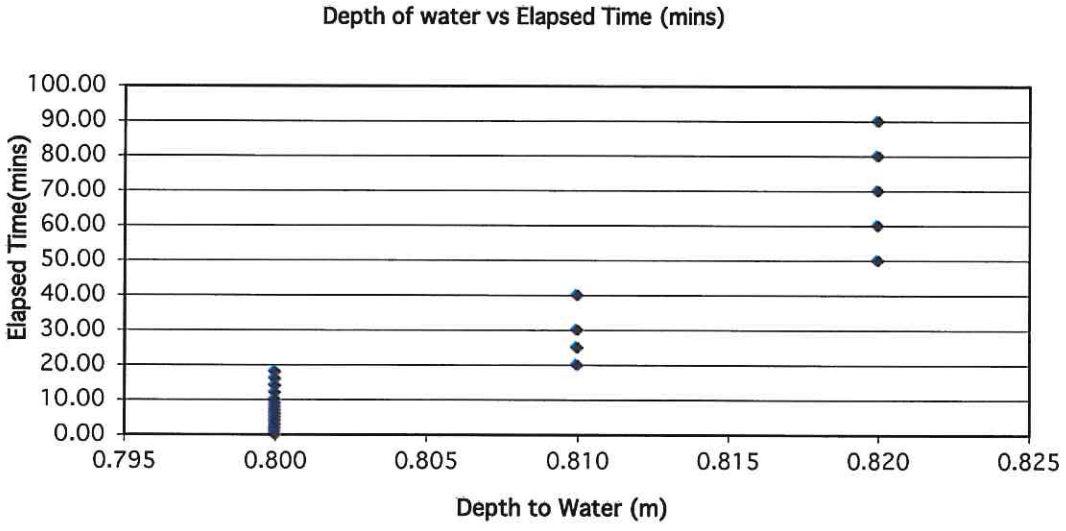
Depth to Water (m)	Elapsed Time (min)
0.800	0.00
0.800	1.00
0.800	2.00
0.800	3.00
0.800	4.00
0.800	5.00
0.800	6.00
0.800	7.00
0.800	8.00
0.800	9.00
0.800	10.00
0.800	12.00
0.800	14.00
0.800	16.00
0.800	18.00
0.810	20.00
0.810	25.00
0.810	30.00
0.810	40.00
0.820	50.00
0.820	60.00
0.820	70.00
0.820	80.00
0.820	90.00

Field Test

Depth of Pit (D)	1.50	m
Width of Pit (B)	0.50	m
Length of Pit (L)	1.50	m
Initial depth to Water =	0.80	m
Final depth to water =	0.82	m
Elapsed time (mins)=	90.00	
Top of permeable soil		m
Base of permeable soil		m
Base area=	0.75	m2
*Av. side area of permeable stratum over test perio	2.76	m2
Total Exposed area =	3.51	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 4.7E-05 m/min or 7.9139E-07 m/sec



Soakaway Design f -value from field tests

IGSL

Contract: Amenity Lands, Sallins, Co.Kildare
Contract No. 23046
Test No. SA05
Engineer DOBA
Date: 22/12/2020

Summary of ground conditions

from	to	Description	Ground water
0.00	0.25	MADE GROUND (brown sandy slightly gravelly clay)	
0.25	0.50	Firm, light brown, slightly sandy slightly gravelly silty CLAY	
0.50	1.10	Medium dense, brownish grey, slightly sandy very clayey fine to coarse GRAVEL	DRY
1.10	1.50	Firm, greyish brown, slightly sandy gravelly CLAY	

Field Data

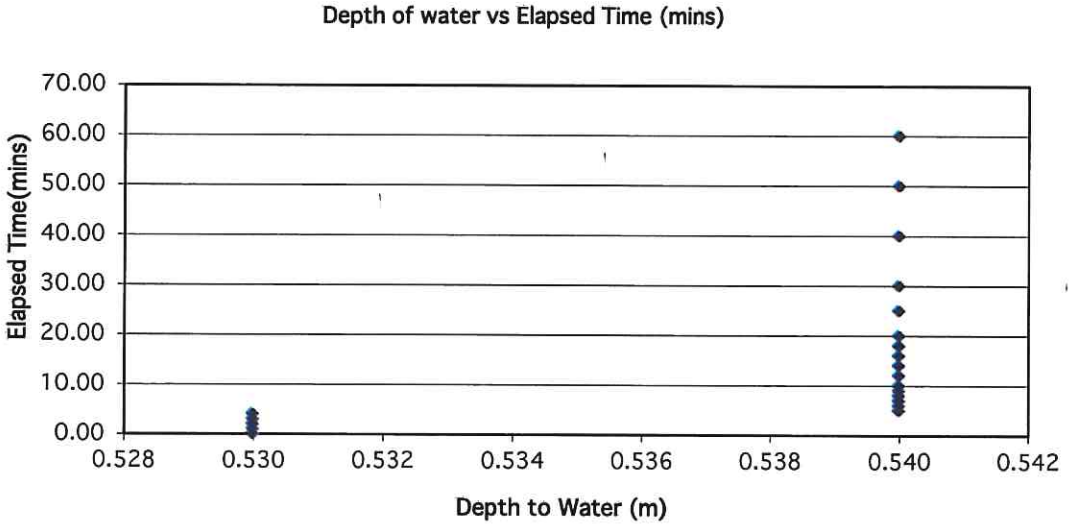
Depth to Water (m)	Elapsed Time (min)
0.530	0.00
0.530	1.00
0.530	2.00
0.530	3.00
0.530	4.00
0.540	5.00
0.540	6.00
0.540	7.00
0.540	8.00
0.540	9.00
0.540	10.00
0.540	12.00
0.540	14.00
0.540	16.00
0.540	18.00
0.540	20.00
0.540	25.00
0.540	30.00
0.540	40.00
0.540	50.00
0.540	60.00

Field Test

Depth of Pit (D)	1.50	m
Width of Pit (B)	0.50	m
Length of Pit (L)	1.70	m
Initial depth to Water =	0.53	m
Final depth to water =	0.54	m
Elapsed time (mins)=	60.00	
Top of permeable soil		m
Base of permeable soil		m
Base area=	0.85	m2
*Av. side area of permeable stratum over test perio	4.246	m2
Total Exposed area =	5.096	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 2.8E-05 m/min or 4.63326E-07 m/sec



Soakaway Design f -value from field tests

IGSL

Contract: Amenity Lands, Sallins, Co.Kildare
Contract No. 23046
Test No. SA06
Engineer DOBA
Date: 21/12/2020

Summary of ground conditions

from	to	Description	Ground water
0.00	0.25	TOPSOIL	
0.25	0.70	MADE GROUND (brown slightly gravelly sandy CLAY	
0.60	1.50	Firm, light greyish brown, slightly sandy slightly gravelly silty CLAY with some lens	DRY
		of laminated silt	

Field Data

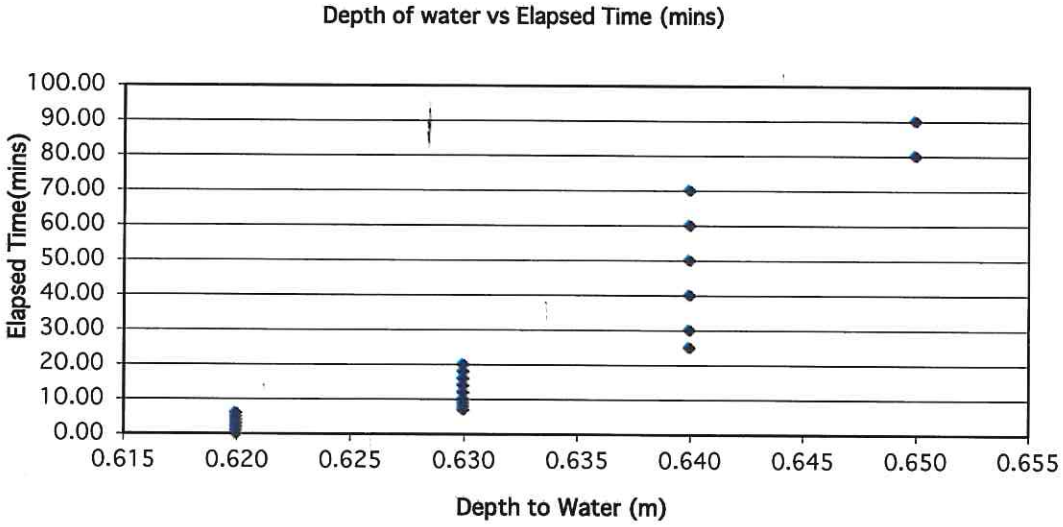
Depth to Water (m)	Elapsed Time (min)
0.620	0.00
0.620	1.00
0.620	2.00
0.620	3.00
0.620	4.00
0.620	5.00
0.620	6.00
0.630	7.00
0.630	8.00
0.630	9.00
0.630	10.00
0.630	12.00
0.630	14.00
0.630	16.00
0.630	18.00
0.630	20.00
0.640	25.00
0.640	30.00
0.640	40.00
0.640	50.00
0.640	60.00
0.640	70.00
0.650	80.00
0.650	90.00

Field Test

Depth of Pit (D)	1.50	m
Width of Pit (B)	0.50	m
Length of Pit (L)	1.50	m
Initial depth to Water =	0.62	m
Final depth to water =	0.65	m
Elapsed time (mins)=	90.00	
Top of permeable soil		m
Base of permeable soil		m
Base area=	0.75	m2
*Av. side area of permeable stratum over test perio	3.46	m2
Total Exposed area =	4.21	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 5.9E-05 m/min or 9.89707E-07 m/sec



Soakaway Design f -value from field tests

IGSL

Contract: Amenity Lands, Sallins, Co.Kildare
Contract No. 23046
Test No. SA07 (CYCLE1)
Engineer DOBA
Date: 22/12/2020

Summary of ground conditions

from	to	Description	Ground water
0.00	0.30	TOPSOIL	
0.30	1.50	Medium dense brownish grey slightly clayey slightly silty sandy fine to coarse GRA	DRY

Field Data

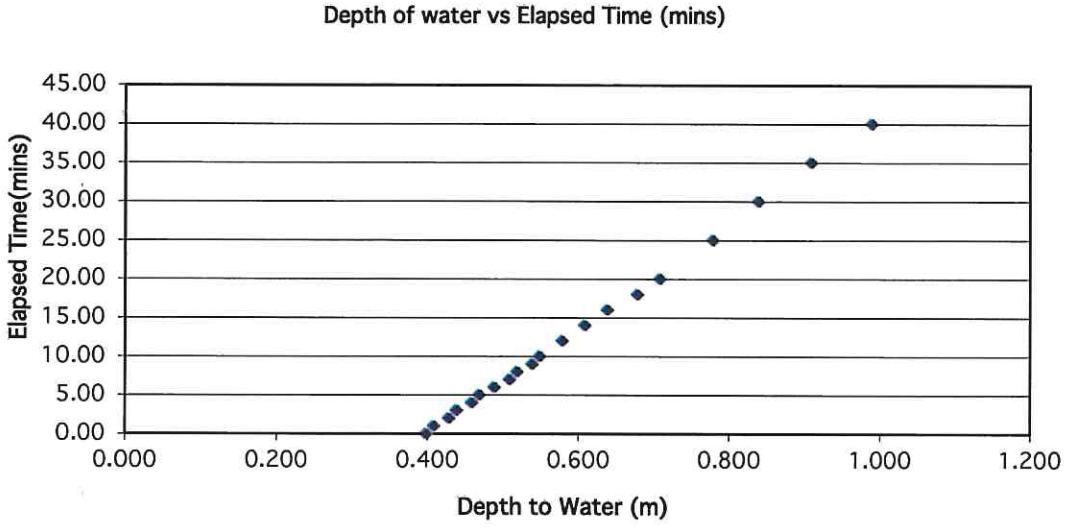
Depth to Water (m)	Elapsed Time (min)
0.400	0.00
0.410	1.00
0.430	2.00
0.440	3.00
0.460	4.00
0.470	5.00
0.490	6.00
0.510	7.00
0.520	8.00
0.540	9.00
0.550	10.00
0.580	12.00
0.610	14.00
0.640	16.00
0.680	18.00
0.710	20.00
0.780	25.00
0.840	30.00
0.910	35.00
0.990	40.00

Field Test

Depth of Pit (D)	1.50	m
Width of Pit (B)	0.50	m
Length of Pit (L)	1.70	m
Initial depth to Water =	0.40	m
Final depth to water =	0.99	m
Elapsed time (mins)=	40.00	
Top of permeable soil		m
Base of permeable soil		m
Base area=	0.85	m2
*Av. side area of permeable stratum over test perio	3.542	m2
Total Exposed area =	4.392	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 0.00285 m/min or 4.7577E-05 m/sec



Soakaway Design f -value from field tests

IGSL

Contract: Amenity Lands, Sallins, Co.Kildare
Contract No. 23046
Test No. SA07 (CYCLE2)
Engineer DOBA
Date: 22/12/2020

Summary of ground conditions

from	to	Description	Ground water
0.00	0.30	TOPSOIL	
0.30	1.50	Medium dense brownish grey slightly clayey slightly silty sandy fine to coarse GRA	DRY

Field Data

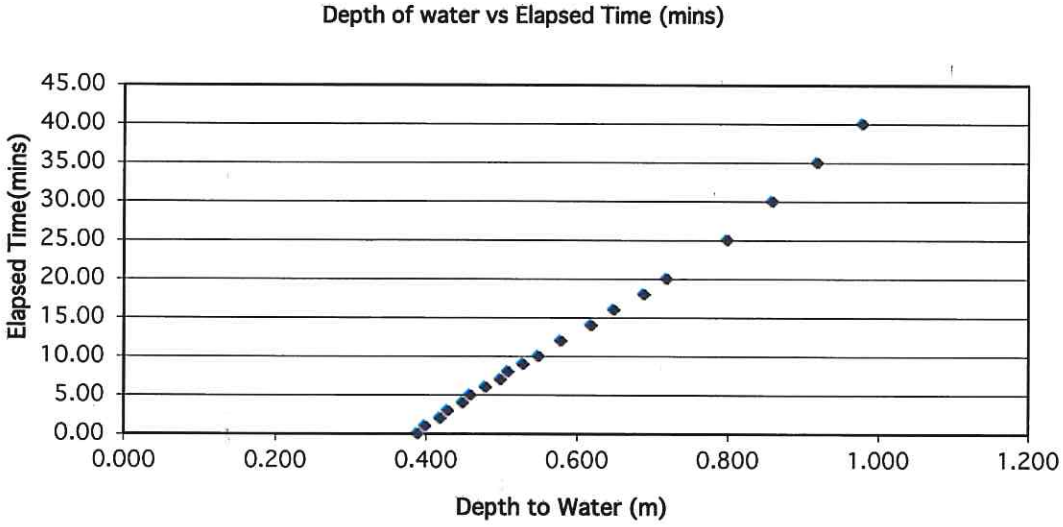
Depth to Water (m)	Elapsed Time (min)
0.390	0.00
0.400	1.00
0.420	2.00
0.430	3.00
0.450	4.00
0.460	5.00
0.480	6.00
0.500	7.00
0.510	8.00
0.530	9.00
0.550	10.00
0.580	12.00
0.620	14.00
0.650	16.00
0.690	18.00
0.720	20.00
0.800	25.00
0.860	30.00
0.920	35.00
0.980	40.00

Field Test

Depth of Pit (D)	1.50	m
Width of Pit (B)	0.50	m
Length of Pit (L)	1.70	m
Initial depth to Water =	0.39	m
Final depth to water =	0.98	m
Elapsed time (mins)=	40.00	
Top of permeable soil		m
Base of permeable soil		m
Base area=	0.85	m2
*Av. side area of permeable stratum over test perio	3.586	m2
Total Exposed area =	4.436	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 0.00283 m/min or 4.71051E-05 m/sec



Soakaway Design f -value from field tests

IGSL

Contract: Amenity Lands, Sallins, Co.Kildare
Contract No. 23046
Test No. SA07 (CYCLE3)
Engineer DOBA
Date: 22/12/2020

Summary of ground conditions

from	to	Description	Ground water
0.00	0.30	TOPSOIL	
0.30	1.50	Medium dense brownish grey slightly clayey slightly silty sandy fine to coarse GRA	DRY

Field Data

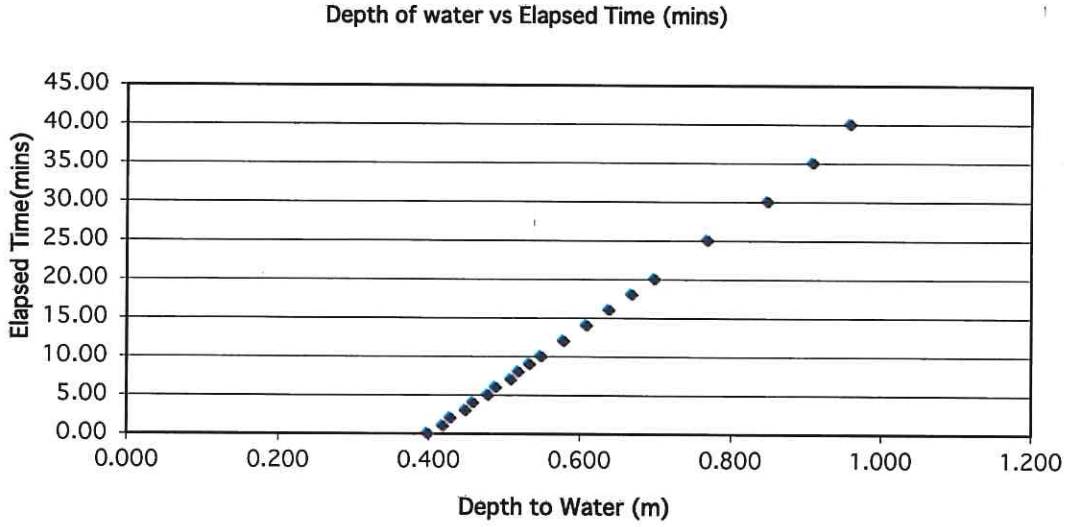
Depth to Water (m)	Elapsed Time (min)
0.400	0.00
0.420	1.00
0.430	2.00
0.450	3.00
0.460	4.00
0.480	5.00
0.490	6.00
0.510	7.00
0.520	8.00
0.535	9.00
0.550	10.00
0.580	12.00
0.610	14.00
0.640	16.00
0.670	18.00
0.700	20.00
0.770	25.00
0.850	30.00
0.910	35.00
0.960	40.00

Field Test

Depth of Pit (D)	1.50	m
Width of Pit (B)	0.50	m
Length of Pit (L)	1.70	m
Initial depth to Water =	0.40	m
Final depth to water =	0.96	m
Elapsed time (mins)=	40.00	
Top of permeable soil		m
Base of permeable soil		m
Base area=	0.85	m2
*Av. side area of permeable stratum over test perio	3.608	m2
Total Exposed area =	4.458	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 0.00267 m/min or 4.44893E-05 m/sec



Appendix III CBR by Plate Test

PLATE TEST REPORT SHEET (F3.1)

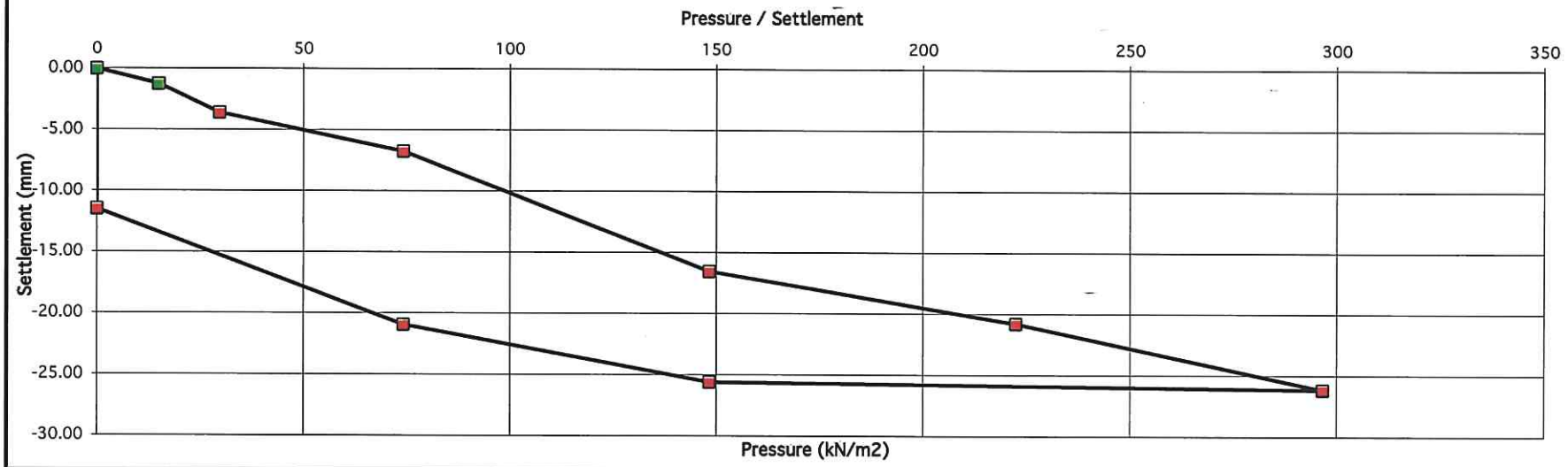
Applied Pressure/Settlement Curve

Reference No.	R118787
Contract	23046 Amenity Lands, Sallins,
Test No.	CBR01 Load
Location	See location map
Depth	Surface
Client	Kildare County Council
Plate Diameter:	300 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	Paul Cummins
Authorised by	H. Byrne
Date	08/01/2021

Description of soil under test
(natural soil, placed fill, sub-base)

Gravelly sandy silty clay, MADE GROUND

Sample Ref No. N/A
Depth 0.00 m bgl



Gradient at 1.25 mm settlement intersection = 12
Modulus of subgrade reaction = 5 MPa/m
Correction factor applied = 0.46 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 0.2 %

PLATE TEST REPORT SHEET (F3.1)

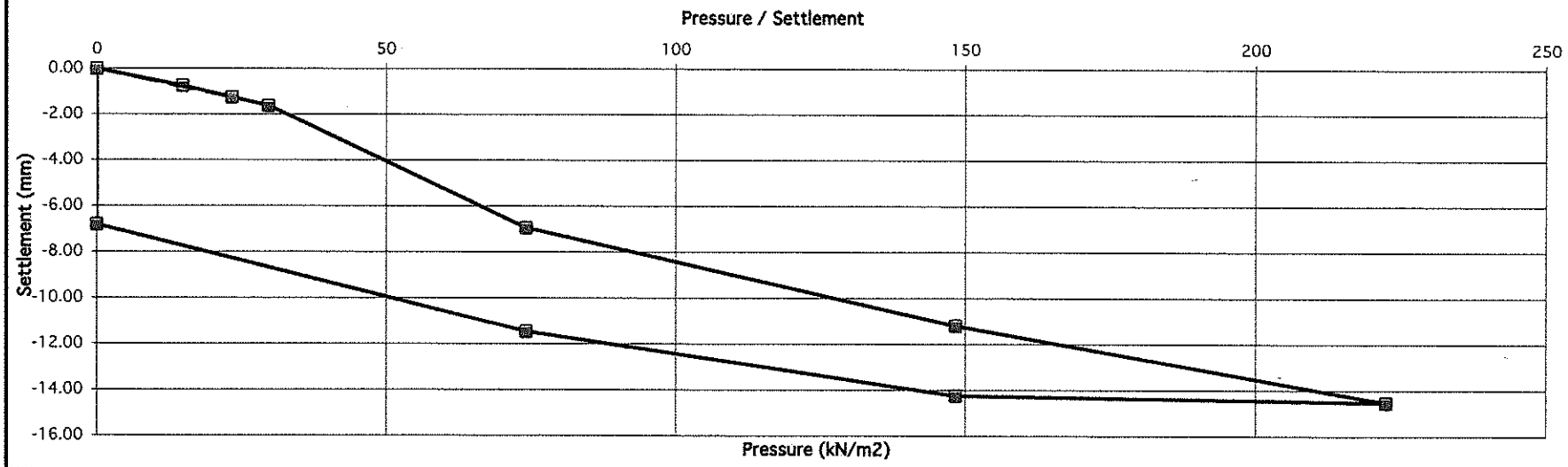
Applied Pressure/Settlement Curve

Reference No.	R118787
Contract	23046 - Amenity Lands, Sallins,
Test No.	CBR01 ReLoad
Location	See location map
Depth	Surface
Client	Kildare County Council
Plate Diameter:	300 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	Paul Cummins
Authorised by	H. Byrne
Date	08/01/2021

Description of soil under test
(natural soil, placed fill, sub-base)

Gravelly sandy silty clay, MADE GROUND

Sample Ref No. N/A
Depth 0.00 m bgl



Gradient at 1.25 mm settlement intersection = 19
Modulus of subgrade reaction = 9 MPa/m
Correction factor applied = 0.46 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 0.4 %

PLATE TEST REPORT SHEET (F3.1)

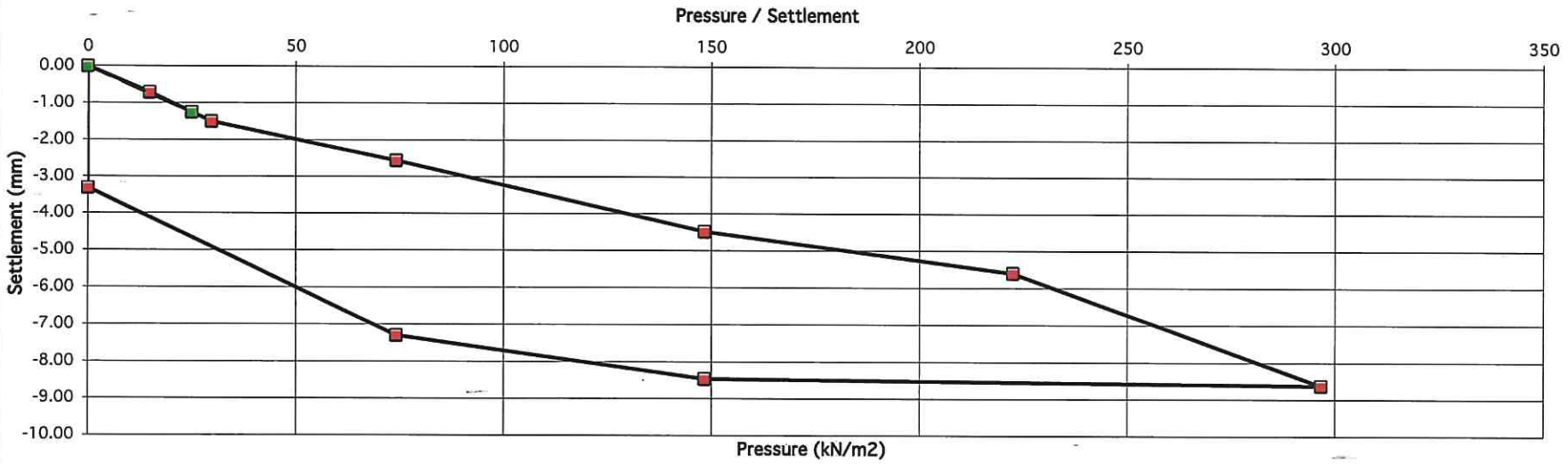
Reference No.	R118788
Contract	23046- Amenity Lands, Sallins,
Test No.	CBR02 Load
Location	See location map
Depth	0.5m below ground level
Client	Kildare County Council
Plate Diameter:	300 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	Paul Cummins
Authorised by	H. Byrne
Date	07/01/2021

Applied Pressure/Settlement Curve

Description of soil under test
(natural soil, placed fill, sub-base)

Yellowish Brown, Gravelly sandy silty CLAY

Sample Ref No. N/A
Depth 0.00 m bgl



Gradient at 1.25 mm settlement intersection = 20
Modulus of subgrade reaction = 9 MPa/m
Correction factor applied = 0.46 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 0.4 %

PLATE TEST REPORT SHEET (F3.1)

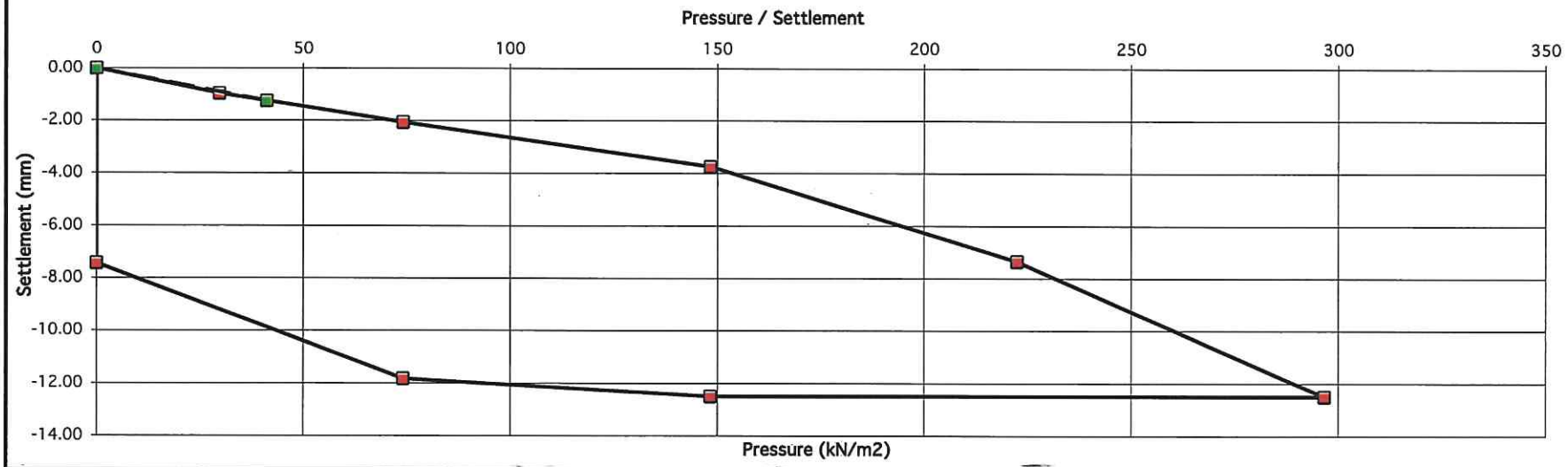
Applied Pressure/Settlement Curve

Reference No.	R118788
Contract	23046- Amenity Lands, Sallins
Test No.	CBR02 ReLoad
Location	See location map
Depth	0.5m below ground level
Client	Kildare County Council
Plate Diameter:	300 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	Paul Cummins
Authorised by	H. Byrne
Date	07/01/2021

Description of soil under test
(natural soil, placed fill, sub-base)

Yellowish Brown, Gravelly sandy silty CLAY

Sample Ref No. N/A
Depth 0.00 m bgl



Gradient at 1.25 mm settlement intersection = 33
Modulus of subgrade reaction = 15 MPa/m
Correction factor applied = 0.46 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 1.1 %

PLATE TEST REPORT SHEET (F3.1)

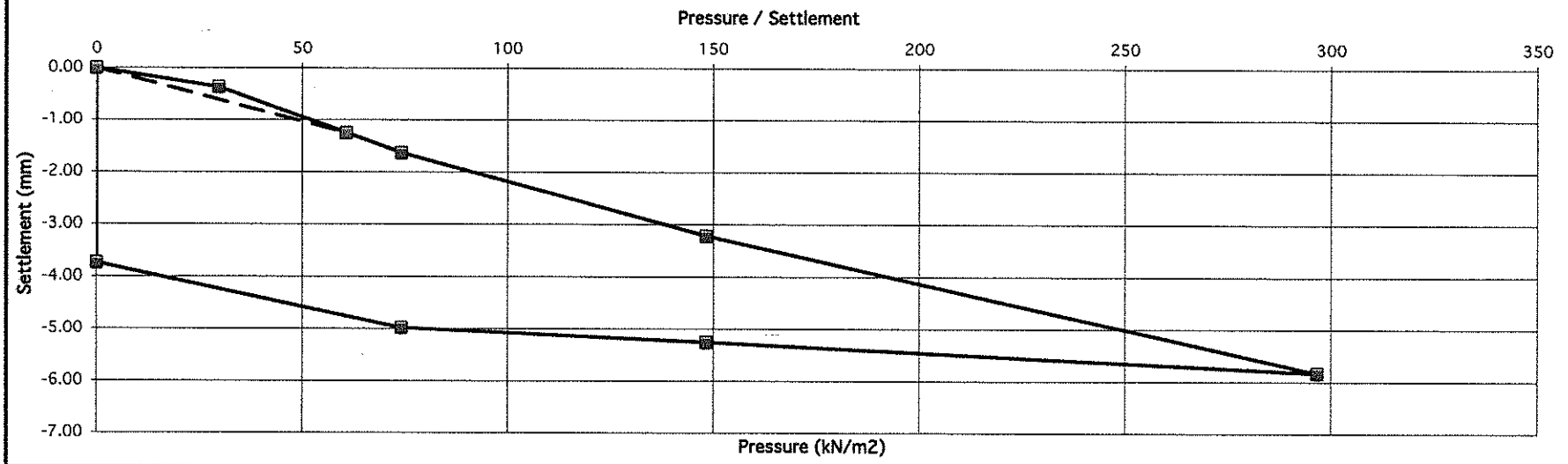
Applied Pressure/Settlement Curve

Reference No.	R118789
Contract	23046- Amenity Lands, Sallins,
Test No.	CBR03 Load
Location	See location map
Depth	Surface
Client	Kildare County Council
Plate Diameter:	300 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	Paul Cummins
Authorised by	H. Byrne
Date	07/01/2021

Description of soil under test
(natural soil, placed fill, sub-base)

Gravelly sandy silty clay, MADE GROUND

Sample Ref No. N/A
Depth 0.00 m bgl



Gradient at 1.25 mm settlement intersection = 49
Modulus of subgrade reaction = 22 MPa/m
Correction factor applied = 0.46 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 2.1 %

PLATE TEST REPORT SHEET (F3.1)

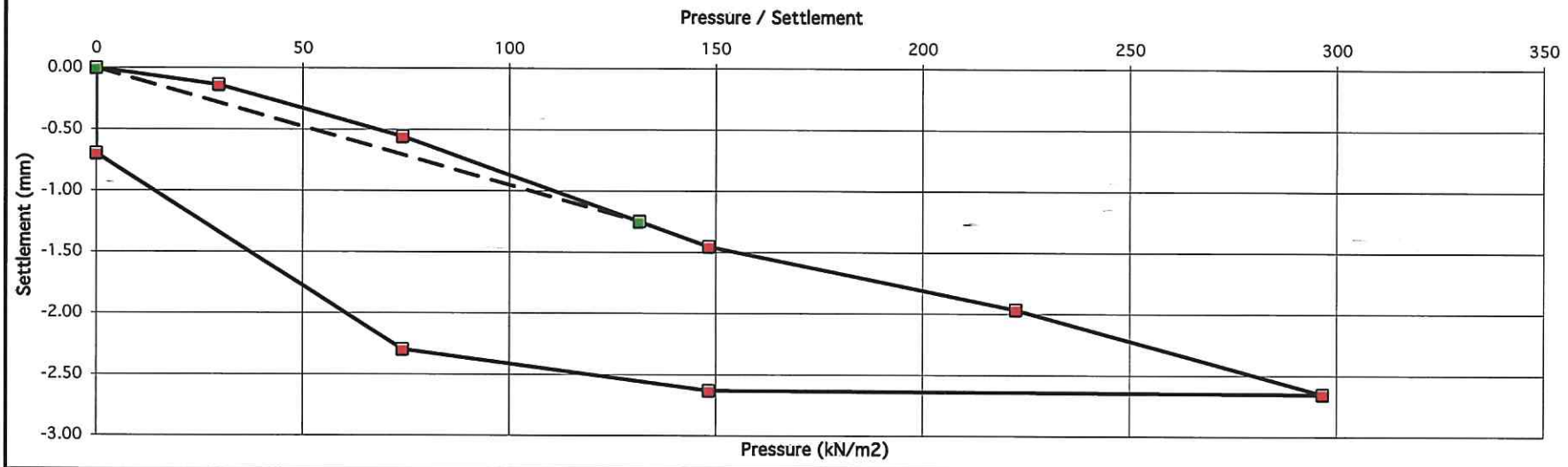
Applied Pressure/Settlement Curve

Reference No.	R118789
Contract	23046- Amenity Lands, Sallins,
Test No.	CBR03 ReLoad
Location	See location map
Depth	Surface
Client	Kildare County Council
Plate Diameter:	300 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	Paul Cummins
Authorised by	H. Byrne
Date	07/01/2021

Description of soil under test
(natural soil, placed fill, sub-base)

Gravelly sandy silty clay, MADE GROUND

Sample Ref No. N/A
Depth 0.00 m bgl



Gradient at 1.25 mm settlement intersection = 105
Modulus of subgrade reaction = 48 MPa/m
Correction factor applied = 0.46 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 7.9 %

PLATE TEST REPORT SHEET (F3.1)

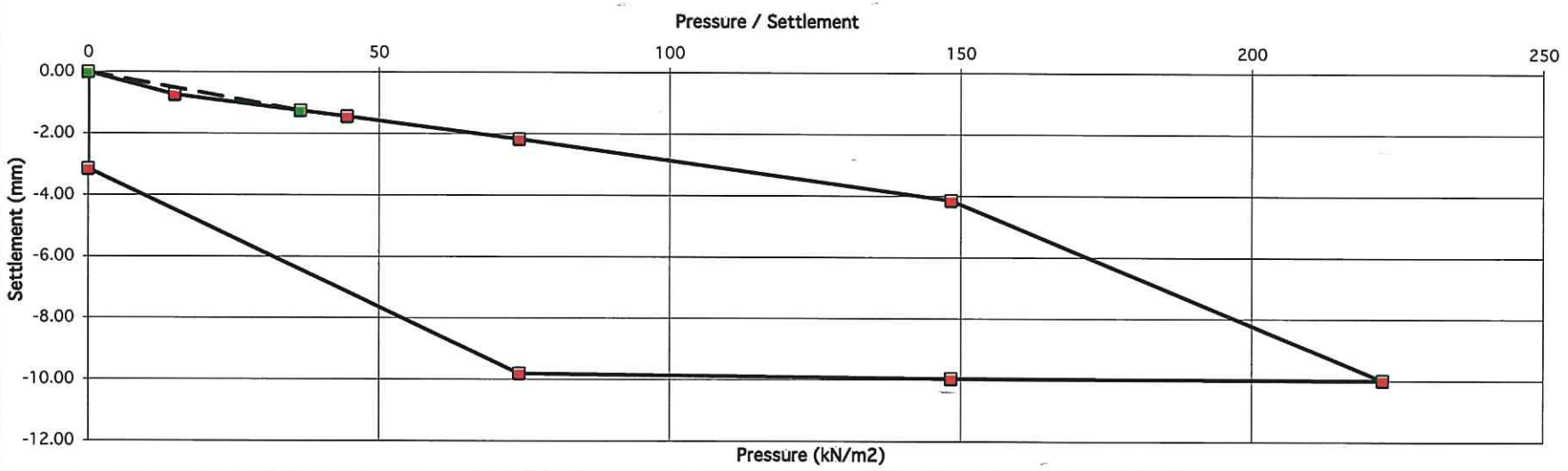
Applied Pressure/Settlement Curve

Reference No.	R118790
Contract	23046- Amenity Lands, Sallins
Test No.	CBR04 Load
Location	See location map
Depth	0.3m below ground level
Client	Kildare County Council
Plate Diameter:	300 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	Paul Cummins
Authorised by	H. Byrne
Date	07/01/2021

Description of soil under test
(natural soil, placed fill, sub-base)

Greyish Brown, slightly gravelly very silty CLAY

Sample Ref No. N/A
Depth 0.00 m bgl



Gradient at 1.25 mm settlement intersection = 29
Modulus of subgrade reaction = 13 MPa/m
Correction factor applied = 0.46 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 0.9 %

PLATE TEST REPORT SHEET (F3.1)

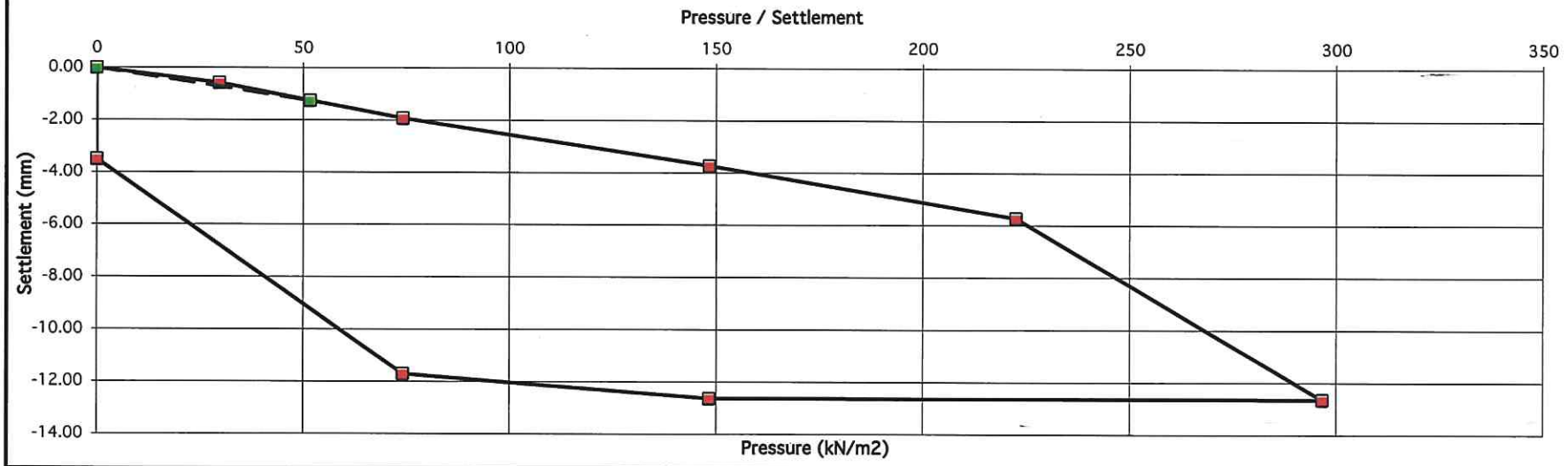
Applied Pressure/Settlement Curve

Reference No.	R118790
Contract	23046- Amenity Lands, Sallins
Test No.	CBR04 ReLoad
Location	See location map
Depth	0.3m below ground level
Client	Kildare County Council
Plate Diameter:	300 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	Paul Cummins
Authorised by	H. Byrne
Date	07/01/2021

Description of soil under test
(natural soil, placed fill, sub-base)

Greyish Brown, slightly gravelly very silty CLAY

Sample Ref No. N/A
Depth 0.00 m bgl



Gradient at 1.25 mm settlement intersection = 41
Modulus of subgrade reaction = 19 MPa/m
Correction factor applied = 0.46 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 1.6 %

Appendix IV Environmental Laboratory

eurofins | Chemtest
Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
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UKAS TESTING
2183

Final Report

Report No.:	21-01431-1		
Initial Date of Issue:	27-Jan-2021		
Client	IGSL		
Client Address:	M7 Business Park Naas County Kildare Ireland		
Contact(s):	Darren Keogh		
Project	23046 Sallins Amenity Lands (DOBA)		
Quotation No.:	Q20-19951	**Date Received:**	19-Jan-2021
Order No.:		**Date Instructed:**	19-Jan-2021
No. of Samples:	5		
Turnaround (Wkdays):	7	**Results Due:**	27-Jan-2021
Date Approved:	27-Jan-2021		

Approved By:

Details: Glynn Harvey, Technical Manager

Results - Leachate

Project: 23046 Sallins Amenity Lands (DOBA)

Client: IGSL				Chemtest Job No.:		21-01431	21-01431	21-01431	21-01431	21-01431
Quotation No.: Q20-19951				Chemtest Sample ID.:		1127068	1127069	1127070	1127071	1127072
Order No.:				Client Sample Ref.:		148204	147531	147540	147536	147545
				Sample Location:		TP1	TP3	TP8	TP11	TP15
				Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):		0.50	0.20	0.25	0.30	0.50
				Bottom Depth (m):		1.50	0.70	0.90	1.00	1.00
Determinand	**Accred.**	**SOP**	**Type**	**Units**	**LOD**					
pH	U	1010	10:1		N/A	8.7	8.4	8.5	8.4	8.1
Ammonium	U	1220	10:1	mg/l	0.050	< 0.050	0.23	< 0.050	< 0.050	0.082
Ammonium	N	1220	10:1	mg/kg	0.10	0.54	2.6	0.45	0.44	0.88
Boron (Dissolved)	U	1450	10:1	mg/kg	0.20	0.49	0.38	< 0.20	< 0.20	< 0.20
Benzo[j]fluoranthene	N	1800	10:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010

Results - Soil

Project: 23046 Sallins Amenity Lands (DOBA)

Client: IGSL				Chemtest Job No.:	21-01431	21-01431	21-01431	21-01431	21-01431
Quotation No.: Q20-19951				Chemtest Sample ID.:	1127068	1127069	1127070	1127071	1127072
Order No.:				Client Sample Ref.:	148204	147531	147540	147536	147545
				Sample Location:	TP1	TP3	TP8	TP11	TP15
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	0.50	0.20	0.25	0.30	0.50
				Bottom Depth (m):	1.50	0.70	0.90	1.00	1.00
				Asbestos Lab:	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
ACM Type	U	2192		N/A	-	-	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-	-	-	-	-
Moisture	N	2030	%	0.020	8.1	10	14	15	17
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	[A] 0.55	[A] 0.43	[A] 0.45	[A] 0.47	[A] < 0.40
Sulphur (Elemental)	U	2180	mg/kg	1.0	[A] 2.9	[A] 2.8	[A] 2.3	[A] 1.5	[A] 1.4
Cyanide (Total)	U	2300	mg/kg	0.50	[A] < 0.50	[A] < 0.50	[A] < 0.50	[A] < 0.50	[A] < 0.50
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	[A] 8.8	[A] 2.7	[A] 4.2	[A] 3.7	[A] 1.9
Sulphate (Acid Soluble)	U	2430	%	0.010	[A] 0.042	[A] 0.037	[A] 0.025	[A] 0.061	[A] 0.092
Arsenic	U	2450	mg/kg	1.0	28	11	11	14	11
Barium	U	2450	mg/kg	10	80	140	92	72	110
Cadmium	U	2450	mg/kg	0.10	1.2	1.1	1.8	1.4	1.3
Chromium	U	2450	mg/kg	1.0	17	22	25	24	20
Molybdenum	U	2450	mg/kg	2.0	< 2.0	2.1	< 2.0	< 2.0	< 2.0
Antimony	N	2450	mg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Copper	U	2450	mg/kg	0.50	19	15	15	22	23
Mercury	U	2450	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.11	0.19
Nickel	U	2450	mg/kg	0.50	29	20	36	35	24
Lead	U	2450	mg/kg	0.50	100	110	39	46	59
Selenium	U	2450	mg/kg	0.20	0.28	0.59	0.37	0.43	0.92
Zinc	U	2450	mg/kg	0.50	120	93	86	110	91
Chromium (Trivalent)	N	2490	mg/kg	1.0	17	22	25	24	20
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Mineral Oil	N	2670	mg/kg	10	< 10	< 10	< 10	< 10	< 10
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0

Results - Soil

Project: 23046 Sallins Amenity Lands (DOBA)

Client: IGSL				Chemtest Job No.:	21-01431	21-01431	21-01431	21-01431	21-01431
Quotation No.: Q20-19951				Chemtest Sample ID.:	1127068	1127069	1127070	1127071	1127072
Order No.:				Client Sample Ref.:	148204	147531	147540	147536	147545
				Sample Location:	TP1	TP3	TP8	TP11	TP15
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	0.50	0.20	0.25	0.30	0.50
				Bottom Depth (m):	1.50	0.70	0.90	1.00	1.00
				Asbestos Lab:	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	[A] < 10	[A] < 10	[A] < 10	[A] < 10	[A] < 10
Benzene	U	2760	µg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Toluene	U	2760	µg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Ethylbenzene	U	2760	µg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
m & p-Xylene	U	2760	µg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
o-Xylene	U	2760	µg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Methyl Tert-Butyl Ether	U	2760	µg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Naphthalene	N	2800	mg/kg	0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010
Acenaphthylene	N	2800	mg/kg	0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010
Acenaphthene	N	2800	mg/kg	0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010
Fluorene	N	2800	mg/kg	0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010
Phenanthrene	N	2800	mg/kg	0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] 0.33
Anthracene	N	2800	mg/kg	0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] 0.057
Fluoranthene	N	2800	mg/kg	0.010	[A] 0.11	[A] 0.17	[A] < 0.010	[A] < 0.010	[A] 0.40
Pyrene	N	2800	mg/kg	0.010	[A] 0.10	[A] 0.16	[A] < 0.010	[A] < 0.010	[A] 0.33
Benzo[a]anthracene	N	2800	mg/kg	0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] 0.22
Chrysene	N	2800	mg/kg	0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] 0.22
Benzo[b]fluoranthene	N	2800	mg/kg	0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] 0.24
Benzo[k]fluoranthene	N	2800	mg/kg	0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] 0.11
Benzo[a]pyrene	N	2800	mg/kg	0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] 0.21
Indeno(1,2,3-c,d)Pyrene	N	2800	mg/kg	0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010
Benzo[g,h,i]perylene	N	2800	mg/kg	0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010
Coronene	N	2800	mg/kg	0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010
Total Of 17 PAH's	N	2800	mg/kg	0.20	[A] 0.21	[A] 0.33	[A] < 0.20	[A] < 0.20	[A] 2.1
PCB 28	N	2815	mg/kg	0.0010	[A] < 0.0010	[A] < 0.0010	[A] < 0.0010	[A] < 0.0010	[A] < 0.0010
PCB 52	N	2815	mg/kg	0.0010	[A] < 0.0010	[A] < 0.0010	[A] < 0.0010	[A] < 0.0010	[A] < 0.0010
PCB 90+101	N	2815	mg/kg	0.0010	[A] < 0.0010	[A] < 0.0010	[A] < 0.0010	[A] < 0.0010	[A] < 0.0010
PCB 118	N	2815	mg/kg	0.0010	[A] < 0.0010	[A] < 0.0010	[A] < 0.0010	[A] < 0.0010	[A] < 0.0010
PCB 153	N	2815	mg/kg	0.0010	[A] < 0.0010	[A] < 0.0010	[A] < 0.0010	[A] < 0.0010	[A] < 0.0010
PCB 138	N	2815	mg/kg	0.0010	[A] < 0.0010	[A] < 0.0010	[A] < 0.0010	[A] < 0.0010	[A] < 0.0010
PCB 180	N	2815	mg/kg	0.0010	[A] < 0.0010	[A] < 0.0010	[A] < 0.0010	[A] < 0.0010	[A] < 0.0010
Total PCBs (7 congeners)	N	2815	mg/kg	0.0010	[A] < 0.0010	[A] < 0.0010	[A] < 0.0010	[A] < 0.0010	[A] < 0.0010

Results - Soil

Project: 23046 Sallins Amenity Lands (DOBA)

Client: IGSL					Chemtest Job No.:	21-01431	21-01431	21-01431	21-01431	21-01431
Quotation No.: Q20-19951					Chemtest Sample ID.:	1127068	1127069	1127070	1127071	1127072
Order No.:					Client Sample Ref.:	148204	147531	147540	147536	147545
					Sample Location:	TP1	TP3	TP8	TP11	TP15
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	0.50	0.20	0.25	0.30	0.50
					Bottom Depth (m):	1.50	0.70	0.90	1.00	1.00
					Asbestos Lab:	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**						
Total Phenols	U	2920	mg/kg	0.30		< 0.30	< 0.30	< 0.30	< 0.30	< 0.30

Results - Single Stage WAC

Project: 23046 Sallins Amenity Lands (DOBA)

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	21-01431						
Chemtest Sample ID:	1127068						
Sample Ref:	148204						
Sample ID:							
Sample Location:	TP1						
Top Depth(m):	0.50						
Bottom Depth(m):	1.50						
Sampling Date:							
Determinand	**SOP**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	U	%	[A] 0.55	3	5	6
Loss On Ignition	2610	U	%	2.9	--	--	10
Total BTEX	2760	U	mg/kg	[A] < 0.010	6	--	--
Total PCBs (7 congeners)	2815	N	mg/kg	[A] < 0.0010	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg	[A] < 10	500	--	--
Total Of 17 PAH's	2800	N	mg/kg	[A] 0.21	100	--	--
pH	2010	U		8.8	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.017	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1450	U	0.0058	0.058	0.5	2	25
Barium	1450	U	0.012	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.010	0.04	1	5
Chromium	1450	U	0.0094	0.094	0.5	10	70
Copper	1450	U	0.0038	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	0.0029	< 0.050	0.5	10	30
Nickel	1450	U	0.0019	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	< 0.010	0.5	10	50
Antimony	1450	U	0.0011	0.011	0.06	0.7	5
Selenium	1450	U	0.0025	0.025	0.1	0.5	7
Zinc	1450	U	0.0042	< 0.50	4	50	200
Chloride	1220	U	1.1	11	800	15000	25000
Fluoride	1220	U	0.20	2.0	10	150	500
Sulphate	1220	U	8.6	86	1000	20000	50000
Total Dissolved Solids	1020	N	78	780	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	10	100	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	8.1

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - Single Stage WAC

Project: 23046 Sallins Amenity Lands (DOBA)

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	21-01431						
Chemtest Sample ID:	1127069						
Sample Ref:	147531						
Sample ID:							
Sample Location:	TP3						
Top Depth(m):	0.20						
Bottom Depth(m):	0.70						
Sampling Date:							
Determinand	**SOP**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	U	%	[A] 0.56	3	5	6
Loss On Ignition	2610	U	%	2.2	--	--	10
Total BTEX	2760	U	mg/kg	[A] < 0.010	6	--	--
Total PCBs (7 congeners)	2815	N	mg/kg	[A] < 0.0010	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg	[A] < 10	500	--	--
Total Of 17 PAH's	2800	N	mg/kg	[A] 0.33	100	--	--
pH	2010	U		8.2	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.014	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1450	U	< 0.0010	< 0.050	0.5	2	25
Barium	1450	U	0.0037	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.010	0.04	1	5
Chromium	1450	U	0.0082	0.082	0.5	10	70
Copper	1450	U	0.0045	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	< 0.0010	< 0.050	0.5	10	30
Nickel	1450	U	< 0.0010	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	< 0.010	0.5	10	50
Antimony	1450	U	< 0.0010	< 0.010	0.06	0.7	5
Selenium	1450	U	0.0015	0.015	0.1	0.5	7
Zinc	1450	U	0.0044	< 0.50	4	50	200
Chloride	1220	U	< 1.0	< 10	800	15000	25000
Fluoride	1220	U	0.21	2.1	10	150	500
Sulphate	1220	U	< 1.0	< 10	1000	20000	50000
Total Dissolved Solids	1020	N	72	710	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	13	130	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	10

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - Single Stage WAC

Project: 23046 Sallins Amenity Lands (DOBA)

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	21-01431						
Chemtest Sample ID:	1127070						
Sample Ref:	147540						
Sample ID:							
Sample Location:	TP8						
Top Depth(m):	0.25						
Bottom Depth(m):	0.90						
Sampling Date:							
Determinand	**SOP**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	U	%	[A] 0.43	3	5	6
Loss On Ignition	2610	U	%	3.0	--	--	10
Total BTEX	2760	U	mg/kg	[A] < 0.010	6	--	--
Total PCBs (7 congeners)	2815	N	mg/kg	[A] < 0.0010	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg	[A] < 10	500	--	--
Total Of 17 PAH's	2800	N	mg/kg	[A] < 0.20	100	--	--
pH	2010	U		8.8	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.011	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1450	U	< 0.0010	< 0.050	0.5	2	25
Barium	1450	U	0.021	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.010	0.04	1	5
Chromium	1450	U	< 0.0010	< 0.050	0.5	10	70
Copper	1450	U	0.0012	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	< 0.0010	< 0.050	0.5	10	30
Nickel	1450	U	< 0.0010	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	< 0.010	0.5	10	50
Antimony	1450	U	< 0.0010	< 0.010	0.06	0.7	5
Selenium	1450	U	< 0.0010	< 0.010	0.1	0.5	7
Zinc	1450	U	0.0019	< 0.50	4	50	200
Chloride	1220	U	< 1.0	< 10	800	15000	25000
Fluoride	1220	U	0.25	2.5	10	150	500
Sulphate	1220	U	< 1.0	< 10	1000	20000	50000
Total Dissolved Solids	1020	N	65	650	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	13	130	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	14

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - Single Stage WAC

Project: 23046 Saltins Amenity Lands (DOBA)

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	21-01431						
Chemtest Sample ID:	1127071						
Sample Ref:	147536						
Sample ID:							
Sample Location:	TP11						
Top Depth(m):	0.30						
Bottom Depth(m):	1.00						
Sampling Date:							
Determinand	**SOP**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	U	%	[A] 1.1	3	5	6
Loss On Ignition	2610	U	%	4.7	--	--	10
Total BTEX	2760	U	mg/kg	[A] < 0.010	6	--	--
Total PCBs (7 congeners)	2815	N	mg/kg	[A] < 0.0010	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg	[A] < 10	500	--	--
Total Of 17 PAH's	2800	N	mg/kg	[A] < 0.20	100	--	--
pH	2010	U		8.6	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.016	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1450	U	< 0.0010	< 0.050	0.5	2	25
Barium	1450	U	0.0070	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.010	0.04	1	5
Chromium	1450	U	< 0.0010	< 0.050	0.5	10	70
Copper	1450	U	0.0019	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	0.0022	< 0.050	0.5	10	30
Nickel	1450	U	< 0.0010	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	< 0.010	0.5	10	50
Antimony	1450	U	< 0.0010	< 0.010	0.06	0.7	5
Selenium	1450	U	< 0.0010	< 0.010	0.1	0.5	7
Zinc	1450	U	0.0026	< 0.50	4	50	200
Chloride	1220	U	1.4	14	800	15000	25000
Fluoride	1220	U	0.27	2.7	10	150	500
Sulphate	1220	U	12	120	1000	20000	50000
Total Dissolved Solids	1020	N	85	840	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	7.8	78	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	15

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - Single Stage WAC

Project: 23046 Sallins Amenity Lands (DOBA)

Chemtest Job No:	21-01431				Landfill Waste Acceptance Criteria Limits		
Chemtest Sample ID:	1127072						
Sample Ref:	147545						
Sample ID:							
Sample Location:	TP15						
Top Depth(m):	0.50						
Bottom Depth(m):	1.00						
Sampling Date:							
Determinand	**SOP**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	U	%	[A] 2.7	3	5	6
Loss On Ignition	2610	U	%	7.2	--	--	10
Total BTEX	2760	U	mg/kg	[A] < 0.010	6	--	--
Total PCBs (7 congeners)	2815	N	mg/kg	[A] < 0.0010	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg	[A] < 10	500	--	--
Total Of 17 PAH's	2800	N	mg/kg	[A] 2.1	100	--	--
pH	2010	U		7.9	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.0030	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1450	U	< 0.0010	< 0.050	0.5	2	25
Barium	1450	U	0.012	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.010	0.04	1	5
Chromium	1450	U	< 0.0010	< 0.050	0.5	10	70
Copper	1450	U	0.0029	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	< 0.0010	< 0.050	0.5	10	30
Nickel	1450	U	< 0.0010	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	< 0.010	0.5	10	50
Antimony	1450	U	< 0.0010	< 0.010	0.06	0.7	5
Selenium	1450	U	< 0.0010	< 0.010	0.1	0.5	7
Zinc	1450	U	0.0010	< 0.50	4	50	200
Chloride	1220	U	< 1.0	< 10	800	15000	25000
Fluoride	1220	U	0.21	2.1	10	150	500
Sulphate	1220	U	< 1.0	< 10	1000	20000	50000
Total Dissolved Solids	1020	N	91	910	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	10	100	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	17

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request.The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
1127068	148204		TP1		A	Amber Glass 250ml
1127068	148204		TP1		A	Plastic Tub 500g
1127069	147531		TP3		A	Amber Glass 250ml
1127069	147531		TP3		A	Plastic Tub 500g
1127070	147540		TP8		A	Amber Glass 250ml
1127070	147540		TP8		A	Plastic Tub 500g
1127071	147536		TP11		A	Amber Glass 250ml
1127071	147536		TP11		A	Plastic Tub 500g
1127072	147545		TP15		A	Amber Glass 250ml
1127072	147545		TP15		A	Plastic Tub 500g

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1450	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-MS	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Pentane extraction / GCMS detection
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2015	Acid Neutralisation Capacity	Acid Reserve	Titration
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2180	Sulphur (Elemental) in Soils by HPLC	Sulphur	Dichloromethane extraction / HPLC with UV detection
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Alkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N–dimethyl-p-phenylenediamine.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.

Test Methods

SOP	Title	Parameters included	Method summary
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenz[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.
640	Characterisation of Waste (Leaching C10)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operation procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

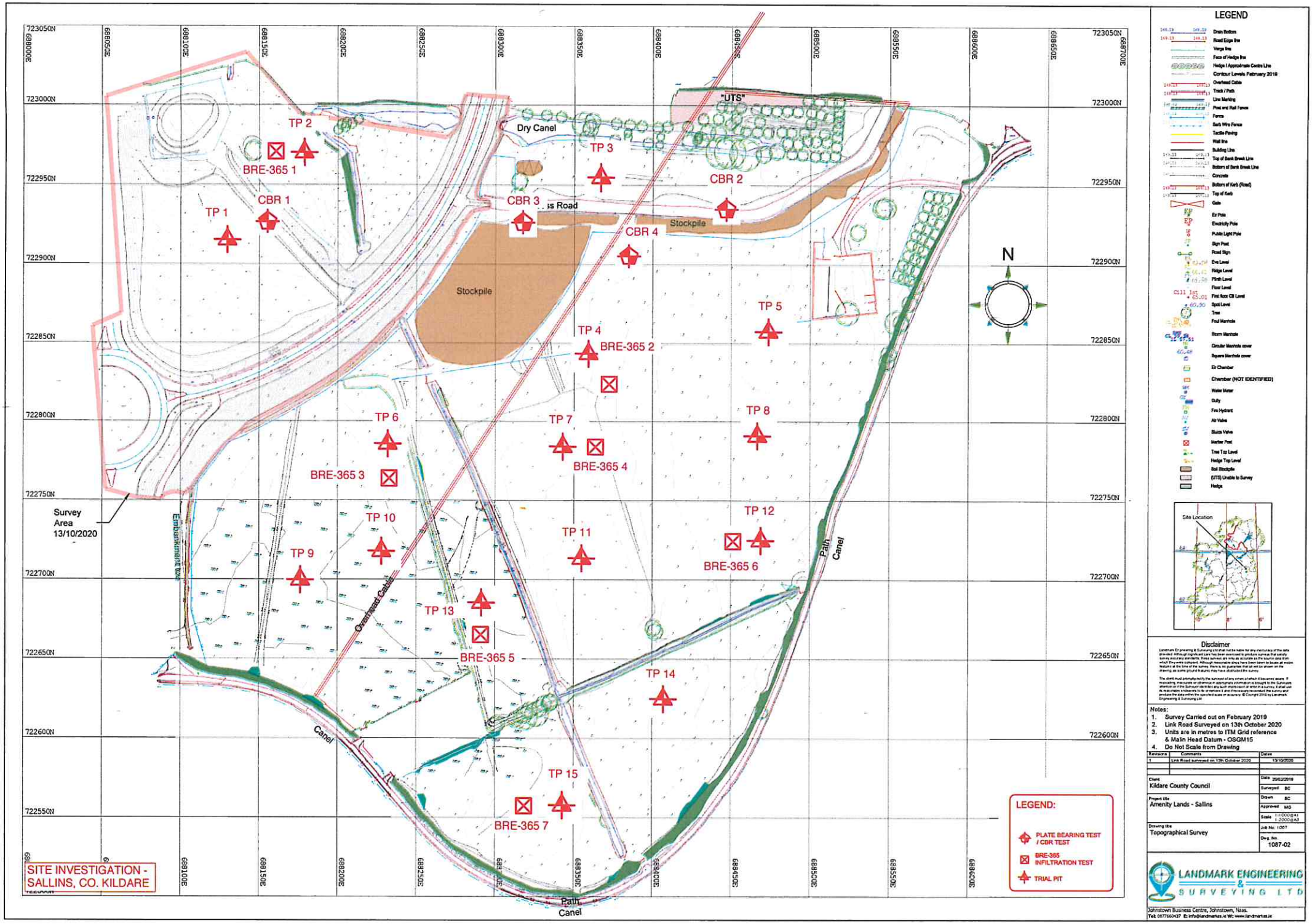
A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

Appendix V Site Plan



LEGEND

Drain Bottom
Road Edge line
Verge line
Face of Hedge line
Hedge / Approximate Centre Line
Contour Levels February 2019
Overhead Cable
Track / Path
Line Marking
Post and Rail Fence
Fence
Barb Wire Fence
Tactile Paving
Wall line
Building Line
Top of Bank Break Line
Bottom of Bank Break Line
Concrete
Bottom of Kerb (Road)
Top of Kerb
Gate
Eir Pole
Electricity Pole
Public Light Pole
Sign Post
Road Sign
Eve Level
Ridge Level
Plinth Level
Floor Level
First floor Cill Level
Spot Level
Tree
Foul Manhole
Storm Manhole
Circular Manhole cover
Square Manhole cover
Eir Chamber
Chamber (NOT IDENTIFIED)
Water Meter
Gully
Fire Hydrant
Air Valve
Sluice Valve
Marker Post
Tree Top Level
Hedge Top Level
Soil Stockpile
(UTS) Unable to Survey
Hedge

Disclaimer

Landmark Engineering & Surveying Ltd shall not be liable for any inaccuracy of the data provided. Although digital land data has been exercised to produce surveys that satisfy survey accuracy standards, these surveys are only as accurate as the source data from which they were compiled. Although measurements have been taken to locate all visible features at the time of the survey, there is no guarantee that all will be shown on the drawing, as some ground features may have obstructed the survey.

The client must promptly notify the surveyor of any errors of which it becomes aware. If misleading, inaccurate or otherwise inappropriate information is brought to the Surveyors attention or if the Surveyor identifies any such inconsistent or error in a survey, it shall use its reasonable endeavors to fix or remove it and if necessary re-conduct the survey and produce the data within the specified scale or accuracy. © Copyright 2019 by Landmark Engineering & Surveying Ltd

Notes:

1. Survey Carried out on February 2019
2. Link Road Surveyed on 13th October 2020
3. Units are in metres to ITM Grid reference & Malin Head Datum - OSGM15
4. Do Not Scale from Drawing

Revisions	Comments	Dates
1	Link Road surveyed on 13th October 2020	13/10/2020

Client: Kildare County Council
Project title: Amenity Lands - Sallins
Drawing title: Topographical Survey
Date: 25/02/2019
Surveyed: BC
Drawn: BC
Approved: MG
Scale: 1:1000@A1 1:2000@A3
Job No. 1087
Dwg. No. 1087-02

LANDMARK ENGINEERING & SURVEYING LTD
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Appendix C – Surface Water Calculations

DONNACHADH O'BRIEN
& ASSOCIATES CONSULTING ENGINEERS

Project ***Sallins Park***
Project No. ***DOBA2018***
Title: ***Catchment 1***
Calcs By ***JM*** Date: 02/12/2021

PRELIMINARY SURFACE WATER STORAGE ESTIMATE (NO LONG TERM STORAGE)

Catchment Characteristics **Greenfield Runoff Flows (Sites < 50 Ha)** denotes Input Value

Standard Average Annual Rainfal (SAAR) =						846	mm
Soil Index =						0.3	
Total Site Area =						3.8400	Hectares (ha)
Storm Return Period =						30	Years
Permissible Outflow per hectare, QBAR =						2.3	l/s/ha
*** Total Permissible Outflow=**						8.73	l/s
Proposed Impermeable Area:							
	Hardstanding					0.6850	ha
	Roofs					0.4166	ha
	Proposed Open Space					2.7384	ha

Soil Classification for Runoff Potential

Based on FSR Maps

Soil 1	0	%	Infiltration
Soil 2	100	%	
Soil 3	0	%	
Soil 4	0	%	
Soil 5	0	%	

.....@	80	% Impermeable
.....@	95	% Impermeable
.....@	5	% Impermeable

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Surface Network 2

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	4	PIMP (%)	100
M5-60 (mm)	16.300	Add Flow / Climate Change (%)	20
Ratio R	0.284	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	0.75
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Surface Network 2

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	37.435	0.936	40.0	0.010	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	54.604	1.092	50.0	0.015	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.002	56.560	0.226	249.9	0.075	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.000	71.107	0.355	200.0	0.074	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.003	25.356	0.102	248.6	0.023	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.004	13.170	0.054	245.7	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
3.000	24.583	0.123	200.0	0.040	5.00	0.0	0.600	o	225	Pipe/Conduit	
3.001	2.606	0.010	250.6	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.005	20.668	0.083	249.9	0.024	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.30	74.784	0.010	0.0	0.0	0.3	2.07	82.5	1.7
1.001	50.00	5.79	73.849	0.025	0.0	0.0	0.7	1.85	73.7	4.1
1.002	50.00	6.94	72.756	0.100	0.0	0.0	2.7	0.82	32.7	16.2
2.000	50.00	6.29	72.886	0.074	0.0	0.0	2.0	0.92	36.6	12.0
1.003	50.00	7.45	72.530	0.197	0.0	0.0	5.3	0.82	32.8	32.0
1.004	49.89	7.71	72.428	0.197	0.0	0.0	5.3	0.83	33.0	32.0
3.000	50.00	5.44	72.508	0.040	0.0	0.0	1.1	0.92	36.6	6.5
3.001	50.00	5.50	72.385	0.040	0.0	0.0	1.1	0.82	32.7	6.5
1.005	48.92	8.06	72.300	0.261	0.0	0.0	6.9	0.99	70.0	41.5

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Network Design Table for Surface Network 2

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
4.000	29.599	0.148	200.0	0.049	5.00	0.0	0.600	o	225	Pipe/Conduit	
4.001	2.030	0.008	250.6	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.006	20.002	0.080	250.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
5.000	29.698	0.149	200.0	0.048	5.00	0.0	0.600	o	225	Pipe/Conduit	
5.001	2.400	0.010	250.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.007	19.659	0.079	250.1	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
6.000	34.325	0.172	200.0	0.049	5.00	0.0	0.600	o	225	Pipe/Conduit	
6.001	2.006	0.008	250.8	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.008	19.674	0.079	250.0	0.050	0.00	0.0	0.600	o	300	Pipe/Conduit	
7.000	34.571	0.173	199.9	0.057	5.00	0.0	0.600	o	225	Pipe/Conduit	
7.001	2.476	0.010	250.1	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.009	26.587	0.106	250.1	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
8.000	41.088	1.110	37.0	0.004	5.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
4.000	50.00	5.54	72.448	0.049	0.0	0.0	1.3	0.92	36.6	7.9
4.001	50.00	5.58	72.300	0.049	0.0	0.0	1.3	0.82	32.7	7.9
1.006	48.03	8.40	72.217	0.310	0.0	0.0	8.1	0.99	70.0	48.4
5.000	50.00	5.54	72.370	0.048	0.0	0.0	1.3	0.92	36.6	7.8
5.001	50.00	5.59	72.221	0.048	0.0	0.0	1.3	0.82	32.7	7.8
1.007	47.19	8.73	72.137	0.358	0.0	0.0	9.1	0.99	69.9	54.8
6.000	50.00	5.62	72.313	0.049	0.0	0.0	1.3	0.92	36.6	7.9
6.001	50.00	5.66	72.141	0.049	0.0	0.0	1.3	0.82	32.6	7.9
1.008	46.38	9.06	72.058	0.456	0.0	0.0	11.5	0.99	70.0	68.8
7.000	50.00	5.63	72.237	0.057	0.0	0.0	1.5	0.92	36.6	9.2
7.001	50.00	5.68	72.064	0.057	0.0	0.0	1.5	0.82	32.7	9.2
1.009	45.48	9.45	71.905	0.513	0.0	0.0	12.6	1.14	126.0	75.9
8.000	50.00	5.32	73.070	0.004	0.0	0.0	0.1	2.16	85.8	0.6

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Network Design Table for Surface Network 2

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.010	16.793	0.056	299.9	0.049	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.011	34.469	0.060	574.5	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.012	6.456	0.026	250.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.013	14.934	0.060	250.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.014	29.348	0.117	250.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.010	44.88	9.72	71.798	0.567	0.0	0.0	13.8	1.04	115.0	82.6
1.011	50.00	6.07	71.738	0.000	8.7	0.0	1.5	0.54	21.4	8.7
1.012	50.00	6.20	71.678	0.000	8.7	0.0	1.7	0.82	32.7	10.4
1.013	50.00	6.50	71.652	0.000	8.7	0.0	1.7	0.82	32.7	10.4
1.014	50.00	7.10	71.592	0.000	8.7	0.0	1.7	0.82	32.7	10.4

Free Flowing Outfall Details for Surface Network 2

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.014	S21	72.400	71.475	0.000	900	675

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Online Controls for Surface Network 2

Hydro-Brake® Optimum Manhole: S17, DS/PN: 1.011, Volume (m³): 3.1

Unit Reference	MD-SHE-0137-8700-1000-8700
Design Head (m)	1.000
Design Flow (l/s)	8.7
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	137
Invert Level (m)	71.738
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	8.7
Flush-Flo™	0.302	8.7
Kick-Flo®	0.668	7.2
Mean Flow over Head Range	-	7.5

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.9	1.200	9.5	3.000	14.6	7.000	21.9
0.200	8.4	1.400	10.2	3.500	15.7	7.500	22.7
0.300	8.7	1.600	10.9	4.000	16.8	8.000	23.4
0.400	8.6	1.800	11.5	4.500	17.7	8.500	24.1
0.500	8.4	2.000	12.1	5.000	18.7	9.000	24.8
0.600	7.9	2.200	12.6	5.500	19.5	9.500	25.4
0.800	7.8	2.400	13.1	6.000	20.4		
1.000	8.7	2.600	13.7	6.500	21.2		

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Storage Structures for Surface Network 2

Tank or Pond Manhole: S17, DS/PN: 1.011

Invert Level (m) 71.738

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	160.0	1.000	160.0	1.001	0.0

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Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 2

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	20.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.284
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	16.300	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	0.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 100
Climate Change (%)	0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	S9	15 Winter	100	+0%					74.817
1.001	S10	15 Winter	100	+0%					73.905
1.002	S11	15 Winter	100	+0%	100/15 Summer				73.350
2.000	S36	15 Winter	100	+0%	100/15 Summer				73.346
1.003	S12	15 Winter	100	+0%	100/15 Summer				73.237
1.004	S13	15 Winter	100	+0%	100/15 Summer				72.986
3.000	S35	120 Winter	100	+0%	100/15 Summer				72.912
3.001	S34	120 Winter	100	+0%	100/15 Summer				72.905
1.005	S33	120 Winter	100	+0%	100/15 Summer				72.903
4.000	S32	120 Winter	100	+0%	100/15 Summer				72.889
4.001	S31	120 Winter	100	+0%	100/15 Summer				72.882
1.006	S30	120 Winter	100	+0%	100/15 Summer				72.881
5.000	S29	120 Winter	100	+0%	100/15 Summer				72.851
5.001	S28	120 Winter	100	+0%	100/15 Summer				72.846
1.007	S16	120 Winter	100	+0%	100/15 Summer				72.845
6.000	S27	180 Winter	100	+0%	100/15 Winter				72.820
6.001	S26	180 Winter	100	+0%	100/15 Summer				72.814
1.008	S25	180 Winter	100	+0%	100/15 Summer				72.813

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Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 2

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S9	-0.192	0.000	0.05			4.0	OK	
1.001	S10	-0.169	0.000	0.14			9.8	OK	
1.002	S11	0.368	0.000	0.99			31.3	SURCHARGED	
2.000	S36	0.235	0.000	0.67			23.9	SURCHARGED	
1.003	S12	0.482	0.000	1.63			49.2	SURCHARGED	
1.004	S13	0.332	0.000	1.71			48.8	SURCHARGED	
3.000	S35	0.179	0.000	0.17			5.6	SURCHARGED	
3.001	S34	0.295	0.000	0.19			5.3	SURCHARGED	
1.005	S33	0.304	0.000	0.53			32.7	SURCHARGED	
4.000	S32	0.217	0.000	0.19			6.7	SURCHARGED	
4.001	S31	0.357	0.000	0.21			6.2	SURCHARGED	
1.006	S30	0.364	0.000	0.62			37.6	SURCHARGED	
5.000	S29	0.256	0.000	0.19			6.5	SURCHARGED	
5.001	S28	0.399	0.000	0.21			5.8	SURCHARGED	
1.007	S16	0.408	0.000	0.68			41.6	SURCHARGED	
6.000	S27	0.282	0.000	0.14			4.8	SURCHARGED	
6.001	S26	0.448	0.000	0.15			4.2	SURCHARGED	
1.008	S25	0.455	0.000	0.62			38.0	SURCHARGED	

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Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 2

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
7.000	S24	180 Winter	100	+0%	100/30 Winter				72.758
7.001	S23	180 Winter	100	+0%	100/15 Summer				72.752
1.009	S22	180 Winter	100	+0%	100/15 Summer				72.751
8.000	S15	15 Winter	100	+0%					73.091
1.010	S14	240 Winter	100	+0%	100/15 Summer				72.720
1.011	S17	240 Winter	100	+0%	1/30 Winter				72.715
1.012	S18	2160 Summer	100	+0%					71.769
1.013	S19	2160 Summer	100	+0%					71.736
1.014	S20	2160 Summer	100	+0%					71.674

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
7.000	S24	0.295	0.000	0.16			5.7	SURCHARGED	
7.001	S23	0.462	0.000	0.18			5.1	SURCHARGED	
1.009	S22	0.471	0.000	0.38			42.2	SURCHARGED	
8.000	S15	-0.205	0.000	0.02			1.5	OK	
1.010	S14	0.547	0.000	0.42			39.5	SURCHARGED	
1.011	S17	0.752	0.000	0.43			8.7	SURCHARGED	
1.012	S18	-0.134	0.000	0.34			8.7	OK	
1.013	S19	-0.141	0.000	0.30			8.7	OK	
1.014	S20	-0.144	0.000	0.28			8.7	OK	

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DONNACHADH O'BRIEN
& ASSOCIATES CONSULTING ENGINEERS

Project: ***Sallins Park*** Date: 03/06/2021
Project No.: ***DOBA2018*** Calcs By: ***JM***
Design Element: ***Surface Water Drainage - skatepark & basketball***
Soakaway Design to BRE Digest 365 for Designing Trench Soakaways

Equivilent Impermeable Area **940** m2 (Depth of stone = min. 250mm, 40% voids)

Source of Rainfall Information is from Met Eireann
Rainfall Return Period 100 years

Soil Infiltration Rate, f = 7.56E-05 m/s

Storage, S = I - O
Inflow, I = A x R
Outflow, O = a_{50} x f x D

Proposed Soakaway Trench Dimensions
Depth 0.6 m (Depth below inflow invert)
Length 118 m
Width 1 m

a_{50} = Internal surface area of soakaway up to 50% effective depth, excluding base area
a_{50} 71.4 m^2
Storage, S = I - O
Inflow, I = A x R
Outflow, O = a_{50} x f x D

Storm Duration, D (mins)	Storm Duration, D (hrs. / days)	Total Rainfall, R (mm)	Inflow, I (m^3)	Outflow, O (m^3)	Storage Required, S (m^3)
5		14.7	16.58	1.62	14.96
10		20.5	23.12	3.24	19.89
15		24.1	27.18	4.86	22.33
30		29.8	33.61	9.72	23.90
60		36.8	41.51	19.43	22.08
120	**2**	45.5	51.32	38.86	12.46
180	**3**	51.6	58.20	58.30	0.00
240	**4**	56.3	63.51	77.73	0.00
360	**6**	63.7	71.85	116.59	0.00
540	**9**	72.2	81.44	174.89	0.00
720	**12**	78.8	88.89	233.19	0.00
1080	**18**	89.2	100.62	349.78	0.00
1440	**1**	97.4	109.87	466.37	0.00
2880	**2**	105.0	118.44	932.75	0.00
4320	**3**	112.7	127.13	1399.12	0.00
5760	**4**	120.1	135.47	1865.49	0.00
8640	**6**	133.7	150.81	2798.24	0.00
11520	**8**	146.1	164.80	3730.99	0.00
14400	**10**	157.6	177.77	4663.73	0.00
17280	**12**	168.5	190.07	5596.48	0.00
23040	**16**	188.8	212.97	7461.97	0.00
28800	**20**	207.7	234.29	9327.47	0.00
36000	**25**	230.0	259.44	11659.33	0.00

Storage provided (assuming gives 40% free volume) = 28.32 m^3 Adequate
Additional Storage Required -4.42 m^3
Factor of Safety 1.19

DONNACHADH O'BRIEN
& ASSOCIATES CONSULTING ENGINEERS

Project: ***Sallins Park*** Date: 03/06/2021
Project No.: ***DOBA2018*** Calcs By: ***JM***
Design Element: ***Surface Water Drainage - GAA 1***
Soakaway Design to BRE Digest 365 for Designing Trench Soakaways

Equivilent Impermeable Area **13050** m2 (Depth of stone = min. 250mm, 40% voids)

Source of Rainfall Information is from Met Eireann
Rainfall Return Period 30 years

Soil Infiltration Rate, f = 3.70E-05 m/s

Storage, S = I - O
Inflow, I = A x R
Outflow, O = a_{50} x f x D

Proposed Soakaway Trench Dimensions
Depth 0.6 m (Depth below inflow invert)
Length 1520 m
Width 0.4 m

a_{50} = Internal surface area of soakaway up to 50% effective depth, excluding base area
a_{50} 13962.24 m^2
Storage, S = I - O
Inflow, I = A x R
Outflow, O = a_{50} x f x D

Storm Duration, D (mins)	Storm Duration, D (hrs. / days)	Total Rainfall, R (mm)	Inflow, I (m^3)	Outflow, O (m^3)	Storage Required, S (m^3)
5		10.5	164.43	154.98	9.45
10		14.6	228.64	309.96	0.00
15		17.2	269.35	464.94	0.00
30		21.6	338.26	929.89	0.00
60		27.0	422.82	1859.77	0.00
120	**2**	33.8	529.31	3719.54	0.00
180	**3**	38.6	604.48	5579.31	0.00
240	**4**	42.3	662.42	7439.08	0.00
360	**6**	48.3	756.38	11158.62	0.00
540	**9**	55.1	862.87	16737.93	0.00
720	**12**	60.5	947.43	22317.24	0.00
1080	**18**	69.0	1080.54	33475.87	0.00
1440	**1**	75.7	1185.46	44634.49	0.00
2880	**2**	83.2	1302.91	89268.98	0.00
4320	**3**	90.4	1415.66	133903.47	0.00
5760	**4**	97.1	1520.59	178537.96	0.00
8640	**6**	109.4	1713.20	267806.93	0.00
11520	**8**	120.5	1887.03	357075.91	0.00
14400	**10**	130.9	2049.89	446344.89	0.00
17280	**12**	140.7	2203.36	535613.87	0.00
23040	**16**	158.9	2488.37	714151.82	0.00
28800	**20**	176.0	2756.16	892689.78	0.00
36000	**25**	196.1	3070.93	1115862.22	0.00

Storage provided (assuming gives 40% free volume) = 145.92 m^3 Adequate
Additional Storage Required -136.47 m^3
Factor of Safety 15.44

DONNACHADH O'BRIEN
& ASSOCIATES CONSULTING ENGINEERS

Project: ***Sallins Park*** Date: 03/06/2021
Project No.: ***DOBA2018*** Calcs By: ***JM***
Design Element: ***Surface Water Drainage - Soccer pitch full size 2***
Soakaway Design to BRE Digest 365 for Designing Trench Soakaways

Equivilent Impermeable Area **5880** m2 (Depth of stone = min. 250mm, 40% voids)

Source of Rainfall Information is from Met Eireann
Rainfall Return Period 100 years

Soil Infiltration Rate, f = 1.00E-05 m/s

Storage, S = I - O
Inflow, I = A x R
Outflow, O = a_{50} x f x D

Proposed Soakaway Trench Dimensions
Depth 0.6 m (Depth below inflow invert)
Length 1150 m
Width 0.6 m

a_{50} = Internal surface area of soakaway up to 50% effective depth, excluding base area
a_{50} 6570.36 m^2
Storage, S = I - O
Inflow, I = A x R
Outflow, O = a_{50} x f x D

Storm Duration, D (mins)	Storm Duration, D (hrs. / days)	Total Rainfall, R (mm)	Inflow, I (m^3)	Outflow, O (m^3)	Storage Required, S (m^3)
5		14.7	103.72	19.71	84.01
10		20.5	144.65	39.42	105.23
15		24.1	170.05	59.13	110.92
30		29.8	210.27	118.27	92.00
60		36.8	259.66	236.53	23.13
120	**2**	45.5	321.05	473.07	0.00
180	**3**	51.6	364.09	709.60	0.00
240	**4**	56.3	397.25	946.13	0.00
360	**6**	63.7	449.47	1419.20	0.00
540	**9**	72.2	509.44	2128.80	0.00
720	**12**	78.8	556.01	2838.40	0.00
1080	**18**	89.2	629.40	4257.59	0.00
1440	**1**	97.4	687.25	5676.79	0.00
2880	**2**	105.0	740.88	11353.58	0.00
4320	**3**	112.7	795.21	17030.37	0.00
5760	**4**	120.1	847.43	22707.16	0.00
8640	**6**	133.7	943.39	34060.75	0.00
11520	**8**	146.1	1030.88	45414.33	0.00
14400	**10**	157.6	1112.03	56767.91	0.00
17280	**12**	168.5	1188.94	68121.49	0.00
23040	**16**	188.8	1332.17	90828.66	0.00
28800	**20**	207.7	1465.53	113535.82	0.00
36000	**25**	230.0	1622.88	141919.78	0.00

Storage provided (assuming gives 40% free volume) = 165.6 m^3 Adequate
Additional Storage Required -54.68 m^3
Factor of Safety 1.49

Appendix D – CFRAM Map

Node Label	Water Level (OD) 10% AEP	Flow (m³/s) 10% AEP	Water Level (OD) 1% AEP	Flow (m³/s) 1% AEP	Water Level (OD) 0.1% AEP	Flow (m³/s) 0.1% AEP
09LIFF04942D	71.01	93.91	71.46	126.21	71.86	159.62
09LIFF04905	70.64	N/A	71.06	N/A	71.43	N/A
09LIFF04872D	70.47	N/A	70.88	N/A	71.26	N/A
09LIFF04841	70.22	94.06	70.62	126.36	70.99	159.77
09LIFF04810	69.88	N/A	70.32	N/A	70.73	N/A
09LIFF04779	69.66	94.23	70.13	126.51	70.56	159.93

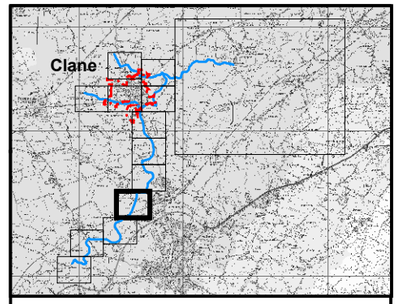
09LIFF04779
09LIFF04810
09LIFF04841
09LIFF04872D
09LIFF04905
09LIFF04942D

SITE LOCATION

286800 287000 287200 287400 287600 287800 288000 288200 288400

223000 222800 222600 222400 222200 222000 221800

0 50 100 200 300 400 500 Metres



IMPORTANT USER NOTE:
THE VIEWER OF THIS MAP SHOULD REFER TO THE DISCLAIMER, GUIDANCE NOTES AND CONDITIONS OF USE THAT ACCOMPANY THIS MAP.

Legend

- 10% Fluvial AEP Event
- 1% Fluvial AEP Event
- 0.1% Fluvial AEP Event
- Modelled River Centreline
- AFA Extents
- Node Point
- Node ID Node Label

FINAL

REV:	NOTE:	DATE:
01	Aquaduct was clipped from Page 4 of all maps	30/10/17

EASTERN CFRAM STUDY
CATCHMENT FLOOD RISK ASSESSMENT AND MANAGEMENT

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Map:
Clane Fluvial Flood Extents

Map Type:	EXTENT
Source:	FLUVIAL
Map Area:	HPW
Scenario:	CURRENT
Drawn By :	C.C. Date : 30 October 2017
Checked By :	M.W. Date : 30 October 2017
Approved By :	S.P. Date : 30 October 2017

Drawing No. :
E09CLA_EXFCD_F1_04

Map Series : Page 4 of 13

Drawing Scale : 1:5,000 @A3

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Appendix E – Letter from Irish Water

Alan Lambe

Donnachadh O'Brien & Associates

Unit 5C
Elm House
Millenium Park
Naas
Co. Kildare
W91P9P8

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

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

www.water.ie

17 September 2021

Re: CDS21004054 pre-connection enquiry - Subject to contract | Contract denied

Non-Domestic Connection for Amenity Park at Sallins Amenity Lands, Sallins, Kildare

Dear Sir/Madam,

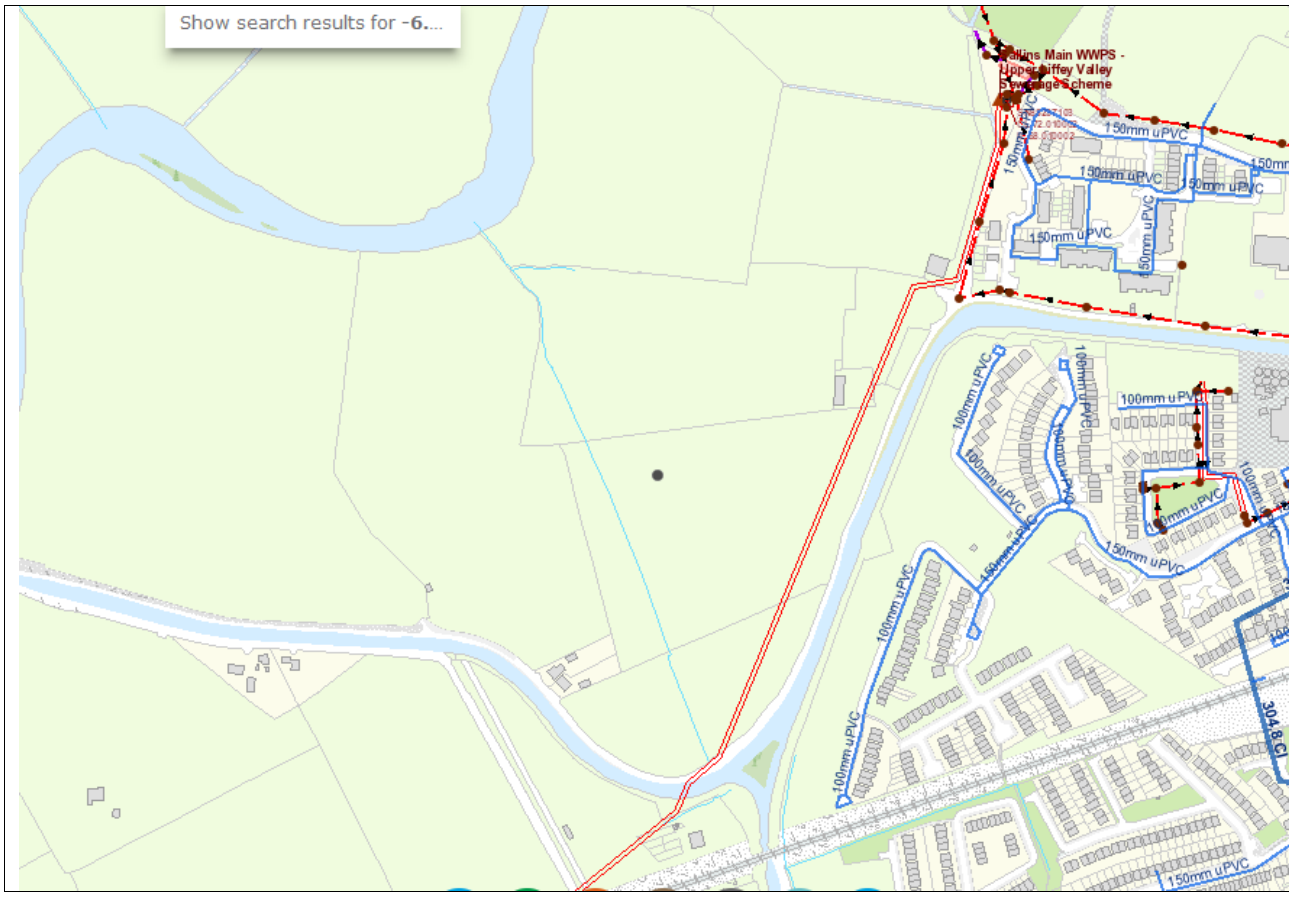
Irish Water has reviewed your pre-connection enquiry in relation to a Water & Wastewater connection at Sallins Amenity Lands, Sallins, Kildare (the **Premises**). Based upon the details you have provided with your pre-connection enquiry and on our desk top analysis of the capacity currently available 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	**OUTCOME OF PRE-CONNECTION ENQUIRY** **THIS IS NOT A CONNECTION OFFER. YOU MUST APPLY FOR A CONNECTION(S) TO THE IRISH WATER NETWORK(S) IF YOU WISH TO PROCEED.**
Water Connection	Feasible Subject to upgrades
Wastewater Connection	Feasible Subject to upgrades
SITE SPECIFIC COMMENTS	
Water Connection	In order to facilitate the connection, the water network will have to be extended. Irish Water currently does not have any plans to extend its network in this area. Should you wish to consider extending the water infrastructure to a point to connect to the Irish Water network, please contact Irish Water. The customer would be responsible for all necessary consents/permissions required to facilitate any water works on third party (private) lands. The confirmation of feasibility to connect to the Irish Water infrastructure does not extend to any fire flow requirements. While flows in excess of any proposed fire demand may be achieved in the Irish Water network and could be utilised in the event of a fire, Irish Water cannot guarantee a flow rate to meet any proposed fire flow requirement.

Stiúrthóirí / Directors: Cathal Marley (Chairman), Niall Gleeson, Eamon Gallen, Yvonne Harris, Brendan Murphy, Maria O'Dwyer
Oifig Chláraithe / Registered Office: Teach Colvill, 24-26 Sráid Thalbóid, Baile Átha Cliath 1, D01 NP86 / Colvill House, 24-26 Talbot Street, Dublin 1, D01 NP86
Is cuideachta ghníomhaíochta ainmnithe atá faoi theorainn scaireanna é Uisce Éireann / Irish Water is a designated activity company, limited by shares.
Uimhir Chláraithe in Éirinn / Registered in Ireland No.: 530363
IW-HP-BUS
REV012

Wastewater Connection	Our records indicate the presence of Irish Water infrastructure within and/or in proximity to the subject site. It will be necessary to comply with Irish Water's wayleave and operational requirements in relation to this infrastructure. Refer to the following link https://www.water.ie/connections/developer-services/diversion-and-build-over/ In order to accommodate the proposed wastewater connection at the development, upgrade works are required to increase the capacity of the wastewater network. Irish Water currently has a project (Upper Liffey Valley Sewerage Scheme Contract 2B) underway which will provide the necessary upgrade and capacity. This upgrade project is scheduled to be completed by Q3 2022 (this may be subject to change) and the proposed connection could be completed as soon as possibly practicable after this date. In addition, in order to facilitate the connection, the wastewater network will have to be extended. Irish Water currently does not have any plans to extend its network in this area. Should you wish to consider extending the wastewater infrastructure to a point to connect to the Irish Water network, please contact Irish Water. The customer would be responsible for all necessary consents/permissions required to facilitate any wastewater works on third party (private) lands.
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:



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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.

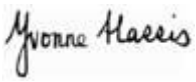
General Notes:

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 Fionán Ginty from the design team on 01 89 25734 087 1496032 or email fginty@water.ie For further information, visit **www.water.ie/connections.**

Yours sincerely,



Yvonne Harris

Head of Customer Operations