ST. VINCENT'S HOSPITAL FAIRVIEW REDEVELOPMENT

For St. Vincent's Hospital Fairview R517 24 March 2023





Multidisciplinary Consulting Engineers

St. Vincent's Hospital Fairview Redevelopment, Richmond Road and Convent Avenue, Fairview, Dublin 3 PROJECT NO. R517 24 March 2023

for

St. Vincent's Hospital Fairview,

Richmond Road and Convent Avenue, Fairview, Dublin 3



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OCSC Job No.: R517		Droject Code R517	Ociginator Originator	X Xolume	XX Level	Hile Type	O Role Type	Number 00002		5 Suitability Code	60d Revision
Rev. Status		Status	Authors		Checked			Authorised		Issue Date	
P05 S4		S4	МКо		МК			AH		24.03.2023	
P04 S4		S4	МКо		MK			AH		07.03.2023	
P03 S4		S4	МКо		МК			AH		27.0	2.2023
P02 S4		S4	МКо		МК			AH		18.10.2022	
P01		S2	МКо		Μ	IK		AH		23.0	9.2022

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1 INTRODUCTION

1.1 Appointment

O'Connor Sutton Cronin & Associates (OCSC) have been appointed by *St. Vincent's Hospital Fairview* to carry out the design of the Civil Engineering services (surface water and wastewater drainage, watermain) associated with the site at St. Vincent's Hospital, Richmond Road and Convent Avenue, Fairview, Dublin 3.

1.2 Administrative Jurisdiction

The proposed development is located in the jurisdiction of Dublin City Council (DCC), and therefore the engineering services design was carried out with reference to the following:

- Dublin City Council Development Plan (2022 2028);
- Greater Dublin Strategic Drainage Study (GDSDS);
- The Planning System and Flood Risk Management Guidelines for Planning Authorities (Department of Environment, Heritage and Local Government and the Office of Public Works).
- Circular PL2/2014 (13th August 2014)

1.3 Site Location

The subject site is located at and surrounding St. Vincent's Hospital, Richmond Road and Convent Avenue, Fairview, Dublin 3. The site contains protected structures under RPS Ref.: 2032 (St. Vincent's Hospital), 8788 (Richmond House) and 8789 (Brooklawn). The application site includes an area of the public road/footpaths (extending for approximately 0.8km) to facilitate service connections via Griffith Court, Phillipsburgh Avenue and Griffith Avenue, part of the An Post service yard and part of the open space within Grace Park Wood to facilitate pedestrian/cycle connections, and part of Richmond Road to facilitate service connections and associated upgrades.





The site is bound by the Grace Park Wood residential development to the northwest; Griffith Court, the 'Fairview Community Unit' nursing home, Fairview Day Centre, Gheel Autism Services and a graveyard to the north; the An Post Fairview Delivery Service Unit on Lomond Avenue and residential properties on Inverness Road to the east; existing residential and commercial properties on Richmond Road and Convent Avenue to the south and Charthouse Business Centre, Dublin Port Stadium / Stella Maris FC, and Ierne Sports and Social Club to the west of the site.

- Overall Application Site Area: 9.46 hectares
- Land in applicant's ownership: 8.71 hectares
- Residential Site Area: 6.04 ha
- Hospital Site Area: 2.67 ha

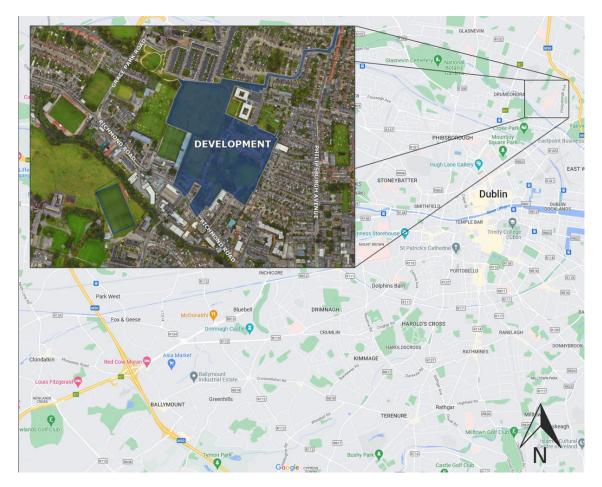


Figure 1-1: Site Location





1.4 Existing Site Overview

The subject site is approximately 9.46 hectares, and the site is a mix of greenfield and existing hardstanding, see Figure 1 2.



Figure 1-2: Existing site overview

The site falls from north to south with levels along the northern boundary approximately 11 mAOD falling to 4.5 mAOD in the south, see Figure 1-.





O'Connor Sutton Cronin & Associates Multidisciplinary Consulting Engineers Richmond Road and Convent Avenue, Fairview, Dublin 3.

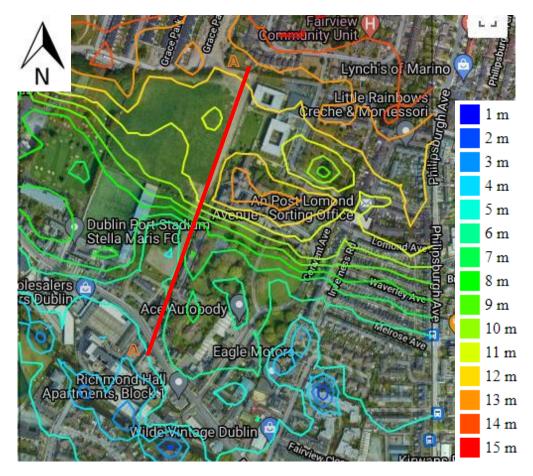


Figure 1-3: Site contour map (source: <u>https://contourmapcreator.urgr8.ch/</u>)

There is a sharp drop in elevation at the centre of the site as can be seen from Figure 1-3 where the elevation drops from 11 mAOD to 5 mAOD.



Figure 1-4: Section A-A





1.5 Proposed Development Description

In summary, the proposed development can be described as follows:

A ten-year planning permission is sought for the proposed development comprising the following:

• Provision of a new part two and part three storey hospital building, providing mental health services, accommodating 73 no. beds, associated facilities, a single storey facilities management building, plant rooms and service areas, associated car and cycle parking, access roads, and open space, all on a proposed hospital site of c. 2.67 ha.

• Refurbishment and repurposing of existing buildings on site including Brooklawn (RPS Ref.: 8789), Richmond House, including chapel and outbuildings (RPS Ref.: 8788), the Laundry building and Rose Cottage for ancillary uses associated with the new hospital. The existing gate lodge building will remain in residential use and used by visiting members of staff to the new hospital.

• Change of use, refurbishment, alterations and extensions, to the existing hospital building (part protected structure under RPS Ref.: 2032), to provide residential amenity areas, a gym, a café, co-working space, a library, a childcare facility, and a community hall (referred to as Block K).

• The proposal includes the demolition of existing structures on site with a GFA of 5,872 sq.m, including the (1) westernmost range of the hospital building, which includes St. Teresa's and the Freeman Wing, (2) extensions to the south and north of the main hospital building, including the conservatory extension, toilet block extension, an external corridor, toilet core, lift core, and stair core (which are all part of / within the curtilage of RPS Ref.: 2032), (3) hospital buildings and outbuildings located to the north of the existing main hospital building, (4) St. Joseph's Adolescent School located in the southeast of the site, (5) Crannog Day Hospital located in the southwest of the site, and (6) extensions to the Old Laundry Building and Rose Cottage.

• Provision of 9 no. residential buildings (Blocks A, B, C, D-E, F, G, H, J, and L) providing a total of 811 no. residential units, including 494 no. standard





designed apartments (in Blocks A, B, C, G, H, J, and L) and 317 no. Build to Rent apartments (in Blocks D-E and F). Residential amenities and facilities are proposed in Block C, D-E, J and K. A retail unit is proposed in Block A and a café in Block F. Block J is proposed as an extension of the existing hospital buildings (protected structure RPS Ref.: 2032- referred to as Block K).

• The building heights of the proposed residential blocks range from part 2 to part 13 storeys. A proposed basement / lower ground level, containing car and cycle parking and plant areas, is located below and accessed via Blocks C, D-E and F.

• Access to the new hospital and associated grounds is provided from Richmond Road and Convent Avenue, with separate internal access points. A separate vehicular access to the residential development is provided from Richmond Road. The development includes a proposed pedestrian / cycle connection to Griffith Court, requiring alterations to the service yard of the Fairview Community Unit, pedestrian / cycle connections to the Fairview Community Unit campus to the north (providing an onward connection to Griffith Court), a pedestrian / cycle connection to Grace Park Wood, and makes provision internally within the site for a potential future connection to Lomond Avenue / Inverness Road.

• The proposal includes public open space, including allotments, children's play areas, a central park, a linear park and an entrance plaza, with a set down area at Richmond Road, and communal open space at surface level. The proposal includes communal roof terraces on Block C and Blocks D-E and private balconies / terraces for the apartments.

• The proposal also includes provision of internal access roads, car and cycle parking, pedestrian and cycle infrastructure, associated set down areas, alterations to existing landscape features, landscaping, boundary treatments, lighting, telecommunications infrastructure at roof level of Block B, green roofs, lift overruns and plant at roof level, site services, including a watermain connection / upgrade via Griffith Court, Philipsburgh Avenue and Griffith Avenue, site clearance, and all associated site works.





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Figure 1.5 – Proposed Site Layout

Duration of Permission

A ten-year permission for the proposed development will be sought. This is considered appropriate given the scale and nature of the proposed development, notwithstanding that based on the best-case scenario the project is expected to be completed within c. 5 to 6 years from receipt of a final grant of permission (allowing for tender and construction phases). Furthermore, following legislation in 2021[1], Section 42(8) of the Planning and Development (Housing) and





Residential Tenancies Act 2016, as amended, provides that a planning authority shall not extend planning permission where an EIAR or Natura Impact Statement would be required for the project to be extended, and accordingly it is considered appropriate to request a duration beyond the typical five-year permission for this application.

Estimated Duration of Construction

As set out in the EIAR and CEMP, based on the associated durations of the respective construction stages, which are dependent on a number of factors, at a high level a preliminary estimate would suggest the construction works, including infrastructural works, will take approximately 48 months from commencement of development. In addition, a c. 6-month period would be required for the tender process from receipt of the final grant. Thus, based on the best-case scenario the development could be completed within c. 5 years from a final grant of permission. However, as noted elsewhere a ten-year permission is sought for this project, which is considered appropriate given the residential, hospital and protected structure aspects of the project and the need to allow sufficient time to address any unforeseen delays during the construction process.





2 SCOPE OF SERVICES REPORT

This Engineering Services Report was prepared by reviewing the available data from the Local Authority sources and national bodies *i.e.*, Dublin City Council, Irish Water, The OPW, and the wider Design Team. The following services are addressed within this report, with respect to the proposed development:

- Surface Water Drainage;
- Wastewater Drainage;
- Potable Water Supply;

An assessment of potential flood risks associated with, and as a result of, the proposed development is provided under separate cover, as part of this application. Refer to document **R517-OCSC-XX-XX-RP-C-0003** for details of the Site-Specific Flood Risk Assessment.

This report should be read in conjunction with the set of OCSC Civil Engineering design drawings that also accompany this submission:

The proposed design, for the aforementioned services, has been carried out in accordance with the following technical guidelines and information:

- Dublin City Council Development Plan (2022 2028);
- Dublin City Council SuDS Design & Evaluation Guide (2021);
- Dublin City Council Green Blue Roof Guide (2021);
- Greater Dublin Strategic Drainage Study (GDSDS);
- Greater Dublin Regional Code of Practice for Drainage Works (GDRCOP);
- Irish Water Code of Practice for Wastewater, IW-CDS-5030-03;
- Irish Water Code of Practice for Water Supply, IW-CDS-5020-03;
- The Building Regulations Technical Guidance Document Part H;
- BE EN 752 Drainage Outside Buildings;
- BS 7533-13 Guide for Design of Permeable Pavements;
- The Office of Public Works, the Planning System and Flood Risk Management;
- Dublin City Council's and Irish Water's Drainage and Watermain Records.





Members of the wider design team cover all other elements of the application pertaining to traffic, sustainability, landscaping, planning, ecological, and architectural detail.





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3 SURFACE WATER DRAINAGE

3.1 Design Guidelines Overview

Any planning permission sought on the subject lands is required to adhere to the Local Authority requirements *i.e.*, the Dublin City Council Development Plan, and as such, the Greater Dublin Strategic Drainage Study (Dublin City Council, 2005) and Dublin City Council SuDS Design and Evaluation Guide (2021).

New development must ensure that a comprehensive Sustainable Drainage System (SuDS) is incorporated into the development. SuDS requires that postdevelopment run-off rates be maintained at equivalent, or lower, levels than pre-development levels. Thus, the development must be able to retain, within its boundaries, surface water volumes from extreme rainfall events up to a 1 in 100-year rainfall event, more commonly expressed as a 1.0% AEP (Annual Exceedance Probability), *while also allowing for an additional climate change factor of* **20%** *increase in rainfall intensity* in accordance with the current DCC Development Plan (2022 – 2026).

Any new development must also have the physical capacity to retain surface water volumes as directed under the Greater Dublin Strategic Drainage Strategy (GDSDS) and, if necessary, release these attenuated surface water volumes to an outfall at a controlled flow rate, not greater than the greenfield runoff equivalent.

A further component of the SuDS protocol is to increase the overall water quality of surface water runoff before it enters a natural watercourse or a public sewer, which ultimately discharges to a water body. This is to ensure the highest possible standard of surface water quality.

All SuDS are designed in accordance with best practice, DCC's SuDS Design and Evaluation Guide, and the CIRIA C753 (The SuDS Manual) guidance material, with development discharge rates restricted to greenfield runoff equivalent, which is significantly less than the existing scenario.



3.2 Existing Site Drainage

3.2.1 Existing Surface Water Drainage Infrastructure

The existing units and hardstanding areas currently discharge surface water to the local combined infrastructure, with no apparent treatment or attenuation facilities in place.

Public records indicate an existing 525 mm concrete stormwater sewer within the site boundary. This sewer flows in the southerly direction towards Richmond Road before discharging to the 1350 mm sewer on Richmond Road. This sewer discharges to the Tolka River immediately downstream of the site.

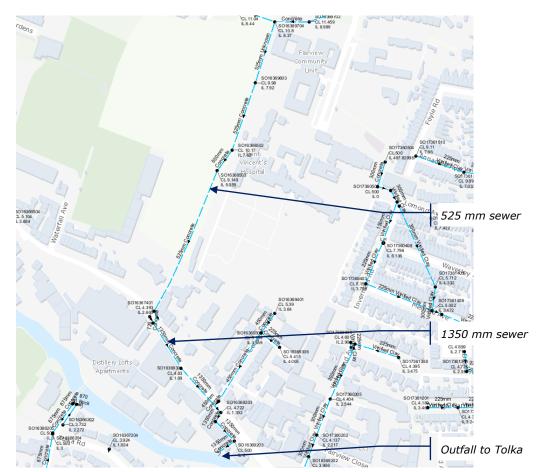


Figure 3-1: Existing surface water records

As part of a new development that was constructed at St Joseph's lands (planning ref. 2991/15) the 525mm diameter surface water sewer that runs through St. Vincent's lands and is shown in figure 3-1 above was replaced with





a 900mm diameter surface water sewer and connects to the existing drainage system on Richmond Rd.

Refer to section 4.5 Historic flooding of the Site Specific Flood Risk Assessment (doc ref. R517-OCSC-XX-XX-RP-C-0003) for more information on the new 900mm surface water sewer.

3.2.2 Existing Site Catchment Area

As detailed in *Section 1.4*, the existing 9.46 hectares is a mix of greenfield and existing hardstanding. The site falls from north to south with levels along the northern boundary of approximately 11 mAOD falling to 4.5 mAOD in the south.

3.2.3 Existing Site Rainfall Runoff

All surface water runoff on the existing site is currently allowed to infiltrate naturally from the greenfield areas or collected by the existing combined and surface water gravity sewers on site.

There are no apparent treatment or attenuation facilities on site, with all rainfall runoff from hardstanding areas discharging directly to the public drainage network, which outfalls to the Tolka River.

The soil value can be calculated from *Figure 1.4.18 (institute of Hydrology, 1978)* which shows the various soil types. The soil classifications are also available from the *Wallingford Procedure, Volume 3, Maps, "Winter rain acceptance potential"*. The equation was first published in FSSR 16, 1985. Refer to *Figure 3.2* for the "Soil" value in MicroDrainage that consider the SPR value and it can be obtained at *Greater Dublin Strategic Drainage Study – Regional Drainage Policies Volume 2 – New Development at section 6.7.2*.

SOIL	SPR value (% runoff)
1	0.1
2	0.3
3	0.37
4	0.47
5	0.53

Figure 3.2 – SPR Values for Soil (Excerpt from GDSDS: Table 6.7)





From the aforementioned mapping and Ground investigation report (refer to **Appendix G**), a **Soil Type 3** was used in design calculations along with the local Standard Annual Average Rainfall (SAAR) equivalent of **720mm**, as received from Met Éireann, which was used to determine the rainfall-runoff rate. Refer to the **Appendix B** for the Return Period Rainfall Depths for Sliding Durations from Met Éireann.

Results from three soakaway tests indicated infiltration at all three of the test locations SA01, SA02 and SA03 with infiltration rates of 9.981×10^{-5} m/s, 4.83×10^{-5} m/s and 3.71×10^{-5} m/s. Refer to **Appendix G** for the locations of the soakaways)

Using the ICPSuDS Input, {Flood Studies Report (FSR)} Method, the rainfallrunoff discharging from the total brownfield site area that is to be developed (i.e. 8.79 ha), in its existing condition, has been estimated at **QBAR**_{RURAL} = **3.0 I/s/ha**. Refer to *Figure 3.3* for an excerpt of the results from the MicroDrainage Runoff Calculator, which also provides the calculated QBAR runoff rate along with the discharge rate for varying Annual Recurrence Intervals (ARI). Refer to **Appendix B** for the QBAR runoff calculations.

	ICP SUDS								
Micro Drainage	ICP SUDS Input (FSR		Results						
biolinage	Return Period (Years)	1	Partly Urbanise			NR)	QBAR rural (I/s)		
	Area (ha)	1.000	Urban	Urban 0.000			3.0		
	SAAR (mm)	720	Region	Region Ireland Greater Dubli V			QBAR urban (I/s)		
	Soil 0.370						3.0		
	Growth Curve		(None)		Calcul	ate	0.0		
111 124	Return Period Flood Region	QBAR (I/s)	Q (1yrs) (l/s)	Q (1 yrs) (l/s)	Q (30 yrs) (I/s)	Q (100 yrs)	^		
IH 124	Region	(l/s)	(l/s)	(l/s)	(l/s)	(l/s)			
IH 124 ICP SUDS	Region Region 6/Region 7	(l/s) 3.0	(I/s) 2.5	(l/s) 2.5	(I/s) 6.7	(I/s) 9.5			
ICP SUDS	Region Region 6/Region 7 Region 8	(I/s) 3.0 3.0	(I/s) 2.5 2.3	(I/s) 2.5 2.3	(I/s) 6.7 5.7	(I/s) 9.5 7.2			
ICP SUDS ADAS 345	Region Region 6/Region 7 Region 8 Region 9	(I/s) 3.0 3.0 3.0	(I/s) 2.5 2.3 2.6	(I/s) 2.5 2.3 2.6	(I/s) 6.7 5.7 5.2	(I/s) 9.5 7.2 6.5			
ICP SUDS	Region Region 6/Region 7 Region 8	(I/s) 3.0 3.0	(I/s) 2.5 2.3	(I/s) 2.5 2.3	(I/s) 6.7 5.7	(I/s) 9.5 7.2			
ICP SUDS ADAS 345	Region Region 6/Region 7 Region 8 Region 9 Region 10	(I/s) 3.0 3.0 3.0 3.0 3.0	(I/s) 2.5 2.3 2.6 2.6	(I/s) 2.5 2.3 2.6 2.6	(I/s) 6.7 5.7 5.2 5.0	(I/s) 9.5 7.2 6.5 6.2			
ICP SUDS ADAS 345 FEH ReFH2	Region Region 6/Region 7 Region 8 Region 9 Region 10 Ireland National	(l/s) 3.0 3.0 3.0 3.0 3.0 3.0	(I/s) 2.5 2.3 2.6 2.6 2.6 2.5	(IVs) 2.5 2.3 2.6 2.6 2.6 2.5	(I/s) 6.7 5.7 5.2 5.0 4.7	(I/s) 9.5 7.2 6.5 6.2 5.5			
ICP SUDS ADAS 345 FEH	Region Region 6/Region 7 Region 8 Region 9 Region 10 Ireland National Ireland East	(l/s) 3.0 3.0 3.0 3.0 3.0 3.0 3.0	(Vs) 2.5 2.3 2.6 2.6 2.6 2.5 2.5	(V/s) 2.5 2.3 2.6 2.6 2.6 2.5 2.5	(I/s) 6.7 5.7 5.2 5.0 4.7 4.8	(I/s) 9.5 7.2 6.5 6.2 5.5 5.6			

Figure 3.3 - Existing Site Runoff Calculator Results (MicroDrainage Excerpt)





3.3 Proposed Surface Water Drainage Design Strategy

3.3.1 Proposed Surface Water Strategy Overview

It is proposed to separate the surface water and wastewater drainage networks, which will serve the proposed development, and provide independent connections to the local public surface water and wastewater sewer networks respectively.

Refer to *Section 4* for details of the proposed wastewater drainage design.

Refer to drawings **R517-OCSC-XX-XX-DR-C-0500**, **R517-OCSC-XX-XX-DR-C-0501 & R517-OCSC-XX-XX-DR-C-0502** for details of the proposed drainage layout, which is to serve the proposed development.

The proposed development is to be served by a sustainable drainage system that is to be integrated with the developments landscaping features and is typically to comprise green roofs, blue podiums, intensive landscaping, pervious paving and filter drains, rain gardens, infiltration basins, trapped road gullies, flow control devices, attenuation storages.

The overall development is divided into a number of surface water subcatchments as a result of the natural topography, site layout, and other site constraints. All surface water runoff is to be attenuated and treated within the new development site boundary, before ultimately discharging to the existing public surface water network on Richmond Road.

Sustainable Drainage Systems are to be provided, wherever practicable, and these are discussed in more detail in Section 3.3.2, with discharge rates from the site being restricted to the greenfield equivalent runoff rate for design rainfall events up to, and including, the 1% AEP, in accordance with the DCC County Development Plan and the GDSDS.

3.3.2 Climate Change Allowance

The proposed surface water network has been designed to allow for an additional 20% increase in rainfall intensity, to allow for Climate Change



projections, in accordance with the Dublin City Council Development Plan and the GDSDS.

All discussions within this report, with regards to surface water network design calculation and results, include for the allowance of an increase of <u>20%</u> in rainfall intensity, as required.

3.3.3 Surface Water Management Strategy

The proposed surface water network is to be split into 2nr. main catchments, which are described further, in *Section 3.4.3*, replicating the natural site catchments.

- 1) Catchment 1 Proposed Hospital area
- 2) Catchment 2 Residential area

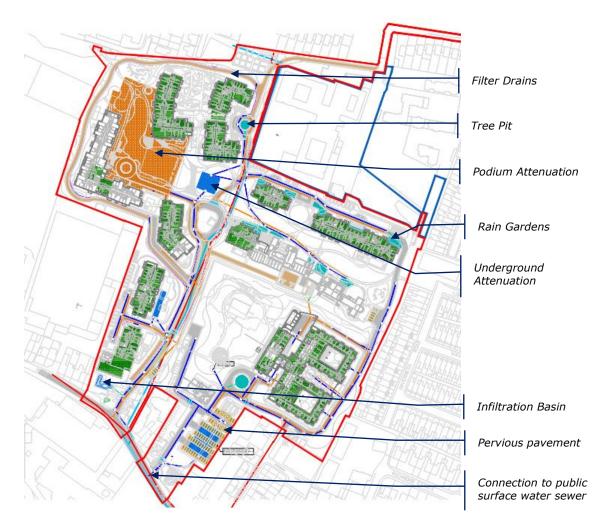


Figure 3.4 - Proposed Surface Water Drainage Strategy





Due to its size and layout, Catchment 2 will be divided into a number of subcatchments, in order to best integrate Sustainable Drainage Systems. Each sub-catchment area will look to provide interception and treatment to the rainfall-runoff, either at source or through site design. Refer to Section 3.5.3 and Figure 3.1 for an overview of the proposed catchment areas.

Infiltration systems will be provided where applicable as the soakaway testing carried out on-site resulted in good infiltration rates across the site.

Each catchment is to discharge treated and attenuated flows (to Qbar equivalent) to the existing public surface water infrastructure.

Interim attenuation benefits are to be provided at roof level, through the provision of green roofs (extension of green roofs shown on the proposed drainage layout and architectural drawings), and throughout the external drainage network: within the landscape features, the podium build-up and pervious paving base course. However, in order to reduce development flow rates to the Greenfield Equivalent Runoff Rate (QBAR), further attenuation is to be provided; before discharging from the site.

The typical traditional and Sustainable Drainage Systems (SuDS) provided, all of which have been designed in accordance with CIRIA C753, the SuDS Manual, and the design guidance material listed in *Section 2* of this report, are listed and detailed in order of general sequence within the drainage network, as follows:

3.3.3.1 Green Roofs

It is proposed to provide green roofs on the buildings within the development. This increases the time of entry for rainwater falling on the roof area of the development while providing source treatment prior to entering the surface water network. At least 70% Green Roof coverage will be provided which is in line with the DCC Development Plan. Refer to drawing R517-OCSC-XX-XX-DR-C-0500 & R517-OCSC-XX-XX-DR-C-0501 & R517-OCSC-XX-XX-DR-C-0502.

As described in section 3.2.3. results from three soakaway tests indicated good infiltration rates throughout the site and therefore instead of implementing





green-blue roofs underground attenuation system at ground level has been implemented to allow for infiltration and recharging water into the ground.



Figure 3.5 - Illustration of Green Roof (DCC SuDS Guide)

The removal of pollutants and reduction of surface water runoff will be provided as a first level of treatment before discharging to the SuDS components downstream.

3.3.3.2 Blue Podium

As a part of the development is a basement structure, there will be significant landscaping and paving above the podium slab. These surfaces shall either be pervious in nature or drain laterally to landscaping features, where the rainfall runoff will be directed to a storage layer above the podium slab that is to comprise either open-graded crushed rock or a proprietary cellular product, in order to attenuate development rainfall discharge rates to the public infrastructure.

Flow controls shall be provided in order to restrict the flow rate from the podium structure.

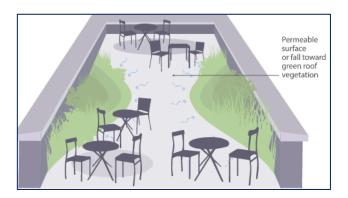


Figure 3.2 - Illustration of Podium Blue Roof (DCC SuDS Guide)





3.3.3.3 Pervious Paving

Pervious pavements provide a pavement finish suitable for both pedestrian and vehicular traffic, while also allowing rainwater to infiltrate the surface layer and into the underlying pervious structural layers. Here, the rainwater is temporarily stored beneath the overlying finished surface before either infiltration to the ground or/and discharge to the main surface water drainage network.

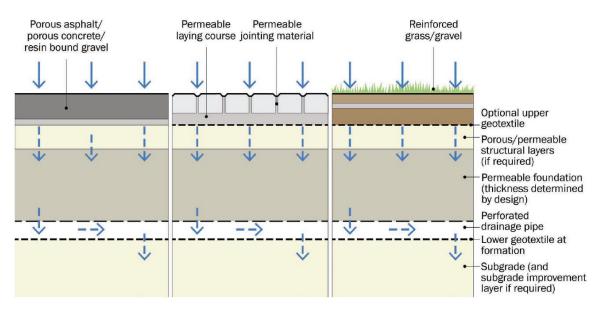


Figure 3.5 - Detail of Type B Pervious Paving (CIRIA C753)

Pervious paving systems are an efficient means of treating the rainwater at source by providing initial interception of the rainwater, reducing the volume and frequency of the runoff and improving the surface water quality by providing at-source treatment of the rainfall-runoff leaving the site. This is achieved by helping remove and retain pollutants prior to discharge to the drainage system and/or groundwater system.

A **Type B** pervious paving, with a 300mm (typical) depth of open graded crushed rock as base course, is to be provided in all car parking spaces, within the proposed development. An overflow pipe, from the base course, will be provided to the drainage network, which will allow for interception of initial rainfall, and groundwater discharge, with an attenuated outflow to the main network in extreme rainfall events.





3.3.3.4 Filter Drains

Filter drains (perforated pipe with cl505 surround) are to be provided along roads where possible to intercept and treat polluted water.

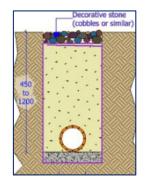


Figure 3.6 - Filter Drain under pavement (left)

Filter drains allow for the interception of rainfall, while also acting as storage and conveying the excess rainfall runoff to the network outfall. Further benefits allow for the filtration of surface water and infiltration to groundwater.

3.3.3.5 Trapped Road Gullies

All road gullies serving the proposed development are to be trapped, to help prevent sediment and gross pollutants from entering the surface water network, thus improving the water quality discharging from the site.

The grated covers are to have a minimum load classification of D400, for frequent vehicular traffic.

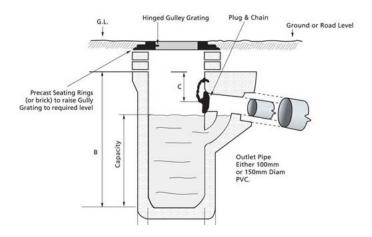


Figure 3.7 - Trapped Road Gully (Typical Detail)





3.3.3.6 Underground Pipe Network

A traditional gravity pipe and manhole network will be provided, to convey the collected rainfall runoff as far as the development's outfall. Manholes, compliant with the GDSDS and GDRCOP, are provided for maintenance access at branched connections, changes in pipe size and gradient, and at intervals no greater than 90m distance.

3.3.3.7 Silt Traps

A manhole upstream of the attenuation system is to contain a 600mm sump, below the invert level of the outlet pipe, in order to trap sediment and other gross pollutants, and prevent them from entering the downstream watercourse; thus improving the water quality discharging from the site.

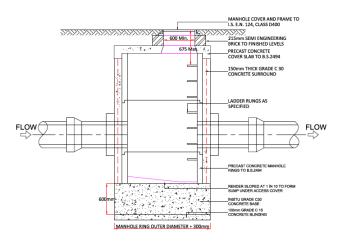


Figure 3.8 - Typical Detail of Silt Trap Manhole

3.3.3.8 Geocellular Storage Systems

Unlined proprietary geocellular storage units are to be provided for the attenuation of rainfall runoff for the catchment area.

These systems are to provide a sufficient temporary storage volume for rainfall events up to, and including, the design of 1% AEP rainfall event (including climate change). Typical geocellular storage systems comprise plastic cellular units of high porosity (typically >95%), structurally arranged in rows and layers, with a perforated distribution pipe through the centre.

These systems also allow for interception of initial rainfall to be provided at the base of the system, by elevating the outlet relative to the system's base.





Access chambers for inspection and maintenance are also to be provided.

Refer to **Appendix F** for a copy of the Cellular Attenuation System details.

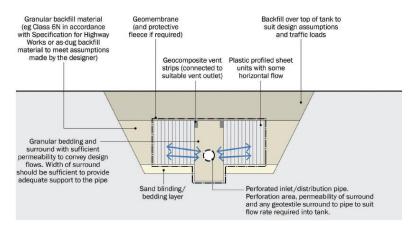


Figure 3.9 - Typical Section of Geocellular System (CIRIA C753)

3.3.3.9 Flow Control Device

Flow Control devices are to be provided at outlet locations at both roof and podium levels, as described previously in *Sections 3.3.3.1* and *3.3.3.2*. These flow control devices shall be as per specialist design.

In areas off the podium, e.g., along the site perimeter and the covered street, a more conventional vortex hydro-brake type flow control is to be provided.



Figure 3.10 - Vortex Hydro-Brake Flow Control Unit (Hydro International)

The flow controls shall all be placed strategically across the development's subcatchments so that the total development discharge rate is restricted to the greenfield equivalent runoff rate of 3.0 l/s/ha, as described in Section 3.4.2.

3.3.3.10 Oil Separator

Oil separators are designed to separate gross amounts of oil and large (>250 μ m) suspended solids from the surface water, mainly through the sedimentation process.





A Class 1 bypass fuel separator is to be provided immediately upstream of the final manhole discharging from the site, as an additional and final mitigation measure, prior to surface water discharge from each unit catchment to the public surface water network.

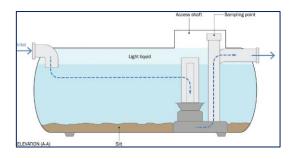


Figure 3.11 - Typical Section Detail of Fuel Separator (CIRIA C753)

3.4 Proposed Sustainable Drainage Network Detailed Design

3.4.1 Software Design Criteria

The proposed surface water network has been designed in accordance with the regulations and guidelines outlined in *Section 2*, using the MicroDrainage Network Design package, by Innovyze Inc., which simulates the performance of the integrated drainage network for varying rainfall return periods and storm durations.

The MicroDrainage Network Design software applies the Flood Studies Report (FSR) methodology for the analysis of the rainfall profiles. However, the input design parameters that were used, as part of this design, were based on the available Flood Studies Update (FSU) data, *i.e.*, the return period rainfall depths for sliding durations, which determine the M_{5-60} and R values, and the standard annual average rainfall (SAAR); as sourced from Met Éireann.





O'Connor Sutton Cronin & Associates Multidisciplinary Consulting Engineers ENGINEERING SERVICES REPORT St. Vincent's Hospital Fairview Redevelopment,

Richmond Road and Convent Avenue, Fairview, Dublin 3.

Design Criteria		
UKRainfall	Design	
FSR Rainfall	Pipes STANDARD	Micro Drainage
Return Period (years) 5	Manholes STANDARD	OK
Region Scotland and Ireland V	Level Level Soffits	Cancel
Map M5-60 (mm) 16.100 Ratio R 0.278	Additional Flow / Climate Change (%) 20	Help
Nalio N 0.270	Min. Backdrop Height (m) 0.200	Default
	Max. Backdrop Height (m) 1.500	
	Min. Design Depth for optimisation (m) 1.200	
Inflow	Min. Velocity for Auto Design only (m/s) 1.00	
Global Time of Entry (mins) 5.00	Min. Slope for Optimisation (1:X) 500	
Max. Rainfall (mm/hr) 50		
Max. Time of Conc. (mins) 30		
Foul Sewage per hectare (I/s) 0.000		
PIMP (%)		
Volumetric Run-off Coeff. 0.750		
Select requ	ired Rainfall Model from the list	

Figure 3.12 - Surface Water Network Design Criteria (MicroDrainage Excerpt)

3.4.2 Proposed Development Rainfall Runoff

It is proposed to reduce and restrict the rainfall-runoff, discharging from the proposed development to the greenfield equivalent, QBAR_{RURAL}, runoff rate, as per the FSR ICP SuDS method, which is based on the IH124 method for catchments smaller than 25km² in area.

This is to be achieved with the provision of a flow restrictor (Hydro-Brake Optimum by Hydro-International, or similar approved) prior to discharging to the existing surface water network on Richmond Road, with the appropriate measures of attenuation provided. Sub-catchment flow-control devices and associated attenuation are also to be strategically provided, in order to maximise SuDS benefits and avail of the open space for preliminary attenuation.

Refer to **Figure 3.3**, in *Section 3.2.3*, for an excerpt from the results MicroDrainage Runoff Calculator for the development catchment area (c.8.9-hectares total development area, which indicates the greenfield equivalent,





QBAR_{RURAL}, value of 3.0 l/s/ha, along with the calculated runoff for varying Average Recurrence Intervals (ARI).

This maximum flow rate (i.e., greenfield equivalent) was incorporated into the integrated drainage network design for each contributing catchment, on a prorata basis for each of the development's outfalls to the public sewer.

For the purpose of the surface water network design simulation, we have considered all external (roads, pavement, and roofs) areas as being 100% impermeable and taken a <u>winter</u> global runoff coefficient, C_v , of 0.90. The proposed car parking areas comprise pervious paving above a drainage layer base course.

3.4.3 Proposed Development Surface Water Catchment Areas

Due to the topography of the site and the proposed layout, the proposed surface water network is to be split into 2nr. main catchment areas. With catchment 1 being the new hospital area and catchment 2 being the residential area.

Each catchment is to be split into further sub-catchments, in order to maximise the treatment and storage benefits of the SuDS structures described in *Section 3.3.3*

The total **net** contributing area for each catchment is as follows:

- Catchment 1 (Hospital) 1.39ha
- Catchment 2 (Residential): 3.18ha

Each catchment is to discharge treated and attenuated flows (to Qbar equivalent of 3.0 l/s/ha) to the existing public surface water drainage infrastructure.

All other areas within the development boundary are to be allowed drain naturally, as per existing.





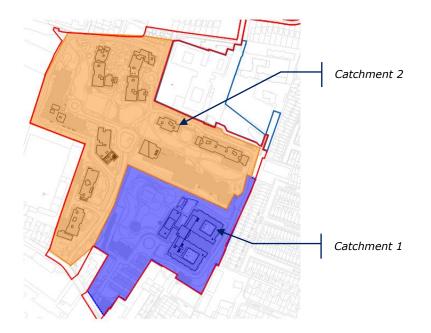


Figure 3.13 - Surface Water Network Catchment Overview

Refer to catchment drawing R517-OCSC-XX-XX-DR-C-0505 for information.

3.4.4 Proposed Surface Water Pipe Network Design

The overall surface water drainage system, serving the proposed development, is to consist of a gravity sewer network that will convey runoff from the roofs and paved areas to the outfall manhole. The new gravity networks will discharge a controlled attenuated flow rate to the existing public network to the new surface water sewer on Richmond Road, as outlined in Section 3.3.2.

The proposed piped network has been designed in accordance with BS EN 752 and all new infrastructure is to be compliant with the requirements of the GDSDS and the GDRCOP for Drainage Works, with minimum full-bore velocities of 1.0 m/s achieved throughout.

All main surface water carrier pipes have been sized to ensure no surcharging of the proposed drainage network for rainfall events up to, and including, the 1 in 5-year ARI event.

Refer to drawing **R517-OCSC-XX-XX-DR-C-0500**, **R517-OCSC-XX-XX-DR-C-0501 & R517-OCSC-XX-XX-DR-C-0502** for masterplan details of the proposed drainage infrastructure layout.





3.5 Proposed Surface Water Attenuation Storage

An integrated attenuation strategy has been applied across the entire masterplan development, in order to best manage the rainfall runoff from hardstanding areas and reduce the runoff rates to less than the greenfield runoff equivalent rate.

This will be provided initially through integration with the landscape proposals around the development, with the further provision of pervious paving for car parking areas.

The development is to combine a number of sustainable drainage features along with elements of a traditional drainage system. The development's main attenuation will be provided on podium level within a 300mm layer of opengraded crushed rock and underground attenuation in the form of a proprietary, modular system (such as the geocellular Y-ESS Pluval Cube, or similar approved).

Pervious paving is to be provided within all car parking spaces within the development. This will provide at-source treatment of runoff from the roads while also providing interim storage within the base course. A minimum of 300mm stone with a minimum porosity of 30% is to be provided below the pervious paving. Runoff temporarily stored within the base course will be allowed to infiltrate naturally into groundwater, an overflow from this is to be provided for events where infiltration is not achieved.

3.6 Surface Water Outfall Locations

Each catchment will have its own independent outfall to the public surface water network located on Richmond Road, based on the natural topography of the site, the new development layout, and resultant design finish levels.

Refer to *Section 3.2.1* for further details of existing public drainage infrastructure.

The discharge rates at both outfall locations are to be restricted to a maximum flow rate of **3.0 l/s/ha**, which is equal to the greenfield runoff equivalent as discussed in *Section 3.2.3*.





The above is to ensure that there is no increase in flow rates and volumes, from the development site, being discharged to the receiving infrastructure and waterbodies; thus causing no adverse impact on adjoining and other downstream properties.

3.7 Water Quality

The quality of the surface water discharging from the site is to be improved through the following provisions, each of which is discussed in greater detail in *Section 3.3.3*.:

- Pervious Paving in all car parking areas;
- Green roofs;
- Intensive landscaping, where practical;
- Interception storage;
- Trapped road gullies on the road carriageway, to trap silt and gross pollutants;
- Silt trap to be provided on manhole immediately upstream of attenuation system, as a further preventative measure to trap silt and other gross pollutants;
- Class 1 bypass fuel separator to be provided prior to discharging from the site.

3.8 Maintenance

The proposed surface water drainage network has been carefully designed, to minimise the risk of blockage throughout the network, mainly through the following provisions that limit and restrict the size of pollutants entering the network:

- Pervious paving;
- Trapped road gullies;
- Silt trap manhole;
- Flow control greater than 50mm diameter.

All devices, including rainwater harvesting units, road gullies, silt traps, flow control devices and attenuation systems, should be inspected regularly and





maintained, as appropriate and in accordance with the manufacturer's recommendations and guidelines. Items such as the flow controls and fuel separators have been located so as to provide easy vehicular access for inspection and maintenance.

3.9 Taking in Charge

It is proposed that all new surface water infrastructure associated with the proposed distribution park development **is not** to be offered to be taken in charge by Dublin City Council.

3.10 Surface Water Impact Assessment

The design criteria for the drainage system are established in GDSDS-RDP Volume 2, Section 6.3.4 and explained further in GDSDS-RDP Volume 2, Appendix E. There are four design criteria, each of which has been considered for the subject site:

- River Water Quality Protection;
- River Regime Protection;
- Level of Service (flooding) for the site and;
- River Flood Protection.

3.11 Criterion 1 – River Water Quality Protection

It is proposed that the overall drainage system, serving this development, will contain a range of surface water treatment methods, as outlined previously in *Section 3.3.3,* which will improve the quality of surface water being discharged from the proposed development.

Gross pollutants, sediments, hydrocarbons, and other impurities, will be removed at the source with the following provisions:

- a) Green Roofs
- b) Pervious Paving along fire tender routes and shared surfaces;
- c) Intensive landscaping, where practicable, including blue podium;
- d) Filter drains
- e) Silt-traps prior to the attenuation storage area.
- f) Class 1 fuel separator prior to discharge from the development.





3.12 Criterion 2 – River Regime Protection

Surface water discharge from the overall development will be restricted to an equivalent rural runoff rate of **3.0 l/s/ha**, which is equal to the greenfield runoff equivalent and significantly less than the existing scenario that discharges unattenuated flows to the public network. Refer to *Section 3.4.2* for further details of the proposed development rainfall runoff calculations.

This will be achieved with the provision of a flow control device (Roof and podium outlets, and Hydro-Brake Optimum, by Hydro-International, or similar approved) upstream of the outfall manholes. Refer to *Section 3.3.3.* for further details.

3.13 Criterion 3 – Level of Service (Flooding) Site

There are four sub-criteria for the required level of service, for a new development; as set out in the *GDSDS Volume 2, Section 6.3.4 (Table 6.3).*

- No flooding on site except where planned (30-year high-intensity rainfall event);
- No internal property flooding (100-year high-intensity rainfall event);
- No internal property flooding (100-year river event and critical duration for site) and;
- No flood routing off-site except where specifically planned. (100-year high-intensity rainfall event).

3.13.1 Sub-Criterion 3.1

The surface water drainage systems, serving the proposed development, have been designed to accommodate the 30-year return period rainfall event (including an allowance of a 20% increase in rainfall intensity for climate change) without flooding.

The performance of the proposed drainage system has been analysed for design rainfall events up to, and including, the 1% AEP event (incl. 20% climate change allowance) using the *MicroDrainage Network Design Software*, by Innovyze Inc. Refer to **Appendix C** for details of design criteria, calculations and results.





3.13.2 Sub-Criterion 3.2

The surface water drainage systems, serving the proposed development, have been designed to accommodate the 100-year return period rainfall event (including an allowance of a 20% increase in rainfall intensity for climate change) without flooding of property.

The performance of the proposed drainage system in 100-year return period storm events (incl. 20% climate change allowance) has been analysed – Refer to **Appendix C** for calculations. The analyses show that no flooding will occur in 100-year return period storm events.

3.13.3 Sub-Criterion 3.3

Details of the flood risk assessment associated with the proposed development are outlined under separate cover, which is submitted as part of this application. The assessment indicates that there is no apparent risk of internal property flooding for a design 100-year return period pluvial rainfall event (including a 20% climate change allowance).

3.13.4 Sub-Criterion 3.4

The surface water drainage systems, serving the proposed development, have been designed to accommodate the 100-year return period rainfall event (including an allowance of 20% increase in rainfall intensity for climate change) without flooding of property, so no flood routing off-site will be experienced for such a rainfall event.

The performance of the proposed drainage system in 100-year return period storm events (incl. 20% climate change allowance) has been analysed – Refer to **Appendix C** for calculations. The analyses show that no flooding will occur in 100-year return period storm events.

Details of the flood risk assessment associated with the proposed development are outlined in the Site-Specific Flood Risk Assessment (Document Nr. **R517-OCSC-XX-XX-RP-C-0003**), which has been submitted under separate cover, as part of this application. This assessment, along with the network design simulation results, from the



MicroDrainage Network Analysis, indicates that no internal property flooding will occur in a 100-year return period fluvial flood event (including 20% climate change allowance).

3.14 Criterion 4 – River Flood Protection

As outlined in *Section 3.12* (Criterion 2), the surface water runoff from the development's catchment will be limited to a maximum of **3.0 l/s/ha**, which is equal to the greenfield runoff equivalent.

Refer to Section 3.2.3 and Section 3.4.2 of this report for further details on the limiting discharge rates. The GDSDS Volume 2, Appendix E states that this practice ensures "that sufficient stormwater runoff retention is achieved to protect the river during extreme events".

Attenuation storage is to be provided for the 100-year return period rainfall event (including an increased 20% rainfall intensity; to allow for climate change). Discharge from the site is to be achieved through the use of a vortex flow control device (e.g. Hydro-Brake Optimum, by Hydro-International, or similar approved), which will reduce the risk of blockage present with other flow devices. Refer to **Appendix C** for details of hydraulic modelling calculations of attenuation and flow control facilities, as carried out using MicroDrainage software by Innovyze Inc.

3.15 Consultation

Meetings have been held with the Dublin City Drainage Department (mid-October 2022) to discuss the proposed strategy and agree on the provision of SUDS elements. Also, all comments that have risen from the Large-scale residential development Pre-application submission and consultations have been addressed. The Drainage Division was generally satisfied with the submission received.





4 WASTEWATER DRAINAGE

4.1 Overview

All proposed wastewater sewer design has been carried out in accordance with Irish Water's Code of Practice for Wastewater Infrastructure. The existing site is currently a mix of greenfield and existing buildings, with existing combined sewer discharging to the public wastewater infrastructure.

It is proposed to provide a connection from each structure to the existing public wastewater network inside the site boundary.

4.2 Existing Wastewater Drainage

Irish Water records a 300 mm sewer within the site boundary with a 900 mm concrete sewer on Richmond Road. This 900 mm sewer flows in an easterly direction and is treated at Ringsend.

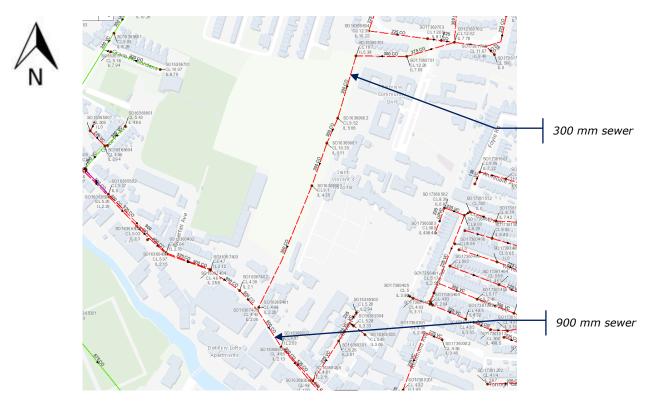


Figure 4.1 - Irish Water Public Records (Excerpt)

Refer to **Appendix A** for details of Irish Water's existing wastewater infrastructure records.





4.3 Consultation

A Pre-Connection Enquiry (PCE) Form (*IW Ref Nr. CDS22004338*) has been submitted to Irish Water with a Confirmation of Feasibility received on the 31st January 2023 stating that the connection is Feasible Subject to upgrades.

As noted in the Confirmation of Feasibility: '*The connection of the Hospital can* proceed prior to any works as it will replace the existing Hospital and hence does not increase the overall load on the downstream network.

In order to accommodate the proposed connection (excluding the Hospital) at the Premises, Storm Sewer Separation works are required to reduce the load on the downstream combined network.

Storm separation of the full site including roofs of any buildings must be undertaken as part of the works.

This Development is being permitted on the bases that a minimum of 1.238ha of hardstanding on the site discharging to the Irish Water combined network must be fully separated. The removal of surface flows from this land will enable the proposed development to connect. The information included in R517-OCSC-ZZ-XX-0006-S0-P04 will need to be independently verified by Irish Water prior to the connection. Irish Water must be contacted in advance of any onsite works impacting the existing storm arrangements to coordinate onsite verification.

As noted in the received Confirmation of feasibility the study undertaken has shown that enough stormwater will be removed from the combined sewer running through the site as part of the new surface scheme that is proposed under this planning application to allow for the connection to the Irish Water wastewater network. Drawing R517-OCSC-ZZ-XX-0006-S0-P04 has been included in **Appendix E**

Refer to **Appendix E** for the Irish Water Confirmation of Feasibility and Statement of Design Acceptance.





4.4 Proposed Wastewater Drainage Strategy

It is proposed to separate the wastewater and surface water drainage networks, which will serve the proposed development, and provide independent connections to the public wastewater and surface water infrastructure respectively.

Refer to *Section 3* for details of the proposed surface water drainage design strategy.

The overall development is to be separated into 2nr. individual gravity wastewater catchments and is to be drained by a gravity wastewater network, based on the natural topography of the development site. It is proposed to provide two individual connections to the existing 900mm public wastewater sewer on Richmond Road (one for the hospital and one for the residential part of the development). All proposed wastewater sewer design is to be carried out in accordance with Irish Water's Code of Practice for Wastewater Infrastructure and submitted as part of the PCE application process.

Refer to detailed design drawing **R517-OCSC-XX-XX-DR-C-0500 & R517-OCSC-XX-XX-DR-C-0501** for masterplan drainage layout.

4.5 Taking In Charge

All new wastewater drainage infrastructure, installed to serve the proposed development **is not** to be offered to Irish Water for to be taken-in-charge.





5 POTABLE WATER SUPPLY

5.1 Overview

All proposed potable water design has been carried out in accordance with Irish Water's Code of Practice for Water Infrastructure, IW-CDS-5020-03.

A new 200mm HDPE watermain connection is to be provided from the existing public watermain with upgrades to the public watermain as noted in the Irish Water Confirmation of Feasibility

5.2 Existing Watermain Infrastructure

Irish Water records show an existing 3 and 5-inch cast iron main within the site and a 6-inch main on Richmond Road.

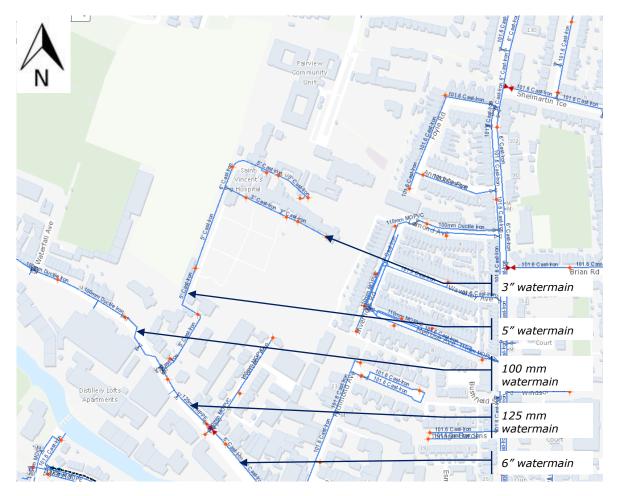


Figure 5-1: Existing watermain infrastructure

Refer to **Appendix A** for details of existing watermain infrastructure records.



Project: R517 Issued: 24-Mar-23



5.3 Consultation

A Pre-Connection Enquiry (PCE) Form (*IW Ref Nr. CDS22004338*) has been submitted to Irish Water with a Confirmation of Feasibility received on the 31st January 2023 stating that the connection is Feasible Subject to upgrades.

As noted in the Confirmation of Feasibility: 'In order to accommodate the proposed connection at the Premises upgrade works are required to increase the capacity of the Irish Water network.

The upgrade works must include:

- *IN 1: Replace 100mm uPVC with 200mm ID pipe for 310m from the Inlet meter of DMA MA01251.*
- IN 2: New 200mm ID pipe to be laid for 300m to connect the site to newly laid 200mm ID pipe in IN 1. (Could replace 100mm uPVC main instead of new additional pipe in Griffith Court Road.)
- IN 3: New 250mm ID main for 50m from 300mm CI to IN 1 (Inlet meter).



Figure 5-2: Indicative watermain upgrades required



Project: R517 Issued: 24-Mar-23



Refer to **Appendix E** for the Irish Water Confirmation of Feasibility and Statement of Design Acceptance.

5.4 Connection to the Existing Network

It is proposed to serve the proposed development by providing a new 200mm high-density polyethylene (HDPE) connection to the upgraded public network sd noted in the Irish Water Confirmation of Feasibility. All works outside the site boundary are in public space and will be undertaken by Irish Water.

The proposed connection is to be carried out in accordance with *Irish Water's Code of Practice for Water Infrastructure*, following a New Connection agreement with Irish Water, with a bulk water meter to be provided at the development's entrance.

Refer to drawing **R517-OCSC-XX-XX-DR-C-0550 and R517-OCSC-XX-XX-DR-C-0551** for the proposed watermain layout.

5.5 Water Saving Devices

Water saving devices are to be considered for use within the proposed development units, in order to conserve the use of water, as part of the internal fit-out.

5.6 Water Meters

Water metering arrangements are to be upgraded at the connection location so that they are to Irish Water's satisfaction. A bulk water meter is to be provided at the connection to the public watermain, at the development entrance, along with individual meters provided at the connection to each commercial and domestic unit. All metering is to be provided in accordance with Irish Water's requirements.

5.7 Taking In Charge

All new watermain infrastructure inside the site boundary, installed to serve the proposed development **is not** to be offered to Irish Water for to be takenin-charge.



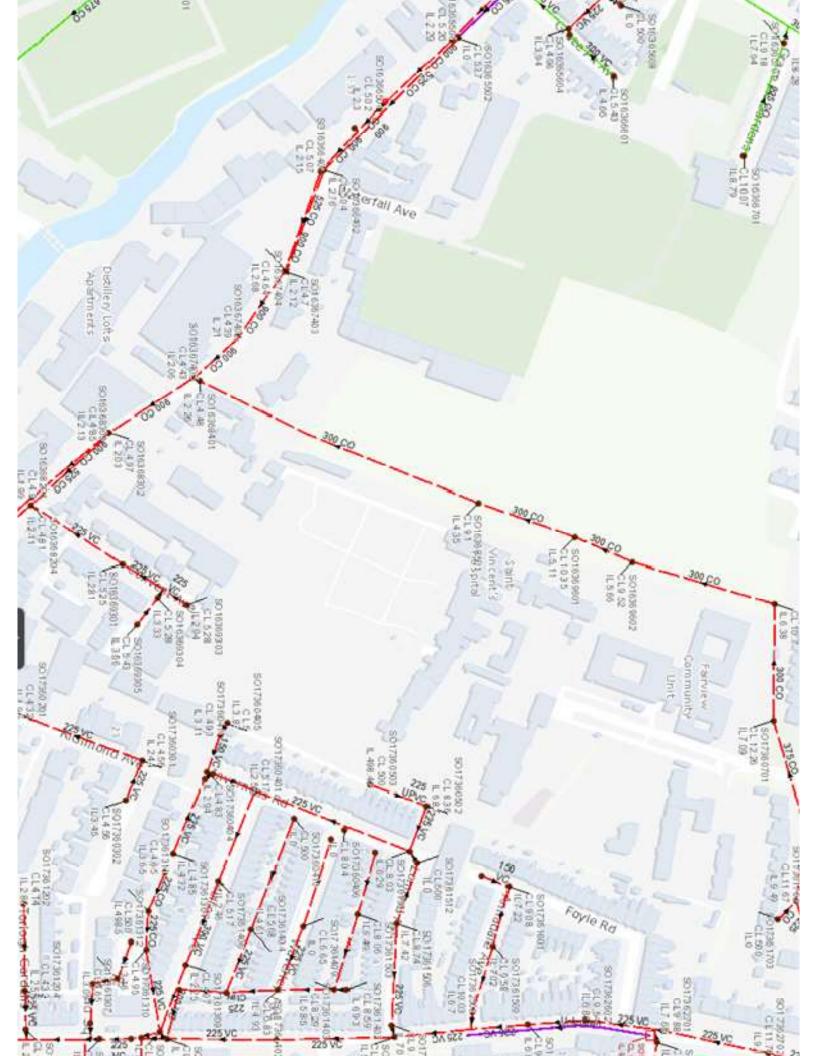




APPENDIX A. DUBLIN CITY COUNCIL & IRISH WATER PUBLIC RECORDS

Appendix A

Dublin City Council & Irish Water Public Records







APPENDIX B. QBAR RUNOFF CALCULATIONS & MET EIRAN

Appendix B

QBAR Runoff Calculations

· · · · · · · · · · · · · · · · · · ·		
O'Connor Sutton Cronin		Page 1
9 Prussia Street		
Dublin 7		
Ireland		Micro Drainage
Date 23/09/2022 17:01	Designed by eoghan.healy	Drainago
File	Checked by	Diamage
XP Solutions	Source Control 2020.1.3	
ICP SUD	S Mean Annual Flood	
	Input	
Area (ha) 1.0	1 Soil 0.37 100 Urban 0.00 20 Region Number Ireland Greater Dubli	0
	Results 1/s	
	QBAR Rural 3.0 QBAR Urban 3.0	
	Q1 year 2.5	
	Q1 year 2.5	
	Q30 years 6.3	
	Q100 years 7.7	
©198	32-2020 Innovyze	
		

Irish Grid:	Return Period	
Easting:	Rainfall	Met I
316967,	Depths	Eireann
Northing: 236469,	for sliding Durations	

N/A Data 1	NOTES:		20 days	16 days		10 days			4 days	3 days	2 days	24 hours	18 hours	12 hours	9 hours	6 hours	4 hours	3 hours	2 hours	1 hours	30 mins	15 mins	10 mins	5 mins	DURATION	
not available		94.2, 13	83.6, 10																						6months, 1	Interval
		12.0,	00.1,	89.8,	78.6,	72.5,	66.0,	58.8,	50.5,	45.8,	40.4,	33.7,	30.2,	25.8,	23.1,	19.8,	16.9,	15.2,	13.0,	10.0,	7.6,	5.9,	5.0,	3.6,	lyear,	а 1
, :		120.6,	108.0,	97.1,	85.3,	78.9,	71.9,	64.3,	55.5,	50.5,	44.7,	37.5,	33.7,	29.0,	26.0,	22.3,	19.2,	17.2,	14.8,	11.4,	8.8,	6.8,	5.8,	4.1,	2,	
		132.4,	118.9,	107.3,	94.6,	87.7,	80.2,	72.0,	62.5,	57.1,	50.9,	43.1,	38.8,	33.5,	30.2,	26.0,	22.4,	20.2,	17.4,	13.5,	10.5,	8.2,	6.9,	5.0,	3,	
1		139.	125.9,	113.	100.	93.	85.	76.	67.	61.	54.	46.	42.	36.	32.	28.	24.	22.	19.	15.	11.	9.	7.	თ •		
ì		145.4,	131.0,	118.6,	105.0,	97.5,	89.5,	80.6,	70.5,	64.6,	57.9,	49.6,	44.8,	38.8,	35.0,	30.3,	26.3,	23.7,	20.6,	16.1,	12.6,	9.8,	8.4,	6.0,	5,	
		162.2,	146.7,	133.3,	118.5,	110.5,	101.7,	92.1,	81.0,	74.6,	67.3,	58.3,	52.8,	46.0,	41.7,	36.3,	31.6,	28.6,	24.9,	19.7,	15.5,	12.2,	10.4,	7.5,	10,	
		179.4,	162.8,	148.4,	132.6,	123.9,	114.5,	104.1,	92.1,	85.2,	77.3,	67.7,	61.5,	53.8,	48.9,	42.8,	37.4,	34.0,	29.7,	23.7,	18.8,	15.0,	12.7,	9.1,	20,	Years
		189.9,	172.7,	157.7,	141.2,	132.2,	122.4,	111.5,	99.1,	91.9,	83.6,	73.7,	67.1,	58.8,	53.6,	47.0,	41.2,	37.5,	32.9,	26.3,	21.0,	16.8,	14.2,	10.2,	30,	
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		215.5,	196.8,	180.5,	162.5,	152.6,	141.9,	130.0,	116.4,	108.5,	99.6,	88.9,	81.3,	71.7,	65.5,	57.8,	50.9,	46.6,	41.1,	33.1,	26.7,	21.5,	18.3,	13.1,	75,	
		224.1,	204.9,	188.2,	169.8,	159.6,	148.6,	136.4,	122.4,	114.3,	105.1,	94.2,	86.2,	76.2,	69.8,	61.6,	54.4,	49.8,	44.0,	35.6,	28.8,	23.3,	19.8,	14.2,	100,	
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These values are derived from a Depth Duration Frequency (DDF) Model For details refer to: 'Fitzgerald D. L. (2007), Estimates of Point Rainfall Frequencies, Technical Note No. 61, Met Eireann, Dublin', Available for download at www.met.ie/climate/dataproducts/Estimation-of-Point-Rainfall-Frequencies_TN61.pdf



APPENDIX C. SURFACE WATER DESIGN & ATTENUATION CALCULATIONS

- Design Criteria;
- Area Summary;
- Network Design & Results Table;
- Simulation Criteria;
- Hydrobrake / Controls & Storage Design;
- Summary of Results.



Appendix C

Surface Water Design and Attenuation Calculations

	©1982-2020 Innovyze	
	S1.000 50.00 5.47 10.725 0.000 0.0 0.0 0.0 1.35 53.7 0.0	
	PN Rain T.C. US/IL E I.Area E Base Foul Add Flow Vel Cap Flow (mm/hr) (mins) (m) (ha) Flow (l/s) (l/s) (m/s) (l/s) (l/s)	
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	Maximum Time of Concentration (mins) 30 Min Jesign Jeptn for Optimisation (m) 1.200 Foul Sewage (1/s/ha) 0.000 Min Vel for Auto Design only (m/s) 1.00 Volumetric Runoff Coeff. 0.750 Min Slope for Optimisation (1:X) 500	
	M5-60 (mm) 16.100 Add FLOW / Climate Change (%) Ratio R 0.278 Minimum Backdrop Height (m) 2 imum Rainfall (mm/hr) 50 Maximum Backdrop Height (m) 2	
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	<u>Design Criteria for Storm</u>	
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)					
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	4.7	39.8	1.00	0.8	0.0	0.0	0.029	9.575		50.00	S1.006	
	ω •ω	49.3	1.24	0.6	0.0	0.0	0.020	9.675		50.00	S1.005	
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	ω •ω	44.5	1.12	0.6	0.0	0.0	0.020	9.875		50.00	S1.003	
	2.3	44.7	1.13	0.4	0.0	0.0	0.014	10.075		50.00	S1.002	
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duit 🚽	Pipe/Conduit	o 450 P		0.0 0.600	0.00	0.052	6 486.2	703 0.036	S1.012 17.703	
duit 🔥	Pipe/Conduit	o 375 P		0.0 0.600	0.00	0.000	6 486.2	617 0.036	s3.007 17.617	
duit 🔩	Pipe/Conduit Pipe/Conduit	o 225 P o 225 P		0.0 0.600	5.00 0.00	0.040 0.000	4 169.6 1 169.6	2.454 0.014 3.536 0.021	\$7.000 2.4 \$7.001 3.1	
duit 🕒	Pipe/Conduit	o 375 P		0.0 0.600	0.00	0.000	4 486.2	320 0.064	S3.006 31.320	
duit 🔥	Pipe/Conduit	o 225 P		0.0 0.600	0.00	0.000	0 169.6	3.405 0.020	s6.001 3.4	
Type Auto Design	Section Type	DIA (mm)	HYD) SECT	Base k Flow (1/s) (mm)	T.E. (mins) F:	I.Area (ha)	L Slope (1:X)	gth Fall) (m)	PN Length (m)	
		1	Storm	Table for	k Design	Network				
				< 2020.1.3	Network					XP Solutions
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Micro				Designed by MKo	Designed by				2 4:53 PM	Date 9/23/2022
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Page 5									on Cronin	O'Connor Sutton

					20 2	020 Innovyze	©1982-2020	0				
	13.9	40.0]	1.01	2.3	0.0	0.0	0.086	8.800	5.04 8	50.00	S10.000	
	21.0	39.8	1.00	ω •5	0.0	0.0	0.129	8.693	5.73 8	50.00	S8.004	
	8.4 8.4	39.8 39.8	1.00 1.00	1.4 1.4	0.0	0.0	0.051 0.051	<mark>8.775</mark> 8.760	5.04 8 5.07 8	50.00 50.00	S9.000 S9.001	
	12.6		1.00	2.1	0.0	0.0	0.077	8.725		50.00	S8.003	
	9.4 12.6	39.8 1	1.00	1.6 2.1	0.0	0.0	0.058	8.860 8.854	5.42 8	50.00	S8.001 S8.002	
	9.4	39.8	1.00	1.6	0.0	0.0	0.058	8.875		50.00	S8.000	
	Flow (l/s)	Cap F (1/s) (]	Vel (m/s)	Add Flow (1/s)	Foul A (1/s)	Σ Base Flow (l/s)	I.Area (ha)	US/IL Σ (m)	T.C. ((mins)	Rain (mm/hr)	PN	
					Table	Results Ta	Network H	Ne				
	9	Pipe/Conduit		o 225	0.600	0.0	5.00	0.086	167.7	515 0.015	S10.000 2.515	
	9	Pipe/Conduit		o 225	0.600	0.0	0.00	0.000	169.6	995 0.077	S8.004 12.9	
	G	Pipe/Conduit		o 225	0.600	0.0	0.00	0.000	9 170.0		S9.001 1.5	
	-	Pipe/Conduit			0.600		5.00	0.051		543 0.015	N	
	-	Pipe/Conduit			0.600	0.0	0.00	0.000				
	.	Pipe/Conduit			0.600		0.00	0.020			N 2	
	3,0	Pipe/Conduit		0 225	0.600		0.00	0.000	169.6		S8.001 1.004	
	6	Pipe/Conduit			0.600	0.0	5.00	0.058		514 0.015		
	Auto Design	Section Type	Secti	HYD DIA SECT (mm)	(mm) \$	Base Flow (l/s)	T.E. (mins)	I.Area (ha)	Slope (1:X)	yth Fall) (m)	PN Length (m)	
				m	for Storm	Table	. Design	Network				
					ω	k 2020.1.	Networ					XP Solutions
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						ned by MKo	Designed				3 PM	Date 9/23/2022 4:5
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						0 Innovyze	©1982-2020	©1				
	51.1	90.1 5:	0.82	оо • 5	0.0	0.0	0.315	7.770	6.49 7	50.00	S8.008	
	14.6 14.6	40.2 1 39.8 1	1.01	2 · 4 • 4	0.0	0.0	0.090	8.100 8.087	5.04 <mark>8</mark> 5.05 8	50.00 50.00	S11.000 S11.001	
	34.9 36.5 36.5	39.8 82.1 39.8 3	1.00 2.07 1.00	5. 5. 1	0.0	0.00.00.00	0.215 0.225 0.225	8.616 8.587 7.993	5.81 8 6.01 8 6.21 7	50.00 50.00	S8.005 S8.006 S8.007	
	13.9	39.8 1:	1.00	2 • 3	0.0	0.0	0.086	8.785	5.08 8	50.00	S10.001	
	Flow (l/s)	Cap F1 (1/s) (1,	Vel (m/s) (Add Flow (1/s)	Foul Add (l/s) (Σ Base Fc Flow (l/s) (l	I.Area) (ha) Fl	US/IL E : (m)	T.C. U (mins)	Rain (mm/hr) (PN	
					o	Results Table	Network Rea	Net				
	9	Pipe/Conduit		o 375	0.600	0.0 0.	0.00	0.000	485.6	631 0.028	S8.008 13.631	
	6 ,6,	Pipe/Conduit Pipe/Conduit		o 225 225	0.600	0.0 0.	5.00 0.00	0.090	166.7 169.6	167 0.013 845 0.005	S11.000 2.167 S11.001 0.845	
	66 6	Pipe/Conduit Pipe/Conduit Pipe/Conduit		o 225 0 225 225	0.600 0.600 0.600	0.0 0.0 0.0 0.0	0.00	0.000 0.010 0.000	9 169.6 40.3 169.6	.926 0.029 .970 0.594 .363 0.073	S8.005 4.926 S8.006 23.970 S8.007 12.363	
	9	Pipe/Conduit		o 225	0.600	0.0 0.	0.00	0.000	169.6	2.213 0.013	S10.001 2.2	
	Auto Design	Section Type	Sectio	D DIA CT (mm)	k HYD (mm) SECT	Base Flow (1/s) (n	T.E. (mins) Fl.	I.Area (ha)	Slope (1:X)	gth Fall) (m)	PN Length (m)	
				Ц	Storm	Table for	Design	Network	N			
						2020.1.3	Network					XP Solutions
Drainage						а ру мко ру мк	Designed Checked b			DX	4:53 PM 01_20220923.MDX	Date 9/23/2022 4 File R517_MD_P01
Micro						opment	Redevelopment					and
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Page 7											ı Cronin	O'Connor Sutton

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	181.2	217.3 18	1.00 2	30.2	0.0	0.0	1.115	8.775	5.13 <mark>8</mark>	50.00	S13.000	
	177.0 177.6 177.6	218.6 17 218.6 17 218.6 17 218.6 17	1.01 1.01 1.01	29.6 6	000	0.0	1.122 1.138 1.138	6.533 6.480	8.60 9.06 6	48.54 48.00 47.41	S1.013 S1.014 S1.015	
	65.4 65.4			10.9 10.9	0.0	0.0	0.402	7.742 7.715	76 50	50.00	S8.009 S8.010	
	12.2 12.2	39.8 1 39.8 1	1.00 1.00	2.0	0.0	0.0	0.075 0.075	8.175 8.161	5.04 8 5.06 8	50.00 50.00	S12.000 S12.001	
	Flow (1/s)	Cap F] (1/s) (1	Vel (m/s)	Add Flow (1/s)	Foul Ad (1/s)	Σ Base I Flow (l/s) (I.Area (ha) I	US/IL Σ (m)	T.C. U (mins)	Rain (mm/hr)	PN	
					Table	Results Tak	Network P	Ne				
	9	Pipe/Conduit		o 525	0.600	0.0 0	5.00	1.115	6 491.3	8.105 0.016	S13.000 8.	
	66	Pipe/Conduit Pipe/Conduit Pipe/Conduit		0 0 5 525 525	0.600 0.600	000000000000000000000000000000000000000	0.00 0.00	0.000 0.016 0.000	7 485.6 6 485.6 0 485.6	156 0.027 825 0.026 655 0.030	S1.013 13.156 S1.014 12.825 S1.015 14.655	
	ዔዔ	Pipe/Conduit Pipe/Conduit		o 375 o 375	0.600 0.600	0.00	0.00	0.013	7 485.6 5 485.6	100 0.027 439 0.075	\$8.009 13.100 \$8.010 36.439	
	ዔዔ	Pipe/Conduit Pipe/Conduit		o 225 225	0.600 0.600	0.00	5.00 0.00	0.075	4 169.6 9 169.6	2.342 0.014 1.501 0.009	\$12.000 2.: \$12.001 1.!	
	Auto Design	Section Type	Sectio	HYD DIA SECT (mm)	k H	Base Flow (1/s)	T.E. (mins)]	I.Area (ha)	. Slope (1:X)	gth Fall 1) (m)	PN Length (m)	
				<u>m</u>	r Storm	n Table for	c Design	Network	<u>r</u>			
						k 2020.1.3	Networ					XP Solutions
Drainage						d by MK	Checked b			DX	_20220923.MDX	File R517_MD_P01_
Micro						mer	Redeve				ר נ	and
					Hospital	Vincent's Hc	St. Vi					Dublin 7
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Page 8											Cronin	O'Connor Sutton

						VZe	020 Innovvze	01982-2020	0					
	555 ••• •40 •40	79.7 125.0 72.2	2.00 3.14 1.81	0.0		000	000	0.033 0.033 0.033	8.575 8.431 7.120	5.05 8 5.17 8 5.24 7	50.00 50.00		S14.000 S14.001 S14.002	
	343.9 347.2 347.2	417.0 34 417.0 34 417.0 34	1.17 4 1.17 4 1.17 4 1.17 4	57.3 57.9 57.9		000	000	2.275 2.324 2.324 2.324	6.299 6.246 6.213	9.44 6 9.68 6 10.17 6	46.52 45.97 44.91		S1.016 S1.017 S1.018	
	181.2 181.2	217.3 18 217.3 18	1.00 2 1.00 2	30.2 30.2		0.0	0.0	1.115 1.115	8.759 8.738	5.30 8 5.73 8	50.00 50.00		S13.001 S13.002	
	Flow (l/s)	Cap F (1/s) (1	Vel ((m/s) (Add Flow (1/s)	Foul (1/s)	Σ Base Flow (l/s)	I.Area (ha) :	US/IL Σ (m)	T.C. U (mins)	Rain ! (mm/hr) (1	(mn	PN	
						Table	Results T	Network F	Net					
	ዔ ዔዔ	onduit onduit onduit	Pipe/Conduit Pipe/Conduit Pipe/Conduit	2 2 5 5 5	0 0 0	0.600 0.600	000	5.00 0.00	0.033	42.8 17.5 52.2	0 0.144 1 1.311 3 0.130	6.170 22.921 6.783	S14.000 S14.001 S14.002	
	֍֍֍	onduit onduit onduit	Pipe/Conduit Pipe/Conduit Pipe/Conduit	675 675	0 0 0	0.600	0.00.00	0.00	0.022 0.049 0.000	500.0 500.0	7 0.053 9 0.034 0 0.069	26.667 16.759 34.490	S1.016 S1.017 S1.018	
	6 ,6,	onduit onduit	Pipe/Conduit Pipe/Conduit	55 00 50 55 55 55 55 55 55 55 55 55 55 5	0 0	0.600	0.0	0.00	0.000	491.3 491.3	4 0.020 5 0.052	9.854 25.786	S13.001 S13.002	
o gn	Auto Design	Section Type	Sectio	DIA (mm)	HYD SECT	k (mm)	Base Flow (l/s)	T.E. (mins)	I.Area (ha)	Slope (1:X)	n Fall (m)	Length (m)	PN	
					torm	for St	Table	Design	Network	N				
						ω	2020.1	Network						XP Solutions
Drainage							ed by MKo by MK	Designed Checked k				3.MDX	2 4:53 PM P01_20220923	Date 9/23/202 File R517_MD_
Micro							Redevelopment	Redeve						
					tal	Hospital	Vincent's H	St. Vi						Dublin 7
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Page 9													OII CLOIITII	O'Connor Sutton

	12.0	39.8	1.00	2.0	0.0	0.0	0.074	5.592		50.00	S15.008	
	•	9	•	1.9	0.0	0.0	0.071	5.675	7.07	50.00	•	
	9	113.6	.86	1.6	0.0	0.0	0.058	7.517		50.00	S15.006	
	9	.8		1	0.0	0.0	0.049	1.5/5		50.00	ST2.002	
	•	LU4.U	2.62	. T	0.0	0.0	0.049	8.775	6.45	50.00	S15.004	
	. i	, α , α , α		• ⊢ • ∪			0.049	0.0 10/0		10.00	500.013	
	2 4 • 7 (2 ~									
	л. -	л () А () А ()		0			6 5 0 0 0 4 0 0	0 0 0 0		50.00	015 003	
	4.2	39.8	. 00	0.7	0.0	0.0	0.026	-		50.00	S15.001	
•	ω. 1	39.8	1.00	0.5	0.0	0.0	0.019	0.225		50.00	S15.000	
	347.2	417.0	1.17	57.9	0.0	0.0	2.357	6.144	10.35	44.54	S1.019	
	Flow (1/s)	Cap (1/s)	Vel (m/s)	Add Flow (1/s)	Foul A((1/s)	Σ Base I Flow (1/s) (I.Area (ha)	US/IL Σ (m)	T.C. ((mins)	Rain (mm/hr)	PN	
					le	Results Table	Network R	Ne				
		Pipe/Conduit	Pipe/	0 225	0.600	0.0 0	0.00	0.003	9 169.6	.819 0.129	S15.008 21.	
9		Pipe/Conduit	Ртре/	22	0.600		0.00	0.UJ3			2 4 .	
		/Conduit	г. (27			0.00	0.009				
	, d	Pipe/Conduit	Pipe/		0.600		0.00	0.000	0.69T 0	· _	,	
		Fibe/Conduit	v					0.000			1.	
		Pipe/Conduit	Pipe/						ט נ ש פ		5 U	
		Fige/Conduit	ק: הד <u>ר</u> כת/	л с л с						2 L 2 L		
, -		r i pe/ comunicit	יידער/	7 C					_			
			D: 00 /		.000			0 00 V			015 001 00 15.000 FJ.	
9		tine/Conduit +	pine/	200	00% 0		л ОО	0 01 0	160	197 N N80	- 	
	с С,	Pipe/Conduit	Pipe/	o 675	0.600	0.0 0	0.00	0.000	5 500.0	258 0.025	S1.019 12.258	
ign	Design			SECT (mm)	(mm) SE	Flow (1/s) ((mins)]	(ha)	(1:X)	n) (m)	(m)	
ţ		Section Type	Secti	HYD DIA				I.Area		цц	PN Len	
				m	storm	n Table for	Design	Network	Þ			
						k 2020.1.3	Network					XP Solutions
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Mirrn						Redevelopment	Redeve					Ireland
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Page 10											Cronin	O'Connor Sutton

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	356.4			59.4	0.0	0	503	N.	ω 4.	10.9	43.38	S1.021	
	356.4	0	17	59.4	0.0	0.0	503	2.	Ц	10.7	ω.	S1.020	
	23.3	39.8	1.00	3. 9	0.0	0.0	146	45 0.	4.8		46.79	S15.016	
	23.3	00		3.9	•	•	0.146		4.8	9.18	47.11	15.01	
	23.3		1.00	3.9	0.0		0.146			5	47.25	S15.014	
	23.3		1.00	3.9	0.0		0.146			0	48.14	•	
	23.3		1.00	3.9	0.0		0.146				49.07	S15.012	
	20.5	39.8	1.00	3.4	0.0		0.127			m	49.56	S15.011	
	14.6	8	1.00	2.4	0.0	0.0	0.090		94 5.319		50.00	S15.010	
	14.6	39.8	1.00	2.4	0.0		0.090				50.00	S15.009	
	Flow (1/s)	Cap I (1/s) (Vel (m/s)	Add Flow (1/s)	Foul Ad (1/s)	ΣBase Fo Flow (1/s) (1	ea	м	US/IL (m)	T.C. (mins)	Rain (mm/hr)	PN	
					0	lts Table	rk Results	Network					
		Pipe/Conduit		o 675	0.600		0.00				106 0.071		ى م
	G	Pipe/Conduit		o 675	0.600	0.0 0.	0.00	0.000 0		51 500.0		\$1.020 25.539	ß
	9	Pipe/Conduit			600	0.	0.00	0.000 0	0	048 169	.110 0.0	.016 8.	S15
	g	Pipe/Conduit		9.2.7.0	.600	0.0 0.	0.00		0	-	C	.UT2 3.	TS
	, G	Pipe/Conduit) N) N	0.600		0.00				0	21	S1
		Pipe/Conduit		o 225	0.600		0.00				863	21.	S1
		Pipe/Conduit		22	0.600		0.00			65 169.6			S1
		Pipe/Conduit			0.600	0.0 0.	0.00					S15.011 16.037	S1
	- ,	Pipe/Conduit	Pipe/	o 225	0.600		0.00	0.000 0	0	36 169.		0	S1
	٩,	Pipe/Conduit			0.600	0.0 0.	0.00		9	44 169.	1.459 0.14	24	S1
	Design				Ξ	Flow (1/s) (1	\sim	(ha) (mi				(m)	
	Auto	Section Type	Secti	7D DIA	k HYD	Base	Т.E. В	I.Area T.		ll Slope	Length Fall	PN Len	
				B	Storm	Table for	Design Ta	Network D	Neti				
						2020.1.3	Network 2	Ne					XP Solutions
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	7.7	85.6	2.15	1.3	0.0	0.0	0.048	7.575	5.23	50.00	S18.000	
	44.7		0.71	7.5	0.0	0.0	0.275	3.004		50.00	S16.004	
	44.7		0.71	7.5	0.0	0.0	0.275	3.009	6.55	50.00	S16.003	
	44.7		0.71	7.5	0.0	0.0	0.275	3.032		50.00	S16.002	
	44.7	49.9	0.71	7.5	0.0	0.0	0.275	3.103		50.00	S16.001	
	22.2	39.9	1.00	3.7	0.0	0.0	0.136	3.325	5.37	50.00	S17.000	
	22.6	39.8	1.00	မ. စ	0.0	0.0	0.139	3.327	5.42	50.00	S16.000	
	Flow (1/s)	Cap 1 (1/s) (Vel (m/s)	Add Flow (1/s)	Foul : (1/s)	Σ Base Flow (1/s)	I.Area (ha)	US/IL E (m)	T.C. 1 (mins)	Rain (mm/hr)	PN	
					Table	Results Ta	Network I	Ne				
	9	Pipe/Conduit	Pipe/(o 225	0.600	0.0	5.00	0.048	0 37.1	713 0.800	S18.000 29.713	
	9	Pipe/Conduit	Pipe/(o 300	0.600	0.0	0.00	0.000		241 0.031	S16.004 15.	
		Pipe/Conduit	Pipe/(o 300	0.600		0.00	0.000			S16.003 2.504	
		Pipe/Conduit	Pipe/0		0.600		0.00	0.000				
		Pipe/Conduit	Pipe/(o 300	0.600	0.0	0.00	0.000	1 486.2			
	3,	Pipe/Conduit	Pipe/(o 225	0.600	0.0	5.00	0.136	3 169.1	496 0.13	S17.000 22.	
	G	Pipe/Conduit	Pipe/(o 225	0.600	0.0	5.00	0.139	9 169.9	0.14	\$16.000 25.314	
	nfaran				(11111)	том (т/s)	(11111)	(II.d.)	(x: 1)	(m)	(m)	
		Section Type	Sectio			Base		I.Area		н	PN Length	
				<u>nra</u>	for Storm	Table	c Design	Network				
					ω	rk 2020.1.	Network					XP Solutions
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		J.9.0	L. 00	1.1	0		0.	TQD.O	.400	0.00 0	00.00	.000	210	
	•	•	•	1 · 1					.444 105	л U D N			610 610	
> 0	> - > 0	· · v · ·		, r			0.0		.400	- - - - - - - - - - - - - -			010 0	
	1 . .		1.00	1.U			0.0	0.035	3.518		50.00	000.618	6.LS	
]	1))	2	þ		0)) 1	1 2 2	1				
1	394.1	417.0		65.7	0	0.0	0.0	2.878	.505	852	41.69	S1.023	S1	
1	394.1		1.17	65.7	0		0.(2.878	.598	.60 2		.022	S1	
	16.1	93.8		2.7	0		0.0	0.099	.875		50.00		S18	
1	16.1	113.0		2.7	0		0.0	0.099	.075		50.00		S18	
9	10.9	99.9	2.51	1.8	0	0.0	0.(0.067	6.775	5.36 6	50.00	S18.001	S18	
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ę		Pipe/Conduit			00	0.600	0.0	0.00				н с	S1.UZ3	
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	2.5	39.8	1.00	0.4	0.0	0.0	0.015	3.688	5.75	50.00	S22.000	
	4.1			0.7	0.0	0.0	0.025	7.076		50.00	S21.002	
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, 6,		Pipe/Conduit	Pipe/(o (л		0.600	•	0.00	0.029			201	S21
¢,		Pipe/Conduit	Pipe/(225		0.600	0.0	0.00	0.000	169.6			S27.002
56		Pipe/Conduit Pipe/Conduit	Pipe/(Pipe/(225 225	0 0	0.600	0.0	5.00 0.00	0.060		514 0.044 514 0.010	.000 7.514 .001 1.614	S27.000 S27.001
G,		Pipe/Conduit	Pipe/0	450	0	0.600	0.0	0.00	0.000	494.8	76 0.040	.011 19.776	S21.011
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	200.5	216.5 200	1.00 2	33.4	0.0	0.0	1.390	2.394	10.42 2	44.39	S21.015	
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	3.9 9	216.5 183.9	1.00 2	30.7	0.0	0.0	1.270	2.436	10.33 2	44.57	S21.014	
	12.3 19.8			2.0 3.3	0.0	0.0	0.075 0.122	4.158 4.033	6.25 4 6.37 4	50.00 50.00	S29.001 S29.002	
	8.1	39.8	1.00	1.3	0.0	0.0	0.050	4.475		50.00	S29.000	
	164.4	216.5 164	1.00 2	27.4	0.0	0.0	1.117	2.459	9.99 2	45.29	S21.013	
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	Auto Design	Section Type I	Sectio	HYD DIA SECT (mm)	k HYD (mm) SECT	Base Flow (l/s) (T.E. (mins) F	I.Area (ha)	Slope (1:X)	gth Fall h) (m)	PN Length (m)	
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	5.5.5 5.5.5 2000.5 5.55 2000.5 5	1.00 216.5 1.00 216.5 1.00 216.5 1.00 216.5		0000	0000	1.390 1.390 1.390 1.390 1.390	2 . 3 8 2 . 2 . 3 2 . 2 . 3 4 8 2 . 2 . 9 9 9 8 8	10.71 11.12 11.37 11.51	43.80 42.55 42.25 42.22	S21.016 S21.017 S21.018 S21.019
	ap Flow 's) (l/s)	Vel Cap (m/s) (l/s)	Add Flow (1/s)	Foul . (1/s)	Σ Base Flow (l/s)	Σ I.Area (ha)	US/IL) (m)	T.C. (mins)	Rain (mm/hr)	Nd
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	0.069	0.069	0.069	- 100	User	4.000 U	
	0.029	0.029	0.029	- 100	User	3.002 U	
	0.000	0.000	0.000	- 100	I	3.001	
	0.058	0.058	0.058	- 100	User	3.000 U	
	0.115	0.006	0.006	- 100	User	U	
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	0.000	0.000	0.000	- 100	I	2.001	
	0.027	0.006	0.006	- 100	User	U	
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	0.006	0.006	0.006	- 100	User	2.000 U	
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	0.097	0.097	0.097	- 100	User	1.009 U	
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	0.000	0.000	0.000	- 100	I	1.007	
	0.009	0.009	0.009	- 100	User	1.006 U	
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	0.000	0.000	0.000	- 100	I	11.001	
	0.090	0.090	0.090	- 100	User	11.000 U	
	0.000	0.000	0.000	- 100	I	8.007	
	0.010	0.010	0.010	- 100	User	8.006 U	
	0.000	0.000	0.000	- 100	I	8.005	
	0.000	0.000	0.000	- 100	I	10.001	
	0.086	0.086	0.086	- 100	User	10.000 U	
	0.000	0.000	0.000	- 100	I	8.004	
	0.000	0.000	0.000	- 100	I	9.001	
	0.051	0.051	0.051	- 100	User	0.000 U	
	0.000	0.000	0.000	- 100	I	8.003	
	0.020	0.020	0.020	- 100	User	8.002 U	
	0.000	0.000	0.000	- 100	I	8.001	
	0.058	0.058	0.058	- 100	User	000.8	
	0.052	0.027	0.027	- 100	User	U	
	0.025	0.025	0.025	- 100	User	1.012 U	
	0.000	0.000	0.000	- 100	I	3.007	
	0.000	0.000	0.000	- 100	I	7.001	
	0.040	0.040	0.040	- 100	User	7.000 U	
	0.000	0.000	0.000	- 100	I	3.006	
	0.000	0.000	0.000	- 100	I	6.001	
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	(ha)	Area (ha)	Area (ha)	me (%)	Type Name	Number T	
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Page 23				O'Connor Sutton Cronin

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Page 25					O'Connor Sutton Cronin

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Page 26				O'Connor Sutton Cronin

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L W n) (mm)	Min D,L Level (mm) (m)		el I. Level (m)	C. Level (m)	Outfall Name	Outfall Pipe Number	71
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On	Online Controls for Storm	
Orifice Manhole:	S70, DS/PN: S2.001, Volume (m³): 1.8	
Diameter (m) 0.021 Dis	Discharge Coefficient 0.600 Invert Level (m) 9.040	
Orifice Manhole:	S20, DS/PN: S3.001, Volume (m ³): 1.4	
Diameter (m) 0.023 Dis	Discharge Coefficient 0.600 Invert Level (m) 7.726	
Orifice Manhole:	<u>S120, DS/PN: S4.001, Volume (m³): 1.7</u>	
Diameter (m) 0.023 Dis	Discharge Coefficient 0.600 Invert Level (m) 7.304	
Orifice Manhole:	S21, DS/PN: S5.001, Volume (m ³): 1.8	
Diameter (m) 0.023 Dis	Discharge Coefficient 0.600 Invert Level (m) 7.398	
Orifice Manhole: S30,	S30, DS/PN: S6.001, Volume (m ³): 1.7	
Diameter (m) 0.023 Dis	Discharge Coefficient 0.600 Invert Level (m) 7.862	
Orifice Manhole:	S33, DS/PN: S7.001, Volume (m ³): 1.7	
Diameter (m) 0.023 Dis	Discharge Coefficient 0.600 Invert Level (m) 8.161	
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	Innovyze	©1982-2020 I:	
-Brake® Optimum as specified. storage routing calculations will	relationship for the Hydro- mum® be utilised then these	the Head/Disc a Hydro-Brake	The hydrological calculations have been based on Should another type of control device other than be invalidated
1.1 1.5	Kick-Flo© 0.506 an Flow over Head Range -	2.000 2.0 4 0.247 1.3 Mean	Design Point (Calculated) Flush-Flo ^m
(1/s)	Control Points Head (m) Flow (1/s)	Head (m) Flow (l/s)	Control Points
Yes 57 75 1200	Sump Available Yes Diameter (mm) 57 Invert Level (m) 6.506 Minimum Outlet Pipe Diameter (mm) 75 Suggested Manhole Diameter (mm) 1200	MD-SHE-0057-2000-2000 2.000 2.0 Calculated : Minimise upstream storage Surface	Unit Reference MD- Design Head (m) Design Flow (1/s) Flush-Flo TM Objective Mi Application
	S/PN: S1.014, Volume (m³): 9.6	Optimum Manhole: S9, DS	<u>Hydro-Brake® Op</u>
	ent 0.600 Invert Level (m) 8.161	0.023 Discharge Coefficient	Diameter (m) (
	S12.001, Volume (m ³): 1.7	Manhole: S41, DS/PN: S	Orifice M
	ent 0.600 Invert Level (m) 8.760	0.023 Discharge Coefficient	Diameter (m) (
	S9.001, Volume (m ³): 1.7	Manhole: S39, DS/PN:	Orifice M
	ent 0.600 Invert Level (m) 8.860	0.023 Discharge Coefficient	Diameter (m) (
	S8.001, Volume (m ³): 1.7	Manhole: S37, DS/PN: ;	Orifice M
	2020.1.3	Network 202	XP Solutions
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9.2	1.600 1.800	8.2	1.200 1.400	6.3 7.0	0.800 1.000	5.5 5.5	0.500 0.600	4.0 4.6	0.300 0.400	မ မ • မ မ	0.100
Flow (l/s)		<pre>Flow (1/s) Depth (m)</pre>	epth (m)	Flow (l/s)	(m)	Flow (1/s) Depth	(m)	w (1/s) Depth	epth (m) Flow	w (1/s) Depth	Depth (m) Flow
ed. ons will	Optimum as specified. routing calculations	Optimum a e routing	he Hydro-Brake® Optimum as specified. en these storage routing calculations	for t sed th	relatic num® be	ne Head/Discharge Hydro-Brake Optir	a H	been based on ice other than	lations have be control device	cal calcu r type of d	The hydrological calculations have Should another type of control dev- be invalidated
		3.7 3.1	Lo® 0.247 1ge <mark>-</mark>	Kick-Flo® rer Head Range	Mean Flow over	4.0 4.0	0.300 0.149	(Calculated) Flush-Flo ^m	Design Point (Cal Fl	Desig	
		Flow (l/s)	Head (m) Flo	l Points	Control	Flow (1/s)	Head (m) F		Control Points		
		Yes 104 8.759 150 1200	Sump Available Diameter (nnn) Invert Level (nn) 8 pe Diameter (nnn) le Diameter (nnn)	S Inv Pipe nhole	Mi	MD-SHE-0104-4000-0300-4000 0.300 4.0 Calculated Minimise upstream storage Surface	D-SHE-0104-4000-0 Ca Minimise upstream		Unit Reference Design Head (m) Design Flow (1/s) Flush-Flo ^m Objective Application	D.	
		U	Lume (m³): 4.5	.001, Vo	DS/PN: S13	ole: S2,	Optimum Manhole:		<u>Hydro-Brake®</u>		
3.9 4.0	8.000 9.000 9.500		5.500 6.000 7.000 7.000	2.4 2.9 2.9	3.000 3.500 4.000 4.500	1.9 2.0 2.2	1.800 2.000 2.200 2.400	1.3 1.5 1.6 1.7	0.800 1.000 1.200 1.400	1.3 1.3 1.1	0.200 0.300 0.400
Flow (1/s) 3.7		Flow (1/s) Depth (m) 3.0 7.500	≥pth (m) 5.000	U	Depth (m) F1 2.600	Flow (1/s)	Depth (m) F 1.600	(1/s) 1.2	Depth (m) Flow 0.600	(1/s) 1.2	Depth (m) Flow 0.100
			ume (m³): 9.6	.014, Vol	DS/PN: S1	hole: S9,	Optimum Manhole		<u>Hydro-Brake®</u>		
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nde	Drainac				l by MKo by MK	Designed by MKo Checked by MK			53 PM 20220923.MDX	4: 01_	Date 9/23/2022 File R517_MD_P
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		(m) 8.775	Invert Level	0.600	rge Coefficient	0.026 Discharge	(m)	Diameter		
		'): <u>3.0</u>	Volume (m³)	S15.004, V	4, DS/PN:	Manhole: S44	<u>Orifice Ma</u>	0		
		(m) 9.675	Invert Level	0.600	rge Coefficient	0.026 Discharge	r (m)	Diamete		
): 2.8	Volume (m³)	S15.003, V	, DS/PN:	Manhole: S43	Orifice Ma	0		
		(m) 10.009	Invert Level	0.600	nge Coefficient	0.026 Discharge	(m)	Diameter		
): 2.9	Volume (m³)	S15.002, V	2, DS/PN:	Manhole: S42	Orifice Ma	0		
		(m) 10.145	Invert Level	0.600	ge Coefficient	0.026 Discharge	(m)	Diameter		
): 2.2	Volume (m³)	<u>\$15.001, \</u>	, DS/PN:	Manhole: S41	<u>Orifice Ma</u>	0		
		(m) 8.431	Invert Level	0.600	rge Coefficient	0.026 Discharge	(m)	Diameter		
): 1.8	Volume (m³)	S14.001, V	7, DS/PN:	<u>Manhole: S3</u>	Orifice Ma	0		
8.500 19.8 9.000 20.3 9.500 20.9	17.9 18.6 19.2	7.000 7.500 8.000	15.9 16.6 17.3	5.500 6.500	13.5 14.3 15.1	4.000 4.500 5.000	11.0 11.8 12.6	2.600 3.000 3.500	9.7 10.2 10.6	2.000 2.200 2.400
oth (m) Flow (1/s)	Flow (1/s) Depth (m)	Depth (m) Flow	(1/s)	Depth (m) Flow	Flow (1/s) De	Depth (m) FJ	Flow (1/s)	(m)	ow (1/s) Depth	Depth (m) Flow
	1	ume (m³): 4	.001, Volun)S/PN: S13.	: S2, D	Optimum Manhole	Brake® Opt	Hydro-B:		
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	r (m) 0.026 Discharge Coefficient 0.600 Invert Level (m) 5.189	Diameter
	fice Manhole: S52, DS/PN: S15.012, Volume (m^3) : 3.3	Orii
	r (m) 0.026 Discharge Coefficient 0.600 Invert Level (m) 5.284	Diameter
	ice Manhole: S51, DS/PN: S15.011, Volume (m³): 2.2	Orifi
	r (m) 0.026 Discharge Coefficient 0.600 Invert Level (m) 5.464	Diameter
	ice Manhole: S49, DS/PN: S15.009, Volume (m³): 2.7	Orifice
	r (m) 0.026 Discharge Coefficient 0.600 Invert Level (m) 5.592	Diameter
	fice Manhole: S48, DS/PN: S15.008, Volume (m³): 2.2	Orii
	r (m) 0.026 Discharge Coefficient 0.600 Invert Level (m) 5.675	Diameter
	ice Manhole: S47, DS/PN: S15.007, Volume (m^3) : 3.1	Orifi
	r (m) 0.026 Discharge Coefficient 0.600 Invert Level (m) 7.517	Diameter
	fice Manhole: S46, DS/PN: S15.006, Volume (m³): 2.6	Orii
	r (m) 0.026 Discharge Coefficient 0.600 Invert Level (m) 7.575	Diameter
	ice Manhole: S45, DS/PN: S15.005, Volume (m³): 2.8	Orifice
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Hydro-Brake® Optimum as specified. these storage routing calculations will	relationship for the num® be utilised then	the Head/Discl a Hydro-Brake	The hydrological calculations have been based on Should another type of control device other than be invalidated
0.545 1.3 - 1.5	Kick-Flo® Flow over Head Range	1.500 2.0 0.269 1.6 Mean	Design Point (Calculated) Flush-Flo ^m
Head (m) Flow (l/s)	Control Points Head	Head (m) Flow (l/s)	Control Points F
ilable Yes c (mm) 61 el (m) 3.004 c (mm) 75 c (mm) 1200	Sump Available Diameter (mm) Invert Level (m) Minimum Outlet Pipe Diameter (mm) Suggested Manhole Diameter (mm)	MD-SHE-0061-2000-1500-2000 1.500 2.0 Calculated Minimise upstream storage Surface	Unit Reference MD-SH Design Head (m) Design Flow (1/s) Flush-Flo ^m Objective Mini Application
$(m^3): 3.1$	DS/PN: S16.004, Volume (r	Manhole: S24,	Hydro-Brake® Optimum
4.866	0.600 Invert Level (m)	026 Discharge Coefficient	Diameter (m) 0.026
<u></u>	S15.015, Volume (m ³): 4.7	Manhole: S55, DS/PN: S	Orifice Man
.995	ent 0.600 Invert Level (m) 4.995)26 Discharge Coefficient	Diameter (m) 0.026
	S15.014, Volume (m³): 4.0	Manhole: S54, DS/PN: S	Orifice Man
5.124	0.600 Invert Level (m)	026 Discharge Coefficient	Diameter (m) 0.026
4	S15.013, Volume (m ³): 3.	Manhole: S53, DS/PN: S	Orifice Man
	2020.1.3	Network 20:	XP Solutions
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		144	l (m) 3.444	Invert Leve	0.600	ye Coefficient	0.035 Discharge	(m)	Diameter		
			.3): 1.6	Volume (m	S19.002,	, DS/PN: :	nhole: S56	ifice Manho	Ori		
		166	1 (m) 3.4	Invert Leve	0.600	ye Coefficient	026 Discharge	(m) 0.	Diameter		
			.3): 1.8	<u>Volume (m</u>	S19.001,	, DS/PN: :	Manhole: S55	Orifice Mar	<u>10</u>		
		375	1 (m) 4.875	Invert Leve	0.600	ge Coefficient	026 Discharge	(m) 0.	Diameter		
			.3): 2.6	Volume (m	S18.003,	, DS/PN:	Manhole: S51	Orifice Mar	<u>10</u>		
)75	1 (m) 6.075	Invert Leve	0.600	ye Coefficient	026 Discharge	(m) 0.	Diameter		
			.3): 2.3	Volume (m³	S18.002,	, DS/PN:	<u>Manhole: S50</u>	fice	Ori		
		75	1 (m) 6.775	Invert Leve	0.600	ye Coefficient	0.026 Discharge	(m)	Diameter		
			³): 2.7	Volume (m	S18.001,	, DS/PN: :	Manhole: S49	Orifice Mar	<u>10</u>		
	9 1 9.000 1 9.500	₽ 3 • •	6.500 7.000	3.1 .3	4.000 4.500	2.4	2.200 2.400	1.8 1.9	1.200 1.400	1.5 1.4	0.400
500 4.2 4.5	5 7.500 8.000 8.500	ωω •••	5.000 6.000	3.0 2.7	2.600 3.000 3.500	2.2 2.3	1.600 1.800 2.000	1.3	0.600	1.0	0.100
(m) Flow (l/s)) Depth	Flow (1/s) Depth (m)	Depth (m)]	(1/s)	Depth (m) Flow	(1/s)	Depth (m) Flow	Flow (1/s) De	Depth (m) Fl	Flow (1/s)	Depth (m) Fl
): 3.1	Lume (m³	5.004, Vol	DS/PN: S16	: S24,	mum Manhole	Brake® Optimum	<u>Hydro-Bra</u>		
					20.1.3	Network 20	N			01	XP Solutions
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	r (m) 0.026 Discharge Coefficient 0.600 Invert Level (m) 2.943	Diameter
	fice Manhole: S63, DS/PN: S19.009, Volume (m^3) : 2.6	Ori
	r (m) 0.026 Discharge Coefficient 0.600 Invert Level (m) 3.067	Diameter
	ice Manhole: S62, DS/PN: S19.008, Volume (m^3) : 3.3	Orifi
	r (m) 0.026 Discharge Coefficient 0.600 Invert Level (m) 3.218	Diameter
	ice Manhole: S61, DS/PN: S19.007, Volume (m³): 3.3	Orifi
	r (m) 0.026 Discharge Coefficient 0.600 Invert Level (m) 3.258	Diameter
	fice Manhole: S60, DS/PN: S19.006, Volume (m³): 3.2	Ori
	r (m) 0.026 Discharge Coefficient 0.600 Invert Level (m) 3.303	Diameter
	Orifice Manhole: S59, DS/PN: S19.005, Volume (m^3) : 2.8	Ori
	r (m) 0.026 Discharge Coefficient 0.600 Invert Level (m) 3.340	Diameter
	fice Manhole: S58, DS/PN: S19.004, Volume (m³): 2.7	Ori
	r (m) 0.026 Discharge Coefficient 0.600 Invert Level (m) 3.405	Diameter
	fice Manhole: S57, DS/PN: S19.003, Volume (m³): 1.8	Ori
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	8.500 9.000 9.500	22.3 23.1 24.0	6.000 6.500 7.000	17.2 18.3 19.4	3.500 4.000 4.500	13.2 13.8 14.4	2.000 2.200 2.400	9.5 10.4 11.1	1.000 1.200 1.400	9.5 9.4 2	0.300 0.400 0.500
	7.500 8.000	20.4 21.4	5.000 5.500	14.9 16.0	2.600 3.000	11.9 12.5	1.600 1.800	8.7	0.600	5.1 9.2	0.100
n) Flow (l/s)	Depth (n	Flow (1/s) Depth (m)	(m)	Flow (1/s) Depth	(1/s) Depth (m) F1	Flow (1/s)	(m)	Flow (1/s) Depth	(m)	Flow (1/s) Depth	Depth (m) Fl
specified. alculations will	num as s Ling cal	Hydro-Brake® Optimum as specified. these storage routing calculations	Hydro these	onship for the utilised then	the Head/Discharge relationship for a Hydro-Brake Optimum® be utilised 1	the Head/Disch a Hydro-Brake (ed on the I than a Hyd	have been based on L device other than	lculations ha of control d	al ca type	The hydrological calculations Should another type of control be invalidated
	7.9 8.2		o® 0.67 ge	Kick-Fl er Head Ran	Mean Flow over	о.	1.000 0.305	(Calculated) Flush-Flo ^m	Point (C	Design	
	/s)) Flow (l/s)	Head (m)	Control Points	Control	Flow (1/s)	Head (m) F	Points	Control Po		
		able Yes (mm) 142 (m) 2.443 (mm) 225 (mm) 1200	Sump Available Diameter (mm) Invert Level (m) pe Diameter (mm) le Diameter (mm)	In Pipe nhole	Mi	00-1000-9500 1.000 9.5 Calculated ream storage Surface	MD-SHE-0142-9500-1000-9500 1.000 9.5 Calculated Minimise upstream storage Surface	ence (m) (m) L/s) Flo ^m Cive	Unit Refere Design Head Design Flow (Flush-I Object Applicat	-	
		. 7.9	lume (m ³):	025, Vol	, DS/PN: S1	ole: S13	Optimum Manhole:		<u>Hydro-Brake®</u>		
		0	el (m) 3.800	Invert Leve	.cient 0.600	rge Coefficient.	0.050 Discharge	Diameter (m) 0.	Diam		
			(m³): 1.1	Volume (;	: S20.001,	9, DS/PN:	Manhole: S99	Orifice Mar	0		
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7.500 9.6 8.000 9.9 8.500 10.1 9.000 10.4 9.500 10.7	7.9 8.6 2.9	5.000 6.000 7.000	5.8 6.2 7.1 7.5	2.600 3.000 3.500 4.000 4.500	5.4.6 5.4.1.9 5.4.1.9	1.600 1.800 2.200 2.200 2.400	4 4 3 3 4 • • • 7 4 3	0.600 0.800 1.000 1.200 1.400	4430 ••• 2010 90	0.100 0.200 0.300 0.400 0.500
-Brake® Optimum as specified. storage routing calculations will Flow (1/s) Depth (m) Flow (1/s)	Brake® Optimum as spe storage routing calcu Flow (1/s) Depth (m)	Hydro these th (m)	relationship for the Hy mum® be utilised then th th (m) Flow (1/s) Depth	relation num® be h (m) E	the Head/Discharge r a Hydro-Brake Optimu (m) Flow (1/s) Depth		have been based on th 1 device other than a Flow (1/s) Depth (m)	(m)	<u>ц</u> т С	The hydrological Should another t be invalidated Depth (m) Flow (]
	ω.4 .7	10® 0.803 nge <mark>-</mark>	Kick-Fl over Head Ran	Mean Flow o	4.2 4.2	1.300 0.392	(Calculated) Flush-Flo™	Point	Design	
	Flow (1/s)	Head (m) F	Control Points	Contro	Flow (1/s)	Head (m) I	Points	Control I		
	Yes 93 2.383 150 1200	Sump Available Diameter (mm) Invert Level (m) pe Diameter (mm) le Diameter (mm)	In Pipe nhole	Mi	MD-SHE-0093-4200-1300-4200 1.300 4.2 Calculated Minimise upstream storage Surface	ID-SHE-0093-42 Minimise upst	ence (m) [/s) [/s] []o ^m L/s L/s Live	Unit Refer Design Head Design Flow (; Flush-I Object Applicat		
	8.1	lume (m³):	S21.016, Vo	DS/PN:	Manhole: S53,		3rake® Optimum	<u>Hydro-Brake®</u>		
		el (m) 3.931	Invert Leve	cient 0.600	arge Coefficient	0.021 Discharge	Diameter (m) O	Dia		
		(m³): 1.9	, Volume (I: S27.001	.32, DS/PN:	Manhole: S1	Orifice Mar			
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	Filter Drain Manhole: S6, DS/PN: S1.002 Infiltration Coefficient Base (m/hr) 0.00000 Trench Length (m) 27.0 Infiltration Coefficient Side (m/hr) 0.13356 Pipe Diameter (m) 0.225 Safety Factor 1.0 Pipe Depth above Invert (m) 0.100 Porosity 0.30 Number of Pipes 1 Invert Level (m) 10.075 Slope (1:X) 100.0 Trench Width (m) 0.7 Cap Volume Depth (m) 0.000	Infiltratio Infiltratio
	Infiltration Coefficient Base (m/hr)0.00000Pipe Diameter (m)0.225Infiltration Coefficient Side (m/hr)0.13356Pipe Depth above Invert (m)0.100Safety Factor1.0Number of Pipes1Porosity0.30Slope (1:X)100.0Invert Level (m)10.315Cap Volume Depth (m)0.000Trench Width (m)0.7Cap Infiltration Depth (m)0.000Trench Length (m)23.023.023.0	Infiltration Infiltration
	Filter Drain Manhole: S5, DS/PN: S1.001	
	Infiltration Coefficient Base (m/hr)0.00000Pipe Diameter (m)0.225Infiltration Coefficient Side (m/hr)0.13356Pipe Depth above Invert (m)0.100Safety Factor1.0Number of Pipes1Porosity0.30Slope (1:X)100.0Invert Level (m)10.725Cap Volume Depth (m)0.000Trench Width (m)0.7Cap Infiltration Depth (m)0.000Trench Length (m)38.038.038.0	Infiltratio Infiltratio
	Filter Drain Manhole: S4, DS/PN: S1.000	
	Storage Structures for Storm	
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	browning 0.00000 it Base (m/hr) 0.00000 it Side (m/hr) 0.13356 Safety Factor 1.0 Porosity 0.30 Pipe Depth rert Level (m) 9.575	
	Filter Drain Manhole: S10, DS/PN: S1.006	
	Infiltration Coefficient Base (m/hr)0.00000Pipe Diameter (m)0.225Infiltration Coefficient Side (m/hr)0.13356Pipe Depth above Invert (m)0.100Safety Factor1.0Number of Pipes1Porosity0.30Slope (1:X)100.0Invert Level (m)9.675Cap Volume Depth (m)0.000Trench Width (m)0.7Cap Infiltration Depth (m)0.000Trench Length (m)11.011.00.000	
	Filter Drain Manhole: S9, DS/PN: S1.005	
	Infiltration Coefficient Base (m/hr)0.00000Pipe Diameter (m)0.225Infiltration Coefficient Side (m/hr)0.13356Pipe Depth above Invert (m)0.100Safety Factor1.0Number of Pipes1Porosity0.30Slope (1:X)100.0Invert Level (m)9.875Cap Volume Depth (m)0.000Trench Width (m)0.7Cap Infiltration Depth (m)0.000Trench Length (m)13.613.6	
	Filter Drain Manhole: S7, DS/PN: S1.003	
	Cap Infiltration Depth (m) 0.000	
	Filter Drain Manhole: S6, DS/PN: S1.002	
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	Invert Level (m) 7.726 Safety Factor 1.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.30 Infiltration Coefficient Side (m/hr) 0.13356	Infiltration (Infiltration (
	Cellular Storage Manhole: S20, DS/PN: S3.001	Cellula
27.0	1.000 59.0 27.0 1.001 0.0	0.000 59.0 0.0
Area (m²)	Area (m^2) Depth (m) Area (m^2) Inf. Area (m^2) Depth (m) Area (m^2) Inf.	Depth (m) Area (m^2) Inf. Area (m^2)
	Invert Level (m) 9.075 Safety Factor 1.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.30 Infiltration Coefficient Side (m/hr) 0.02300	Inve Infiltration Coefficient Infiltration Coefficient
	r Storage Manhole: S69, DS/PN: S2.000	Cellular
	Invert Level (m) 9.492 Cap Volume Depth (m) 0.000 Trench Width (m) 0.7 Cap Infiltration Depth (m) 0.000 Trench Length (m) 2.3	I T Tr
	ent Base (m/hr) 0.00000 Pipe Diameter (m) 0.225 ent Side (m/hr) 0.13356 Pipe Depth above Invert (m) 0.100 Safety Factor 1.0 Number of Pipes 1 Porosity 0.30 Slope (1:X) 100.0	Infiltration Coefficient Infiltration Coefficient S:
	r Drain Manhole: S11, DS/PN: S1.007	Filter
	Lope (1:X) 100.0 Cap Infiltration Depth (m) 0.000 Depth (m) 0.000	Slope Cap Volume Dept
	r Drain Manhole: S10, DS/PN: S1.006	Filter
	Network 2020.1.3	XP Solutions
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			Innovyze	2020	-2861©		
	1.0 0.30	afety Factor 1.0 Porosity 0.30	7.862 s 0.00000 0.13356	rel (m/l (m/l	Inver Coefficient Coefficient	Invert Lev Infiltration Coefficient Base Infiltration Coefficient Side	
		<u> S6.001</u>	S30, DS/PN:	Manhole:	r Storage	<u>Cellular</u>	
37.0	0.0	0.801	37.0	85.0	0.800	0.0	0.000 85.0
1 (m ²)	Area (m^2) Inf. Area (m^2))epth (m) Area	nf. Area (m²) Depth	Area (m²) Inf. Area	(m ²) Depth (m)	Inf. Area	Depth (m) Area (m^2)
	1.0 0.30	Safety Factor 1 Porosity 0.	7.398 0.00000 0.13356	Invert Level (m) ient Base (m/hr) ient Side (m/hr)	Inver Coefficient Coefficient	Invert Lev Infiltration Coefficient Base Infiltration Coefficient Side	
		\$5.001	S21, DS/PN:	Storage Manhole:		<u>Cellular</u>	
39.0	0.0	0.801	39.0	80.0	0.800	0.0	0.000 80.0
1 (m ²)	Area (m^2) Inf. Area (m^2)	(m)	\inf Area (m^2) Depth	Area (m²) Inf.	Depth (m)	Inf. Area (m ²) Depth (m)	Depth (m) Area (m²)
	1.0 0.30	Safety Factor 1 Porosity 0.	7.304 0.00000 0.13356	Invert Level (m) ient Base (m/hr) ient Side (m/hr)	Inver Coefficient Coefficient	Invert Lev Infiltration Coefficient Base Infiltration Coefficient Side	
		S4.001	S120, DS/PN:	Storage Manhole:		Cellular	
32.0	0.0	0.801	32.0	90.0	0.800	0.0	0.000 90.0
1 (m ²)	Area (m^2) Inf. Area (m^2)	(m)	Inf. Area (m ²) Depth	Area (m²) I	(m ²) Depth (m)	Inf. Area	Depth (m) Area (m^2)
		S3.001	S20, DS/PN:	Manhole:	r Storage	<u>Cellular</u>	
			0.1.3	Network 2020.1.3	Ne		XP Solutions
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			's Hospital	• Vincent's	st.		Dublin 7
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			Innovyze	2020	-Z86T©		
	1.0 0.30	Safety Factor 1.0 Porosity 0.30	8.760 0.00000 0.13356	Invert Level (m) ient Base (m/hr) ient Side (m/hr)	Inver pefficient] pefficient ;	Invert Lev Infiltration Coefficient Base Infiltration Coefficient Side	
		S9.001	S39, DS/PN:	Storage Manhole:		Cellular	
28.0	0.0	0.801	28.0	63.0	0.800	0.0	0.000 63.0
rea (m²)	(m) Area (m ²) Inf. Area (m ²)		nf. Area (m²) Depth	Area (m²) Inf.	(m ²) Depth (m) I	Inf. Area (m ²)	Depth (m) Area (m²)
	1.0	Safety Factor 1.0 Porosity 0.30	8.860 0.00000 0.13356	Invert Level (m) ient Base (m/hr) ient Side (m/hr)	Inver pefficient pefficient ;	Invert Lev Infiltration Coefficient Base Infiltration Coefficient Side	
		S8.001	S37, DS/PN:	Manhole:	Storage	<u>Cellular</u>	
20.0	0.0	0.801	20.0	43.0	0.800	0.0	0.000 43.0
trea (m²)	Area (m^2) Inf. Area (m^2)	(m)	inf. Area (m^2) Depth	Area (m²) Inf.		Inf. Area (m^2)	Depth (m) Area (m ²) Inf. Area (m ²) Depth (m)
	1.0	Safety Factor Porosity (8.161 0.00000 0.13356	Invert Level (m) ient Base (m/hr) ient Side (m/hr)	Inver pefficient 1 pefficient :	Inve: Infiltration Coefficient Infiltration Coefficient	
		S7.001	S33, DS/PN:	Manhole:	Storage	Cellular	
29.0	0.0	0.801	29.0	70.0	0.800	0.0	0.000 70.0
urea (m²)	Area (m^2) Inf. Area (m^2)	(m)	Inf. Area (m ²) Depth	Area (m²) I	(m^2) Depth (m) I	Inf. Area (m ²)	Depth (m) Area (m^2)
		S6.001	S30, DS/PN:	Manhole:	Storage	<u>Cellular</u>	
			2020.1.3	Network 2020	Net		XP Solutions
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			's Hospital	. Vincent's	st.		Dublin 7
				17	R517		9 Prussia Street
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			Innovyze	2020	©1982-		
		Safety Factor 1.0 Porosity 0.30	8.161 0.00000 0.13356	Invert Level (m) ient Base (m/hr) ient Side (m/hr)	Inver pefficient pefficient	Invert Lev Infiltration Coefficient Base Infiltration Coefficient Side	
		<u>S12.001</u>	S41, DS/PN: \$	Storage Manhole:		<u>Cellular</u>	
26.0	0.0	0.801	26.0	38.0	0.800	0.0	0.000 38.0
rea (m²)	ea (m²) Inf. Area (m²)	Depth (m) Area	nf. Area (m²) Depth	Area (m²) Inf. Area	(m ²) Depth (m)	Inf. Area (m ²)	Depth (m) Area (m^2)
	00	Safety Factor 1.0 Porosity 0.30	7.662 0.00000 0.13356	Invert Level (m) ient Base (m/hr) ient Side (m/hr)	Inver pefficient pefficient	Invert Lev Infiltration Coefficient Base Infiltration Coefficient Side	
		<u>S11.001</u>	S132, DS/PN:	<u>Manhole: </u>	Storage 1	<u>Cellular</u>	
17.6	0.0	0.801	17.6	30.0	0.800	0.0	0.000 30.0
rea (m²)	(m) Area (m ²) Inf. Area (m ²)		Area (m ²) Inf. Area (m ²) Depth	Area (m²) I	Depth (m) ;	Inf. Area (m^2)	Depth (m) Area (m ²) Inf. Area (m ²) Depth (m)
	00	Safety Factor 1.0 Porosity 0.30	8.360 0.00000 0.13356	Invert Level (m) ient Base (m/hr) ient Side (m/hr)	Inver pefficient pefficient	Inve: Infiltration Coefficient Infiltration Coefficient	
		S10.001	S39, DS/PN: 3	Manhole:	Storage	<u>Cellular</u>	
29.0	0.0	0.801	29.0	84.0	0.800	0.0	0.000 84.0
Inf. Area (m²)	(m) Area (m²) Inf. A		Inf. Area (m ²) Depth		(m^2) Depth (m) Area (m^2)	Inf. Area	Depth (m) Area (m²)
		S9.001	S39, DS/PN:	Manhole:	2 Storage	<u>Cellular</u>	
			2020.1.3	Network 202	Ne		XP Solutions
Drainage			MK	Checked by MK	Ch	1DX	File R517_MD_P01_20220923.MDX
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			's Hospital	St. Vincent's			Dublin 7
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				Innovyze	2020	©1982-		
	7755	/ 0.30 8.575 0.7	Porosity Level (m) Width (m)	0.00000 0.35932 Invert 1 1.0 Trench V	(m/hr) (m/hr) Factor	Coefficient Base Coefficient Side Safety	Infiltration Coe: Infiltration Coe:	
			4.000	S36, DS/PN: S14	Manhole: S	Drain	Filter	
0.0	0.0		0.451	0.0	5260.0	0.450	0.0	0.000 5260.0
¥ (m ²)	Area (m²) Inf. Area (m²)		Depth (m)	Inf. Area (m ²) Depth	Area (m²) Inf.	(m ²) Depth (m)	Inf. Area (m ²)	Depth (m) Area (m^2)
		2.0 0.30	Safety Factor Porosity	8.775 0.00000 0.00000	Invert Level (m) ient Base (m/hr) ient Side (m/hr)	Inver Coefficient Coefficient	Invert Lev Infiltration Coefficient Base Infiltration Coefficient Side	
			S13.000	S1, DS/PN:	Manhole:	: Storage	<u>Cellular</u>	
136.0	0.0		2.001	136.0	290.0	2.000	0.0	0.000 290.0
3 (m ²)	(m) Area (m ²) Inf. Area (m ²)	Area		Area (m ²) Inf. Area (m ²) Depth	Area (m²)		Inf. Area (m ²) Depth (m)	Depth (m) Area (m^2)
		1.0 0.95	Safety Factor Porosity	6.506 0.00000 0.35932	Invert Level (m) ident Base (m/hr) ident Side (m/hr)	Inver Coefficient Coefficient	Inve: Infiltration Coefficient Infiltration Coefficient	
			S1.014	S9, DS/PN:	Manhole:	r Storage	<u>Cellular</u>	
61.0	0.0		0.801	61.0	140.0	0.800	0.0	0.000 140.0
Area (m²)	Inf.	Area (m²)	Depth (m)	Inf. Area (m ²) Depth	Area (m²)	(m ²) Depth (m)	Inf. Area (m ²)	Depth (m) Area (m^2)
			S12.001	S41, DS/PN: S	Manhole:	Storage	<u>Cellular</u>	
				2020.1.3	Network 202	Ne		XP Solutions
Urainage				MK	Checked by MK	Ch	IDX	R517_MD_P01_202
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				c's Hospital	• Vincent's	st.		ublin 7
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	Infiltration Coefficient Base (m/hr) 0.00000 Safety Factor 1.0 Infiltration Coefficient Side (m/hr) 0.13356 Porosity 0.30	
	Filter Drain Manhole: S41, DS/PN: S15.001	
	Infiltration Coefficient Base (m/hr) 0.00000 Pipe Diameter (m) 0.225 Infiltration Coefficient Side (m/hr) 0.13356 Pipe Depth above Invert (m) 0.100 Safety Factor 1.0 Number of Pipes 1 Porosity 0.30 Slope (1:X) 100.0 Invert Level (m) 10.225 Cap Volume Depth (m) 0.000 Trench Width (m) 0.7 Cap Infiltration Depth (m) 0.000 Trench Length (m) 13.5	
	Filter Drain Manhole: S40, DS/PN: S15.000	
	Infiltration Coefficient Base (m/hr) 0.00000 Pipe Diameter (m) 0.225 Infiltration Coefficient Side (m/hr) 0.35932 Pipe Depth above Invert (m) 0.100 Safety Factor 1.0 Number of Pipes 1 Porosity 0.30 Slope (1:X) 170.0 Invert Level (m) 8.431 Cap Volume Depth (m) 0.000 Trench Width (m) 0.7 Cap Infiltration Depth (m) 0.000 Trench Length (m) 23.0	
	Filter Drain Manhole: S37, DS/PN: S14.001	
	Trench Length (m)6.0Slope (1:X)170.0Pipe Diameter (m)0.225Cap Volume Depth (m)0.000Pipe Depth above Invert (m)0.100Cap Infiltration Depth (m)0.000Number of Pipes1	
	Filter Drain Manhole: S36, DS/PN: S14.000	
	Solutions Network 2020.1.3	XP So
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Page 45	hor Sutton Cronin	0'Connor

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	Cap Infiltration Depth (m) Cap Infiltration Depth (m) S42, DS/PN: S15.002 3356 Pipe Depth above Inver 1.0 Pipe Depth above Inver 1.0 Cap Volume Dept 0.7 Cap Infiltration Dept 3356 Pipe Depth above Inver 1.0 Pipe Diamete 3356 Pipe Depth above Inver 1.0 Cap Volume Dept 0.7 Cap Infiltration Dept 0.7 Cap Infiltration Dept 35.0 Cap Volume Dept 35.0 Lance Dept	
	Drain Manhole: S41, DS/PN: S15.001 Level (m) 10.145 Number of Pi	
	Network 2020.1.3	XP Solutions
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	ω	
	<pre>/hr) 0.00000 ripe Depth above Invert (m) /hr) 0.13356 Pipe Depth above Invert (m) ctor 1.0 Number of Pipes sity 0.30 Slope (1:X) (m) 7.517 Cap Volume Depth (m) /m) 7.517 Cap Volume Depth (m)</pre>	Infiltration CC
	rain Manhole: S46, DS/PN: S15.006	
	7.575 Cap Volume 0.7 Cap Infiltration 10.0	
	Coefficient Base (m/hr)0.00000Pipe Diameter (m)0.225Coefficient Side (m/hr)0.13356Pipe Depth above Invert (m)0.100Safety Factor1.0Number of Pipes1Porosity0.30Slope (1:X)100.0	Infiltration Cc Infiltration Cc
	Filter Drain Manhole: S45, DS/PN: S15.005	
	Cap Volume Depth (m) Cap Infiltration Depth (m)	
	0.000000 Pipe Dia 0.13356 Pipe Depth above 3 1.0 Number	Infiltration Cc Infiltration Cc
	Filter Drain Manhole: S44, DS/PN: S15.004	
	Network 2020.1.3	XP Solutions
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	(m/hr) 0.00 (m/hr) 0.13 Factor C rosity C =1 (m) 5. th (m) 2 th (m) 2	Infiltration C Infiltration C
	Filter Drain Manhole: S49, DS/PN: S15.009	
	Coefficient Base (m/hr)0.00000Pipe Diameter (m)0.225Coefficient Side (m/hr)0.13356Pipe Depth above Invert (m)0.100Safety Factor1.0Number of Pipes1Porosity0.30Slope (1:X)100.0Invert Level (m)5.592Cap Volume Depth (m)0.000Trench Width (m)0.7Cap Infiltration Depth (m)0.000Trench Length (m)22.022.00.000	Infiltration C Infiltration C
	Filter Drain Manhole: S48, DS/PN: S15.008	
	Coefficient Base (m/hr)0.00000Pipe Diameter (m)0.225Coefficient Side (m/hr)0.13356Pipe Depth above Invert (m)0.100Safety Factor1.0Number of Pipes1Porosity0.30Slope (1:X)100.0Invert Level (m)5.675Cap Volume Depth (m)0.000Trench Width (m)0.7Cap Infiltration Depth (m)0.000Trench Length (m)14.014.00.000	Infiltration C Infiltration C
	Filter Drain Manhole: S47, DS/PN: S15.007	
	Network 2020.1.3	XP Solutions
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	St. Vincent's Hospital	Dublin 7
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	5.124 Cap Volume Depth (m) 0.7 Cap Infiltration Depth (m) 22.0	
	9 Pipe Depth	<u>ri</u> Infiltration Coef: Infiltration Coef
	Porosity 0.30 S. vert Level (m) 5.189 Cap Volume ench Width (m) 0.7 Cap Infiltration nch Length (m) 11.0	- <u>-</u>
	0.00000 Pipe Diameter (m) 0.13356 Pipe Depth above Invert (m) 1.0 Number of Pipes	Infiltration Coef: Infiltration Coef:
	lter Drain Manhole: S52, DS/PN: S15.012	<u>F1</u>
	0.0	Infiltration Coef: Infiltration Coef:
	lter Drain Manhole: S51, DS/PN: S15.011	<u> </u>
-	Network 2020.1.3	XP Solutions
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000 0000 Tasa	
Side (m/hr) 0.35932 Pipe Depth above Invert (m) afety Factor 1.0 Number of Pipes Porosity 0.30 Slope (1:X) rt Level (m) 7.575 Cap Volume Depth (m) ch Width (m) 0.7 Cap Infiltration Depth (m) h Length (m) 30.0	Coeffi
er Drain Manhole: S48, DS/PN: S18.000 ient Base (m/hr) 0.000000 Pipe Diameter (m) 0.225	<u>Filter D</u> Infiltration Coefficient
0 1.500 121.0 95.0 1.501 0.0 95.0	0.000 121.0 0.0
(m^2) Depth (m) Area (m^2) Inf. Area (m^2) Depth (m) Area (m^2) Inf. Area (m^2)	Depth (m) Area (m²) Inf. Area (m²
Invert Level (m) 3.009 Safety Factor 1.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.13356	Infiltration Infiltration
ar Storage Manhole: S23, DS/PN: S16.003	Cellular
Coefficient Base (m/hr)0.00000Pipe Diameter (m)0.225Coefficient Side (m/hr)0.13356Pipe Depth above Invert (m)0.100Safety Factor1.0Number of Pipes1Porosity0.30Slope (1:X)100.0Invert Level (m)4.995Cap Volume Depth (m)0.000Trench Width (m)0.7Cap Infiltration Depth (m)0.000Trench Length (m)25.025.00.000	Infiltration Coefficient Infiltration Coefficient S: Inve: Trenc Trenc
ter Drain Manhole: S54, DS/PN: S15.014	Filt
Network 2020.1.3	XP Solutions
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	(m) 8.7	Trenc
	Level (m) 3.518 Cap Volume Width (m) 1.0 Cap Infiltration	Invert
	0.30 Slope (1:X)	
	t Side (m/hr) 0.35932 Pipe Depth above Invert (m) 0.100 Safety Factor 1.0 Number of Pipes 1	Intiltration Coefficient Side Safety
	(m/hr) 0.00000 Pipe Diameter (m)	
	Drain Manhole: S54, DS/PN: S19.000	Filter I
	Trench Length (m) 25.0	Trenc
	Width (m) 0.7 Cap Infiltration Depth (m)	Tren
	Level (m) 6.075 Cap Volume Depth (m)	Invert
	Salety Factor 1.0 Number of Pipes 1	
	(m/hr) 0.00000 Pipe Diameter (m) 0. (m/hr) 0.35932 Pipe Depth above Invert (m) 0.	Infiltration Coefficient Infiltration Coefficient
	Drain Manhole: S50, DS/PN: S18.002	Filter I
	Trench Length (m) 19.0 Trench Length (m) 19.0	Trenc
	(m) 6.775 Cap Volume Depth (m)	Invert
	Safety Factor 1.0 Number of Pipes 1 Porosity 0.30 Slope (1:X) 170.0	(0)
	Base (m/hr) 0.00000 Pipe Diameter (m) 0.225 Side (m/hr) 0.35932 Pipe Depth above Invert (m) 0.100	Infiltration Coefficient
	Drain Manhole: S49, DS/PN: S18.001	Filter I
	Network 2020.1.3	XP Solutions
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	Width (m) 1.0 Cap Infiltration Depth (m) Length (m) 14.0	
	Porosity 0.30 Slope (1:X) 170.0 Invert Level (m) 3.303 Cap Volume Depth (m) 0.000	
	Coefficient Side (m/hr) 0.35932 Pipe Depth above Invert (m) 0.100 Safety Factor 1.0 Number of Pipes 1	Infiltration Co
	Base (m/hr) 0.00000 Pipe Diameter (m)	
	Filter Drain Manhole: S59, DS/PN: S19.005	
	11.0	
	Width (m) 1.0 Cap Infiltration Depth (m)	
	ν ν	
	afety Factor 1.0 Number of Pipes	
	Coefficient Base (m/hr) 0.00000 Pipe Diameter (m) 0.225 Coefficient Side (m/hr) 0.35932 Pipe Depth above Invert (m) 0.100	Infiltration Co
	Filter Drain Manhole: S57, DS/PN: S19.003	
	Trench Width (m) 1.0 Cap infiltration Depth (m) 0.000 Trench Length (m) 3.7	
	(m) 3.466 Cap Volume Depth (m)	
	Afety Factor 1.0 Number of Pipes Porosity 0.30 Slope (1:X)	
	Coefficient Base (m/hr) 0.00000 Pipe Diameter (m) 0.225 Coefficient Side (m/hr) 0.35932 Pipe Depth above Invert (m) 0.100	Infiltration Co Infiltration Co
	Filter Drain Manhole: S55, DS/PN: S19.001	
	Network 2020.1.3	XP Solutions
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	3.067 Cap Volume 0.7 Cap Infiltration 21.0	
	Infiltration Coefficient Base (m/hr)0.00000Pipe Diameter (m)0.225Infiltration Coefficient Side (m/hr)0.35932Pipe Depth above Invert (m)0.100Safety Factor1.0Number of Pipes1Porosity0.30Slope (1:X)170.0	In In
	Filter Drain Manhole: S62, DS/PN: S19.008	
	Trench Width (m) 0.7 Cap Infiltration Depth (m) 0.000 Trench Length (m) 25.5	
	Jorosity 0.30 Slope (1:X) vel (m) 3.218 Cap Volume Depth (m)	
	Infiltration Coefficient Base (m/hr) 0.00000 Pipe Diameter (m) 0.225 Infiltration Coefficient Side (m/hr) 0.35932 Pipe Depth above Invert (m) 0.100 Safetv Factor 1.0 Number of Pipes 1	Ini Ini
	Filter Drain Manhole: S61, DS/PN: S19.007	
	Trench Width (m) 0.7 Cap Infiltration Depth (m) 0.000 Trench Length (m) 6.8	
	(m) 3.258 Cap Volume Depth (m)	
	Safety Factor 1.0 Number of Pipes	
	Infiltration Coefficient Base (m/hr) 0.00000 Pipe Diameter (m) 0.225 Infiltration Coefficient Side (m/hr) 0.35932 Pipe Depth above Invert (m) 0.100	Int
	Filter Drain Manhole: S60, DS/PN: S19.006	
	Network 2020.1.3	XP Solutions
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130.0	0.0	1.301	130.0	617.0	1.300	0.0	617.0	0.000
Inf. Area (m²)	Area (m²) Inf	(m ²) Depth (m)	Area	Area (m²) Inf.	(m ²) Depth (m)	Inf. Area (m²)	Area (m²)	Depth (m)
	1.0 0.95	Safety Factor Porosity (2.383 0.00000 0.35932	Invert Level (m) ient Base (m/hr) ient Side (m/hr)	Inve: oefficient oefficient	Invert Level (m) Infiltration Coefficient Base (m/hr) Infiltration Coefficient Side (m/hr)		
		S21.016	S53, DS/PN:	Manhole:	Storage	<u>Cellular</u>		
37.0	0.0	1.001	37.0	113.0	1.000	0.0	113.0	0.000
(m²) Inf. Area (m²)	(m) Area (m²) Inf	(m ²) Depth (m)	Area	(m ²) Depth (m) Area (m ²) Inf.	Depth (m)	Inf. Area (m^2)	(m) Area (m^2)	Depth (m)
	.or 1.0 .ty 0.30	Safety Factor Porosity (3.975 0.00000 0.02300	Invert Level (m) ient Base (m/hr) ient Side (m/hr)	Inve Coefficient Coefficient	Invert Level (m) Infiltration Coefficient Base (m/hr) Infiltration Coefficient Side (m/hr)		
		DS/PN: S27.000	S131, DS/PN:	Manhole: :	Storage	<u>Cellular</u>		
	0.0		166.0 1.001	1.000	166.0	0.000		
	2)	m) Area (m²)	Depth (m) Area (m^2) Depth (m) Area (m^2) Depth (m) Area	pth (m) Area	ea (m²) Dej	Depth (m) Ar		
	or 1.0 ty 0.30	Safety Factor Porosity (3.040 0.00000 0.35932	Invert Level (m) ient Base (m/hr) ient Side (m/hr)	Inve: oefficient oefficient	Invert Level (m) Infiltration Coefficient Base (m/hr) Infiltration Coefficient Side (m/hr)		
		: \$20.000	S98, DS/PN:	n Manhole:	Infiltration Basin	Infiltrat		
			0.1.3	Network 2020.1.3	Ne			XP Solutions
Urainage			MK	Checked by MK	Cł	1DX	\mathbb{N}	R517_MD_P01_
			MKo	Designed by	De		3 PM	Date 9/23/2022 4:53
Mirro				Redevelopment	Re			Ireland
			's Hospital	. Vincent's	st.			Dublin 7
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	©1982-2020 Innovyze	
	Pipe US/MH US/CL Discharge Flow PN Name Event (m) Vol (m³) (l/s) Status	
20 00 00 00	Profile(s) Summer and Winter Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, Return Period(s) (years) 2880, 4320, 5760, 7200, 8640, 1008 Climate Change (%) 20, 20, 20	
	Margin for Flood Risk Warning (mm) 300.0 Analysis Timestep 2.5 Second Increment (Extended) DTS Status ON DVD Status OFF Inertia Status OFF	
	<u>Synthetic Rainfall Details</u> Rainfall Model FSR M5-60 (mm) 16.100 Cv (Summer) 0.750 Region Scotland and Ireland Ratio R 0.278 Cv (Winter) 0.840	
ns O Ls O	Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams Number of Online Controls 43 Number of Storage Structures 50 Number of Real Time Controls	
torage 2.000 ecient 0.800 r/day) 0.000	Simulation Criteria Areal Reduction Factor 1.000 Manhole Headloss Coeff (Global) 0.500 MADD Factor * 10m³/ha Storage Hot Start (mins) 0 Foul Sewage per hectare (1/s) 0.000 Inlet Coefficient Hot Start Level (mm) 0 Additional Flow - % of Total Flow 0.000 Flow per Person per Day (1/per/day)	Are
Storm	5 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for	
	ns Network 2020.1.3	XP Solutions
Drainage	MD_P01_20220923.MDX Checked by MK	File R517_MD
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Page 55	Sutton Cronin	0'Connor Su

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	OK	1.7	7.880		r I+20%	Winte	minute 5	S29 180	S6.000	
	OK	3.1	126.852	1.6		year Winter	minute 5	Ц	53.005	
	OK	2.6	106.127			year Winter	minute 5		S3.004	
	SURCHARGED		9.43/			year Winter	minute 5		, ი	
	SURCHARGED		CTC.BT				minute 5		ι σ	
	OK						minute 5		ιu	
	SURCHARGED		.55.8	8.750			. minute 5	N	4.001 2.001	
	SURCHARGED					year Winter	minute 5		4.000	
	OK		3.928			year Winter	minute 5		3.002	
	SURCHARGED	0.6	9.743			year Winte	minute 5	N	νw	
	SURCHARGED		506°GT		В	year Winter	minute 5		53.000	
	NO		23.205				minute 5		TTOTE	
	OK								SZ.002	
	SURCHARGED		5.654				minute 5	L	T00.7S	
	OK		5.753			year Winter	minute 5		S2.000	
	OK	19.5	11.697			year Winter	minute 5		S1.010	
	OK	19.4	11.697			year Winter	minute 5		S1.009	
	OK	5.0	2.660			year Winter	minute 5		S1.008	
	OK	- 4. 8	2.660				minute 5		S1.007	
	OK	4.6	2.6/2			year Winter	minute 5		SI.006	
	OK		1.881				minute 5		ST.005	
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	200	2	010 1				з. 			
	OK	0.0	0.000	11.650	r I+20%	vear Summer	5 minute 5	S4 1	S1.000	
	Status	(1/s)	Vol (m³)	(m)		Event	Ы	Name	PN 1	
		Flow	Discharge	US/CL				US/MH		
		Pipe							ł	
for Storm	Rank 1) fo	Level (Maximum L	by	Results	Critical	Summary of	Period Su	Return Pe	5 year Re
				• - ເ	K 2020	Network				XP Solutions
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Page 56										O'Connor Sutton Cronin
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			Thhomas	∩c∩c_c801@			
	.0 SURCHARGED	422.368 11.0	20% 1	J	3 1440 minute	80 80	S1.013
	.1 OK	19.162 29.	I+20% 9.490	5 year Winter	30 minute		S8.010
	.3 OK		I+20% 9.600	5 year Winter		о С	82.009
	.5 SURCHARGED	9.417 0.5	I+20% 9.600	5 year Winter	. 240 minute	S41	S12.001
	.4 SURCHARGED		I+20% 9.600	5 year Winter			S12.000
	.4 OK	16.554 27.4	I+20% 9.100	5 year Winter) 30 minute	S40	S8.008
	.1 OK	5.151 11.1	I+20% 9.100	5 year Winter	30 minute		S11.001
	.8 OK	8.392 17.8	I+20% 9.100	5 year Winter	. 15 minute	S131	S11.000
	.1 OK	11.449 17.1	I+20% 9.100	5 year Winter	l 30 minute		S8.007
	.1 OK	11.476 17.1	I+20% 9.800	5 year Winter		S33	S8.006
	.7 OK		I+20% 9.800	5 year Winter			S8.005
	.2 OK	5.892 12.2	I+20% 9.800	5 year Winter		65S	S10.001
	.9 OK	7.989 16.9	I+20% 9.800	5 year Winter	3 15 minute		S10.000
	. 7 OK		I+20% 9.800	5 year Winter	30 minute		S8.004
	. 6 SURCHARGED		I+20% 10.200	5 year Winter) 180 minute		29.001
	.8 SURCHARGED	12.656 2.8	I+20% 10.200	5 year Winter	3 180 minute		000.65
	.5 OK	3.121 3.5	I+20% 10.200	5 year Winter			S8.003
	.6 OK		I+20% 10.300	5 year Winter	. 15 minute		S8.002
	.5 SURCHARGED	7.963 0.5	I+20% 10.300	5 year Winter	N		S8.001
	.5 SURCHARGED			5 year Winter			28.000
				5 year Winter	μ		S1.012
				5 year Winter	1440	70	ι ω
		5.00X		5 year Winter	0.7.7		TDD•/S
				5 year Winter	0.2.T		
		76		5 year Winter	1440	S29	ιω
		5.286 0.		5 year Winter	180		S6.001
	5) JEALUS) (+)	(111)			Natie	2
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	ξ Φ	Pipe Discharge Flow	IIS/CT.				
<u>Storm</u>	(Rank 1) for S	<u>Maximum Level</u>	Results by Ma	of Critical	d Summary	Period	<u>5 year Return</u> :
			2020.1.3	Network 20			XF SOLUCIONS
L							
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			by MKo	Designed k			Date 9/23/2022 4:53 PM
Mirrn			nent	Redevelopment			Ireland
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				011170	\geq	-C801@				
	OK	0.6	11.179	7.800	Winter I+20%	year	240 minute		S15.013	
	SURCHARGED		0.96T	1.	Winter 1+20%	5 year Win	mınute		15. (
	SURCHARGED		0.18/			year	minute		ιυ	
						Acar	ILTICC		ι. ι.	
			3 073			1001				
	SURCHARGED		6.705			vear	minute			
	SURCHARGED		6		Winter I+20%	year	minute			
	SURCHARGED		~1	7.100	Winter I+20%	5 year Win	minute		S15.007	
	OK	0.5	5.713	9.500	Winter I+20%	5 year Win	minute		S15.006	
	OK	0.5	~	9.000	Winter I+20%	year	minute		S15.005	
	OK	0.6	•	ш		year	minute			
	SURCHARGED			11	Winter I+20%	year	minute		•	
	OK		4.879		Winter I+20%	year	minute	S42	S15.002	
	SURCHARGED		3.13U			year	minute			
			2.8.0			year	minute	0 4 C	000.010	
		12.4	706.8T			year	minute	2 V.	670 TS	
						Уеаг			200.410	
	DURCHARGEU			5 10		усаг		000 - 00	000 VI3	
							5	0 C C C C	001 I I 10	
	OK	4.4	2			vear	0 minute	983 0		
	OK	11.7		9.96		vear	minute	0 0	S1.018	
	OK	11.9	14.971	10.395	Winter I+20%	5 year Win	15 minute	ഗ 5	S1.017	
	OK	5.2	11.753		Winter I+20%	5 year Win	30 minute	S4	S1.016	
	OK	3.9	ი		Winter I+20%	year	2160 minute	ω	S13.002	
	OK	ω •				5 year Win	minute	N	S13.001	
	OK	υ. α	602.458			year	mınute		•	
	OK	· 1 • 6	- 5 - N	10.50		year	minute	C	•	
	SUKCHARGED		ια	10.00		Year	minute		<u> ۱</u>	
	XIID CH A D C F D	ω	ა л თ	10 Л		VDDY	a+114 [m	0	-	
	Status	(1/s)	Vol (m ³)	(m)		Event		Name	PN	
		Flow	Discharge	US/CL				US/MH		
		Pipe								
r Storm	Rank 1) for	vel (<u>Maximum Le</u>	ts by M	Resul	f Critical	Summary of	Period :	r Return	5 yea
				.1.3	2020	Network				XP Solutions
				X	ced by MK	Checked		XC	20220923.MDX	File R517_MD_P01_
Drainano				MKo	Уq	Designed			53 PM	Date 9/23/2022 4:
Mirro					Redevelopment	Redev				Ireland
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Laga Jo										
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				TunonAze	uut 020	Z−Z86T©					
					>						1
	OK	0.4	4.224	5.100			minute	Ц	S19.008		
	SURCHARGED		3.427		er I+20%		60 minute 5		S19.007		
	OK	0.4	1.362				minute	ш	S19.006		
	OK		•	თ •		year Winter	minute	S59 1:	S19.005		
	SURCHARGED		1.641				minute		S19.004		
	SURCHARGED		•				minute		S19.003		
	SURCHARGED		3.725				minute		S19.002		
	SURCHARGED		1.795	4			minute		S19.001		
	SURCHARGED		2.187		I+20		minute	S54	S19.000		
	OK	9.0	182.708	4.825			minute		s1.023		
	OK		183.678				minute		S1.022		
	SURCHARGED		5.915				minute		S18.003		
	SURCHARGED		4.303				minute		S18.002		
	SURCHARGED		4.578				minute		S18.001		
	OK		4.416				minute		S18.000		
	SURCHARGED		67.467	5.700	I+20		minute	S24 48	S16.004		
	SURCHARGED		67.386				minute		S16.003		
	SURCHARGED		95.094				minute		S16.002		
	SURCHARGED		95.085				minute	Ъ	S16.001		
	OK	26.4	12.718			year Winter	minute		S17.000		
	OK	26.7	12.941			year Winter	minute	0	S16.000		
	OK	12.5	19.179		er I+20%	year Winter	30 minute 5		S1.021		
	OK	12.4	19.379		er I+20%	year Winter	30 minute 5	00	S1.020		
	OK	0.5	12.151		er I+20%	year Winter	360 minute 5	0	S15.016		
	OK	0.5	12.155		er I+20%	year Winter	360 minute 5	S55 3	S15.015		
	OK	0.5	10.249	7.823	er I+20%	year Winter	40 minute 5	4	<u>н</u>		
	Status	(1/s)	Vol (m³)	(m)		Event		Name	PN		
		Flow	Discharge	US/CL				US/MH			
		Pipe									
for Storm	(Rank 1) f	evel	Maximum Le	ts by N	Resul.	Critical	Summary of	riod	r Return Pe	5 yea	
				.1.3	.k 2020	Network				P Solutions	XP
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				МКо	Уq	Designed			3 PM	ate 9/23/2022 4:5	Da
Mirrn				(†	Redevelopment	Redeve				reland	Τr
			ital	s Hospital	Vincent'	St. Vi				Dublin 7	Ď
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Page 59									Cronin	Connor Sutton	0
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				TunonAze		707-786T©				
X	OK	106.9	81.433	5.300	: I+20%	year Winter	15 minute 5	S48	S21.011	
~	OK	29.8	16.377		: I+20%	year Winter	15 minute 5	S53	S26.004	
~	OK	30.2	16.377			year Winter	5 minute 5		S26.003	
~	OK	30.2	16.377			year Winter	5 minute 5		S26.002	
~	OK	10.1	4.833	4.900	: I+20%	year Winter	15 minute 5		S26.001	
~	OK	10.1	4.833	4.900	: I+20%	year Winter			S26.000	
~	OK	92.2	65.057	5.400	: I+20%	year Winter	15 minute 5		S21.010	
~	OK	94.0	58.141	5.500	: I+20%	year Winter	15 minute 5	S46	S21.009	
~	OK	96.1	58.141	5.400	: I+20%	year Winter	15 minute 5		S21.008	
0	SURCHARGED	95.6	55.054		: I+20%	year Winter	minute 5		S21.007	
0	SURCHARGED	96.7	55.054	5.070	: I+20%	year Winter	15 minute 5		S21.006	
~	OK	7.6	3.628			year Winter	15 minute 5		s25.000	
~	OK	91.4	51.425	5.120	: I+20%	year Winter	15 minute 5		S21.005	
~	OK	75.2	36.440	4.900	: I+20%	year Winter	15 minute 5	S117	S24.000	
~	OK	28.2	14.977	6.000	: I+20%	year Winter	15 minute 5		S21.004	
~	OK	7.5	3.586	4.900	: I+20%	year Winter	15 minute 5		S23.000	
~	OK	14.4	7.453	7.500	: I+20%	year Winter	15 minute 5		S21.003	
~	OK	2.9	1.411	4.750	: I+20%	year Winter	15 minute 5	S40	S22.000	
~	OK	5.0	2.329		: I+20%	year Winter	15 minute 5		S21.002	
~	OK	4.9	2.329			year Winter	minute 5		S21.001	
~	OK	5.0	2.329	9.329	: I+20%	year Winter	5 minute 5		S21.000	
~	OK	9.5	194.158			year Winter	minute		S1.025	
~	OK	0.0				year Winter	minute 5		S20.001	
~	OK	0.1	0.184			year Winter	minute 5		S20.000	
~	OK	9.2	188.153			year Winter	minute 5		S1.024	
~	OK	0.4	4.161			year Winter	minute 5		S19.009	
	0 10100	(- (-)	· OF (111)			2 V C11 C		Manic	5	
	מוולבלמ	(1/e)	Vol (m ³)	j ·		FVDn+		Name	DN	
		Pipe Flow	Discharge	US/CL				US/MH		
for Storm	(Rank 1)	Level	Maximum I	s by	Result	Critical :	Summary of (Period S	ar Return	5 ye
				.1	2020.	Network				XP Solutions
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OK		4.	273.879	I+20% 4.	year	minute		S21.019		
OK OK		4.2	274.255	er I+20% 6.500 1+20% 5.500	5 year Winter 5 vear Winter	720 minute 5	855 855	S21.017 S21.018		
OK			274.418	I+20%	year	minute		21.		
OK OK		29.6	4.322 547.502	er I+20% 5.500 er I+20% 6.000	5 year Winter 5 year Winter	15 minute 5 720 minute 5		S30.000 S21.015		
OK			500.152	I+20%	year	minute	S51	21.		
OK			11.327	I+20%	year	5 minute	S65	S29.002		
OK		10.0	4.033 7.028	er I+20% 5.900	o year winter vear Winter	15 minute :	564 S64	S29.001		
OR		, TT	134.005 / 633	T+20%	year	0 minute		•		
OK			14.400	I+20%	year	5 minute				
OK			5.726	I+20%	5 year Winter	5 minute	S56	28.		
OK			115.121	I+20%	year	minute		S21.012		
OK			31.779	I+20%	year	60 minute	ω	S27.002		
JED JED	SURCHARGED	0.0	17.240 17.097	er I+20% 5.400 er T+20% 5.400	5 year Winter 5 vear Winter	480 minute 5	S131	S27.000		
ŭ	Status	(1/s)	Vol (m³)	(m)	Event		Name	PN		
			Discharge	US/CL			HW/SD			
) for Storm	(Rank 1	Level	Maximum :	Results by N	Critical	Summary of	Period	year Return P	5 V	
-					Network				Solutions	XP
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Page 61								Cronin	Connor Sutton	0
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	Pipe US/MH US/CL Discharge Flow PN Name Event (m) Vol (m³) (l/s) Status	
.00 20	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) 5, 30, 100 Climate Change (%) 20, 20, 20	
	Margin for Flood Risk Warning (mm) 300.0 Analysis Timestep 2.5 Second Increment (Extended) DTS Status ON DVD Status OFF Inertia Status OFF	
	Synthetic Rainfall Details Rainfall Model FSR M5-60 (mm) 16.100 Cv (Summer) 0.750 Region Scotland and Ireland Ratio R 0.278 Cv (Winter) 0.840	
uns O ls O	Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams Number of Online Controls 43 Number of Storage Structures 50 Number of Real Time Controls	
Storage 2.000 iecient 0.800 er/day) 0.000	<u>Simulation Criteria</u> Areal Reduction Factor 1.000 Manhole Headloss Coeff (Global) 0.500 MADD Factor * 10m³/ha Storage Hot Start (mins) 0 Foul Sewage per hectare (1/s) 0.000 MADD Factor * 10m³/ha Storage Hot Start Level (mm) 0 Additional Flow - % of Total Flow 0.000 Flow per Person per Day (1/per/day)	
r Storm	30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for	
	Solutions Network 2020.1.3	XP
Drainage	Date 9/23/2022 4:53 PM Designed by MKo File R517_MD_P01_20220923.MDX Checked by MK	H H
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for storm	(Rank 1) f	evel .	Maximum T.	р Ч] Results	Critica	Summarv of	n Period	30 vear Return	
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Page 63									Sutton Cronin	O'Connor
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			Innovvze	©1982-2020			
	19.0 SURCHARGED			30 year Winter	00 00	13 S	S1.013
	49.6 OK	28.813 49	I+20% 9.490	30 year Summer	36 30 minute	ى م	S8.010
	8 OK	28.949 49.8	I+20% 9.600	30 year Summer	35 30 minute		600°8S
	0.7 SURCHARGED	12.060 0	I+20% 9.600	30 year Winter I+	41 240 minute		S12.001
	4.9 SURCHARGED	29.277 4	I+20% 9.600	30 year Winter	40 240 minute		S12.000
	47.9 OK	25.519 47	I+20% 9.100	30 year Summer I+	40 30 minute		800.8S
	20.7 OK		I+20% 9.100	Summer			S11.001
	26.1 OK	12.339 26	I+20% 9.100	30 year Winter		00 S131	S11.000
		199		30 year Winter			S8.007
		13.226 28	I+20% 9.800	year Winter		06 833	S8.006
	26.2 OK		I+20% 9.800	Winter	38 15 minute		S8.005
	21.8 OK	6.951 21	I+20% 9.800	30 year Winter	39 15 minute		S10.001
	24.9 OK	11.746 24	I+20% 9.800	30 year Winter	38 15 minute		S10.000
	6.5 OK		I+20% 9.800	30 year Winter	38 15 minute	04 S38	S8.004
	-7 SURCHARGED	9.873 0	I+20% 10.200	30 year Winter	39 180 minute		\$9.001
	4.0 SURCHARGED		I+20% 10.200	30 year Winter	38 180 minute		000.65
	5.7 OK		I+20% 10.200	Summer	32 30 minute		S8.003
	6.4 OK		I+20% 10.300	30 year Winter	31 15 minute		S8.002
	0.7 SURCHARGED		I+20% 10.300	30 year Winter	37 180 minute		S8.001
	4.4 SURCHARGED		I+20% 10.300	30 year Winter	36 180 minute	ດ	S8.000
	12.9 SURCHARGED	364.518 12	I+20% 10.500	30 year Winter	S7 960 minute		S1.012
	5.1 SURCHARGED		I+20% 9.600	30 year Winter	10 960 minute	07 S10	\$3.007
	0.8 SURCHARGED		I+20% 9.600	30 year Winter	33 120 minute	о 0	S7.001
	4.0 SURCHARGED	12.389 4	I+20% 9.600	30 year Winter I+	32 120 minute	SS 000	S7.0
	4.9 SURCHARGED	154.548 4	I+20% 9.300	30 year Winter	29 960 minute	ຄ	s3.006
	0.6 SURCHARGED			30 year Winter	30 180 minute	03	S6.00
	s) Status	Vo⊥ (m³) (⊥/s)	(m)	Event	ñ	Name	PN
		Ŵ	Ч		ΔĦ	HW/SD	
	ē						
Storm	1 (Rank 1) for	<u>Maximum Level</u>	Results by M	of Critical	od Summary.	n Period	<u>30 year Return</u>
			۲ nonc	Network 21			VP Solutions
			y MK	Checked by		MDX	File R517_MD_P01_20220923.MDX
			by МКо	Designed 1			Date 9/23/2022 4:53 PM
Mirrn			nent	Redevelopment			Ireland
		tal	nt's Hospital	St. Vincent's			Dublin 7
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	SURCHARGED	0.6	12.360			ar Winter		minute	5ω 3	.013 2	15.		
	SURCHARGED	1.1	8.204		н	ar Winter	30 year	120 minute	S52 1:		S15.012		
	SURCHARGED	0.6	6.851		r I+20%	ar Winter	30 year	120 minute	S51 1:		S15.011		
	SURCHARGED	0.6	1.911	7.100		ar Winter	30 year	minute			S15.010		
	SURCHARGED	0.5	5.061		r I+20%		30 year	minute		-	S15.009		
	SURCHARGED	0.4	6.319					minute			S15.008		
	SURCHARGED	0.7	8.391			ar Winter		minute			S15.007		
	OK	0.6	1.654					minute			S15.006		
	SURCHARGED	0.6	6.825					minute			S15.005		
	OK	0.6	8.189					minute			S15.004		
	SURCHARGED	0.8	8.294	11.100		ar Winter	30 year	120 minute	S43 12		S15.003		
	SURCHARGED	0.7	6.242	11.800	r I+20%	ar Winter	30 year	120 minute	S42 12		S15.002		
	SURCHARGED	0.7	3.704	11.700	r I+20%	ar Winter	30 year	60 minute			S15.001		
	SURCHARGED	1.9	3.965	11.650	r I+20%	ar Winter	30 year	minute			S15.000		
	OK	20.3	21.825	8.415	r I+20%	ar Winter	30 year	15 minute			S1.019		
	OK	0.9	2.254	8.545	r I+20%	ar Winter	30 year	minute	S38		S14.002		
	SURCHARGED	0.9	2.268		r I+20%	ar Winter	30 year	30 minute	S37 0		S14.001		
	SURCHARGED	6.3	5.809		r I+20%	ar Winter	30 year	30 minute			S14.000		
	OK	20.1	20.157			ar Winter	30 year	minute			S1.018		
	OK	21.2	20.450	F			30 year	minute		T./	SI.017		
	OK		14.092				30 year	minute		10	S1.016		
	OK	4.1	065 8/./.				30 year	minute	21	. 02	S13.002		
	OK	4.L	778.629					minute) L	222 COS		
	OK	 	//8.343				30 year	minute		00	ST3.000		
	OK	1.4	131.151					minute	,		S1.015		
	SURCHARGED	1.4	131.226			ar Winter	30 year	minute			S1.014		
	Status	(1/s)	۷0⊥ (m°)	(m)		Ĩ	Event		me	Name	Nd		
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		Pipe	Discharge	IIS/CI.					HW/ SII	112			
	·			I									
for Storm	(Rank 1) fo	evel	Maximum Le	λq	Results	itical	Of Cri	Summary o	Period S		ar Return	30 Ve	
				1.3	2020.	Network						olutions	XP So
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Page 65											Cronin	Sutton	O'Connor

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				TNNAVVZA	<u> </u>			
	OK	0.5	4.578	+20%	year Winter I	120 minute 30	S62	S19.008
	SURCHARGED	1.0	2.407	I+20% 5.900	year Winter]	30 minute	S61	S19.007
	SURCHARGED	0.4	0.954	I+20% 5.900	Winter	120 minute 30	S60	S19.006
	SURCHARGED	0.4	2.954	I+20% 5.600	Winter	120 minute 30		S19.005
	SURCHARGED	1.3	2.458	I+20% 5.390	Winter			S19.004
	SURCHARGED	0.3	0.579	I+20% 4.840	year Winter]	120 minute 30	S57	S19.003
	SURCHARGED	1.7	5.033	I+20% 4.750	year Winter]	60 minute 30	S56	S19.002
	SURCHARGED	0.6	2.157	I+20% 4.750	Winter		S55	S19.001
	SURCHARGED	0.9	2.726	I+20% 4.750	Winter	60 minute 30	S54	S19.000
	OK	9.3	307.818	I+20% 4.825	Winter	360 minute 30		S1.023
	OK	11.3	308.936	I+20% 6.100	year Winter J	360 minute 30	S10	S1.022
	SURCHARGED	0.9	7.116	I+20% 6.300	year Winter]	120 minute	S51	S18.003
	SURCHARGED	1.0	5.061		year Winter]	60 minute	S50	S18.002
	SURCHARGED	1.4	5.738			60 minute	S49	S18.001
	OK	7.9	11.163			60 minute	S48	S18.000
	SURCHARGED	1.6	90.306			600 minute	S24	S16.004
	SURCHARGED	4.2	/6.2/0			480 minute		S16.003
	SURCHARGED	9. DT	134.024			480 minute		S16.002
	SURCHARGED		134.402		Winter	480 minute	TZS	SI6.UUI
	SURCHARGED	30.L	869.8T		winter	TO WINUTE	170	
	SURCHARGED		10.02/		WINTEr	15 minute	070	
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	NO	Э Л	J	FC8 7 %0C+1	vear Winter 1	Us atriuim U95	л л	S15 014
	Status	(1/s)	Vol (m³)	(m)	Event		Name	PN
		Flow	Discharge	US/CL			US/MH	
		Pipe					•	
for Storm	(Rank 1) f	.evel	<u>Maximum L</u>	Results by I	Critical Re	d Summary of	Period	<u> 30 year Return :</u>
				020.1.3	Network 2			XP Solutions
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	SURCHARGED	167.2	119.582	5.300	Winter I+20%	year Wii	minute 30	15	1 S48	S21.011	
	SURCHARGED	41.0	4.0	• 87	0/P	year Win	minute 30	15		S26.004	
	SURCHARGED	42.1	24.081	4.875		year Win	minute 30	15	03	S26.003	
	SURCHARGED	44.3	24.081	4.900		year Wii		15		S26.002	
	SURCHARGED	16.4	7.107	4.900	I+20%	year Win		15		S26.001	
	OK	13.6		4.900		year Win	minute 30	15) S49	26.	
	SURCHARGED	134.8	95.643	5.400	Winter I+20%	year Win	minute 30	15		S21.010	
	SURCHARGED	134.6	85.473	5.500	Winter I+20%	year Win	minute 30	15	9 S46	S21.009	
	SURCHARGED	140.7	85.485	5.400	Winter I+20%	year Win	minute 30	15		S21.008	
	SURCHARGED	137.9	80.947	5.300	Winter I+20%	year Win	minute 30	15		S21.007	
	SURCHARGED	140.4	80.947	5.070	Winter I+20%	year Win	minute 30	15	5 S43	S21.006	
	OK	11.2	5.335	4.900	Winter I+20%	year Wi	minute 30	15) S119	S25.000	
	SURCHARGED	131.7		5.120	Winter I+20%	year Wii	minute 30	15	5 S42	S21.005	
	SURCHARGED	110.1		4.900			minute 30	15	7.0	S24.000	
	SURCHARGED	36.9	.022	6.000	I+20%	year Wii	minute 30	15		S21.004	
	OK	10.9	5.274	4.900		year Wii	minute 30	15	70	S23.000	
	OK	20.9	10.958	7.500		year Win	minute 30	15		S21.003	
	OK	4.0	2.075	4.750	I+20%	year Win		15		S22.000	
	OK		3.424	9.400	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~			τυ		200 222 2007 TZS	
	ON	C	3.424		1+20%			ι η Η		201 000 TUN'TZS	
	ON ON	1 ~ . U	0.424 101	0 .000	907+T			ч Н С		000.TZC	
	01		D.					- C - C			
	NC C	о л	375 378	4 400	T+20%			2 1 0	0	100 FS	
	OK	0.0	0.000	4.400	I+20%			240	0	s20.001	
	SURCHARGED	0.2		4.400	T+2.0%			240		S20.000	
	OK	9.2	315.049	ப	0/0		minute 30	360	4 S12	S1.024	
	OK	0.5	6.495	4.500	Winter I+20%	year Wii	minute 30	240	9 263	S19.00	
	Status	(1/s)	Vol (m³)	(m)		Event			Name	PN	
		P.T.OM	U	F				ц	US/MH		
		Pipe						4			
or Storm	(Rank 1) fc	evel	Maximum Le	Уq	al Results	Critical	lary of	d Summary	Period	0 year Return	ω
-				1.ω	ork 2020.1	Network					XP Solutions
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Mirro					Redevelopment	Redev					Ireland
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	OK	4.2	504.685	° 4.900	Summer I+20%	30 year Si	minute	S56 2160	S21.019		
	OK OK	4.2 2	504.794 507 776			year	minute	л Ф	S21.017		
	SURCHARGED	N	308.565			- Year	minute	ω			
	SURCHARGED	39.8	6.304 763.537	% 0.000	Winter I+20%	30 year Wi	minute	S52 7:	S21.015		
	SURCHARGED		69			year		51	S21.014		
	SURCHARGED			% 6.500		year	minute	65	S29.002		
	OK	20.4				year	5 minute	64	S29.001		
	OK		6.812			year	minute	63	S29.000		
	SURCHARGED	ω ⁴ υ. ω1.αυ			Winter I+20%	30 year W:	720 minute 3	50 -	S21.013		
			024.8 025.8			year	5 minute	ט ח ס נ			
	SURCHARGED		5		I+20	year	minute	49	S21.012		
	OK	0.5			Winter I+20%	year	minute	ω	S27.002		
	SURCHARGED		21.075	° 5.400	I+20	9 9 year	0 minute		S27.001		
	SURCHARGED	0.5		° 5.400	Winter I+20	0 year	80 minute 3	1 4	S27.000		
	Status	(1/s)	Vol (m³)	(m)		Event		Name	PN		
		Flow	Discharge	US/CL				US/MH			
		Pipe									
for Storm	(Rank 1) f	evel (Maximum L	s by	al Result	f Critica	Summary of	Period S	Return P	<u>30 year</u>	
				1. 3	ork 2020.	Network				Solutions	XP
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	Pipe US/MH US/CL Discharge Flow PN Name Event (m) Vol (m³) (l/s) Status	
Summer and Winter 960, 1440, 2160, 7200, 8640, 10080 5, 30, 100 20, 20, 20, 20	Profile(s) 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) Climate Change (%) Summer and Winter 2880, 4320, 5760, 7200, 8640, 1008 2880, 4320, 5760, 7200, 8640, 1008 20, 20, 20, 20	Ret
300.0 nded) ON OFF OFF	Margin for Flood Risk Warning (mm) 300.0 Analysis Timestep 2.5 Second Increment (Extended) DTS Status OFF DVD Status OFF Inertia Status OFF	
0.750	<u>Synthetic Rainfall Details</u> Rainfall Model FSR M5-60 (mm) 16.100 Cv (Summer) Region Scotland and Ireland Ratio R 0.278 Cv (Winter)	
f Time/Area Diagrams 0 f Real Time Controls 0	Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time Number of Online Controls 43 Number of Storage Structures 50 Number of Rea	Numbe Num
MADD Factor * 10m³/ha Storage 2.000 Inlet Coeffiecient 0.800 Flow per Person per Day (1/per/day) 0.000	Simulation Criteria1.000Manhole Headloss Coeff (Global) 0.500MADD0Foul Sewage per hectare (1/s) 0.0000.0000Additional Flow - % of Total Flow 0.000Flow per Pe	Areal Reduction Factor Hot Start (mins) Hot Start Level (mm)
(Rank 1) for Storm	Return Period Summary of Critical Results by Maximum Level	<u>100 year</u>
	Network 2020.1.3	XP Solutions
Drainage	20220923.MDX Designed by MKo Checked by MK	Date 9/23/2022 4:53 File R517_MD_P01_202
Micro	Redevelopment	
	St. Vincent's Hospital	9 Prussia Street Dublin 7
Page 69		'Connor S

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	SURCHARGED	3.2	14.593	9.300		ar Winter	100 year	minute	S29 180	6.000	S	
	SURCHARGED	თ • თ	165.339	9.150	r I+20%	ar Winter	100 year	minute	9	3.005	S	
	SURCHARGED	4.3	134.068	9.000	r I+20%	ar Winter	100 year	minute	096 8S	3.004	S	
	SURCHARGED	1.0	12.885	8.850	r I+20%	ar Winter	100 year	minute	S21 180	5.001	S	
	SURCHARGED	7.5	34.109	8.850	r I+20%	ar Winter	100 year	minute	S20 180	5.000	S	
	SURCHARGED	4.0	107.818	8.850	r I+20%	ar Winter	100 year	minute	S20 960	3.003	S	
	SURCHARGED	0.8	10.011	8.750	r I+20%	ar Winter	100 year	minute	S120 180	4.001	ũ	
	SURCHARGED	6.8	31.063		r I+20%	ar Winter	100 year	minute	S119 180	34.000	ũ	
	OK	12.2	6.883	8.750	r I+20%	ar Winter	100 year	minute	S7 15	3.002	S	
	SURCHARGED	0.8	11.983	8.850	r I+20%	ar Winter	100 year	minute	S20 180	3.001	S	
	SURCHARGED	5. 8	26.406		r I+20%	ar Winter	100 year	minute	S19 180	33.000	S	
	SURCHARGED	69.2	43.202	10.500	r I+20%	ar Winter	100 year	minute	S6 15	31.011	S	
	SURCHARGED	3.2	0.621	10.500	r I+20%	ar Winter	100 year	minute	S71 15	2.002	S	
	SURCHARGED	0.5	9.643	10.500	r I+20%	ar Winter	100 year	minute	S70 240	32.001	S	
	SURCHARGED	0.5	9.929	10.500	r I+20%	ar Winter	100 year	minute	S69 240	32.000	S	
	SURCHARGED	38.1	22.223	10.500	r I+20%	ar Winter	100 year	minute		31.010	S	
	SURCHARGED	36.8	22.223	10.500	r I+20%	ar Winter	100 year	minute	S4 15	1.009	S	
	SURCHARGED	20.1	5.006	10.500	r I+20%	ar Winter	100 year	minute	S12 15	S1.008	S	
	SURCHARGED	18.9	5.006	10.500	r I+20%	ar Winter	100 year	minute	S11 15	1.007	S	
	SURCHARGED	15.9	5.036	10.500	r I+20%	ar Winter	100 year	minute	S10 15	L.006	S1.	
	OK	9.5	3.571	10.600	r I+20%	ar Winter	100 year	5 minute		1.005	S	
	OK	7.8		10.700	r I+20%	ar Winter	100 year	5 minute	8	31.004	S	
	OK	7.9	3.590	10.800	r I+20%	ar Winter	100 year	minute	7 1	1.003	S	
	OK	5.6	2.508	11.000	r I+20%	ar Winter	100 year	5 minute	S6 15	1.002	S	
	OK	5.7	2.514	11.240	r I+20%	ar Winter	100 year	minute	S5 15	1.001	S	
	OK	0.0	0.000	11.650	r I+20%	ar Summer	100 year	minute	S4 15	1.000	N	
	Status	(1/s)	Vol (m³)	(m)		ot	Event		Name	PN I		
		Flow	Discharge	US/CL			l		US/MH			
		Pipe		•					•			
r Storm	(Rank 1) for	Jevel	Maximum I	s by	Result	Critical	0f	Summary	Period	turn	<u>100 year Re</u>	
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Storm	(Rank 1) for Status SURCHARGED SURCHARGED SURCHARGED	<u>revel</u> Pipe Flow (1/s) 5.8 5.1	Maximum L Discharge Vol (m³) 181.812 15.915	.ts by 1 us/cr (m) 9.300 9.300	<u>Resul</u> nr I+20% nr I+20%	<pre>E Critical Event Event) year Winter) year Winter) year Winter</pre>	of Ev	Summary 0 minute 0 minute 0 minute	Period S US/MH Name S30 180 S29 960 S32 120	Return P PN U \$6.001 \$3.006 \$7.000	<u>100 year</u>	
				• (u	K 2020.1	Network					Solutions	Xr v.o
Drainage					1 D	Designed Checked J				53 PM 20220923.MDX	22 4: 	- H - H - H
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Page 71						R517				n 	Connor Sutton Cronin Prussia Street	0'Connor 9 Prussi

In 7 In 7 EST Return Period Summary of Critical Results by Maximum Level (Rank 1) for Store 100 vere Return Period Summary of Critical Results by Maximum Level (Rank 1) for Store 100 vere Return Period Summary of Critical Results by Maximum Level (Rank 1) for Store 100 vere Return Period Summary of Critical Results by Maximum Level (Rank 1) for Store 100 vere Return Period Summary of Critical Results by Maximum Level (Rank 1) for Store 100 vere Return Period Summary of Critical Results by Maximum Level (Rank 1) for Store 100 vere Return Period Summary of Critical Results by Maximum Level (Rank 1) for Store 100 vere Return Period Summary of Critical Results by Maximum Level (Rank 1) for Store 100 vere Return Period Summary of Critical Results by Maximum Level (Rank 1) for Store 100 vere Return Period Summary of Critical Results by Maximum Level (Rank 1) for Store 100 vere Return Period Summary of Critical Results by Maximum Level (Rank 1) for Store 100 vere Return Period Summary of Critical Results by Maximum Level (Rank 1) for Store 100 vere Return Period Summary of Critical Results 100 vere Returns					JYZ€	Innovyz	2-2020	©1982-					
ussia Street R517 in 7 St. Vincent's Hospital and Redevelopment 9/23/2022 4:53 PM Designed by MKo R517_MD_P01_20220923.MDX Checked by MKo 01utions Network 2020.1.3 100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm		SURCHARGED OK OK OK OK OK OK OK OK SURCHARGED	Fipe Flow (L/s) 1.6 1.6 2.6.3 2.6.3 2.6.3 2.6.3 2.6.3 2.6.4 23 23 23 23 0.2 0.2 0.2 0.2 0.5 0.5 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7	Discharge Vol (m³) 140.360 140.266 895.336 895.336 895.527 24.205 2.4.205 2.4.205 2.4.205 2.535 2.535 2.535 2.535 2.535 2.535 2.535 2.535 2.535 2.535 2.535 3.511 9.397 7.549 3.511 9.210 6.123 3.920 -1.573 3.922 9.221	US/CL (m) 10.500 10.500 10.500 10.500 10.500 10.500 10.500 10.395 9.960 10.395 9.960 10.395 11.650 11.700 11.700 11.700 11.700 11.100 9.500 7.100 7.100 7.100 7.100 7.100 7.100 7.100 7.100 7.100 7.100	$\begin{array}{c} \Pi \ \Pi $	Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter	vent Year Year Year Year Year Year Year Year					
ussia Street R517 in 7 St. Vincent's Hospital and St. Vincent's Hospital P/23/2022 4:53 PM Designed by MKo R517_MD_P01_20220923.MDX Checked by MK Network 2020.1.3		1)	evel		٨q	esult	cal		₹ry of	Period			
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	0.5 OK	3.331	minute 100 year Winter I+20% 5.100	S62 480 mir	S19.008
	1.2 SURCHARGED	•	ы	61 30	S19.007
		0.604	100 year Winter I+20%	60 120	\$19.006
		3.079	year Winter I+20% 5.	59 120	\$19.005
		3.107	100 year Winter I+20%	30	S19.004
		-0.094	year Winter I+20% 4.		S19.003
	2.0 FLOOD RISK	6.159		60	s19.002
	0.7 FLOOD RISK	2.392	minute 100 year Winter I+20% 4.750	60	\$19.001
	1.1 FLOOD RISK	3.117	minute 100 year Winter I+20% 4.750	60	S19.000
	9.9 SURCHARGED	534.633	minute 100 year Winter I+20% 4.825	600	S1.023
	11.5 SURCHARGED	5.676	minute 100 year Winter I+20% 6.100	600	S1.022
	1.0 SURCHARGED	8.005	minute 100 year Winter I+20% 6.300	120	S18.003
	1.2 SURCHARGED	5.601	minute 100 year Winter I+20% 7.500	60	S18.002
	1.5 FLOOD RISK	6.495		60	S18.001
	9.1 SURCHARGED	13.303	year Winter I+20%	60	S18.000
		78.922	100 year Winter I+20%	480	S16.004
		278	100 year Winter I+20%		S16.003
		938	100 year Winter I+20% 5	480	S16.002
	14.0 SURCHARGED	.373	Winter I+20%	480	S16.001
	45.8 SURCHARGED	.210	minute 100 year Winter I+20% 4.755	15	\$17.000
	SURCHARG		year Winter I+20%	15	\$16.000
	26.1 OK	6.503	minute 100 year Winter I+20% 7.000	15	S1.021
	26.4 OK	6.730	Winter I+20% 8.	15	\$1.020
		.24	100 year Summer I+20%	56 960	S15.016
	0.5 OK	24.255	Summer I+20% 8.	S55 960 mir	S15.015
	0.5 OK	24.253	minute 100 year Summer I+20% 7.823	S54 960 mir	S15.014
	(1/s) Status	Vol (m³) (]	Event (m)	Name	PN
	Flow	Discharge F	US/CL	US/MH	
	Pipe				
: Storm	evel (Rank 1) for	Maximum Le	of Critical Results by	Period Summary	100 year Return I
			Network 2020.1.3		XP Solutions
			Checked by MK	X	File R517_MD_P01_20220923.MDX
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		tal	St. Vincent's Hospital		Dublin 7
			R517		9 Prussia Street
Page 73					O'Connor Sutton Cronin
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				<u>∩cuc=c80 t⊎</u>			
	9.5 SURCHARGED	154.377 19	Winter I+20% 5.300	year	15 minute 100	S48	S21.011
		31.203	1+20% 4.	year	mınute	202 2	26.
			I+20%	year	5 minute	S52	S26.003
			I+20%	year	5 minute	S51	
			I+20%	year	minute	s50	S26.001
		206	I+20%	year	minute	S49	S26.000
	159.7 SURCHARGED	123.864 15	Winter I+20% 5.400	year	15 minute 100	S47	S21.010
	153.0 SURCHARGED	110.758 15	Winter I+20% 5.500	year	15 minute 100	S46	S21.009
	159.0 SURCHARGED	110.759 15	Winter I+20% 5.400	year	15 minute 100	S45	S21.008
	156.2 SURCHARGED		Winter I+20% 5.300	year	15 minute 100	S44	S21.007
	160.7 SURCHARGED	104.878 16	Winter I+20% 5.070	year	15 minute 100	S43	S21.006
	14.6 SURCHARGED	6.916 1	Winter I+20% 4.900	year	15 minute 100	S119	S25.000
	159.4 SURCHARGED	97.964 15	Winter I+20% 5.120	year	15 minute 100	S42	S21.005
	137.1 SURCHARGED	69.431 13	Winter I+20% 4.900	year	15 minute 100	S117	S24.000
	40.1 SURCHARGED	28.530 4	Winter I+20% 6.000	year	15 minute 100	S41	S21.004
	12.4 SURCHARGED	6.830 1	Winter I+20% 4.900	year	15 minute 100	S142	\$23.000
	21.9 SURCHARGED	94		year	minute	S40	S21.003
	5.3 SURCHARGED		Winter I+20% 4.750	year	15 minute 100	S40	S22.000
			Winter I+20% 9.400	year	15 minute 100	839	S21.002
			I+20%	year	minute	853	S21.001
			- 202 - 202	year	mınute	1.53	S21.000
	SURCHARG		T+20%	year	minute		500 100 520 1 I S
			I+20%	year	minute		S20.001
	SURCHARG		I+20%	year	minute		S20.000
			I+20%	year	minute		S1.024
	0.4 SURCHARGED		4.50	year	minute		\$19.009
	(1/S) Status	т) (-щ) тол	(m)	Event		Name	EN
		Ø	F			US/MH	1
	Pipe						
or Storm	evel (Rank 1) fo	<u>Maximum Lev</u>	Results by	f Critical	l Summary of	Period	<u>100 year Return</u>
			rk 2020.1.3	Network			XP Solutions
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				TITIONATE							
				0000000	0000	001000					
	OK	4.2	837.695	I+20% 4.900	Winter I+	100 year	minute 1	6 4320	S S	S21.019	
	OK	4.2	837.783		Winter I+		minute 1	U	с 5	21.	
	OK		837.801		В			~		S21.017	
	SURCHARGED		309.200							21.	
	SURCHARGED		951.309					~ 1	5 \$52	S21.015	
	OK		8.233							30.	
	SURCHARGED		870.215					~ 1	رم م	S21.014	
	SURCHARGED		21.579						сл	S29.002	
	OK	26.9	13.390	I+20% 6.100	Winter I+	100 year		4 15		S29.001	
	OK	18.2	8.827	I+20% 5.900	Winter I+	100 year	minute 1		со	S29.000	
	SURCHARGED	38.9	765.470	I+20% 6.200	Winter I+	100 year	minute 1	~ 1		S21.013	
	SURCHARGED		27.433	I+20% 6.200	Winter I+	100 year	minute 1	7 15	رم م	S28.001	
	SURCHARGED				Winter I+	100 year	minute 1	Ц	رم م	S28.000	
	SURCHARGED			I+20% 5.750	Winter I+	100 year	minute 1			S21.012	
	OK		24.395		Winter I+	100 year	minute 1	3 480	رم م	S27.002	
	SURCHARGED		24.407	•	Winter I+	100 year	minute 1	2 480	1 S132	27.	
	SURCHARGED	0.6	24.909	I+20% 5.400	Winter I+	.00 year	minute 1	1 480		S27.000	
	Status	(1/s)	Vol (m³)	(m)		Event		W	Name	PN	
		Flow	Discharge	US/CL				H	US/MH		
		Pipe									
for Storm	(Rank 1) f	level (Maximum Le	sults by 1	ical Res	f Crit	Summary o		n Period	<u>100 year Retur</u>	
				0.1.3	Network 202	Net				Ø	XP Solutions
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Drainano				' MKo	Designed by	Des				022 4:53 PM	Date 9/23/2
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Page 75										Sutton Cronin	O'Connor Su
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APPENDIX D. WASTEWATER DESIGN CALCULATIONS

- As per Irish Water Code of Practice for Wastewater Infrastructure, IW-CDS-5030-03
- Network Design Tables

Appendix D

Wastewater Design Calculations

O'Connor Sutton Cronin		Page 1
9 Prussia Street		
Dublin 7		
Ireland		Micro
Date 2/28/2023 11:52 AM	Designed by marko.komso	
File R517_MD_20230228.MDX	Checked by	Drainage
XP Solutions	Network 2020.1.3	
	FOUL SEWERAGE DESIGN	
<u>D</u>	sign Criteria for Foul - Main	
Pij	Sizes GDSDS Manhole Sizes STANDARD	
Industrial Flow (1/s Industrial Peak Flow Fa Flow Per Person (1/per, Persons per F Domestic (1/s Domestic Peak Flow Fa	tor0.00Minimum Backdrop Height (m)0.000ay)222.00Maximum Backdrop Height (m)20.000use3.00 Min Design Depth for Optimisation (m)1.000ha)0.00Min Vel for Auto Design only (m/s)0.75	
	Designed with Level Soffits	
Netw	rk Design Table for Foul - Main	
PN Length Fall Slope		
(m) (m) (1:X)	ha) Flow (l/s) (mm) SECT (mm) Desi	.gn
F1.000 62.456 0.312 200.0	± · · · •	
F1.001 16.539 0.083 200.0	.000 0 0.0 1.500 o 225 Pipe/Conduit 💣	
	Network Results Table	
	E Base Σ Hse Add Flow P.Dep P.Vel Vel Cap Flow ow (l/s) (l/s) (mm) (m/s) (m/s) (l/s) (l/s)	
F1.000 7.612 0.000 F1.001 7.300 0.000	0.000.000.000.8132.20.00.000.000.000.8132.20.0	
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O'Connor Sutton Cronin		Page 2
9 Prussia Street		
Dublin 7		
Ireland		Micro
Date 2/28/2023 11:52 AM	Designed by marko.komso	Drainage
File R517_MD_20230228.MDX	Checked by	Diamage
XP Solutions	Network 2020.1.3	

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)		ase (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
	53.149 20.177				0 0		1.500 1.500	0		Pipe/Conduit Pipe/Conduit	e e
F2.000			150.0		0		1.500	0		Pipe/Conduit	ď
	13.575 30.412 8.018	0.203	150.0	0.000	0 0 0	0.0	1.500 1.500 1.500	0	225	Pipe/Conduit Pipe/Conduit Pipe/Conduit	5 5 5
F1.004	32.626				0		1.500	0		Pipe/Conduit	ď
F3.000	32.153	0.536	60.0	0.000	0	0.0	1.500	0	225	Pipe/Conduit	- 6

<u>Network Results Table</u>

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)		Vel (m/s)	-	Flow (l/s)
F1.002	7.217	0.000	0.0	0	0.0	0	0.00	0.81	32.2	0.0
F1.003	6.951	0.000	0.0	0	0.0	0	0.00	0.81	32.2	0.0
F2.000	9.358	0.000	0.0	0	0.0	0	0.00	0.94	37.2	0.0
F2.001	9.297	0.000	0.0	0	0.0	0	0.00	0.94	37.2	0.0
F2.002	9.207	0.000	0.0	0	0.0	0	0.00	0.94	37.2	0.0
F2.003	9.004	0.000	0.0	0	0.0	0	0.00	0.94	37.2	0.0
F1.004	6.775	0.000	0.0	0	0.0	0	0.00	0.98	69.2	0.0
F3.000	9.211	0.000	0.0	0	0.0	0	0.00	1.48	59.0	0.0
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O'Connor Sutton Cronin		Page 3
9 Prussia Street		
Dublin 7		
Ireland		Micro
Date 2/28/2023 11:52 AM	Designed by marko.komso	Drainage
File R517_MD_20230228.MDX	Checked by	Diamaye
XP Solutions	Network 2020.1.3	

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	ase (1/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
D 2 001	22 022	0 657		0 000	0	0 0	1 500	_	225	Dine (Generalit	•
F3.001	32.833	0.65/	50.0	0.000	0	0.0	1.500	0	225	Pipe/Conduit	ெ
F3.002	41.630	0.208	200.0	0.000	0	0.0	1.500	0	225	Pipe/Conduit	6
F3.003	41.630	0.208	200.0	0.000	0	0.0	1.500	0	225	Pipe/Conduit	Ĵ
F1.005	18.107	0.060	300.0	0.000	0	0.0	1.500	0	300	Pipe/Conduit	ď
F4.000	30.000	0.150	200.0	0.000	0	0.0	1.500	0	225	Pipe/Conduit	ď
F1.006	23.857	0.080	300.0	0.000	0	0.0	1.500	0	300	Pipe/Conduit	ď
F1.007	22.305	0.074	300.0	0.000	0	0.0	1.500	0	300	Pipe/Conduit	5
F1.008	39.854	0.141	282.0	0.000	0	0.0	1.500	0	300	Pipe/Conduit	ď

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Base (1/s)			Flow /s)	-	P.Vel (m/s)		-	
F3.001	8.675	0.000	0.0	()	0.0	0	0.00	1.63	64.6	0.0
F3.002	8.018	0.000	0.0	()	0.0	0	0.00	0.81	32.2	0.0
F3.003	7.810	0.000	0.0	()	0.0	0	0.00	0.81	32.2	0.0
F1.005	6.612	0.000	0.0	()	0.0	0	0.00	0.80	56.4	0.0
F4.000	9.358	0.000	0.0	()	0.0	0	0.00	0.81	32.2	0.0
F1.006	6.552	0.000	0.0	()	0.0	0	0.00	0.80	56.4	0.0
F1.007	6.472	0.000	0.0	()	0.0	0	0.00	0.80	56.4	0.0
F1.008	6.398	0.000	0.0	()	0.0	0	0.00	0.82	58.2	0.0
 11.000	0.350	0.000				innov	0	0.00	0.02	50.2	0.0

O'Connor Sutton Cronin		Page 4
9 Prussia Street		
Dublin 7		
Ireland		Micro
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File R517_MD_20230228.MDX	Checked by	Drainage
XP Solutions	Network 2020.1.3	·

	PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)		ase (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
F5	.000	52.122	0.261	200.0	0.000	0	0.0	1.500	0	225	Pipe/Conduit	•
F1	.009	58.835	1.471	40.0	0.000	0	0.0	1.500	0	300	Pipe/Conduit	ď
F6	.000	23.147	0.103	225.0	0.000	0	0.0	1.500	0	225	Pipe/Conduit	ď
F7	.000	20.324	0.102	200.0	0.000	0	0.0	1.500	0	225	Pipe/Conduit	ď
		30.497 28.290				0 0		1.500 1.500	0		Pipe/Conduit Pipe/Conduit	ъ ъ

Network Results Table

PN	US/IL (m)		Σ Base Flow (l/s)		Add Flow (1/s)	-			-	
F5.000	6.582	0.000	0.0	0	0.0	0	0.00	0.81	32.2	0.0
F1.009	6.246	0.000	0.0	0	0.0	0	0.00	2.20	155.2	0.0
F6.000	3.710	0.000	0.0	0	0.0	0	0.00	0.76	30.4	0.0
F7.000	3.701	0.000	0.0	0	0.0	0	0.00	0.81	32.2	0.0
F6.001	3.599	0.000	0.0	0	0.0	0	0.00	0.81	32.2	0.0
F6.002	3.447	0.000	0.0	0	0.0	0	0.00	0.81	32.2	0.0
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9 Prussia Street		
Dublin 7		
Ireland		Micro
Date 2/28/2023 11:52 AM	Designed by marko.komso	Drainage
File R517_MD_20230228.MDX	Checked by	Drainage
XP Solutions	Network 2020.1.3	

PN	Length	Fall	Slope	Area	Houses	Ba	ase	k	HYD	DIA	Section Type	Auto
	(m)	(m)	(1:X)	(ha)		Flow	(l/s)	(mm)	SECT	(mm)		Design
												_
F1.010	45.490	0.152	300.0	0.000	0		0.0	1.500	0	300	Pipe/Conduit	f
F1.011	29.945	0.100	300.0	0.000	0		0.0	1.500	0	300	Pipe/Conduit	6
F1.012	17.850	0.060	300.0	0.000	0		0.0	1.500	0	300	Pipe/Conduit	<u>-</u>
												-
F8.000	23.921	0.120	200.0	0.000	0		0.0	1.500	0	225	Pipe/Conduit	6
F8.001	14.768	0.074	200.0	0.000	0		0.0	1.500	0	225	Pipe/Conduit	- J
F8.002	25.675	0.128	200.0	0.000	0		0.0	1.500	0	225	Pipe/Conduit	- Č
F8.003	25.158	0.126	200.0	0.000	0		0.0	1.500	0	225	Pipe/Conduit	- Ū
F8.004	35.329	0.177	200.0	0.000	0		0.0	1.500	0	225	Pipe/Conduit	ď
F8.005	14.987	0.075	200.0	0.000	0		0.0	1.500	0	225	Pipe/Conduit	ď

<u>Network Results Table</u>

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (1/s)	P.Dep (mm)			Cap (1/s)	Flow (l/s)
F1.01	0 3.230	0.000	0.0	0	0.0	0	0.00	0.80	56.4	0.0
F1.01	1 3.079	0.000	0.0	0	0.0	0	0.00	0.80	56.4	0.0
F1.01	2 2.979	0.000	0.0	0	0.0	0	0.00	0.80	56.4	0.0
F8.00	0 3.905	0.000	0.0	0	0.0	0	0.00	0.81	32.2	0.0
F8.00	1 3.785	0.000	0.0	0	0.0	0	0.00	0.81	32.2	0.0
F8.00	2 3.712	0.000	0.0	0	0.0	0	0.00	0.81	32.2	0.0
F8.00	3 3.583	0.000	0.0	0	0.0	0	0.00	0.81	32.2	0.0
F8.00	4 3.457	0.000	0.0	0	0.0	0	0.00	0.81	32.2	0.0
F8.00	5 3.281	0.000	0.0	0	0.0	0	0.00	0.81	32.2	0.0
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O'Connor Sutton Cronin		Page 6
9 Prussia Street		
Dublin 7		
Ireland		Micro
Date 2/28/2023 11:52 AM	Designed by marko.komso	Drainage
File R517_MD_20230228.MDX	Checked by	Diamage
XP Solutions	Network 2020.1.3	

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	ise (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
F8.007		0.042	200.0	0.000	0 0 0	0.0	1.500 1.500 1.500	0	225	Pipe/Conduit Pipe/Conduit Pipe/Conduit	5 5 5
F8.009	19.580	0.098	200.0	0.000	0	0.0	1.500	0		Pipe/Conduit	ð
F9.001	12.896 14.578 23.009	0.073	200.0	0.000	0 0 0	0.0	1.500 1.500 1.500	0 0 0	225	Pipe/Conduit Pipe/Conduit Pipe/Conduit	9 9 9
F10.000 F10.001	23.979 19.769			0.000	0 0		1.500 1.500	0 0		Pipe/Conduit Pipe/Conduit	5

<u>Network Results Table</u>

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)		Vel (m/s)	Cap (1/s)	Flow (l/s)
F8.006	3.206	0.000	0.0	0	0.0	0	0.00	0.81	32.2	0.0
F8.007	3.019	0.000	0.0	0	0.0	0	0.00	0.81	32.2	0.0
F8.008	2.977	0.000	0.0	0	0.0	0	0.00	0.81	32.2	0.0
F8.009	2.926	0.000	0.0	0	0.0	0	0.00	0.81	32.2	0.0
F9.000	3.675	0.000	0.0	0	0.0	0	0.00	0.81	32.2	0.0
F9.001	3.611	0.000	0.0	0	0.0	0	0.00	0.81	32.2	0.0
F9.002	3.538	0.000	0.0	0	0.0	0	0.00	0.81	32.2	0.0
F10.000	4.885	0.000	0.0	0	0.0	0	0.00	1.68	66.7	0.0
F10.001	4.375	0.000	0.0	0	0.0	0	0.00	1.42	56.3	0.0
			©198	2-202) Innovy	ze				

O'Connor Sutton Cronin											Page 7
9 Prussia Street											
Dublin 7											
Ireland											Micro
Date 2/28/2023 11:52 AM			Desi	gned by n	arko.	komso					
File R517_MD_20230228.MDX			Chec	ked by							Drainage
XP Solutions			Netw	ork 2020.	1.3						
		<u>Network</u>	Design	Table fo	r Foul	l – Ma	in				
PN Length (m)		-		Base Flow (l/s				Section	Туре	Auto Design	
F9.003 11.913	3 0.060 2	00.0 0.000		0.	1.500) 0	225	Pipe/Con	nduit		
F9.004 29.815 F9.005 4.355	5 0.149 2 5 0.022 2			0.				Pipe/Con Pipe/Con			
										•	
]	Network	K Results	Table						
			_								
PN U		rea ΣBa a) Flow		Hse Add Flo				el Cap /s) (l/s)			
	(, (u, 110	(_, 0,	(1/0/	(11211)	, (11, 0	, (,	0, (1,0)	(_/.	-	
E0 002 2	2 1 2 2 0	000	0 0	0 0	0	0 0 0	0 0	.81 32.2	· · ·	0	
F9.003	3.363 0.	000 000	0.0	0 0				.81 32.2			
	3.214 0.							.81 32.2			
				11							
	Free	e Flowing	Outia	ll Detail	<u>s ior</u>	Foul	- Ma	ain			
	Outfa	all Outf	all C. 1	Level I. Le	vel	Min	D,L	W			
	Pipe Nu	mber Nar	ne (m) (m)	I.	Level (m)	(mm)	(mm)			
	F1	.012	F 4	4.400 2.	919	3.000	0	0			

O'Connor Sutton Cronin			Page 8
9 Prussia Street			
Dublin 7			
Ireland			Micro
Date 2/28/2023 11:52 AM		Designed by marko.komso	
File R517_MD_20230228.MDX		Checked by	Drainage
XP Solutions		Network 2020.1.3	
	<u>Free Flowing Outfall Details for Foul - Main</u>		
	Outfall Outfal Pipe Number Name	lC.LevelI.Level Min D,L W (m) (m) I.Level (mm) (mm) (m)	
	F8.009	F 5.300 2.828 2.948 0 0	
	Free Flowing (Dutfall Details for Foul - Main	
	Outfall Outfal Pipe Number Name	lC.LevelI.Level Min D,L W (m) (m) I.Level (mm) (mm) (m)	
	F9.005	F 5.300 3.192 2.948 0 0	
	©	1982-2020 Innovyze	



APPENDIX E. IRISH WATER CONFIRMATION OF FEASIBILITY

Appendix E

Irish Water Confirmation Of Feasibility



CONFIRMATION OF FEASIBILITY

Marko Komso

9 Prussia Street Stoneybatter Dublin 7 D07KT57

31 January 2023

Our Ref: CDS22004338 Pre-Connection Enquiry St. Vincent's, Fairview, Dublin 3, Co. Dublin

Dear Applicant/Agent,

We have completed the review of the Pre-Connection Enquiry.

Irish Water has reviewed the pre-connection enquiry in relation to a Water & Wastewater connection for a Multi/Mixed Use Development of 851 unit(s) at St. Vincent's, Fairview, Dublin 3, Co. Dublin, (the **Development**).

Based upon the details provided we can advise the following regarding connecting to the networks;

• Water Connection - Feasible Subject to upgrades

In order to accommodate the proposed connection at the Premises upgrade works are required to increase the capacity of the Irish Water network.

The upgrade works must include:

IN 1: Replace 100mm uPVC with 200mm ID pipe for 310m from Inlet meter of DMA MA01251.

IN 2: New 200mm ID pipe to be laid for 300m to connect the site to newly laid 200mm ID pipe in IN 1. (Could replace 100mm uPVC main instead of new additional pipe in Griffith Court Road.)

IN 3: New 250mm ID main for 50m from 300mm CI to IN 1 (Inlet meter).

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



- Wastewater
 Connection
- Feasible Subject to upgrades

The connection of the Hospital can proceed prior to any works as it will replace the existing Hospital and hence does not increase the overall load on the downstream network.

In order to accommodate the proposed connection (excluding the Hospital) at the Premises, Storm Sewer Separation works are required to reduce the load on the downstream combined network.

Storm separation of the full site including roofs of any buildings must be undertaken as part of the works.

This Development is being permitted on the bases that a minimum of 1.238ha of hardstanding on the site discharging to the Irish Water combined network must be fully separated. The removal of surface flows from this land will enable the proposed development to connect. The information included in R517-OCSC-ZZ-XX-0006-S0-P04 will need to be independently verified by Irish Water prior to the connection. Irish Water must be contacted in advance of any onsite works impacting the existing storm arrangements to coordinate onsite verification. This letter does not constitute an offer, in whole or in part, to provide a connection to any Irish Water infrastructure. Before the Development can be connected to our network(s) you must submit a connection application and be granted and sign a connection agreement with Irish Water.

As the network capacity changes constantly, this review is only valid at the time of its completion. As soon as planning permission has been granted for the Development, a completed connection application should be submitted. The connection application is available at <u>www.water.ie/connections/get-connected/</u>

Where can you find more information?

- Section A What is important to know?
- Section B Details of Irish Water's Network(s)

This letter is issued to provide information about the current feasibility of the proposed connection(s) to Irish Water's network(s). This is not a connection offer and capacity in Irish Water's network(s) may only be secured by entering into a connection agreement with Irish Water.

For any further information, visit <u>www.water.ie/connections</u>, email <u>newconnections@water.ie</u> or contact 1800 278 278.

Yours sincerely,

onne flace

Yvonne Harris Head of Customer Operations

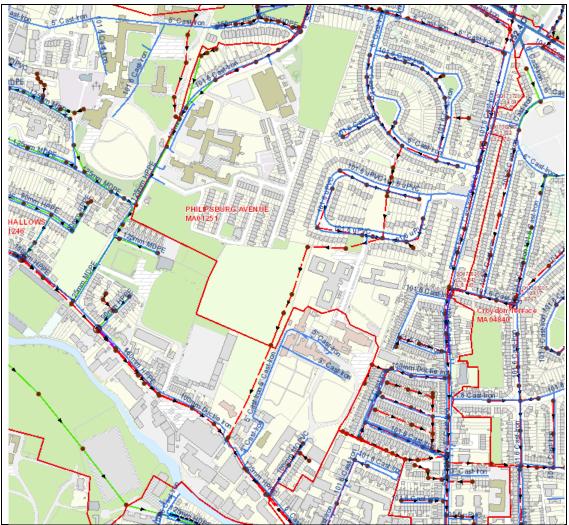
Section A - What is important to know?

What is important to know?	Why is this important?	
Do you need a contract to connect?	• Yes, a contract is required to connect. This letter does not constitute a contract or an offer in whole or in part to provide a connection to Irish Water's network(s).	
	 Before the Development can connect to Irish Water's network(s), you must submit a connection application <u>and</u> <u>be granted and sign</u> a connection agreement with Irish Water. 	
When should I submit a Connection Application?	A connection application should only be submitted after planning permission has been granted.	
Where can I find information on connection charges?	Irish Water connection charges can be found at: <u>https://www.water.ie/connections/information/charges/</u>	
Who will carry out the connection work?	 All works to Irish Water's network(s), including works in the public space, must be carried out by Irish Water*. 	
	*Where a Developer has been granted specific permission and has been issued a connection offer for Self-Lay in the Public Road/Area, they may complete the relevant connection works	
Fire flow Requirements	• The Confirmation of Feasibility does not extend to fire flow requirements for the Development. Fire flow requirements are a matter for the Developer to determine.	
	What to do? - Contact the relevant Local Fire Authority	
Plan for disposal of storm water	• The Confirmation of Feasibility does not extend to the management or disposal of storm water or ground waters.	
	• What to do? - Contact the relevant Local Authority to discuss the management or disposal of proposed storm water or ground water discharges.	
Where do I find details of Irish Water's network(s)?	 Requests for maps showing Irish Water's network(s) can be submitted to: <u>datarequests@water.ie</u> 	

What are the design requirements for the connection(s)?	 The design and construction of the Water & Wastewater pipes and related infrastructure to be installed in this Development shall comply with <i>the Irish Water</i> <i>Connections and Developer Services Standard Details</i> <i>and Codes of Practice,</i> available at <u>www.water.ie/connections</u>
Trade Effluent Licensing	 Any person discharging trade effluent** to a sewer, must have a Trade Effluent Licence issued pursuant to section 16 of the Local Government (Water Pollution) Act, 1977 (as amended).
	 More information and an application form for a Trade Effluent License can be found at the following link: <u>https://www.water.ie/business/trade-effluent/about/</u>
	**trade effluent is defined in the Local Government (Water Pollution) Act, 1977 (as amended)

Section B – Details of Irish Water's Network(s)

The map included below outlines the current Irish Water infrastructure adjacent the Development: To access Irish Water Maps email datarequests@water.ie



Reproduced from the Ordnance Survey of Ireland by Permission of the Government. License No. 3-3-34

Note: The information provided on the included maps as to the position of Irish Water's underground network(s) is provided as a general guide only. The information is based on the best available information provided by each Local Authority in Ireland to Irish Water.

Whilst every care has been taken in respect of the information on Irish Water's network(s), Irish Water assumes no responsibility for and gives no guarantees, undertakings or warranties concerning the accuracy, completeness or up to date nature of the information provided, nor does it accept any liability whatsoever arising from or out of any errors or omissions. This information should not be solely relied upon in the event of excavations or any other works being carried out in the vicinity of Irish Water's underground network(s). The onus is on the parties carrying out excavations or any other works to ensure the

exact location of Irish Water's underground network(s) 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.



Marko Komso O'Connor Sutton Cronin 9 Prussia Street Stoneybatter Dublin 7 D07KT57

3 March 2023

Re: Design Submission for St. Vincent's, Fairview, Dublin 3, Co. Dublin (the "Development") (the "Design Submission") / Connection Reference No: CDS22004338

Dear Marko Komso,

Many thanks for your recent Design Submission.

We have reviewed your proposal for the connection(s) at the Development. Based on the information provided, which included the documents outlined in Appendix A to this letter, Irish Water has no objection to your proposals.

This letter does not constitute an offer, in whole or in part, to provide a connection to any Irish Water infrastructure. Before you can connect to our network you must sign a connection agreement with Irish Water. This can be applied for by completing the connection application form at <u>www.water.ie/connections</u>. Irish Water's current charges for water and wastewater connections are set out in the Water Charges Plan as approved by the Commission for Regulation of Utilities (CRU)(<u>https://www.cru.ie/document_group/irish-waters-water-charges-plan-2018/</u>).

You the Customer (including any designers/contractors or other related parties appointed by you) is entirely responsible for the design and construction of all water and/or wastewater infrastructure within the Development which is necessary to facilitate connection(s) from the boundary of the Development to Irish Water's network(s) (the "Self-Lay Works"), as reflected in your Design Submission. Acceptance of the Design Submission by Irish Water does not, in any way, render Irish Water liable for any elements of the design and/or construction of the Self-Lay Works.

If you have any further questions, please contact your Irish Water representative: Name: Antonio Garzón Email: antonio.garzon@water.ie

Yours sincerely,

Monne Maesis

Yvonne Harris Head of Customer Operations

Stiúrthóirí / Directors: Tony Keohane (Chairman), Niall Gleeson (CEO), Christopher Banks, Fred Barry, Gerard Britchfield, Liz Joyce, Patricia King, Eileen Maher, Cathy Mannion, Michael Walsh

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

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

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

www.water.ie

Appendix A

Document Title & Revision

- R517-OCSC-XX-XX-DR-C-0500-S4-P04
- R517-OCSC-XX-XX-DR-C-0501-S4-P04
- R517-OCSC-XX-XX-DR-C-0502-S4-P04
- R517-OCSC-XX-XX-DR-C-0503-S4-P01
- R517-OCSC-XX-XX-DR-C-0515-S4-P01
- R517-OCSC-XX-XX-DR-C-0516-S4-P01
- R517-OCSC-XX-XX-DR-C-0550-S4-P04
- R517-OCSC-XX-XX-DR-C-0551-S4-P04
- R517-OCSC-XX-XX-DR-C-0552-S4-P04

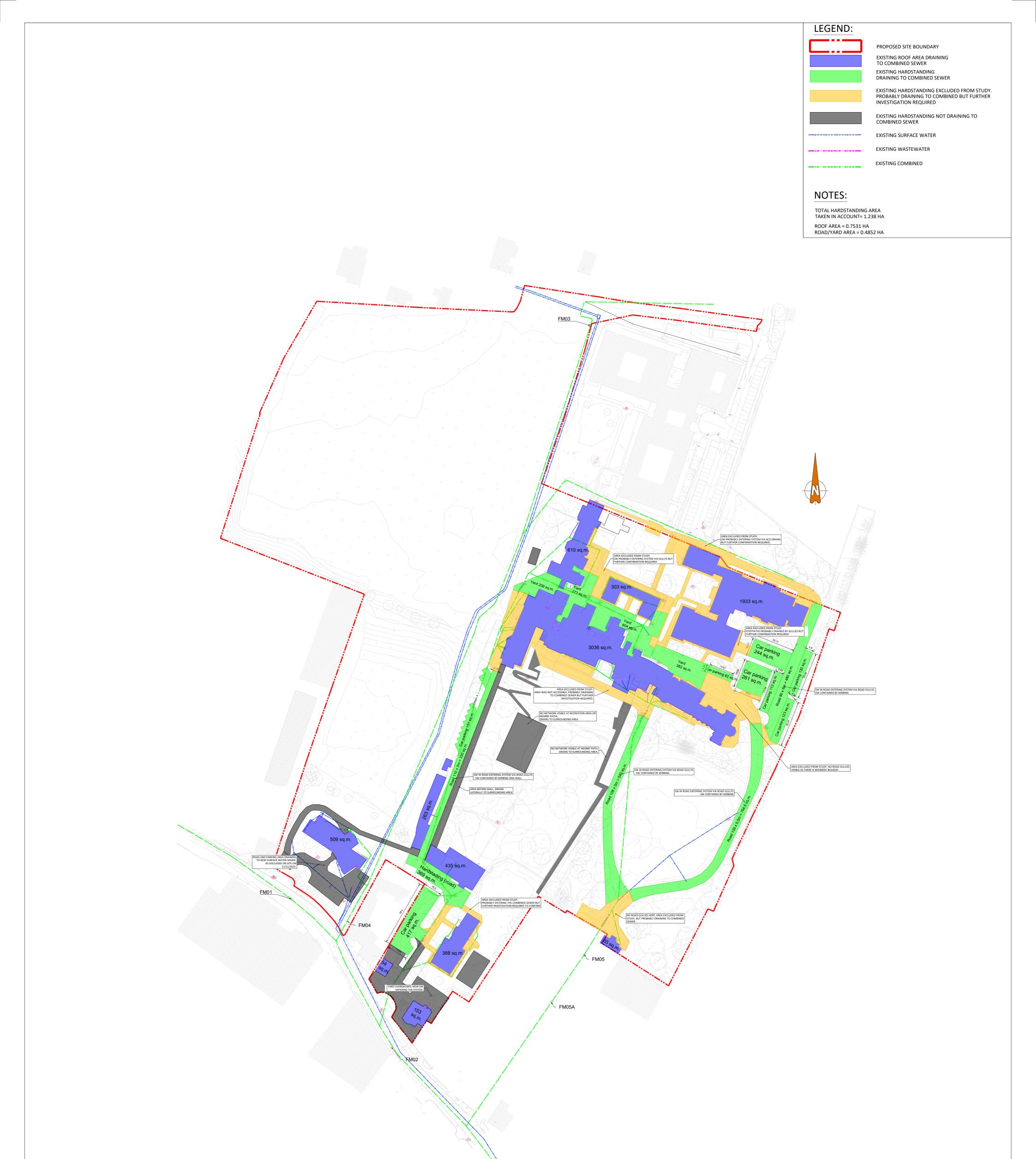
Additional Comments

The design submission will be subject to further technical review at connection application stage.

Irish Water cannot guarantee that its Network in any location will have the capacity to deliver a particular flow rate and associated residual pressure to meet the requirements of the relevant Fire Authority, see Section 1.17 of Water Code of Practice.

For further information, visit www.water.ie/connections

<u>Notwithstanding any matters listed above, the Customer (including any appointed</u> <u>designers/contractors, etc.) is entirely responsible for the design and construction of the Self-Lay</u> <u>Works.</u> Acceptance of the Design Submission by Irish Water will not, in any way, render Irish Water liable for any elements of the design and/or construction of the Self-Lay Works.



DRAFT THIS DRAWING HAS BEEN ISSUED FOR INFORMATION PURPOSES ONLY AND MUST NOT BE USED

FOR CONSTRUCTION UNDER ANY CIRCUMSTANCES

• FOR SETTING OUT REFER TO ARCHITECT'S DRAWINGS.	Rev No.	Date	Revision Note	Drn by	Chkd by		Head Office,		Client: ROYALTON GROUP
THIS DRAWING TO BE READ IN CONJUNCTION WITH	P01	18.11.21	SUITABLE FOR INFORMATION	DR	DR		9 Prussia Street,		Project: ST VINCENT'S FAIRVIEW
ALL OTHER ARCHITECTURAL AND ENGINEERING DRAWINGS AND ALL OTHER RELEVANT DRAWINGS	P02	29.11.21	EXISTING INFRASTRUCTURE ADDED	DR	DR		Dublin 7. D07 KT57		
AND SPECIFICATIONS.	P03	12.08.22	REVISED RED LINE BOUNDARY AND AREAS	МКо	MK	ENVIRONMENT ISO 140012015 USAU Certified NSAI Certified NSAI Certified NSAI Certified			Title:
 DO NOT SCALE DRAWING. USE FIGURED DIMENSIONS ONLY. NO PART OF THIS DOCUMENT MAY BE REPRODUCED OR 	P04	14.11.22	REVISED AREAS	МКо	MK		TEL +353 (0)1 8682000	OCSC	EXISTING HARDSTANDING
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SYSTEM OF ANY NATURE WITHOUT THE WRITTEN PERMISSION OF O'CONNOR SUTTON CRONIN AS COPYRIGHT						Construction	e: contactus@ocsc.ie	Multidisciplinary Consulting Engineers	Code Originator Zone Level Type Role Number Status Revision
HOLDER EXCEPT AS AGREED FOR USE ON THE PROJECT FOR						VerlifieD	w: www.ocsc.ie		R517-OCSC - XX - XX - SK - C -0006 SO PO4
WHICH THE DOCUMENT WAS ORIGINALLY ISSUED.							Dublin London Belfast Galw	ay Cork Birmingham	Date: 18.11.21 Scale: 1000 @ A1 Drn by:DR Chkd by:DR Aprvd by:AH



APPENDIX F. CELLULAR ATTENUATION SYSTEM

- Y-E.S.S. Pluvial Cube with Access and Inspection Chamber

Appendix F

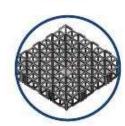
Cellular Attenuation System

H₀3

Modular Geo-Void Systems Total Water Management

ESS EcoCell Ecological Tank Systems







ENVIRONMENTAL SUSTAINABLE SOLUTIONS LTD

Environmental Sustainable Solutions

Welcome to Environmental Sustainable Solutions; specialist suppliers and designers of geocomposites and water re-use systems. Environmental Sustainable Solutions can help you achieve innovative results for all your requirements:-

^G Stormwater Management

^G Gas Barrier Protection

- ^G Stormwater Attenuation
- G Contaminated Land Development

G Stormwater Drainage

- G Ground Stabilisation
- G Rainwater Recycling Management G Structural Waterproofing
- G Gas Venting Systems
- G Damp-proofing projects

Over the last 12 years Environmental Sustainable Solutions, and associated companies, have designed and installed thousands of water recycling, drainage and attenuation tank systems for schools, car parks, retail parks, offices and sports arenas throughout Ireland, UK, Europe and the Middle East.

Our wide range of environmental protection products, surface water drainage modules and modular water storage tank systems provides maximum design flexibility for engineers and architects working on even the most demanding of storm water storage and recycling projects.

Stormwater Management And Design

Stormwater is the phrase used to describe the excess rainwater that flows from rooftops, roads, car parks and other buildings. This water can contain many pollutants picked up from roofs and highways. In extreme weather conditions sudden heavy downpours of rain can cause major environmental disasters. Using our Rainmanager products; stormwater can not only safely be removed, but it can be stored and recycled for commercial and domestic use.

How it works

- ESS Attenuation Tank

Stormwater enters the attenuation tank via the inlet manhole, which incorporates a silt collection sump and a galvanised leaf collection basket. Water passes through the tank and exits through the outlet manhole, which contains an AquaBrake flow control device.

This flow control device regulates the release rate of water from the tank, and in so doing, enables the tank to fill. As a result of water entering the tank at a greater rate than it can exit, the void space then fills with water. While the tank fills, air is vented from the tank.

The Inlet/Outlet pipe will act as a flushing channel. This perforated pipe is wrapped completely in High Flow Filtering Geotextile, which prevents silt entering the block area. As the tank continues to empty at a pre-determined rate, air re-enters the tank via the same air vent system. The roof of the completed tank must be lower than the lowest gully trap on site.

Benefits

- ^G 100% sealed tank
- G Full installation service provided
- 6 12 years experience as market leader
- G Quick installation reduce site access delays
- G Increased land usage tanks are sub surface
- c Economical generally more cost efficient than any other equivalent sealed tank
- c Cost effective reduced costs for excavation and disposal of material
- G Modular easy to create any shape
- G Strong designed to support shear loading
- G Lightweight no cranes required

© Determinate volume – one cubic metre of matrix tank modules contain 950 litres of water, whereas stone fill will only provide 300 litres of storage per cubic metre.

Soakaway

The soakaway is normally best built as a long narrow structure.

The inlet pipe comes in at roof level and faces downwards so that the water can percolate into the tank.

The blocks are wrapped in Geotextile, to protect them and also to keep clay from filling up the void.

An air vent pipe is installed on the highest point with a cowl on top or vented back to an inlet manhole.

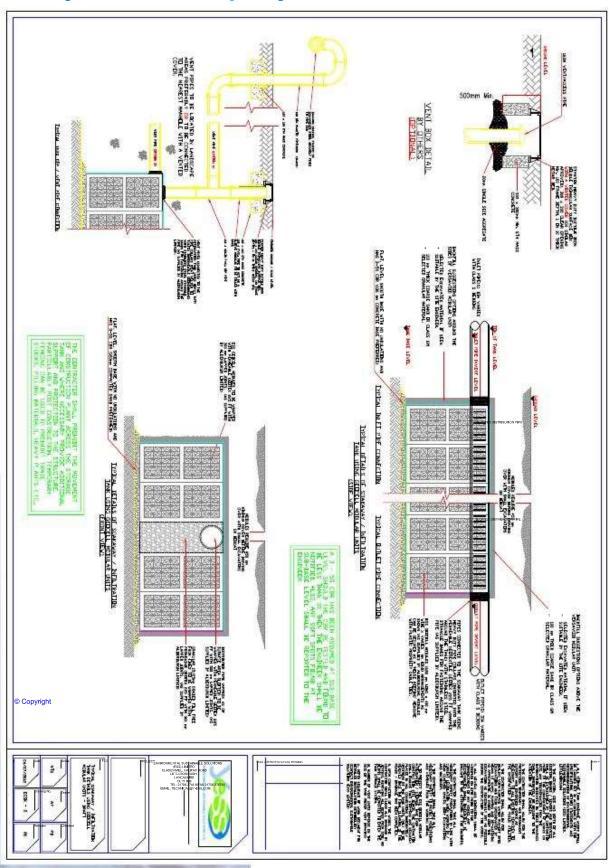
There is no outlet from a soakaway, therefore no flow control unit is required.

Protecting the Environment

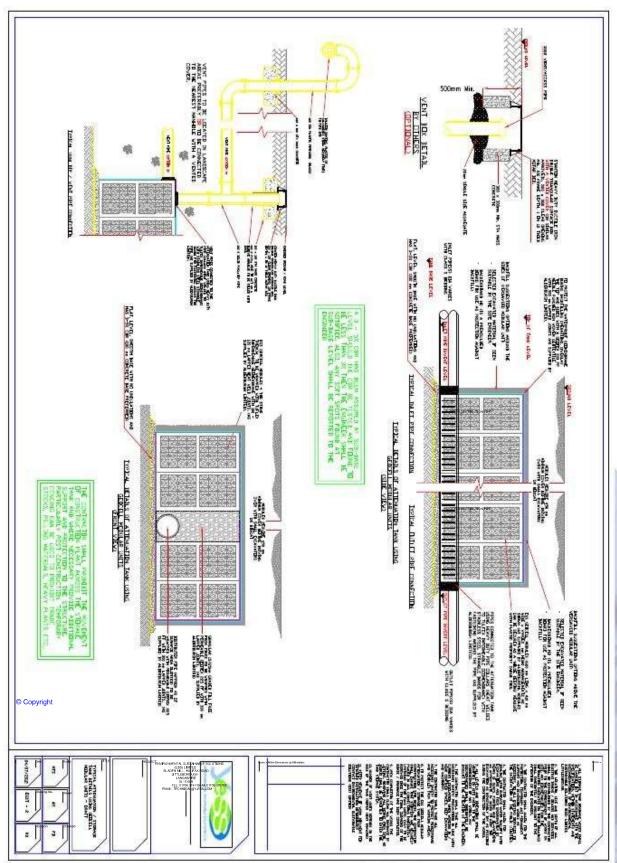


Infiltration System

Typical arrangement using ESS Ecological Tank System for water quality



Retention System



Typical on site collection and recycling arrangement using ESS Ecological Tank System

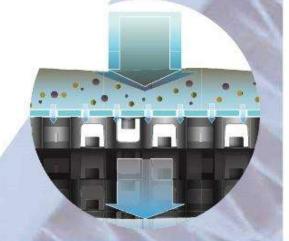
Infiltration Swales & Underground Channels

Please refer to separate data sheets for the following products

Modular VersaVoid System



Oil Filtration



Benefits

^GQuick Reduce site access delays

^GLightweight No cranes required

^G **Strong** Designed for maximum anticipated loads

G Maintenance Free Tank All debris and sediment is prefiltered

^G **Determinate Volume** One cubic metre of Tank modules contain 950 litres of water

^G **Cost Effective** Reduces excavation and disposal by up to 5 x compared with conventional soak wells

^G **High Infiltration** 98% void surface area

^G **Totally Modular** For greatest flexibility designed to cope. Units start at 300mm deep

Benefits

G Source control designed to handle catastrophic spillages G Capture, filter and break down residual hydrocarbons - all in one compact unit G Self-maintaining ecosystems decompose hydrocarbon compounds and clean filters G Load bearing, modular components provide up to 200t/m² loading capacity for shallow inverts to 3050mm+ deep in 250mm increments.

^G Designed by Engineers for

Engineers – to specify with confidence.

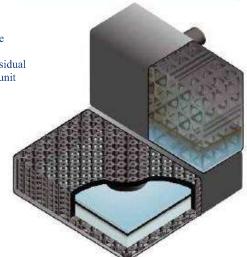
^G **Designing out Problems** with such systems (access, maintenance, loading etc.)

^G **Designing in Answers** to design requirements.

^G **Total 3D Access** For total maintenance with total confidence.

^G **Structurally Designed** with built in safety factor to carry all loads with complete confidence. 16 clear vertical access chambers per m2.

^G **Total Void Creation** With the greatest strength from any modular systems.



Aquabrake



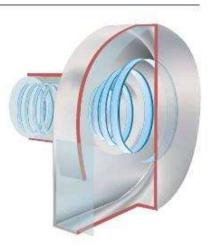
G Cost Savings Can reduce upstream storage requirements by up to 30%.

G Durability Corrosion resistant stainless steel.

G No energy requirements Self-activating solution with no moving parts.

c Clog Resistant AquaBrake design prevents blockages likely to occur in traditional orifices.

G Flexible Design Several options for attachment available.



Water Sensitive Urban Channels

Surface and Sub-Surface Water Treatment

By combining surface and sub-surface channeling and treatment solutions, ESS has created the ideal in bioswale water management.

The CombiSwale system includes the addition of permeable sub-surface waterways that further restore

water quality and recharge the natural environment. The sub-surface ESS channel system provides a unique way of working with nature to solve the enormous problems currently associated with open

concrete channels and swales.



Tuflex (not shown)

Tuflex is a waterproof membrane which helps to channel and direct filtered water to a specified outlet when the CombiSwale is used as a low flow channel system.

Plupave prevents soil compaction and maintains the permeability of the infilled soils over long periods of time. By preserving the vegetation, it also prevents uprooting and maintains the natural filtering process.



Ecosand

Cover materials are an essential part of the infiltration process. Ecosand is biologically engineered to provide maximum permeability through optimum physical, chemical and biological characteristics.



Geotex Protection Fleece (not shown)

Designed to protect against abrasions which may rip or tear membranes, the Geotex protection fleece provides blanket protection against any rough materials within the backfill that may cause the membrane to tear. Only needed when Tuflex is used.





Geotex 225 **Filter Fabric**

Geotex 225 is a filter fabric which combats the problems of silting and clogging, by allowing water to pass into the sub-surface system. but preventing the movement of subsoils.



Pluvial Cube

By providing a subterranean channel, dangerous and space consuming open channels are avoided. They provide direction for an outlet and the open void remains accessible for maintenance

All products are manufactured to the highest quality, being subject to rigid quality control. However, the company cannot control conditions of application and use of its products, thus any warranty, written or implied, is given in good faith for materials only. ESS Ltd will not accept any responsibility for damage or injury arising from storage handling, misapplication or misuse of its products All transactions are subject to our standard condition of sale, copies of which are available on request.







APPENDIX G. GROUND INVESTIGATION REPORT & GROUND WATER MONITORING DATA

Appendix G

Ground Investigation Report

Ground Water Monitoring Data



Tel: 01 601 5175 / 5176 Email: info@gii.ie Web: www.gii.ie

Ground Investigations Ireland

St Vincent's Fairview

OCSC

Ground Investigation Report

April 2022



Directors: Fergal McNamara (MD), James Lombard, Conor Finnerty, Aisling McDonnell & Barry Sexton Ground Investigations Ireland Limited | Registered in Ireland Company Regsitration No.: 405726



Tel: 01 601 5175 / 5176 Email: info@gii.ie Web: www.gii.ie

DOCUMENT CONTROL SHEET

Project Title	St. Vincent's Hospital, Fairview
Engineer	OCSC
Client	Royalton Developments Ireland
Project No	10927-08-21
Document Title	Ground Investigation Report

Rev.	Status	Author(s)	Reviewed By	Approved By	Office of Origin	Issue Date
А	Interim	M Sutton	A McDonnell	A McDonnell	Dublin	20 December 2021
В	Final	M Sutton	A McDonnell	A McDonnell	Dublin	08 April 2022

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





 Tel:
 01 601 5175 / 5176

 Email:
 info@gii.ie

 Web:
 www.gii.ie

GROUND INVESTIGATIONS IRELAND

Geotechnical & Environmental

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3.1.	Slit Trenching2
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APPENDICES

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1.0 Preamble

On the instructions of OCSC Engineers, a site investigation was carried out by Ground Investigations Ireland Ltd., between September and November 2021 at the site of the proposed hospital and residential development in St. Vincent's hospital, Fairview.

2.0 Overview

2.1. Background

It is proposed to construct a new residential development and hospital with associated services, access roads and car parking at the proposed site. The eastern part of the site is currently occupied by the existing Fairview hospital and gardens with a greenfield area on the western area of the site. The site is situated in north Dublin city to the north of Richmond Road off Convent Avenue. The proposed construction is envisaged to consist of conventional foundations or piles and pavement make up with some local excavations for services and plant. A basement is proposed as part of the proposed residential scheme which will require excavation of approximately 4m BGL and is understood to be in the northwest part of the site.

2.2. Purpose and Scope

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

- Visit project site to observe existing conditions
- Carry out 8 No. Trial Pits to a maximum depth of 3.7m BGL
- Carry out 3 Slit trenches to investigate the presence of existing services.
- Carry out 2 Foundation Pits to investigate existing foundations.
- Carry out 3 No. Soakaways to determine a soil infiltration value to BRE digest 365
- Carry out 22 No. Cable Percussion boreholes to a maximum depth of 10.2m BGL
- Carry out 15 No. Rotary Core follow on Boreholes to a maximum depth of 26m BGL
- Carry out 3 No. Plate Bearing Tests to determine CBR Value.
- Installation of 19 No. Groundwater monitoring wells
- Geotechnical & Environmental Laboratory testing
- Report with recommendations

3.0 Subsurface Exploration

3.1. General

During the ground investigation a programme of intrusive investigation specified by the Consulting Engineer was undertaken to determine the sub surface conditions at the proposed site. Regular sampling and insitu testing was undertaken in the exploratory holes to facilitate the geotechnical descriptions and to enable laboratory testing to be carried out on the soil samples recovered during excavation and drilling. The procedures used in this site investigation are in accordance with Eurocode 7 Part 2: Ground Investigation and testing (ISEN 1997 – 2:2007) and B.S. 5930:2015.

3.2. Trial Pits

The trial pits were excavated using a JCB 3CX excavator at the locations shown in the exploratory hole location plan in Appendix 1. The locations were checked using a CAT scan to minimise the potential for encountering services during the excavation. The trial pits were sampled, logged and photographed by a Geotechnical Engineer/Engineering Geologist prior to backfilling with arisings. Notes were made of any services, inclusions, pit stability, groundwater encountered and the characteristics of the strata encountered and are presented on the trial pit logs which are provided in Appendix 2 of this Report.

3.1. Slit Trenching

The slit trenches were excavated a JCB 3CX excavator at the locations shown in the exploratory hole location plan in Appendix 1. The locations were checked using a CAT scan to minimise the potential for encountering services during the excavation. The soil was slowly stripped using a spotter on the trench to alert the driver if any services were seen, to avoid damage to any underlying services. The slit trenches were sampled, logged and photographed by a Geotechnical Engineer/Engineering Geologist prior to backfilling with arisings. Notes were made of any services, inclusions, pit stability, groundwater encountered and the characteristics of the strata encountered and are presented on the slit trench records which are provided in Appendix 3 of this Report.

3.2. Foundation Pits

The foundation inspection pits were excavated at the locations shown in the exploratory hole location plan in Appendix 1. The exposed foundations were logged and sketched prior to backfilling and reinstatement. The logs and sketches are provided in Appendix 3 of this Report.

3.3. Soakaway Testing

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

soakaway test and were backfilled with arising's upon completion. The soakaway test results are provided in Appendix 4 of this Report.

3.4. Cable Percussion Boreholes

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

The standard method of boring in soil for site investigation is known as the Cable Percussion method. It consists of using a Shell in non cohesive soils and a clay cutter in cohesive soils, both operated on a wire cable. Very hard soils, boulders and other hard obstructions are broken up by chiselling and the fragments removed with the Shell. Where ground conditions made it necessary, the borehole was lined with 200mm diameter steel casing. While the use of the Cable Percussion method of boring gives the maximum data on soil conditions, some mixing of laminated soil is inevitable. For this reason, thin lenses of granular material may not be noticed. Disturbed samples were taken from the boring tools at suitable depths, so that there is a representative sample at the top of each change in stratum and thereafter at regular intervals down the borehole until the next stratum was encountered. The disturbed samples were then sealed and sent to the laboratory where they were visually examined to confirm the description of the relevant strata.

Standard Penetration Tests were carried out in the boreholes. The results of these tests, together with the depths at which the tests were taken are shown on the accompanying borehole records. The test consists of a thick wall sampler tube, 50mm external diameter, being driven into the soil by a monkey weighing 63.5kg and with a free drop of 760mm. For gravels and glacial till the driving shoe was replaced by a solid 60° cone. The Standard Penetration Test number referred to as the 'N' value is the number of blows required to drive the tube 300mm, after an initial penetration of 150mm. The number gives a guide to the consistency of the soil and can also be used to estimate the relative strength/density at the depth of the test and also to estimate the bearing capacity and compressibility of the soil. The cable percussion borehole logs are provided in Appendix 5 of this Report.

3.5. Rotary Boreholes

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

The T44 Beretta is equipped with rubber tracks which allow for short travel on pavement surfaces avoiding any damage to the surface. The T44 Beretta utilises a triple tube core barrel system operated using a wireline drilling process. The outer barrel is rotated by the drill rods and at its lower end, carries the coring bit. The inner barrel is mounted on a swivel so that it does not rotate during the process. The third barrel or liner is placed within the second one to retain the core intact and to preserve as much as possible the fabric of the drilling stratum. The core is cut by the coring bit and passes to the inner liner. The core is brought up to the surface within the inner barrel on a small diameter wire rope or line attached to the "overshoot" recovery tool which is then placed into a core box in order of recovery. A drilling fluid, typically air mist or

water flush is passed from the surface through hollow drill rods to the drill bit, and is used to cool the drill bit. Temporary casing is used in some situations to support unstable ground or to seal off fissures or voids. It should be noted that the rotary coring can only achieve limited recovery in overburden, particularly granular or weakly cemented strata due to the flushing medium washing away the cohesive fraction during coring. The recovery achieved, where required is noted on the borehole logs and core photographs are provided to allow assessment of the core recovered. The rotary borehole logs are provided in Appendix 5 of this Report.

3.6. Surveying

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

3.7. Groundwater/Gas Monitoring Installations

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

3.8. Insitu Plate Bearing Test

The plate bearing tests were carried out using a 450mm diameter plate at the locations shown on the site plan in Appendix 1. The plate was loaded in increments using a hydraulic jack and an excavator to provide a reaction and the displacement was monitored in accordance with BS1377 Part 9 using independently mounted digital strain gauges. The constrained modulus and equivalent CBR are calculated in accordance with HD29/75 and are provided on the test reports in Appendix 3 of this Report.

3.9. Laboratory Testing

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

Chemical testing as required by the specification, including pH and sulphate testing was carried out by Element Materials Technology Laboratory in the UK.

Geotechnical testing consisting of moisture content, Atterberg limits, Particle Size Distribution (PSD), hydrometer, California Bearing Ratio (CBR), tests were carried out in Pro Soils Geotechnical Laboratory in the UK.

Rock strength testing including Point Load (Is₅₀) and Unconfined Compressive Strength (UCS) testing was carried out in Pro Soils Geotechnical Laboratory

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

4.0 Ground Conditions

4.1. General

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

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

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

TOPSOIL: Topsoil was encountered in the majority of exploratory holes and was present to a maximum depth of 0.3m BGL. Tarmac surfacing was present in BH05 and BH05A typically to a depth of 0.10m BGL.

MADE GROUND: Made Ground deposits were encountered beneath the Topsoil/Surfacing in the majority of the trial pits (TP01 to TP08) and boreholes (BH01 to BH04) in the south eastern area of the site and was present to depths of between 0.6m and 1.80m BGL. Made ground deposits were also encountered in some of the boreholes in other areas of the site including BH06, BH08, BH09, BH10, BH12 and BH17 to depths of up to 3m BGL. These deposits were described generally as *brown sandy slightly gravelly CLAY with occasional cobbles and contained occasional fragments of concrete, red brick, glass, ash, ceramic and plastic.*

COHESIVE DEPOSITS: Cohesive deposits were encountered beneath the Made Ground and were described typically as *brown sandy gravelly CLAY with occasional cobbles and boulders* overlying a *stiff dark brown / grey sandy gravelly CLAY with occasional cobbles and boulders*. The secondary sand and gravel constituents varied across the site and with depth, with granular lenses occasionally present in the glacial till matrix. The strength of the cohesive deposits typically increased with depth and was firm and stiff to very stiff below 1.5m to 2m BGL in the majority of the exploratory holes. These deposits had some, occasional or frequent cobble and boulder content where noted on the exploratory hole logs.

GRANULAR DEPOSITS: The granular deposits were encountered within the cohesive deposits at some of the borehole locations and were typically described as *Grey brown clayey sandy sub rounded to sub*

angular fine to coarse GRAVEL with occasional cobbles and rare boulders. The secondary sand/gravel and silt/clay constituents varied across the site and with depth while occasional or frequent cobble and boulder content also present where noted on the exploratory hole logs.

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

BEDROCK: The rotary core boreholes recovered Medium strong to very strong grey/dark grey fine to medium grained laminated LIMESTONE interbedded with weak black fine grained laminated Mudstone. This is typical of the Calp Formation, which is noted on the geological mapping to the east of the proposed site. Rare visible calcite and pyrite veins were noted during logging which are typically present within the Calp Limestone.

The depth to rock across the site varies from 15.5m BGL in BH13 to a maximum of 22.5m BGL in BH21. To the northern park of the site which has a higher ground level the rock was encountered between 19.0m in BH05A and 22.50m in BH21. On the southern part of the site the rock was encountered between 15.50 in BH13 and 16.50m in BH12. The total core recovery is good, typically 100% with some of the uppermost runs dropping to 80 or 90%. The SCR and RQD both are relatively poor in the upper weathered zone, often recovered as non-intact, however both indices show an increase with depth in each of the boreholes.

4.2. Groundwater

Groundwater strikes are noted on the exploratory hole logs where they occurred and where possible drilling was suspended for twenty minutes to allow the subsequent rise in groundwater to be recorded. We would point out that these exploratory holes did not remain open for sufficiently long periods of time to establish the hydrogeological regime and groundwater levels would be expected to vary with the tide, time of year, rainfall, nearby construction and other factors. For this reason, standpipes were installed in the majority of the boreholes to allow the equilibrium groundwater level to be determined. The groundwater monitoring is included in Appendix 8 of this Report.

4.3. Laboratory Testing

4.3.1. Geotechnical Laboratory Testing

The geotechnical testing carried out on soil samples recovered generally confirm the descriptions on the logs with the primary constituent of the cohesive deposits found to be a CLAY of low to intermediate plasticity. The Particle Size Distribution tests confirm that generally the cohesive deposits are well-graded with percentages of sands and gravels ranging between 18% and 47% generally with fines contents of 34 to 49%.

The Particle Size Distribution test taken on a sample from granular deposits show the material has a percentage of sands of 15%, silt/clay of 9% with a gravel content of 37% and Cobble content of 39%.

The CBR testing on remoulded samples gave results ranging between 0.4% and 4.1% for the cohesive deposits and made ground.

4.3.2. Chemical Laboratory Testing

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

4.3.3. Rock Laboratory Testing

The rock testing carried out on samples recovered from the boreholes reported Unconfined Compressive Strength (UCS) values ranging between 16.3 and 49.7 MPa while the point load testing gave Is50 values ranging between 1.94 MPa to 8.66 MPa. The Is₅₀ results correlate to the UCS values using a factor of approximately 20, giving values of 38.8 MPa and 173.2 MPa. These results correlate to the strength descriptions ranging between of Extremely Weak to Strong and confirming the variability of this stratum and the descriptions on the logs.

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

5.0 Recommendations & Conclusions

5.1. General

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

5.2. Foundations

5.2.1. Foundations for Hospital (South eastern area of site)

An allowable bearing capacity of 300 kN/m² is recommended for conventional strip or pad foundations on the stiff cohesive deposits at a depth of 2.0m BGL for the proposed construction in the area of BH01-BH04 and TP01-TP08.

A ground bearing floor slab is recommended to be based on the firm to stiff cohesive deposits with an appropriate depth of compacted hardcore specified by the consulting engineer and in accordance with the limits and guidelines in SR21:2014 +A1:2016 and/or NRA SRW CL808 Type E granular stone fill. Where the depth of Made Ground/Soft deposits exceeds 0.9m then suspended floor slabs should be considered.

5.2.2. Foundations for Residential Buildings (Western area of site)

An allowable bearing capacity of 125 kN/m² is achievable for conventional strip or pad foundations on the firm to stiff / stiff cohesive deposits generally at depths of between 1.0m and 2.70m. An allowable bearing capacity of 250 is achievable on the very stiff cohesive deposits at depths of between 2.3m and 4.0m. Due to the high loading anticipated, piled foundations may be more economically advantageous for the proposed building. The type, size and depth of the pile foundations should be confirmed by a specialist piling contractor based on the loading from the proposed building.

Table 1 below shows the depths where an allowable bearing capacity of 125 kN/m² and 250kN/m² is achievable for conventional strip or pad foundations at each of the borehole locations in the areas where the residential development is proposed. Where the founding strata is deeper than standard depth that conventional foundations would be constructed, lean mix trench fill is recommended to achieve the recommended allowable bearing capacity.

The possibility for variation in the depth of the made ground in the vicinity of these foundations should be considered and foundation inspections should be carried out. Any soft spots encountered at the proposed foundation depths should be excavated and replaced with lean mix concrete.

		Allowa	able Bearing Capa	acities (ABC	C) kN/m2		
Dynamic Probe	125 kN/m2 ABC	250 kN/m2 ABC	Comment	Dynamic Probe	125 kN/m2 ABC	250 kN/m2 ABC	Comment
No.	Depth m BGL	Depth m BGL		No.	Depth m BGL	Depth m BGL	
BH01				BH12	3.0	3.0	
BH02			to BH04 within	BH13	1.9	4.0	
BH03			e section 5.2.1 for ommendations	BH14	1.0	3.0	
BH04				BH15	2.0	4.0	
BH05A	2.0	2.0		BH16	2.7	4.0	
BH06	2.5	5.5		BH17	4.0	7.0	
BH07				BH18	2.3	3.0	
BH08	2.8	2.8		BH19	1.0	3.0	
BH09	2.0	4.7		BH20	2.0	2.7	
BH10	3.0	3.0		BH21	2.8	2.8	
BH11	2.9	2.9		BH22	2.7	2.7	

Table 1 - Allowabl	e Bearing	Capacities
--------------------	-----------	------------

A ground bearing floor slab is recommended to be based on the firm to stiff cohesive deposits with an appropriate depth of compacted hardcore specified by the consulting engineer and in accordance with the limits and guidelines in SR21:2014 +A1:2016 and/or NRA SRW CL808 Type E granular stone fill. Where the depth of Made Ground/Soft deposits exceeds 0.9m then suspended floor slabs should be considered.

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

5.3. External Pavements

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

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

5.4. Excavations

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

Excavations in the Made Ground or soft Cohesive Deposits will require to be appropriately battered or the sides supported due to the low strength of these deposits.

Any excavations which penetrate the granular deposits will require to be appropriately battered or the sides supported and are likely to require dewatering due to the groundwater seepages noted in the exploratory hole logs in the Appendices of this Report.

The groundwater and stability noted on the trial pit logs and borehole logs should be consulted when determining the most appropriate construction methods for excavations.

The water level recorded in the boreholes was above the presumed basement level however generally Cohesive deposits were encountered at the proposed location of the basement so is it expected that water inflow will be limited. It should be noted that granular deposits where encountered in areas on the site and generally, where significant excavations are required in water bearing granular deposits a cut-off wall may be more cost effective than extensive dewatering. An assessment by a specialist dewatering contractor is recommended to determine the most cost effective approach to the proposed excavation.

Excavations in the upper cohesive and weathered rock deposits are expected to be excavatable with conventional excavation equipment.

Any waste material to be removed off site should be disposed of to a suitably licenced landfill.

5.5. Soakaway Design

Infiltration rates of f=9.981 x 10^{-5} m/s, 4.83 x 10^{-5} m/s and f=3.71 x 10^{-5} m/s respectively were calculated for the soakaway locations SA01, SA02 and SA03. It should be noted that groundwater was encountered in the soakaway pits and excavation was stopped at this depth to undertake soakaway test. Depth that ground water was encountered in the pit should be considered when determining the design of soakaway areas.

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

APPENDIX 1 - Site Location Plan







716850E

717000E

APPENDIX 2 – Trial Pit Records



SI		nd Inv	estigations www.gii.ie	Ireland	Ltd	Site St. Vincent's Fairview	Trial Pit Number TP01 Job	
Machine : JCB 30 Method : Trial Pi		Dimension 2.60 x 0.4		Ground	Level (mOD) 5.34	Client Engineer OCSC		
		Location 7364	77.3 E 716878.2 N	Dates 14	4/09/2021			
Depth (m) Sa	imple / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	
0.50 B				2.24	(0.20) 0.20 (0.70) 0.90 (2.20)	Brown slightly sandy slightly gravelly TOPSOIL with rootlets MADE GROUND: Brown slightly sandy slightly gravelly Clay with occasional subangular to subrounded cobbles ceramic and red brick fragments. Greyish brown sandy clayey angular to subrounded fine to coarse GRAVEL with some angular to subrounded cobbles and occasional boulders. Complete at 3.10m		
Plan					• •	Remarks No groundwater encountered during excavation. Slight spalling of trial pit walls. Trial pit backfilled upon completion.		
•	· ·				•••	Trial pit backfilled upon completion.		
·								
	· ·		· · · ·		· · ·			
						cale (approx) Logged By Figu	ire No.	

SI	Gro	und In	vestiga www.	tions Ir _{gii.ie}	reland	Ltd	Site St. Vincent's Fairview		Trial Pit Number TP02
Machine:JC Method:Tr		Dimens 2.30 x 0	ions).40 x 3.10		Ground	Level (mOD) 5.03	Client		Job Number 10927-08-2
		Location 736	n 6444.2 E 7169	909 N	Dates 14	4/09/2021	Engineer OCSC	Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field	Records	Level (mOD)	Depth (m) (Thickness)	D	escription	Legend
1.00	в				4.73 4.43 3.03 2.03 1.93	(0.30) (0.30) (0.30) (0.30) (0.30) (0.30) (1.40) (1.40) (1.00) (1.00) (0.10) (0.10) (0.10) (0.10)	rootlets. MADE GROUND: Brown : Clay with occasional subaceramic and red brick frag Greyish brown sandy clay coarse GRAVEL with som and occasional boulders. Brownish grey very sandy subrounded fine to coarse subangular to subrounded	ey angular to subrounded fine e angular to subrounded cobbl slightly clayey subangular to gRAVEL with occasional	to
Plan . 	· · ·	· · · ·	· · ·	·			Complete at 3.10m Complete at 3.10m Remarks No groundwater encountere Slight spalling of trial pit wal Trial pit backfilled upon corr		

SII	Grou	nd In	vestig www	ations v.gii.ie	Ireland	Ltd	Site St. Vincent's Fairview	Trial Pit Numbe TP03
Machine : JCB 3CX		Dimensi 2.90 x 0	ons 0.50 x 3.50		Ground	I Level (mOD) 7.16	Client	
		Location 736	n 6544.5 E 7	16891 N	Dates	4/09/2021	Engineer OCSC	Sheet 1/1
Depth (m) Samp	le / Tests	Water Depth (m)	Fie	ld Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend
.50 В					6.96 5.41 4.06	(0.20) (0.20) (1.55) (1.55) (1.35) (1.35)	Brown slightly sandy slightly gravelly TOPSOIL with rootle MADE GROUND: Brown slightly gravelly silty Clay with occ. subangular to subrounded cobbles glass metal rubbi and ceramic fragments.	s
Plan	· · · ·	· · ·	• • • •	· · · · · ·	3.66	- 3.50 	Complete at 3.50m Remarks No groundwater encountered during excavation. Trial pit stable. Trial pit backfilled upon completion.	
		·				s		j ure No.)27-08-21.TF

	Grou	nd In	vesti	igatio vw.gii	ons Ire .ie	eland	Ltd	Site St. Vincent's Fairview	Trial Pit Number TP04	
Machine:JC Method:Tri		Dimens 2.30 x (s ions 0.50 x 3.1	10		Ground	Level (mOD 5.22	Client	Job Number 10927-08-	
		Locatio	n 6508.4 E	716870	N	Dates 14	4/09/2021	Engineer OCSC	Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	F	Field Re	cords	Level (mOD)	Depth (m) (Thickness	Description	Legend	
.50	В					4.92	(0.30) - 0.30 - 0.30 	Dark brown slightly sandy slightly gravelly TOPSOIL with rootlets. Light brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.		
50	В		Water s	trike(1) a	ıt 3.00m.	4.02	1.20 	Greyish brown sandy clayey angular to subrounded fine to coarse GRAVEL with occasional angular to subrounded cobbles. Gravel becoming wet from 2.00m BGL. Complete at 3.10m		
Plan .	· ·			•		- ·	- - - - - -	Remarks Groundwater encountered at 3.00m BGL. Slight spalling of trial pit walls. Trial pit backfilled upon completion.		
•	· ·	•		•			· · ·			
•						-		Scale (approx) Logged By Figu	ıre No.	

	Gro	und In		gatic w.gii		eland	Ltd	Site St. Vincent's Fairview	Trial Pit Number TP05		
Machine : Jo Method : Tr		Dimens 2.30 x	sions 0.50 x 3.70)		Ground	Level (mOD) 5.65	Client	Job Numbe 10927-08		
		Locatio	on 6527.1 E 7	716910.	8 N	Dates 14	4/09/2021	Engineer OCSC	Sheet 1/1		
Depth (m)	Sample / Tests	Water Depth (m)	Fi	eld Rec	cords	Level (mOD)	Depth (m) (Thickness)	Description	Legend		
						5.45	(0.20)	Dark brown slightly sandy slightly gravelly TOPSOIL with rootlets.			
						5.45	0.20	MADE GROUND: Grey sandy subangular to subrounded fine to coarse Gravel.			
						5.25	F	MADE GROUND: Brown slightly sandy slightly gravelly Clay with occasional cobbles concrete and red brick fragments.			
80	В						(0.80)				
						4.45	- - - - - -	Greyish brown sandy clayey angular to subrounded fine to coarse GRAVEL with occasional angular to subrounded cobbles.			
00	В		Water str	ike(1) a	t 3.50m.	1.95	(2.50)	Gravel becoming wet from 2.70m BGL.			
lan .				·			• •	Remarks Groundwater encountered at 3.50m BGL.			
•		·	·	•	·	•		Groundwater encountered at 3.50m BGL. Slight spalling of trial pit walls. Trial pit backfilled upon completion.			
				·							
·		·	·		·	•					

S			und In	vest wv	igatio vw.gii	ons Ire .ie	eland	Ltd	Site St. Vincent's Fairview	Trial P Numbe TP0		
lachine lethod				Dimensions 2.40 x 0.50 x 3.40						Level (mOD) 5.40	Client	Job Numbe 10927-08
			Locatio		716938	.4 N	Dates 14	/09/2021	Engineer OCSC	Sheet 1/1		
Depth (m)	1	Sample / Tests	Water Depth (m)		Field Re	cords	Level (mOD)	Depth (m) (Thickness)	Description	Legend		
								(0.20)	Dark brown slightly sandy slightly gravelly TOPSOIL with rootlets.			
							5.20	- 0.20 (0.15)	MADE GROUND: Grey sandy subangular to subrounded fine to coarse Gravel.			
							5.05	0.35 - 0.35 	MADE GROUND: Brown slightly sandy slightly gravelly Clay with occasional cobbles plastic and red brick fragments.			
							4.30	 1.10	Greyish brown sandy clayey subangular to subrounded fine to coarse GRAVEL with occasional subangular to subrounded cobbles.			
				Water s	strike(1) a	ıt 3.10m.	2.00		Gravel becoming wet from 2.80m BGL.			
lan	•		•	•		·	• •	•	Remarks Groundwater encountered at 3.10m BGL.			
									Slight spalling of trial pit walls. Trial pit backfilled upon completion.			
					•		· ·	•				
	•			•	•							
	•			·	•		· ·		cale (approx) Logged By Figu	re No.		
									1:25 C. Byrne 1092	7-08-21.T		

	www.gii.ie		www.gii.ie		St. Vincent's Fairview	Trial Pit Numbe TP07				
lachine : J(lethod : Tr		Dimens 2.30 x	sions 0.50 x 3.2	20		Ground	Level (mOD) 5.18	Client	Job Number 10927-08-21 Sheet 1/1	
		Locatio	o n 6489.3 E	716930	.3 N	Dates	4/09/2021	Engineer OCSC		
Depth (m)	Sample / Tests	Water Depth (m)	1	Field Re	cords	Level (mOD)	Depth (m) (Thickness)	Description	Legend	
							(0.30)	Dark brown slightly sandy slightly gravelly TOPSOIL with rootlets.		
						4.88	0.30	MADE GROUND: Brown slightly sandy slightly gravelly Clay with occasional cobbles plastic and red brick fragments.		
							(0.60)	raginento.		
						4.28	0.90	Greyish brown sandy clayey subangular to subrounded fine to coarse GRAVEL with occasional subangular to subrounded cobbles.		
20	В						- - - - - - - -			
							(2.30) 			
			Waters	triko(1)	at 3.00m.			Gravel becoming wet from 2.70m BGL.		
20	В		waters	апке(т) а	at 3.00m.	1.98	3.20	Complete at 3.20m	· · · · · · · · · · · · · · · · · · ·	
rlan .			•				•••	Remarks		
			·	·				Slight spalling of trial pit walls. Trial pit backfilled upon completion.		
				•			•••			
		·				·				
			•			•	•••			

		Grou	nd In		iyatio ww.gii	.ie			St. Vincent's Fairview	Number TP08									
lachine : lethod :	JCB 3CX Trial Pit			Dimensions 2.50 x 0.50 x 3.20						Dimensions 2.50 x 0.50 x 3.20						3.20 Ground Level (mOD) Client 5.15		Client	Job Number 10927-08-2
			Locatio		E 716917	.1 N	Dates 14	/09/2021	Engineer OCSC	Sheet 1/1									
Depth (m)	Sample	e / Tests	Water Depth (m)		Field Re	cords	Level (mOD)	Depth (m) (Thickness	Description	Legend									
								 (0.40)	Dark brown slightly sandy slightly gravelly TOPSOIL with rootlets.										
							4.75	0.40	MADE GROUND: Brown slightly sandy slightly gravelly Clay with occasional cobbles ceramic and red brick fragments.										
								- (0.70) 											
							4.05	1.10	Greyish brown sandy clayey subangular to subrounded fine to coarse GRAVEL with occasional subangular to subrounded cobbles.										
								- - - - - - - -											
								 (2.10) 											
				Waters	strike(1) a	at 3.00m.		- - - - - - - - - -	Gravel becoming wet from 2.60m BGL.										
							1.95	- 3.20 	Complete at 3.20m	- 0 9									
lan .				•					Remarks										
									Groundwater encountered at 3.00m BGL. Slight spalling of trial pit walls. Trial pit backfilled upon completion.										
				·	·			•											
								1											











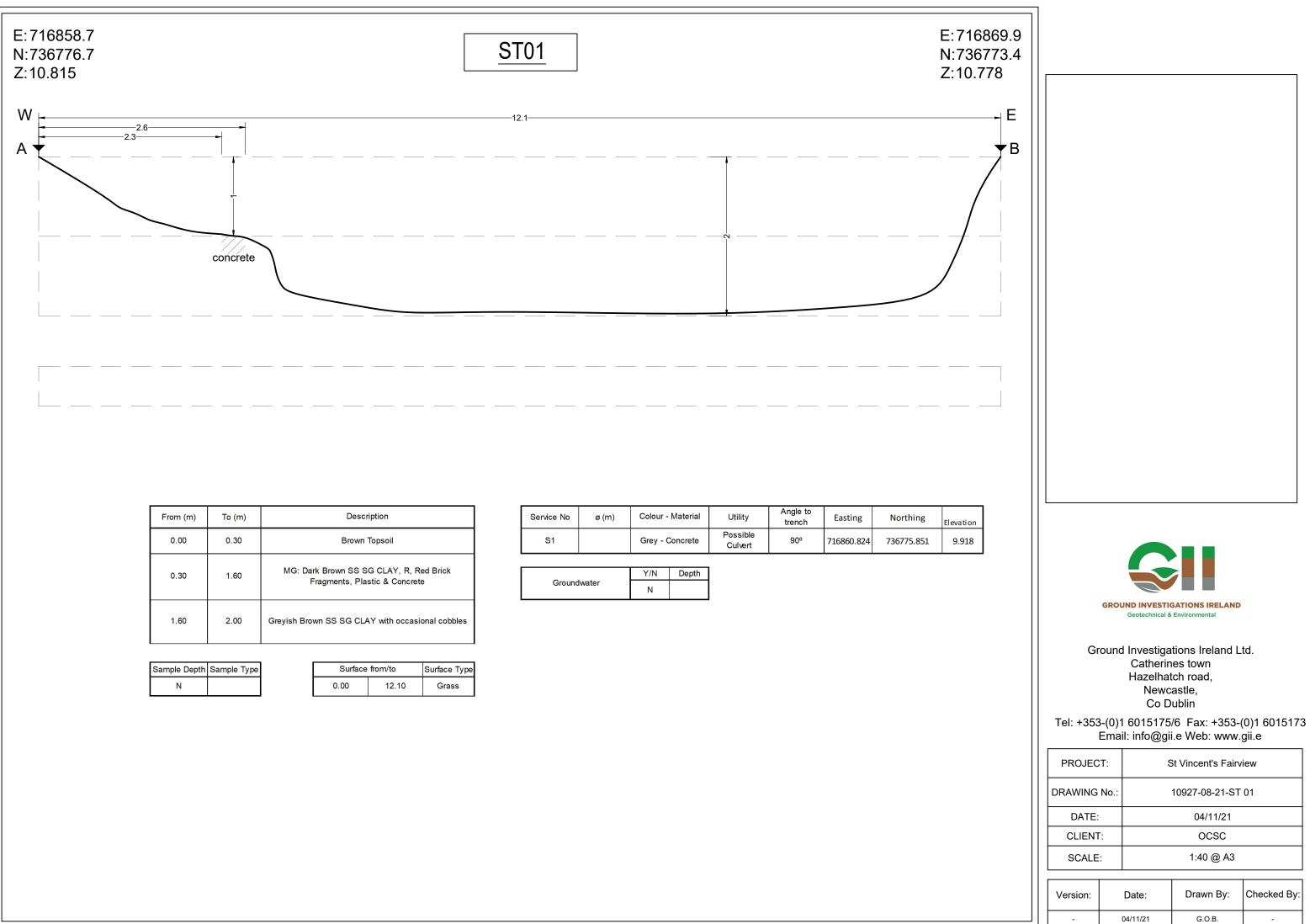






APPENDIX 3 – Slit Trench / Foundation Pit Records



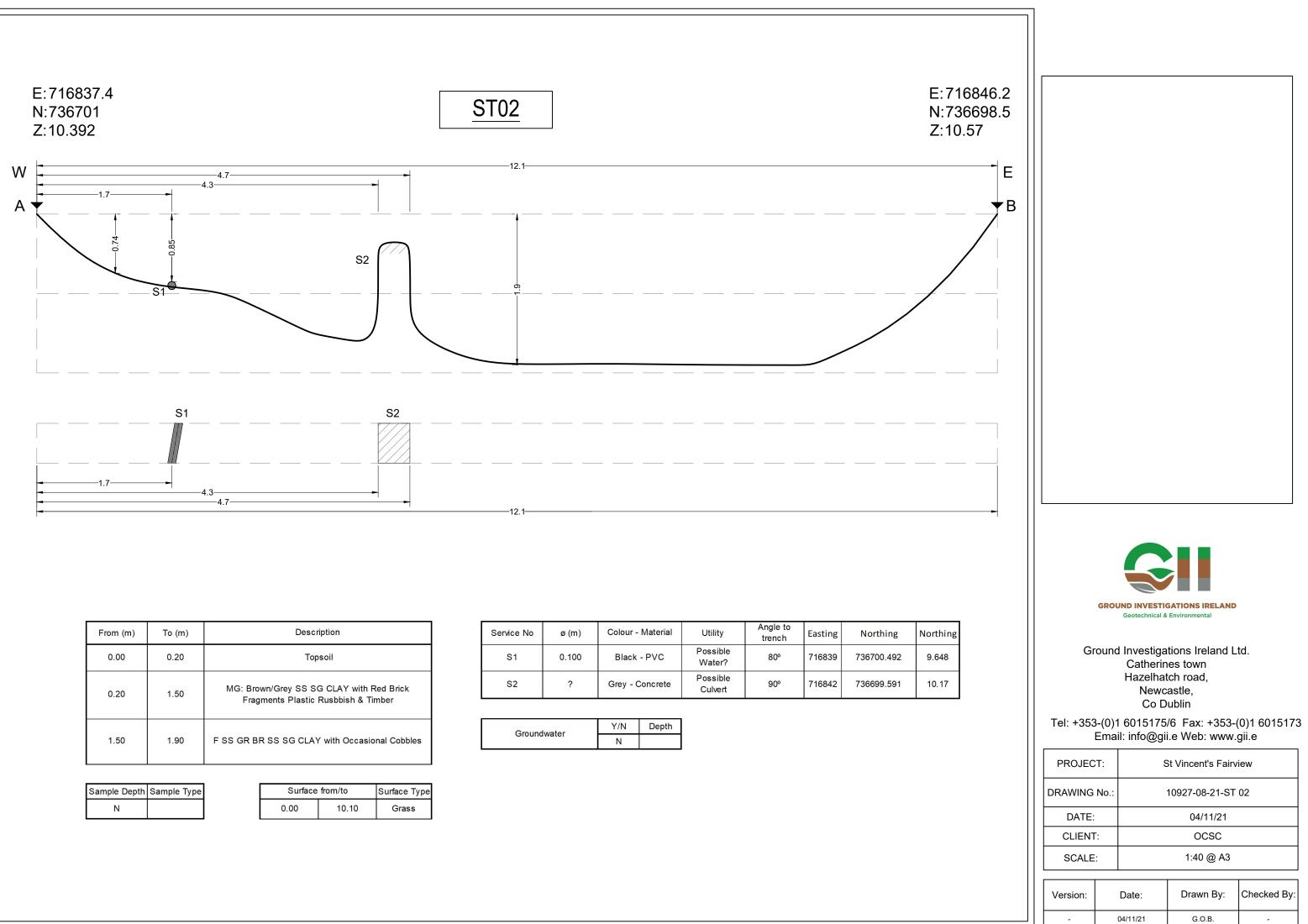


From (m)	To (m)	Description
0.00	0.30	Brown Topsoil
0.30	1.60	MG: Dark Brown SS SG CLAY, R, Red Brick Fragments, Plastic & Concrete
1.60	2.00	Greyish Brown SS SG CLAY with occasional cobbles

ample Type	Surface	from/to	Su
	0.00	12.10	

Service No	ø (m)	Colour - Material	Utility	Angle to trench	Easting	Northing	Elevation
S1		Grey - Concrete	Possible Culvert	90°	716860.824	736775.851	9.918

	Y/N	Depth
Groundwater	Ν	

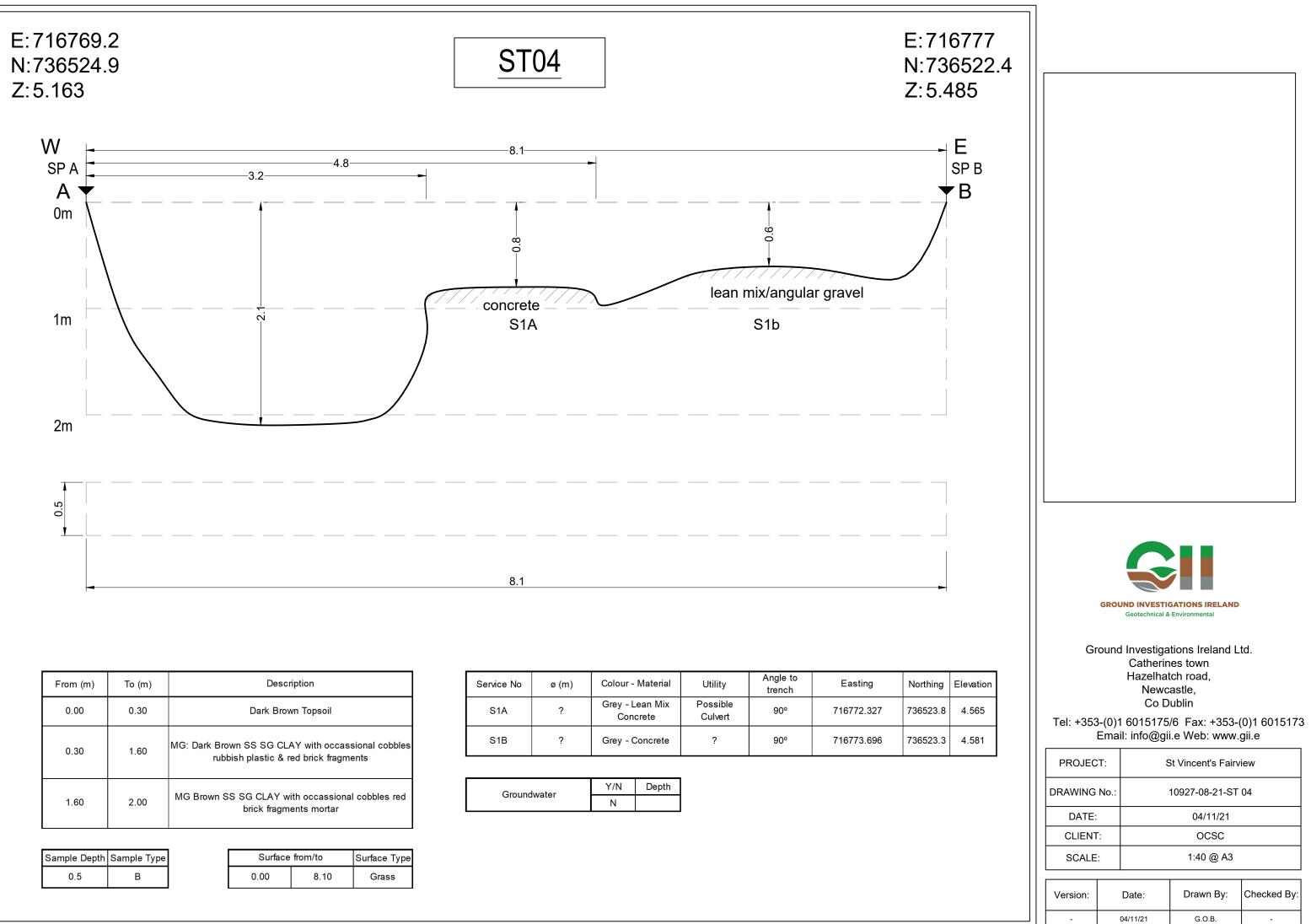


From (m)	To (m)	Description
0.00	0.20	Topsoil
0.20	1.50	MG: Brown/Grey SS SG CLAY with Red Brick Fragments Plastic Rusbbish & Timber
1.50	1.90	F SS GR BR SS SG CLAY with Occasional Cobbles

Sample Depth	Sample Type	Surface	from/to	Surface Type
N		0.00	10.10	Grass

Service No	ø (m)	Colour - Material	Utility	Angle to trench	Easting	Northing	Northing
S1	0.100	Black - PVC	Possible Water?	80°	716839	736700.492	9.648
S2	?	Grey - Concrete	Possible Culvert	90°	716842	736699.591	10.17

Groundwater	Y/N	Depth
Giodildwater	Ν	



From (m)	To (m)	Description
0.00	0.30	Dark Brown Topsoil
0.30	1.60	MG: Dark Brown SS SG CLAY with occassional cobbles rubbish plastic & red brick fragments
1.60	2.00	MG Brown SS SG CLAY with occassional cobbles red brick fragments mortar

Service No	ø (m)	Colour - Material	Utility	Angle to trench	Easting	Northing	Elevation
S1A	?	Grey - Lean Mix Concrete	Possible Culvert	90°	716772.327	736523.8	4.565
S1B	?	Grey - Concrete	?	90°	716773.696	736523.3	4.581

Groundwater	Y/N	Depth
Giodildwater	Ν	

Sample Depth	Sample Type	Surface	from/to	Surface Type
0.5	В	0.00	8.10	Grass

ST01 Looking East



ST01 S1



ST01 Slit trench centre



ST01 Eastern end of trench



ST01 Spoil



ST02 Looking East



ST02 S1



ST02 S2 Western end of trench



ST02 S2



ST02 Eastern end of trench



ST04 Looking East



ST04 Western end of trench



ST04 S1A

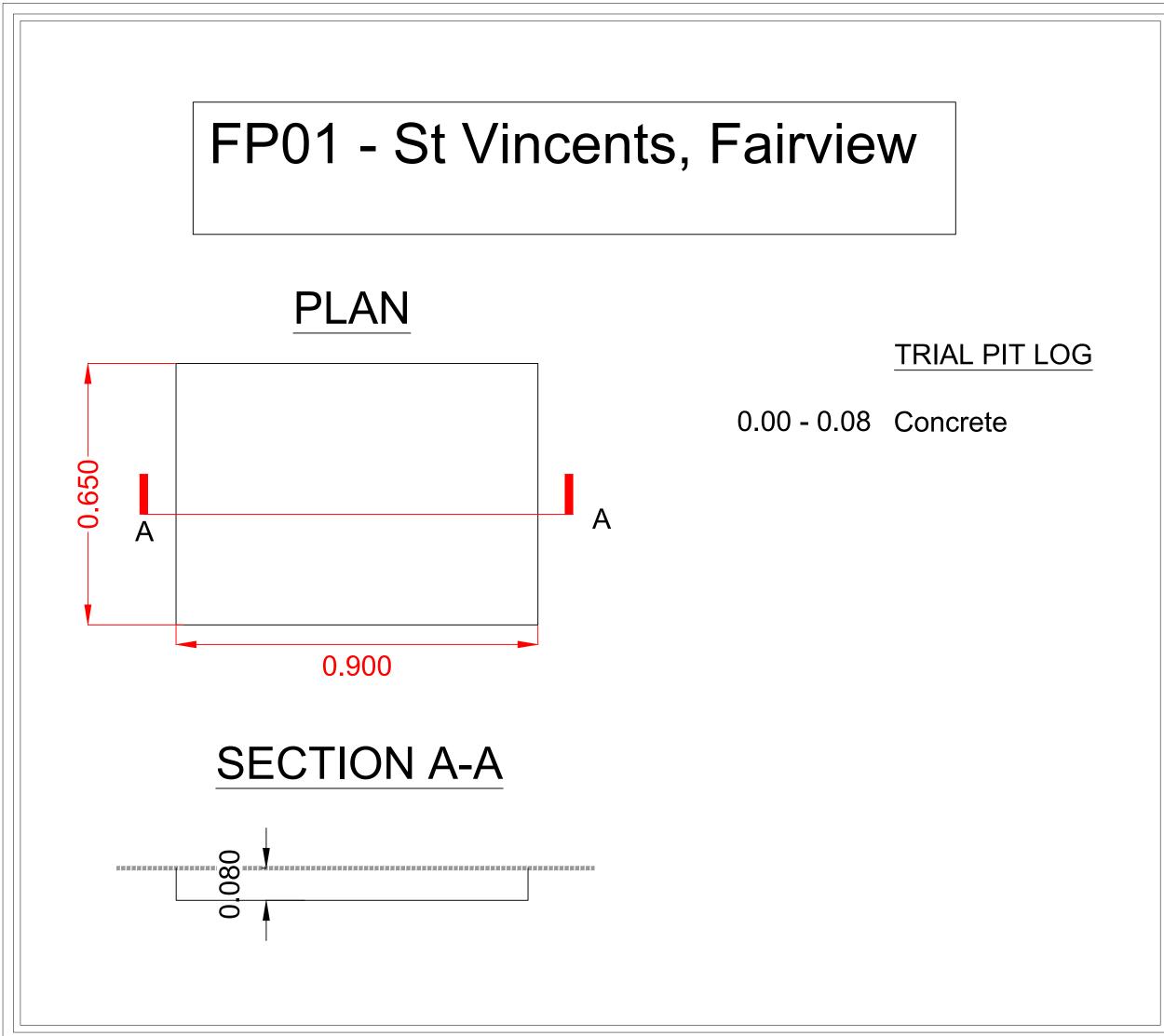


ST04 Eastern end of trench



ST04 Spoil







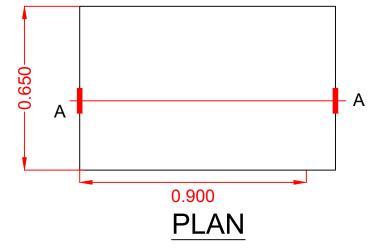
GROUND INVESTIGATIONS IRELAND Geotechnical & Environmental

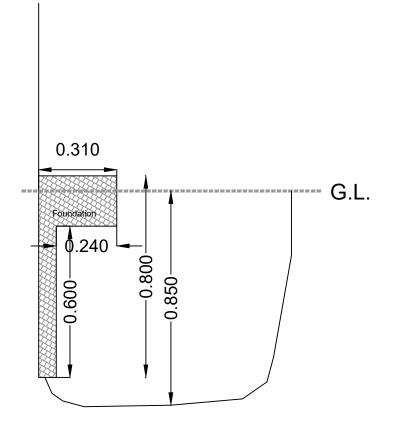
Ground Investigations Ireland Ltd. Catherines town Hazelhatch road, Newcastle, Co Dublin

Tel: +353-(0)1 6015175/6 Fax: +353-(0)1 6015173 Email: info@gii.e Web: www.gii.e

PROJECT:		St. Vincents Fairview				
DRAWING No.:		10927-08-21 - FP01				
DATE:		15/02/22				
CLIENT:		OCSC				
SCALE:		NTS @ A3				
Version:		Date:	Drawn By:	Checked By:		
0	23/03/2022		S.K.	-		

FP02 - St Vincents Fairview





TRIAL PIT LOG

- 0.00 0.05 MADE GROUND: Grey slightly sandy angular fine to coarse Gravel.
- 0.05 0.10 MADE GROUND: Brown fine to medium Sand.
- 0.10 0.85 MADE GROUND: Dark brown slightly gravelly slightly sandy CLAY with fragments of mortar and concrete.



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Ground Investigations Ireland Ltd. Catherines town Hazelhatch road, Newcastle, Co Dublin

Tel: +353-(0)1 6015175/6 Fax: +353-(0)1 6015173 Email: info@gii.e Web: www.gii.e

PROJECT:		St. Vincents Fairview				
DRAWING No.:		10927-08-21 - FP02				
DATE:		15/02/22				
CLIENT:		OCSC				
SCALE:		NTS @ A3				
Version:	Date:		Drawn By:	Checked By:		
-	2	3/03/2022	S.K.	-		



FP01



FP02

APPENDIX 4 – Soakaway Records



Ground Investigations Ireland

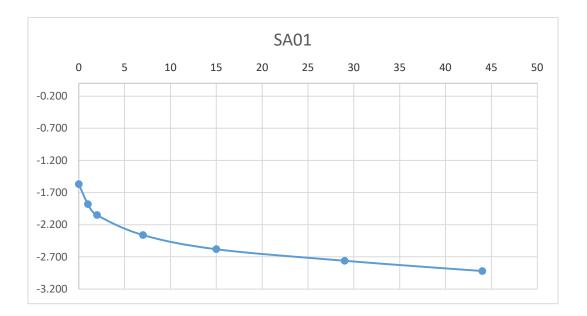


SA01

Soakaway Test to BRE Digest 365 Trial Pit Dimensions: 4.00m x 0.60m x 3.20m (L x W x D)

Date	Time	Water level (m bgl)
27/10/2021	0	-1.570
27/10/2021	1	-1.880
27/10/2021	2	-2.050
27/10/2021	7	-2.360
27/10/2021	15	-2.580
27/10/2021	29	-2.760
27/10/2021	44	-2.920

Start depth 1.57	Depth of Pit 3.200		Diff 1.630	75% full 1.9775	25%full 2.7925
Length of pit (m) 4.000) Width of pit (m) 0.600			75-25Ht (m) 0.815	Vp75-25 (m3) 1.96
Tp75-25 (from g	raph) (s)	1980		50% Eff Depth 0.815	ap50 (m2) 9.898
f =	9.981E-05	m/s			



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Ground Investigations Ireland

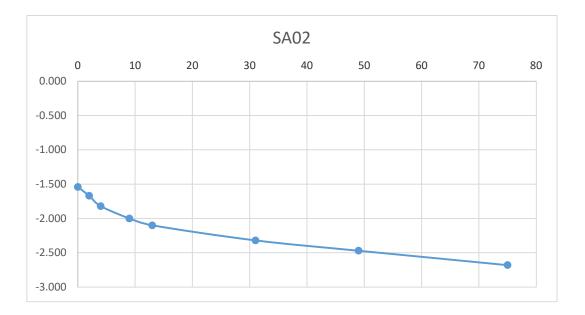


SA02

Soakaway Test to BRE Digest 365 Trial Pit Dimensions: 3.80m x 0.60m x 3.00m (L x W x D)

Date	Time	Water level (m bgl)		
27/10/2021	0	-1.540		
27/10/2021	2	-1.670		
27/10/2021	4	-1.820		
27/10/2021	9	-2.000		
27/10/2021	13	-2.100		
27/10/2021	31	-2.320		
27/10/2021	49	-2.470		
27/10/2021	75	-2.680		

Start depth 1.54	Depth of Pit 3.000		Diff 1.460	75% full 1.905	25%full 2.635
Length of pit (m) 3.800) Width of pit (m) 0.600			75-25Ht (m) 0.730	Vp75-25 (m3) 1.66
Tp75-25 (from g	ıraph) (s)	3960		50% Eff Depth 0.730	ap50 (m2) 8.704
f =	4.829E-05	m/s			



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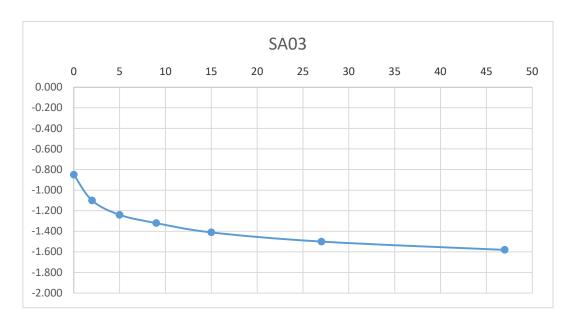


SA03

Soakaway Test to BRE Digest 365 Trial Pit Dimensions: 3.00m x 0.60m x 2.10m (L x W x D)

Date	Time	Water level (m bgl)
27/10/2021	0	-0.850
27/10/2021	2	-1.100
27/10/2021	5	-1.240
27/10/2021	9	-1.320
27/10/2021	15	-1.410
27/10/2021	27	-1.500
27/10/2021	47	-1.580
27/10/2021		

Start depth 0.85	Depth of Pit 2.100		Diff 1.250	75% full 1.1625	25%full 1.7875
Length of pit (m) 3.000) Width of pit (m) 0.600			75-25Ht (m) 0.625	Vp75-25 (m3) 1.13
Tp75-25 (from g	raph) (s)	5460		50% Eff Depth 0.625	ap50 (m2) 6.3
f =	3.271E-05	m/s			



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 Tel:
 01 601 5175 / 5176

 Email:
 info@gii.ie

 Web:
 www.gii.ie

Machine : JCB 3CX			round Investigations Irel www.gii.ie			Ground	Level (mOD)	St. Vincent's Fairview Client		Job Numb	
Method : Trial Pit			T.UU A U.UU A J.ZU				5.60			10927-08	
		Locati		716809.9	N		/10/2021- /11/2021	Engineer OCSC		Sheet 1/1	
Depth (m)	ו	Sample / Tes	sts Water Depth (m)	5	Field Re	cords	Level (mOD)	Depth (m) (Thickness)	D	escription	Legend
								(0.25)	Dark brown slightly sandy rootlets.	slightly gravelly TOPSOIL with	
							5.35	- 0.25	Soft to firm light brown slig with occasional subangula	ghtly sandy slightly gravelly CLAY ar to subrounded cobbles.	0 <u>0</u> 00
								(0.55)			
							4.80	0.80			<u> </u>
								-	Greyish brown slightly sar fine to coarse GRAVEL wi cobbles.	ndy clayey angular to subrounded th some angular to subrounded	
								(0.80)			
								 - - -			
							4.00	1.60	Greyish brown slightly sar	ndy clayey sangular to rounded th some sangular to rounded	<u> </u>
								-	cobbles.		· · · · · · · · · · · · · · · · · · ·
								-			
								(1.60)			· · · · · ·
								-			
								- - -			
				Water	strike(1) a	at 3.20m.	2.40	3.20	Complete at 3.20m		
								 - - -			
								-			
								-			
an				•	•	•		<u> </u>	Remarks		
									Groundwater encountered a Trial pit stable. Soakaway test SA01 undert Trial pit backfilled upon com		
				-	-	-			i rial pit backfilled upon com	pietion.	
			-								
	•	·		•	•			•			
	•	·						•			
				•	•	·	• •		Scale (approx)	Logged By Fig	ure No.
										1	

	Ground Investigations In www.gii.ie				.ie			Site St. Vincent's Fairview	
Machine : JCB 3CX Method : Trial Pit		Dimensions 3.80 x 0.60 x 3.00					Level (mOD) 5.17		
		Location 736538.1 E 716847.6 N					7/10/2021- 7/11/2021	Engineer OCSC	
Depth (m)	Sample / Tests	Water Depth (m)		Field Re	cords	Level (mOD)	Depth (m) (Thickness)	Description	Legend
						4.97	(0.20) 0.20 (1.00) 1.20 1.20	Dark brown slightly sandy slightly gravelly TOPSOIL with rootlets. Soft to firm light brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles. Greyish brown slightly sandy clayey angular to subrounded fine to coarse GRAVEL with some angular to subrounded cobbles.	
						2.67	- (1.30) - (1.30) - 2.50	Greyish brown sandy clayey sangular to rounded fine to coarse GRAVEL with some sangular to rounded cobbles.	
			Water s	trike(1) a	at 3.00m.	2.17	- (0.50) - 3.00 	Complete at 3.00m	
lan .					•	· ·	<u> </u>	Remarks	
				·				Groundwater encountered at 3.00m BGL. Trial pit stable. Soakaway test SA02 undertaken in pit. Trial pit backfilled upon completion.	
		•			•				
•	· ·	•	•		•				

Method : Trial Pit 3.00 x 0.60 x 2.10 4.42 Engineer Nur Location 736507.9 E 716740.1 N 27/10/2021- 27/11/2021 Engineer OCSC She				vestigations Ir www.gii.ie			St. Vincent's Fairview		Number SA03
Period Sample / Tests Weight find Field Records Integration Lege Dight in the sample / Tests Weight find Field Records Integration Description Lege Image: Sample / Tests Weight find Field Records Integration Description Lege Image: Sample / Tests Image: Sample / Test	Machine : JCB 3CX Method : Trial Pit						Engineer		Job Numbe 10927-08 Sheet 1/1
Plan					27	/10/2021- /11/2021			
Image: Second	Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	D	escription	Legend
					3.82	(0.20) 0.20 0.20 0.40) 0.60 1.10 (1.00)	MADE GROUND: Dark brown s gravelly Clay with ceramic MADE GROUND: Brown s Clay with ceramic and red MADE GROUND: Brown s ceramic and red brick frag	own slightly sandy slightly plastic and red brick fragments. lightly sandy slightly gravelly brick fragments.	
Scale (approx) Logged By Figure No.	lan .	· · ·	· · ·	· · · ·	· · ·	•	Groundwater encountered a	t 2.00m BGL. aken in pit. pletion.	

Soakaway Photographs – St. Vincents Fairview OCSC – 10927-08-21

SA01



Soakaway Photographs – St. Vincents Fairview OCSC – 10927-08-21

SA02



Soakaway Photographs – St. Vincents Fairview OCSC – 10927-08-21

SA03



APPENDIX 5 - Borehole Records



Machine : D Method : C	ando 2000 able Percussion	-	Diamete	vW.gii.ie r ed to 10.20m	Ground	Level (mOD) 4.57	Client		Jo Nu	mbe
		Locatio		736508.2 N	Dates 13	8/09/2021	Engineer OCSC		Numb 10927-0 Sheet	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Inst
					4.17	(0.40) 0.40 (0.60)	Brown slightly sandy slightly gravelly TOPSOIL with rootlets. MADE GROUND: Grey slightly sandy angular fine to coarse Gravel with some angular cobbles (crushed rock fill).	2		
1.00-1.45	SPT(C) N=17			4,4/5,4,4,4	3.57	(0.80)	MADE GROUND: Brown sandy slightly gravelly Clay with occasional subangular to subrounded cobbles and red brick fragments.			
1.50 2.00-2.45	B SPT(C) N=41			4,5/5,7,13,16	2.77	1.80	Stiff brown sandy slightly gravelly CLAY.	······································	111111	
2.40	В				2.27	2.30	Very stiff brown/grey sandy slightly gravelly CLAY	· · · · · · · · · · · · · · · · · · ·	120 200° 0 0'9020 2'	640-200 00-00 00 00-00 00-00 00-00 00-00 10-00 00-00 00-00 10-00 00-00 00-00 10-00 00-00 00-00
3.00-3.28	SPT(C) 50/125			13,17/20,30	1.17	(1.10) (1.10) (1.10) (1.10) (1.10) (1.10) (1.10) (1.10) (1.10) (1.10) (1.10)			¥1	50,00,00,00,00,00,00,00 010,00,00,00,00,00 010,00,00,00,00,00,00 010,00,00,00,00,00,00,00,00 00,00,00,00,00
3.70	В			Water strike(1) at 3.40m, rose to 3.37m in 20 mins.	0.97	3.40 (0.20) 3.60	Very stiff grevish brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0,80,80,800,80	
4.00-4.45	SPT(C) N=47			3,8/12,12,12,11			Very stiff dark grey slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.	0 0 0 0 0 0 0 0 0 0 0 0	0 8080 8000 0	
4.40	В								0,80,80,800,800,800,800	
5.00-5.45 5.40	SPT(C) N=44 B			4,6/10,11,13,10					ວິສິດດີ ລູດ ດີສຸດຄູດ ສັດດີ ລູດ ດີສຸດລູດ ສັດດີ ລູດ ດີ	০০ ৬০ ৩ ১৯৯০ ৫০৫৮ ০০ ৬০ ৩ ১৯৯০ ৫০৫৮ ০০ ৬০ ৩ ৯৯৬ ১০০ ৫০ ৩ ৩ ৫০ ৫৫৫ ৩ ৫০৫৫ ৩ ৫০৫৫ ৩ ৫০৫৫ ৩ ৫০৫ ১০০৫০ ৩ ৫০ ৫৫৫ ৫ ৫০৫৫ ৩ ৫০ ৫৫৫ ৫৫ ৫৫৫ ৫৫৫
6.50-6.86 6.50 7.50	SPT(C) 50/210 B			8,11/14,16,20		(6.60)				ი წელი დრელია დევილი დეგილი და გილი და სი იკლიკი იკიკი იკი იკი იკი იკი იკი იკი ი
8.00-8.31	SPT(C) 50/160			10,13/18,22,10					0.040.0040.000	60, 60, 20, 20, 20, 00, 70, 20, 20, 20, 20, 20, 20, 20, 20, 20, 2
8.50	В							00000000000000000000000000000000000000	00000000000000000000000000000000000000	5626 20 20 20 20 20 20 20 20 0.20 0.00 20 20 20 20 10 0.2 00 20 20 20 20 20 20 20 20 20 20 20 20
9.50-9.80 9.50	SPT(C) 50/150 B			Water strike(2) at 9,12/20,24,6 9.70m, rose to 9.60m in 20 mins.						620 00 20 20 20 20 20 20 20 20 20 20 20 2
Borehole co	r encountered at 3.4 mplete at 10.20m BC	GL.				loin nine '		Scale (approx)	Lo By	gged
Slotted stand with a raised	dpipe with gravel filte I cover	er zone ins			-		bentonite seal from 2.00m BGL to GL. Finished 0.5 hours. Chiselling from 8.90m for 0.5 hours.	1:50 Figure N 10927-0	C. I	B

	Grou	nd In	vesti ww	gations Ire /w.gii.ie	land	Ltd	Site St. Vincent's Fairview		Nur	rehole mber H01
lachine : Dan lethod : Cab	do 2000 le Percussion	Casing I 200		ed to 10.20m		Level (mOD) 4.57	Client		1	b mber ?7-08-2
		Location 716		736508.2 N	Dates 13	/09/2021	Engineer OCSC		She	eet 2/2
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
					-5.63		Complete at 10.20m			
Remarks								Scale (approx)	Log By	gged
								1:50 Figure I 10927-0	No.	Byrne BH01

				gations Ire /w.gii.ie	iand	∟tđ		St. Vincent's Fairview	Numl BH	
lachine : Dando 20 lethod : Cable Pe		Casing I 200		ed to 1.60m	Ground	Level 5.77	(mOD)	Client	Job Numb 10927-0 Sheet	
		Location 716		736441.3 N		/09/20 /09/20		Engineer OCSC	Shee 1/	
Depth (m) Sam	ple / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	D (Thic	epth (m) kness)	Description	Legen	d
50/0	(C) 25*/0			25/50	4.17		(0.20) 0.20 (0.30) 0.50 (0.50) 1.00 (0.60) 1.60	Brown slightly sandy slightly gravelly TOPOSIL with rootlets. MADE GROUND: Light brown slightly sandy slightly gravelly Clay. Grey sandy gravelly CLAY with occasional subangular to subrounded cobbles and boulders. Dense greyish brown sandy clayey angular to subrounded fine to coarse GRAVEL with occasional subangular to subrounded cobbles and boulders. Obstruction: Boulders. Refusal at 1.60m		
Remarks o groundwater enco orehole complete a orehole refused at hiselling from 1.00	countered dur at 1.60m BGL 1.60m due to m for 1 hour.	ing drilling o obstructi Chiselling	on. from 1.6	0m for 1 hour.				Scale (approx) 1:50 Figure N	Logg By C. By	

S	Grou	nd In		gations Ire w.gii.ie	land	Ltd	Site St. Vincent's Fairview		N	orehole umber H02A
Machine : Da Method : Ca	ando 2000 able Percussion	-	Diamete Omm cas	r ed to 7.50m	Ground	Level (mOD) 5.12	Client		Ň	ob umber 927-08-2
		Locatio		716909 N	Dates 20)/09/2021	Engineer OCSC		Sheet 1/*	heet 1/1
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
					4.82 4.52	(0.30) 0.30 (0.30) 0.60	Dark brown slightly sandy slightly gravelly TOPSOIL with rootlets. MADE GROUND: Brown slightly sandy slightly gravelly Clay with occasional subangular to subrounded cobbles ceramic and red brick fragments.			
						(1.40)	Greyish brown sandy clayey angular to subrounded fine to coarse GRAVEL with some angular to subrounded cobbles and occasional boulders.			
2.80	в				3.12	2.00	Brownish grey very sandy slightly clayey subangular to subrounded fine to coarse GRAVEL with occasional subangular to subrounded cobble	S.		
3.00-3.45 3.20 3.50	SPT(C) N=47 B B			4,9/12,12,11,12	2.12	3.00	Very stiff dark grey slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		
4.00-4.38 4.50	SPT(C) 50/225 B			8,11/12,16,18,4	0.82	4.30	Dense dark grey sandy angular to subrounded fin to coarse GRAVEL with occasional angular to subrounded cobbles.	8 0		
5.00-5.45 5.50	SPT(C) 50/295 B			7,10/13,14,12,11		(1.80)				
6.00-6.45 6.30	SPT(C) N=46 B			9,11/9,10,13,14	-0.98	6.10 (1.40)	Dense dark grey sandy angular to subrounded fin to coarse GRAVEL with occasional angular to subrounded cobbles and pockets of clay.			
7.00-7.26	SPT(C) 50/110			10,13/25,25	-2.38	7.50	Obstruction: Boulder.			
							Refusal at 7.50m			
Bomos'										
Groundwater Borehole cor	led through TP02. rencountered at 3.3 nplete at 7.50m BGI				01,			Scale (approx)		ogged y
with a raised Chiselling fro	cover. m 1.40m for 0.5 hou	urs. Chisel	ling from		s. Chisellin	•••	entonite seal from 2.00m BGL to GL. Finished for 0.75 hours. Chiselling from 6.20m for 0.5	1:50 Figure N 10927-08	lo.	Byrne

Machine:D Method:C	ando 2000 able Percussion	Casing 1 200		r ed to 5.30m	Ground	Level (mOD) 5.74	Client		10927-0 Sheet	umber
		Location 716		736547.3 N	Dates 15	/09/2021	Engineer OCSC		Shee 1/-	heet 1/1
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Inst
1.00-1.45 1.00 2.00-2.45 2.00 3.00-3.23 3.00 4.00-4.45 4.20 5.00-5.30	SPT(C) N=49 B SPT(C) N=49 SPT(C) 50/75 B SPT(C) N=45 B SPT(C) 50/150			9,13/18,9,11,11 8,8/10,13,12,14 14,17/20,30 10,12/10,12,11,12 Water strike(1) at 4.20m, rose to 4.00m in 20 mins. 13,14/16,20,14	5.64 5.44 4.74 3.14 1.54 0.44		Brown slightly sandy slightly gravelly TOPSOIL With rootlets. MADE GROUND: Brown gravelly fine Sand. MADE GROUND: Light brown sandy slightly gravelly Clay with red brick fragments. Very stiff brown sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles. Dense brown slightly gravelly fine to coarse SANE with occasional subangular to subrounded cobbles and boulders. Very stiff dark grey slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles and boulders. Very stiff dark grey slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles and boulders. Obstruction: Boulders. Complete at 5.30m		∑ 1	
Borehole co Blotted stand with a raised	cover.	 er zone ins		m 1.50m to 0.50m B0 50m for 0.75 hours. C	-	in pipe and be	entonite seal from 0.50m BGL to GL. Finished 1 hour.	Scale (approx) 1:50 Figure N 10927-0	C. No.	oggec y Byrne

Aachine : Da			WV	gations Ire w.gii.ie			St. Vincent's Fairview		E	umber 3H04
	able Percussion	Casing 1 200		r ed to 7.00m		Level (mOD) 4.57	Client		N	ob umber 027-08-2
		Location 716		736497.9 N		/09/2021- /09/2021	Engineer OCSC			heet 1/1
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
.00-1.23 .00-2.15 .00-3.25 .00-4.30 .00-4.30 .00-5.30 .00 5.00-5.30 5.00 5.50-6.80	SPT(C) 50/75 B SPT(C) 50/0 B SPT(C) 50/150 B SPT(C) 50/150 B SPT(C) 50/150			15,17/20,30 10,25/50 8,20/30,20 7,10/17,23,10 Water strike(1) at 4.30m, fell to 4.50m in 20 mins. 8,10/13,19,18 10,12/18,22,10	4.27		TOPSOIL Very stiff brown slightly sandy slightly gravelly CLAY with fine to coarse subrounded to subangular gravel and subangular cobbles. Very stiff dark brown slightly sandy slightly gravelly CLAY with fine to coarse subrounded to subangular gravels. Complete at 7.00m		⊻1 ▼1	
Borehole con	encountered at 4.3 nplete at 7.00m BGI			1		1		Scale (approx)	L(B	ogged Y
Slotted stand	pipe with gravel filte	er zone ins					entonite seal from 2.00m BGL to GL. Finished ur. Chiselling from 4.40m for 1 hour. Chiselling	1:50	C.	Byrne
m 5.70m fo	or 0.75 hours. Chise	elling from	7.00m fc	or 1 hour.			an entroning rom tron for Frider Office	Figure N 10927-0		

Description Service	Grou Iachine : Dando 150	WW	gations Ire w.gii.ie			St. Vincent's Fairview Client	Bore Num BH	iber 105
T158911 E 736978.8 N 137172221 OCSC Bit Sample / Tests Distribution Field Records Mo2D Description Less B	lethod : Cable Percussion					Client	10927-	be
B ADDE GROUND: Tarmacadam ADDE GROUND: Tarma			736578.8 N	12	/10/2021- /11/2021		Sheet 1/1 Legend	
B	Depth (m) Sample / Tests	Casing Depth (m) Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Leger	۱d
prounwater encountered during drilling.	50 В					MADE GROUND: brown slightly sandy gravelly clay with occasional grass rootlets and fine to coarse round to subangular gravel.		
	Remarks o grounwater encountered duri orehole refusal at 0.90m BGL d	ing drilling. lue to obstruction, p	ossible concrete.	_		Scal (appro	e Logg (x) By	je
hole backfilled upon completion. elling from 0.90m to 0.90m for 0.01 hours.	orehole backfilled upon comple hiselling from 0.90m to 0.90m f	or 0.01 hours.				1:50		

Machine : B Flush : W	eretta T44 /ater		-	Diamete	vW.gii.ie r ed to 21.50m	Ground	Level (mOD)	Client		Jot Nui	mber
Core Dia: 63 Method : R			Locatio	n		Dates	1/11/2021	Engineer OCSC		10927-08 Sheet 1/3	
Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	1/3	Instr
0.00	10							TARMACADOM Poor recovery. Recovery consists of MADE GROUND. Firm slightly gravelly sandy Clay with tarmac and occasioanal subangular cobble. Gravel is angular to subangular fine to medium.			
2.00 2.00-2.45	27		_		5,4/5,5,9,14 SPT N=33			Very stiff grey gravelly slightly sandy CLAY. Grave is subangular to subrounded fine to coarse.			
3.50 3.50-3.95	23				4,4/6,6,8,12 SPT N=32						
5.00 5.00-5.23	23		_		10,14/14,36 SPT 50/75		<u> </u>				
6.50 6.50-6.58	87				18,7/50 SPT 25*/75 50/0			Very stiff grey slightly gravelly slightly sandy CLA Gravel is subangular to subrounded fine to coars	Y. • • • • • • • • • • • • • • • • • • •		
3.00 3.00-8.00	47		_		25/50 SPT 25*/0 50/0						
0.50 0.50-9.58 Remarks					25/50 SPT 25*/75 50/0		9.50	Poor recovery. Recovery consist of dense grey subangular medium to coarse GRAVELS with cobbles. (Dense) [Driller's notes: grey sands and gravels].			
Remarks No groundwa Rotary core of Slotted stand 21.50m to 13	ater encou drilling con dpipe instal 3.50m BGL	ntered du plete fron led from with ben	ring drillin m GL to 2′ 21.50m to tonite seal	g 1.50m BC 13.50m led from	GL. BGL with plain pipe fi 13.50m BGL to GL. F	rom 13.50r inished wi	n BGL to GL fi th a flush cove	nished with a flush cover. Gravel filter zone from r.	Scale (approx) 1:50 Figure N 10927-08	F Io.	gged RM 3H05

Depth TCR SCR ROD Level Depth Š	Machine : Be Flush : Wa			Casing 96	Diamete	vw.gii.ie r ed to 21.50m	Ground	Level (mOD)	Client		Jo Ni	H054 ob umber 27-08-2
7				Locatio	n		Dates 0'	1/11/2021	-		Shee 2/	h eet 2/3
11.00 11.00 11.18 (2.50) (2.50) 11.00 41 (2.50) (2.00) 12.50 21.450 (2.00) 12.50 21.450 (2.00) 12.50 21.450 (2.00) 12.50 21.450 (2.00) 14.00 16.750 (2.00) 14.00 16.750 14.00 15.50 15.50 (2.00) 15.50 500 (1.50) 15.50 500 (1.50) 15.50 500 (1.50) 15.50 500 (1.50) 15.50 500 (1.50) 15.50 500 (1.50) 15.50 500 (1.50) 15.50 500 (1.50) 15.50 500 (1.50) 15.50 500 (1.50) 15.50 500 (1.50) 15.50 500 (1.50) 15.50 500 (1.50) 15.50 500 (1.50) 15.50 500 (1.50) 15.50 500 (1.50) 15.50 500 (1.50) 15.50 500 (1.50) 15.50 500 <	Depth (m)				FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
12.50	11.00 11.00-11.15					11,18/50 SPT 50/0		(2.50)				
4.00-14.08 4.00-14.08 10 10 10 10 10 10 10 10 10 10				_		SPT 25*/75			Very stiff slightly sandy slightly gravelly CLAY with occasional subangular cobbles. Gravel is subangular to subrounded fine to coarse.	ဗိန္နဲ့လွ ဗိန္နိုင်ငံ ဗိန္နိုင်ငံ ဗိန္နိုင်ငံ ဗိန္နိုင်ငံ ဗိန္နိုင်ငံ ဗိန္နိုင်ငံ ဗိန္နိုင်ငံ ဗိန္နိုင်ငံ ဗိန္န ဗိန္နြင်မှ ဗိန္နိုင်ငံ ဗိန္နိုင်ငံ ဗိန္နိုင်ငံ ဗိန္နိုင်ငံ ဗိန္နိုင်ငံ ဗိန္နိုင်ငံ ဗိန္နိုင်ငံ ဗိန္နိုင်ငံ ဗိန္ ဗိန္နိုင်ငံ ဗိန္နိုင်ငံ ဗိန္နိုင်ငံ ဗိန္နိုင်ငံ ဗိန္နိုင်ငံ ဗိန္နိုင်ငံ ဗိန္နိုင်ငံ ဗိန္နိုင်ငံ ဗိန္နိုင်ငံ ဗိန		
5.50 22,3/50 Very stiff grey slightly sandy gravelly CLAY Gravel 5.50 50 SPT 25'775 50 50/0 (3.50) 7.00 25/50 (3.50) 7.00 50 (3.50) 50 18,18/50 50 18,18/50 9.00 60 33 9 41 41 41 19.00 1set of fractures: F1 0-20 degrees extremely closely to medium spaced undulating rough with occiasional clay smearing.		10		_		SPT 25*/75			coarse GRAVEL. (Dense) [Driller's notes: brown			
17.00-17.00 50 50 50 50 50 50 50 50 50	15.50 15.50-15.58	50		-		SPT 25*/75			Very stiff grey slightly sandy gravelly CLAY. Gravel is subangular to subrounded medium to coarse.			
8.50 8.50 SPT 50/0 Image: style	7.00 7.00-17.00	50				SPT 25*/0		(3.50)				
	8.50-18.65	60	33	9	41	18,18/50 SPT 50/0		19.00	interbedded with weak grey MUDSTONE. Partially to distinctly weathered. 1 set of fractures. F1 0-20 degrees extremely closely to medium spaced undulating rough		· · · · · · · · · · · · · · · · · · ·	
Scale Logg((approx) By	•					-				Scole		
										Scale (approx)	By)gged /

Machine : B		rouح		Diamete	gations Ire /w.gii.ie		Level (mOD)	St. Vincent's Fairview		BH	umber H05A
	/ater				d to 21.50m	Cround				Nu	u mber 27-08-2
Core Dia: 6			Locatio	on		Dates		Engineer		Sheet	
Method : R	otary Core					01	/11/2021	ocsc		3/3	3/3
Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
21.50	92	80	47	25				Complete at 21.50m			
Remarks									Scale (approx)	Lo By	ogged /
										1	
									1:50	F	RM

	ando 150 + Berett	a Casino	WV Diamete	vw.gii.ie r	Ground	Level (mOD)	St. Vincent's Fairview Client		BH00	
T₄ Method ∙Ca	44 able Percussion	20	0mm cas	ed to 5.10m d to 12.50m		8.75			Numbe 10927-08	
wi or	ith rotary core follo	Locatio	n	736630.9 N		2/10/2021- 3/11/2021	Engineer OCSC		Sheet 1/2	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Kater Nater	
						(0.50)	MADE GROUND: Brown sightly sandy slightly gravelly Clay with grass, red brick, ceramic, ash, plaster and few very small pieces of glass.			
.50	В				8.25	0.50	MADE GROUND: Dark brown slightly sandy slightly gravelly Clay with occasional rootlets and ash. Gravel is subangular to subrounded fine to course.			
.00-1.45 .00	SPT(C) N=6 B			1,1/1,1,2,2		(2.00)				
.00-2.45 .00	SPT(C) N=8 B			1,2/2,2,2,2						
	-				6.25	2.50	Firm to stiff brown slightly gravelly sandy CLAY. Gravel is angular to subrounded fine to coarse.	· · · · · · · · · · · · · · · · · · ·		
.00-3.45 .00	SPT(C) N=14 B			2,2/3,3,4,4						
.00-4.45	SPT(C) N=14 B			3,3/3,4,4,3		(3.00)				
	5									
5.00 5.00-5.00	B SPT 25*/0 50/0 TCR SCR	RQD	FI	25/50						
5.50	82				3.25	5.50	Very stiff brown slightly sandy slightly gravelly CLAY with occasional cobbles. Gravel is subangular to subrounded fine to coarse.			
.50-6.65 .50	02	_		11,13/50 SPT 50/0				0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		
						(2.50)		0 0 0 0 0 0 0 0 0 0 0 0		
00.045	39			12,13/50						
.00-8.15 .00		_		SPT 50/0	0.75	8.00	Very stiff brown slightly sandy slightly gravelly CLAY with occasional cobbles. Gravel is subangular to subrounded fine to coarse.	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		
	58					(1.50)		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		
.50-9.58 .50		_		18,7/50 SPT 25*/75 50/0	-0.75	9.50	Poor recovery. Recovery consists of: Brown slightly gravelly SAND. Gravel is subangular fine to coarse. [Driller notes sandy gravelly Clay]			
Remarks lo groundwa	ater encountered o	uring drillin	g.			-	נט טטמוסב. נטרווובו ווטנפס סמוועץ טומעפווע טומען	Scale (approx)	Logge	
able percus	ssion drilling comp	lete at 5.10	m with Ro	otary follow on comp GL with plain pipe fro cover	lete at 12.5 om BGL to (0m. GL. Gravel filt	er zone 12.50 to 9.50m BGL with bentonite	(approx) 1:50	RM	
calca nonis hiselling fro	om 5.00m to 5.10m	for 1 hour.						Figure N		

Boreho Numbe BH0		Site St. Vincent's Fairview	nd L	gations Irel w.gii.ie	vesti	nd In	Grour	(S
Job Numbe 10927-08		Client	ound Le 8.	d to 5.10m to 12.50m	Diameter)mm case nm cased	200	⊦ Beretta	44 vater	Flush : w
Sheet 2/2		Engineer OCSC	tes 12/10 13/1 ⁻	36630.9 N		Locatio	ssion ore follow	able Percu vith rotary co	Core Dia: 63 Method : Ca wi
Water Sul	Legend	Description	evel 10D) (1	Field Records	FI	RQD (%)	SCR (%)	TCR (%)	Depth (m)
		Poor recovery. Recovery consists of: grey slightly sandy slightly gravelly CLAY with occasional subangular cobbles. Gravel is subangular to subrounded fine to coarse.	-2.25					30	11.00 12.50 Remarks
Logge By	Scale (approx)	(Remarks
RM	1:50								
10.)8-21.BHC	Figure N 10927-0								

Te DB: Imm that : Roler Correct Location 71500.6 / E 72563.6 1 N Dates (0111.021) Engineer COSC Cost (0110.021) Bare COSC See (1.20) Dpgh (1.20) TCR 60 ROD FI Field Records Am35 Dpgth (1.20) Description Lagend Imm Lagend Lagend Lagend Lagend					W	igations Ire ww.gii.ie			Site St. Vincent's Fairview		B	orehol umber SH07
Te DB: Imm that : Roler Correct Location 71500.6 / E 72563.6 1 N Dates (0111.021) Engineer COSC Cost (0110.021) Bare COSC See (1.20) Dpgh (1.20) TCR 60 ROD FI Field Records Am35 Dpgth (1.20) Description Lagend Imm Lagend Lagend Lagend Lagend							Ground		Client		N	umber
Binder : Rollary Commit Location Dates: Untropy: 0 1716906.4 E 73604.4 1 N Description Logent / 10000.4 (10000) Description Logent / 10000 Logent / 10000 <thlogent <="" th=""><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th>0.07</th><th></th><th></th><th>109</th><th>27-08-2</th></thlogent>								0.07			109	27-08-2
Trendo 4E 70604 4E 70604 1 N OCSC TO Orght/h TGR RG0 PI Feld Records AmOD Pitterses Description Lagerd 2 0 31 - <th></th> <th></th> <th>d</th> <th></th> <th></th> <th></th> <th>01</th> <th>/10/2021-</th> <th></th> <th></th> <th>Sł</th> <th></th>			d				01	/10/2021-			Sł	
Image: Second				71	6906.4 E	736644.1 N	01	/11/2021	OCSC			1/2
0 31	Depth (m)				FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0 31 31 34.44,6,7,11 2.2.45 27 2.3.0 2.3.								(1.20)	Hand pit dug to 1.20m.			
27 4.471112.12 6.17 3.50 0	1.20	31					8.47		Firm to stiff light brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse suubangular to subrounded.			
0 3.95 72 1 1,1/1,2,1/2 1	2.00 2.00-2.45	27		_		3,4/4,6,7,11 SPT N=28		(2.30)				
0 6.5.30 43 8.13/19.31 4.50 0 6.80 43 43 43 0 6.80 8.8/14.36 SPT 50/150 4.50 90 90 10.15/50 1.67 8.00 0 0.6.8.00 10.15/50 1.67 8.00 0 0.8.08 10.15/50 1.67 8.00 13 10.15/50 1.67 8.00 0 0.8.08 13 12.17/50 (3.00) 0 9.65 12.17/50 (3.00) 10.15/7 0 9.65 12.17/50 12.17/50 1.67 0 9.65 12.17/50 1.67 1.00 0 9.65 12.17/50 1.00 1.00 0 9.65 12.17/50 1.50 1.00 0 9.65 12.17/50 1.00 1.00 0 9.65 12.17/50 1.00 1.00 0 1.50 RM 1.50 RM	3.50 3.50-3.95	72		_		4,4/7,11,12,12 SPT N=42	6.17		Very stiff grey slightly sandy slightly gravelly CLAY with occasional cobbles. Gravel is fine to coarse angular to subangular.			
0 0.0 6.80 90 8.8/14.36 SPT 50/150 1.67 8.00 90 90 10,15/50 1.67 8.00 Poor recovery: Recovery consists of dense fine to coarse angular to subangular GRAVEL and to totocarse angular to subangular GRAVEL and to c	5.00 5.00-5.30	43		_		8,13/19,31 SPT 50/150		(4.50)				
0 10,15/50 1.67 8.00 Poor recovery: Recovery consists of dense fine to coarse angular to subangular GRAVEL and occasional subangular cobbles. (Dense) [Driller notes gravelly clay with sand bands] 13 12,17/50 (3.00) emarks groundwater encountered during drilling. rehole complete at 14.00m BGL.	3.50 3.50-6.80	90		_		8,8/14,36 SPT 50/150						
13 13 13 12,17/50 SPT 50/0 emarks groundwater encountered during drilling. rehole complete at 14.00m BGL. SPT 50/0 E SPT 50/0 E SPT 50/0 E SPT 50/0 SPT 50/0 E SPT 50/0 SPT 50/0	3.00 3.00-8.08			_		SPT 25*/75	1.67		Poor recovery: Recovery consists of dense fine to coarse angular to subangular GRAVEL and occasional subangular cobbles. (Dense) [Driller notes gravelly clay with sand bandel	0.0.0 0.0.0 0.0.0		
groundwater encountered during drilling. Logging rehole complete at 14.00m BGL. 1:50	9.50 9.50-9.65	13		_		12,17/50 SPT 50/0		(3.00)				
groundwater encountered during drilling. Logging rehole complete at 14.00m BGL. 1:50								<u> </u>				
1:50 RM	Remarks No groundwa Borehole con	ater encou nplete at 1	ntered du 4.00m BC	ring drilling GL.	g.					Scale (approx)	Lo By	ogged /
										1:50		RM
Figure No.									·			

S		Grou	nd In		gations Ire w.gii.ie	land	Ltd	Site St. Vincent's Fairview		N	orehole umber 3H07
Machine : Be	erretta T44	1	Casing			Ground	Level (mOD)	Client			ob
Flush : wa	ater		96	mm to 14	.00m		9.67				umber 927-08-21
Core Dia: m	nm		Locatio			Dates		Engineer		6	heet
Method : Ro	otary Core	d			736644.1 N	01	/10/2021- /11/2021	OCSC			2/2
Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
11.00 11.00-11.08 12.50 12.50-12.65	30				15,10/50 SPT 25*/75 50/0 9,17/50 SPT 50/0	-1.33 -2.83 -4.33		Very stiff brown slightly sandy slightly gravelly CLAY with occasional cobbles. Gravel is subangular fine to coarse.			
Remarks							<u> </u>		Scale (approx)	B	ogged y
								-	1:50		RM
									Figure N 10927-0		1.BH07

Machine : D Method : C		Casing I	WV Diamete	gations Ire /w.gii.ie r ed to 5.70m	Ground	LLQ Level (mOD) 4.93	St. Vincent's Fairview Client	Number BH08 Job Number 10927-08-
		Location 716		736520.4 N	Dates 01	/11/2021	Engineer OCSC	Sheet 1/1
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend
0.50 1.00-1.45 1.00 2.00-2.45	B SPT N=6 B SPT N=7			1,2/2,1,1,2			MADE GROUND: brown slightly sandy slightly gravelly Clay with occasional rootlets and red brick.	
2.00 3.00-3.45 3.00	B SPT N=48 B			4,6/7,10,15,16	2.13	2.80	Very stiff dark brown slightly clayey slightly sandy CLAY with occasional subangular to subrounded cobbles. Gravel is subangular to subrounded fine to medium.	81.2028 81.2028 82 91.2028 81.2028 82 91.2028 91.2028 82 91.2028 92 91.2028 92 91.202
4.00-4.45 4.00	SPT N=50 B			6,8/9,12,15,14	0.93	4.00	Very stiff dark brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium.	
5.00-5.38 5.00	SPT 50/225 B			8,11/15,19,16	-0.77	(1.70)	Complete at 5.70m	
Remarks to groundw Sable percu Chiselling fro	ater encountered du ssion drilling comple om 5.70m to 5.70m f	ring cable te at 5.70n or 1.0 hour	pecussic n. r.	n drilling			Scale (approx) 1:50 Figure 10927-1	RM

Machine : D		Casing	WV	gations Ire /w.gii.ie		Level (mOD)	St. Vincent's Fairview	Numbe BH09 Job
	able Percussion			ed to 5.50m	Ground	5.77	Chent	Numbe 10927-08
		Locatio		736578.6 N	Dates 01	/11/2021	Engineer OCSC	Sheet 1/1
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend
0.50	в					(0.80)	MADE GROUND. Brown slightly sandy slightly gravelly Clay with grass and subangular to subrounded fine to coarse gravel and occasional subangular cobbles.	
.00-1.45 .00	SPT N=13 B			2,3/3,3,3,4	4.97	0.80	Firm to stiff light brown slightly sandy slightly gravelly CLAY with occasional rootlets. Gravel is subangular to subrounded fine to coarse.	
2.00-2.45 2.00	SPT N=17 B			2,3/4,4,5,4	3.77	2.00	Stiff light brown slightly sandy slightly gravelly CLAY with occasional rootlets. Gravel is subangular to subrounded fine to coarse.	
.00-3.45 .00	SPT N=16 B			3,3/4,4,4,4		(2.70)		
1.00-4.45 1.00	SPT N=21 B			3,4/5,5,5,6				
5.00-5.38 5.00	SPT 50/225 B			Water strike(1) at 4.50m, rose to 4.00m in 20 mins. 6,9/12,17,21	0.27	4.70	Very stiff dark brown slightly sandy gravelly CLAY with subrounded cobbles. Gravel is angular to subrounded fine to coarse.	80000000000000000000000000000000000000
							Complete at 5.50m	
Remarks Froundwate	r encountered 4.5m	BGL durin	g drilling.				Scale (approx)	Logge By
able percus	ssion drilling comple om 5.50m to 5.50m f	te at 5.50r or 1.0 hou	n BGL. r.				1:50	RM
								<u> </u>

	ando 150 + Beretta	1	WV	gations Ire /w.gii.ie -			Site St. Vincent's Fairview		Borehol Number BH10 Job
T4	44	20		r ed to 5.10m d to 23.00m		Level (mOD) 10.44	Client		Number 10927-08-2
wi	able Percussion ith Rotary core illow on	Locatio		u to 23.0011	Dates		Engineer		Sheet
		71	6811.8 E	736630.1 N		/10/2021- /11/2021	ocsc		1/3
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Nate Nate
0.50	В					(1.90)	MADE GROUND: Brown slightly sandy slightly gravelly Clay with occasional subangular cobbles and rootlets. Gravel is subangular to subrounded fine to coarse.		
1.00-1.45 1.00	SPT(C) N=5 B			1,1/1,2,1,1	8.54	1.90			
2.00-2.45 2.00	SPT(C) N=12 B			2,2/2,3,3,4	0.01	(1.10)	Firm to stiff dark brown slightly sandy slightly gravelly CLAY. Gravel is angular to subangular fine to medium.	e	
3.00-3.45 3.00	SPT(C) N=30 B			3,4/6,7,7,10	7.44	3.00	Very stiff dark brown slightly sandy slightly gravelly CLAY. Gravel is angular to subangular fine to medium.	I I	
4.00-4.45 4.00	SPT(C) N=50 B			5,7/9,13,13,15		(2.00)			
5.00-5.08 5.00 5.10	TCR SCR	RQD	FI	13,12/50 50/0 SPT(C) 25*/75 B	5.44 5.34	5.00 5.10	Slightly sandy slightly clayey GRAVEL. Gravel is subrounded to subangular fine to coarse.		
	30			5,8/9,17,24			Stiff dark brown slightly sandy gravelly CLAY and subangular to subrounded cobbles. Gravel is subrounded to subangular medium to coarse.		
6.50-6.88 6.50	20	-		SPT(C) 50/225				0 0 0 0 0 0 0 0 0 0 0 0 0 0	
3.00-8.38 3.00		-		13,14/14,16,20 SPT(C) 50/225		(5.90)		99999999999999999999999999999999999999	
9.50-9.80	32			10,15/18,32 SPT(C) 50/150					
9.50								0.0.0.0	
Remarks	ater encountered dur	ing drillin	g.					Scale (approx)	Logged By
able nercus	ssion drilling complet	te at 5 10r	m BGL w	ith Rotary follow on c n BGL with plain pipe ed with a raised cov	omplete at e from 1.50 er.	23.00m BGL. m BGL to GL.	Gravel filter zone from 2.00m BGL to 1.5m BGL	(approx) 1:50	ву RM
Chiselling fro	om 5.10m to 5.10m fo	or 1 hour.	/E. I IIIIƏI	with a faised COV	.			Figure N	

				W	igations Ire ww.gii.ie			St. Vincent's Fairview		B	umber 3H10
Machine : Da T4 Flush : wa	14	+ Beretta)mm cas	sed to 5.10m		Level (mOD) 10.44	Client		N	ob umber 027-08-2
Core Dia: 63	8.5 mm				ed to 23.00m						
	able Percu th Rotary llow on		Locatio 71		E 736630.1 N		2/10/2021- 3/11/2021	Engineer OCSC		SI	heet 2/3
Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
1.00-11.30 1.00	63		_		10,14/14,36 SPT(C) 50/150	-0.56		Poor recovery: Recovery consists of dense subangular to subrounded cobbles.			
2.50-12.58 2.50	35				18,7/50 SPT(C) 25*/75 50/0	-2.21	(1.65)	Very stiff brown slightly sandy gravelly CLAY.			
4.00-14.15 4.00	39				14,17/50 SPT(C) 50/0	-3.66	(1.45)	Gravel is subangular to subrounded fine to medium. Poor recovery: Recovery consists of grey coarse subangular gravel. Clay likely washed away. (Stiff [Driller's notes: gravelly sandy clay]			
5.50-15.58 5.50	17				19,6/50 SPT(C) 25*/75 50/0		(2.90)	[Uniter's notes, gravely sandy day]			
7.00-17.08 7.00	13				18,7/50 SPT(C) 25*/75 50/0	-6.56	17.00	Poor recovery: Recovery consists of very stiff			
	10				25/50		(1.50)	Poor recovery: Recovery consists of very stiff brown slightly sandy slightly gravelly CLAY with occasional cobbles. Sand and silt washed away.	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		
8.50-18.50 8.50	27				25/50 SPT(C) 25*/0 50/0	-8.06	18.50	Very stiff brown slightly sandy gravelly CLAY. Gravel is subrounded to subangular medium to coarse.			
0.00					4		Ē		• <u></u> ,•••.•.•.		*****
Remarks									Scale (approx)	Lo B	ogged Y
									1:50 Figure N 10927-0	lo.	RM

Flush ::edd Core De:: 30.5 mm 200 mm cased to 5.0 mm 10.44 Image: Core De:: 30.5 mm Month in the construction in the core De:: 30.5 mm Descent in the core De:: 30.5 mm <th>Boreh Numb BH1</th> <th></th> <th>Site St. Vincent's Fairview</th> <th>Ltd</th> <th>land</th> <th>gations Ire /w.gii.ie</th> <th></th> <th>nd In</th> <th>Grou</th> <th></th> <th>SI</th>	Boreh Numb BH1		Site St. Vincent's Fairview	Ltd	land	gations Ire /w.gii.ie		nd In	Grou		SI
Instruct Cochio Location Dates (1000001 Project (20100201 Project (20100201 Project (20100201 Project (20100201 Project (20100201 Project (20100201 Project (20100201 Project (20100201 Project (20100201 Description Learning (20100201 Project (20100201 Description Learning (20100201 Project (20100201 Description Learning (20100201 Description Learning (2010010000 Description Learning (20100000 Project (20100000 Description Learning (20100000 Description Learning (20100000 Description Learning (20100000 Description Learning (20100000 Description Learning (20100000 Description Learning (201000000 Description Learning (201000000 Description Learning (2010000000 Description Learning (20100000000000000000000000000000000000	Job Numb 10927-08		Client			ed to 5.10m	0mm cas	20	+ Beretta	44 ater	T4 Flush : wa
54 33 23 10 -10.36 20.60 Medium strong to strong theiry to medium backdod dark gay for garbong strong theiry to medium backdod dark gay for garbong strong theiry to medium strong the	Sheet 3/3		-		12	736630.1 N			ission core	able Percu ith Rotary o	Method : C
21.50 90 87 44 15 33.00 90 87 44 15	Vater Sul	Legend	Description) Depth (m) (Thickness)	Level (mOD)	Field Records	FI				Depth (m)
			dark grey to black fine to medium grained LIMESTONE with occasional calcite veins inter-bedded with weak to medium strong thinly laminated dark grey fine grained MUDSTONE. Partially weathered. (20.8-23.00m) 2 sets of fractures. F1 10-15 degrees. Very closely to medium spaced rough occasionaly open with clay smearing. F2 70-90 degrees. Medium spaced undulating								21.50
			Complete at 23.00m								23.00
1:50 R	Logge By RM										Remarks

	ndo 2000 Ible Percussion		Diamete)mm cas	r ed to 5.60m		Level (mOD) 10.61	Client	Job Numbe 10927-08
		Location 716		736673.4 N	Dates 01	/11/2021	Engineer OCSC	Sheet 1/1
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend
.50 .00-1.45 .00 .00-2.45 .00	B SPT N=13 B SPT N=10 B			2,3/3,3,3,4 2,2/2,2,3,3		(0.20) 1 0.20 0.20 1 0.20	TOPSOIL Firm brown slightly sandy slightly gravelly CLAY with rootlets. Gravel is subrounded to subangular fine to course gravel.	
.00-3.45 .00	SPT N=30 B			3,5/6,7,7,10	7.71	2.90 	Stiff greyish brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse.	
.00-4.45 .00	SPT N=48 B			5,8/11,12,12,13	6.61	4.00	Very stiff greyish brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse.	
.00-5.38	SPT 50/225 B			7,10/13,17,20	5.01		Complete at 5.60m	
Remarks hiselling from	m 5.60m to 5.60m f	or 1.0 hou	r.			<u> </u>	Scale (approx)	Logge By

Machine : D	ando 2000	Grou	1		vw.gii.ie	Ground	Level (mOD	St. Vincent's Fairview Client		BH1
B Method :C	eretta T44 able Percu	ssion	200	0mm cas	ed to 3.70m to 19.50m		4.65			Numb 10927-0
	ith Rotary		Locatio			Dates		Engineer		Sheet
			710	6726.9 E	736508.6 N		/09/2021- /09/2021	ocsc		1/2
Depth (m)	Sample	/ Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness) Description	Legend	Water Sul
						4.45	(0.20) 0.20	Dark brown TOPSOIL		
.50	в						(0.80)	MADE GROUND: Brown sandy gravelly Clay wit ash and plaster fragments and subangular to subrounded fine to coarse gravel	h	
00-1.45 00	SPT(C) B	N=7			1,1/2,2,2,1	3.65	1.00	MADE GROUND: Brown sandy clayey angular to subangular fine to coarse Gravel.		
							(1.60)			
.00-2.45 .00	SPT(C) B	N=13			2,3/3,4,3,3					
.00-3.45	SPT(C)	N=43			3,4/5,8,13,17	2.05	2.60	Very stiff grey slightly sandy slightly gravelly CLA Gravel is subangular to subrounded fine to medium.	Y.	
.00	TCR	SCR	RQD	FI	-		(1.10)			
.70						0.95	3.70	Poor recovery. Recovery consists of slightly san GRAVEL. Gravel is subangualr to subrounded fin to coarse.		
	38						(1.50)			
.00-5.08 .00			-		19,6/50 SPT 25*/75 50/0	-0.55	5.20			
	30							Very stiff brown slightly sandy slightly gravelly CLAY. Gravel is angulalr to subrounded fine to coarse.		
.50-6.65			_		15,15/50 SPT 50/0				• <u>•</u> ••••••••••••••••••••••••••••••••••	
.50								(6.50-8.00m) Driller's notes: Bands of sand and gravel.		
	13				7 7/40 04		(4.30)			
00-8.30 00			-		7,7/16,34 SPT 50/150					
	71								· · · · · · · · · · · · · · · · · · ·	
50-9.65					10,15/50 SPT 50/0				······································	
50						-4.85	9.50	Very stiff dark grey slightly sandy slightly gravelle CLAY with occasional cobbles and bands of gravel. Gravel is subangular to angular fine to coarse.	y <u>6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 </u>	
emarks	ater encou	ntered du	ring drilling	g.	tany follow on commit				Scale (approx)	Logge By
otted stand th a raised	dpipe with g I cover.	gravel filte	r zone ins	talled fro	tary follow on comple om 19.50m to 16.50m	BGL with	plain pipe an	d bentonite seal from 16.50m BGL to GL. Finished	1:50	C. Byr
uselling fro	om 3.70m f	or 1 hour.							Figure N	 lo

SI				W	igations Ire vw.gii.ie			Site St. Vincent's Fairview		B	oreholoumber H12
lush :	eretta T44	+	20	Diamete Omm cas mm case	er sed to 3.70m ed to 19.50m	Ground	Level (mOD) 4.65	Client			b Imber 27-08-2
Core Dia: m Method : Ca wi		ssion ollow on	Locatio		736508.6 N		/09/2021- 5/09/2021	Engineer OCSC		Sł	2/2
Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
1.00-11.08 . 1.00	32		-		25/50 SPT 25*/75 50/0	-6.35	(1.50)	Very stiff dark grey slightly sandy gravelly CLAY with occasional cobbles and bands of gravel. Gravel is subangular to subrounded fine to coarse	0 0		
	83				17.8/50			Gravel is subangular to subrounded fine to coarse			
2.50-15.65 2.50	80				SPT 50/0						
4.00-14.00 4.00	100		-		25/50 SPT 25*/0 50/0		(5.50)		8		
5.50					-				8		
7.00	90	31	20		_	-11.85	16.50	Medium strong to strong grey/black thinly to medium bedded fine to medium grained LIMESTONE interbedded with weak grey MUDSTONE with clay lenses and smearing.			
7.00	97	93	44	13			(3.00)	Partially weathered. (16.5-19.5m) 2 fracture sets: F1 5-20 degrees very closely to medium spaced, undulating, rough with occasional clay smearing. F2 70-87 degrees medium spaced undulating rough with clay smearing.			ນີ້ເລື້ອງ ແລະ
8.50	100	74	26	14	-						2.4.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2
19.50					-	-14.85	19.50	Complete at 19.50m			<u></u>
Remarks									Scale (approx)	Lc By	gged
									1:50 Figure N 10927-0	С. о.	Byrne

Machine : D				WV	gations Ire w.gii.ie		Level (mOD)	St. Vincent's Fairview Client			umber 6H13
B	eretta T44		Casing)mm cas	ed to 8.20m		4.16	Client		Nu	on J mbe 27-08-
	able Percu ith Rotary Ilow on		Locatio		d to 8.00m	Dates		Engineer			neet
10					736559.4 N	14	/09/2021- /09/2021	OCSC		01	1/2
Depth (m)	Sample	/ Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Inst
							(0.30)	Brown sandy TOPSOIL			
0.50	в					3.86	0.30	Firm brown slightly sandy slightly gravelly CLAY with occasional rootlets. Gravel is subangular to subrounded fine to medium			
.00-1.45 .00	SPT(C) B	N=11			1,2/2,3,3,3		(1.60)				
						2.26	1.90	Stiff dark brown slightly sandy slightly gravelly	· · · · · · · · · · · · · · · · · · ·		
2.00-2.45 2.00	SPT(C) B	N=20			2,3/4,5,5,6			CLAX. Gravel is subangular to subrounded fine to coarse.			
3.00-3.45 3.00	SPT(C) B	N=28			3,5/5,7,8,8		(2.10)				
4.00-4.45 4.00	SPT(C) B	N=48			5,7/9,11,13,15	0.16	4.00	Very stiff dark brown slightly sandy gravelly CLAY. Gravel is subangular to subrounded fine to coarse.			
5.00-5.45 5.00	SPT(C) B	N=44			5,8/9,9,12,14						
5.00-6.38 5.00	SPT(C) B	50/225			5,8/11,13,15,11		(4.20)				
7.00-7.38 7.00	SPT(C) B	50/225			7,9/13,17,19,1						
3.00 3.00-8.15 3.00	TCR	SCR	RQD	FI	9,19/50 B SPT(C) 50/0						
	65					-4.04	8.20	Very stiff greyish brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.			
.50-9.58 .50			-		11/50 SPT 11*/75 50/0	-5.34	9.50	Very stiff dark grey slightly sandy gravelly CLAY with occasional subangular to subrounded cobbles	0 0 0 0 0 0 0 0 0 0 0 0 0 0		
Remarks	ater encou	ntered du	ring cable	percussi	on drilling		<u> </u>	<u> </u>	Scale (approx)	F Lo	ogged
Slotted stand with a raised Chiselling fro	cover.			talled fro	m 18.50m to 15.50m	BGL with I	plain pipe and	bentonite seal from 15.50m BGL to GL. Finished	(approx)		/ Byrne
miselling fro	ערוות.∠0M 1	or r nour.						_		0.	eyine

				W	igations Ire ww.gii.ie			Site St. Vincent's Fairview		E	orehol umber 8H13
Machine : Da Be Flush : wa	eretta T44	&	Casing 20	0mm cas	sed to 8.20m	Ground	Level (mOD) 4.16	Client		Ν	ob umber 027-08-2
Core Dia: m	ım		96 Locatio		ed to 8.00m	Dates		Engineer			heet
Method : Ca wi fol	able Percu th Rotary c llow on				E 736559.4 N	14	/09/2021- 5/09/2021	OCSC		0	2/2
Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
11.00-11.23 11.00	67		-		12,17/50 SPT 50/75						
12.50-12.58 12.50	83		-		18/50 SPT 18*/75 50/0		(6.00)				
14.00-14.00 14.00	100		-		25/50 SPT 25*/0 50/0				00000000000000000000000000000000000000		
15.50-15.50 15.50					25/50 SPT 25*/0 50/0	-11.34		Medium-strong to strong thinly to thickly laminate grey fine to medium grained argillaceous LIMESTONE interbedded with weak to medium-strong thinly laminated dark grey fine-grained MUDSTONE with occasional calcite veins and pyrite. Partially weathered to			
17.00	97	72	50	12	-		(3.00)	 2 sets of fractures. F1 5-15 degrees. Very close to medium spaced undulating rough occasionally open with clay smearing. F2 70-80 degrees. Medium spaced undulating rough open with clay staining. 			
	100	85	43	10							
8.50						-14.34		Complete at 18.50m	<u><u><u> </u></u></u>		92883 B
Remarks							-		Scale (approx)	L	ogged Y
									1:50 Figure N 10927-0	С. Io.	Byrne

Number Voltow Product State Product State Product State Product State Product State State Engineer CCSC S 0 PR/h Sample / Tests State Cost Description Leasen S 0 S0 S Sample / Tests State Leasen Leasen Leasen Leasen Leasen S Description Leasen Leasen S 0.50 S ST(C) N+10 Lasen		eretta T44		Casing)mm cas	ed to 1.60m		Level (mOD) 4.86	Client			b Imbei 27-08-
Index Index <th< th=""><th>Wethod : Ca wi</th><th>able percu ith Rotary i</th><th>follow on.</th><th></th><th></th><th>d to 15.00m</th><th>Dates</th><th></th><th>Engineer</th><th></th><th></th><th>neet</th></th<>	Wethod : Ca wi	able percu ith Rotary i	follow on.			d to 15.00m	Dates		Engineer			neet
1.50 B 1.50 Form slightly gavely day. (DSOL why gave and y slightly gavely clav. (DSOL why gavely gavely clav. (DSOL why gavely clav. (DSOL why gavely gavely gavely clav. (DSOL why gavely gavely clav. (DSOL why gavely gavely gavely gavely clav. (DSOL why gavely gavely gavely gavely cla						736588.4 N	14				0.	1/2
1.50 B 4.36 0.50 TOPSOL with grass and notes to subconded gravely consistence addingtone adding for a dispersion for a signification addingtone adding for adding	Depth (m)	Sample	e / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Inst
1500 B Image: Second seco								(0.50)	TOPSOIL with grass and rootlets and fine to			
.00-2.45 SPT(C) N=20 2.34.5.5.6 2.56 2.30 .00-3.45 SPT(C) N=28 4.56.7.7.9 (1.70) .00-4.45 SPT(C) N=50 5.7/10.13.14.13 0.86 4.00 .00-3.45 SPT(C) N=28 6.9/13.16.19.2 (1.50) .00-3.45 SPT(C) S0225 6.9/13.16.19.2 (1.50) .00-4.45 SPT(C) S0225 6.9/13.16.19.2 -0.64 5.50 .00-3.45 SPT(C) S0225 6.9/13.16.19.2 -0.64 5.50 .00-4.45 SPT(C) S0225 6.9/13.16.19.2 -0.64 5.50 .00-5.38 SPT(C) S0225 6.9/13.16.19.2 -0.64 5.50 .00-5.37 SO .00.4 .00 .00.4 .00.4 .50 .00.4 .00.4 .00.4 .00.4 .00.4 .00.4 .50 .00.7 .00.4 .00.4 .00.4 .00.4 .00.4 .00.4 .50 .00.7 .00.4 .00.4 .00.4 .00.4 .00.4 .00.4 .00.4 .00.4 .00.4 .00.4 .00.4 .00.4 .00.4 .0	.50	В					4.36	0.50	Firm to stiff light brown slightly sandy slightly gravelly CLAY with occasional rootlets. Gravel is	······································		
.00-2.45 SPT(C) N=20 2.3/4.5.5.6 2.56 2.30 .00-3.45 SPT(C) N=28 4.5/5.7.9 (1.70) .00-4.45 SPT(C) N=50 5.7/10.13.14.13 0.86 4.00 .00-5.38 SPT(C) N=50 5.7/10.13.14.13 0.86 4.00 .00-5.38 SPT(C) N=50 5.7/10.13.14.13 0.86 4.00 .00-5.38 SPT(C) S0/225 6.9/13.16.19.2 (1.50) 110 .00 19 6.9/13.16.19.2 0.64 5.50 19 19 1.84 6.50 .50 19 1.84 6.50 .50 19 1.84 6.50 .50 19 1.84 6.50 .50 19 1.84 6.50 .50 1.84 6.50 Shift dark brown slightly sandy cLAY. Gravel is fine .50 19 1.84 8.00 Shift dark brown slightly sandy slightly gravelly CLAY with .50 19 1.84 8.00 Shift dark brown slightly sandy slightly gravelly CLAY with .50 19 1.29 9.25 Shift dark brown slightly		SPT(C) B	N=15			2,3/3,4,4,4		(1.80)		••••••••••••••••••••••••••••••••••••••		
0.00 B Description Stiff grey slightly gravely sandy CLAY. Gravel is subangular fine to coarse. 1.00-3.45 SPT(C) N=28 4.55,7.7.9 (1.70) 0.00-4.45 SPT(C) N=50 5.7/10,13,14,13 0.86 4.00 0.00-4.45 SPT(C) N=50 5.7/10,13,14,13 0.86 4.00 0.00-4.45 SPT(C) N=50 5.7/10,13,14,13 0.86 4.00 0.00-4.45 SPT(C) S0/225 6.9/13,16,19,2 6.9/13,16,19,2 6.9/13,16,19,2 1.00 19 19 1.164 6.50 Stiff dark brown slightly gravely sandy CLAY. Gravel is in the to coarse. 1.00 19 1.164 6.50 Stiff dark brown slightly sandy slightly gravelly (CLAY. Gravel is the bottom. 1.00 1.164 6.00 Stiff dark brown slightly sandy slightly gravelly (CLAY. Gravel is the bottom. 1.164 1.00 1.164 8.00 Stiff dark brown slightly sandy slightly gravelly (CLAY. Gravel is the bottom. 1.50 19 1.164 8.00 Stiff dark brown slightly sandy slightly gravelly (CLAY. Gravel is the bottom. 1.50 1.164 8.00 Stiff dark brown slightly sandy slightly gravelly CLAY. 1.50 1.1												
00-3.45 SPT(C) N=28 4.5/5,7,7,9 (1.70) 00-3.45 SPT(C) N=50 5.7/10,13,14,13 0.86 4.00 00-5.38 SPT(C) S0/225 6.9/13,16,19,2 (1.50) 00-5.38 SPT(C) 50/225 6.9/13,16,19,2 -0.64 5.50 19 19 -0.64 6.9/13,16,19,2 -0.64 5.50 19 -0.64 -0.64 -0.64 5.50 19 -0.64 -0.64 -0.64 -0.64 19 -0.64 -0.64 -0.64 -0.64 19 -0.64 -0.64 -0.64 -0.64 19 -0.64 -0.64 -0.64 -0.64 10 -1.64 -0.60 -0.64 -0.64 50 -0.64 -0.64 -0.64 -0.64 19 -0.64 -0.64 -0.64 -0.64 -0.64 -0.64 -0.64 -0.64 -0.64 -0.64 -0.64 -0.64 -0.64 -0.64 -0.64 <td></td> <td></td> <td>N=20</td> <td></td> <td></td> <td>2,3/4,5,5,6</td> <td>2.56</td> <td>2.30</td> <td>Stiff grey slightly gravelly sandy CLAY. Gravel is</td> <td>······································</td> <td></td> <td></td>			N=20			2,3/4,5,5,6	2.56	2.30	Stiff grey slightly gravelly sandy CLAY. Gravel is	······································		
0.00 B F Image: constraint of the second seco									subangular fine to coarse.	· · · · · · · · · · · · · · · · · · ·		
0.0-4.45 SPT(C) N=50 5,710,13,14,13 over standy etcy stightly gravely sandy CLAT. Gravels 0.0-5.38 SPT(C) 50/225 6,9/13,16,19,2 50 TCR SCR ROD 19 -0.64 5.50 19 -1.64 6.50 60 -1.64 5.50 60 -1.64 5.50 50 -1.64 5.50 60 -1.64 5.50 57 -3.14 8.00 57 -4.39 9.25 50 Stiff dark brown slightly sandy slightly gravelly CLAY. with a short of light brown firm to stiff clay at the bottom. 57 -4.39 9.25 50 Stiff brown slightly sandy slightly gravelly CLAY. 60 -3.14 8.00 57 -4.39 9.25			N=28			4,5/5,7,7,9		(1.70)		······································		
0.0-4.45 SPT(C) N=50 5,710,13,14,13 over standy etcy stightly gravely sandy CLAT. Gravels 0.0-5.38 SPT(C) 50/225 6,9/13,16,19,2 50 TCR SCR ROD 19 -0.64 5.50 19 -1.64 6.50 60 -1.64 5.50 60 -1.64 5.50 50 -1.64 5.50 60 -1.64 5.50 57 -3.14 8.00 57 -4.39 9.25 50 Stiff dark brown slightly sandy slightly gravelly CLAY. with a short of light brown firm to stiff clay at the bottom. 57 -4.39 9.25 50 Stiff brown slightly sandy slightly gravelly CLAY. 60 -3.14 8.00 57 -4.39 9.25							0.86			······································		
00-5.38 00 B B SPT(C) 50/225 (a) 00 FI 6,9/13,16,19,2 0.64 For recovery. Recovery consists of soft dark brown slightly gravely sandy CLAY. Gravel is fine to carse subangular to subrounded. For recovery. Recovery consists of soft dark brown slightly gravely sandy CLAY. Gravel is fine to carse subangular to subrounded. For recovery. Recovery consists of soft dark brown slightly gravely sandy CLAY. Gravel is fine to carse subangular to subrounded. For recovery. Recovery consists of soft dark brown slightly sandy slightly gravely class of soft dark brown slightly sandy slightly gravely class of soft dark class. For recovery. Recovery consists of soft dark brown slightly sandy slightly gravely class. For recovery. Recovery consists of soft dark brown slightly sandy slightly gravely class. For recovery. Recovery consists of soft dark brown slightly sandy slightly gravely class. For recovery. Recovery consists of soft dark brown slightly sandy slightly gravely class. 50 60 -1.64 6.50 Stiff dark brown slightly sandy gravely class with bottom. -1.64 57 -1.84 8.00 Stiff dark brown slightly sandy slightly gravely class. -1.64 50 -1.84 9.25 Stiff dark brown slightly sandy slightly gravely class. -1.64 50 -1.84 -0.64 -0.64 -0.64 -1.64 -0.64 57 -1.84 -0.64 -0.64 -0.64			N=50			5,7/10,13,14,13	0.80	4.00	Very stiff grey slightly gravelly sandy CLAY. Grave is subangular fine to coarse.			
0.00 B TCR SCR RQD Fi .50 19 -0.64 5.50 19 (1.00) -1.64 6.50 60 -1.64 6.50 60 -1.64 6.50 57 -1.64 8.00 57 -1.64 -1.25 57 -1.64 -1.25 57 -1.64 -1.25 57 -1.64 -1.25 57 -1.64 -1.25 57 -1.64 -1.25 560 -1.25 -1.25 57 -1.25 -1.25 50 -1.25 -1.25 50 -1.25 -1.25 50 -1.25 -1.25 51 -1.25 -1.25 50 -1.25 -1.25 50 -1.25 -1.25 51 -1.25 -1.25 51 -1.25 -1.25 51 -1.25 -1.25 51 -1.25 -1.25 51 -1.25								(1.50)		**************************************		
.50		B		RQD	FI	6,9/13,16,19,2				······································		
.50 -1.64 6.50 Stiff dark brown slightly sandy slightly gravelly .50 60 -1.64 6.50 .00 -3.14 8.00 .57 -3.14 8.00 .57 -4.39 9.25 Stiff brown slightly sandy slightly gravelly CLAY. -3.14 .50 -3.14 8.00 Stiff dark brown slightly sandy gravelly CLAY with a bottom. -3.14 .50 -3.14 9.25 Stiff brown slightly sandy slightly gravelly CLAY. -3.14 .50 -4.39 9.25 Stiff brown slightly sandy slightly gravelly CLAY. -3.14 .50 -4.39 9.25 Stiff brown slightly sandy slightly gravelly CLAY. -3.14 .50 -4.39 9.25 Stiff brown slightly sandy slightly gravelly CLAY. -3.14 .50 -4.39 9.25 Stiff brown slightly sandy slightly gravelly CLAY. -3.14 .60 -4.39 9.25 Stiff brown slightly sandy slightly gravelly CLAY. -4.39 .60 -4.39 -4.39 .60 -5.50 mBCL. with Rotary fol	.50						-0.64		brown slightly gravelly sandy CLAY. Gravel is fine	· · · · · · · · · · · · · · · · · · ·		
.50 60 .60 -3.14 .60 -3.14 .60 -3.14 .61 -3.14 .62 Stiff dark brown slightly sandy gravelly CLAY with a abnd of light brown firm to stiff clay at the bottom. .61 -4.39 .60 -57 .50 -4.39 .50 -4.39 .50 -4.39 .50 Stiff brown slightly sandy slightly gravelly CLAY. .50 -4.39 .50 Stiff brown slightly sandy slightly gravelly CLAY.		19								**************************************		
.00 -3.14 -4.39 -4.3	.50						-1.64	6.50	Stiff dark brown slightly sandy slightly gravelly CLAY.	······································		
57 57 57 57 57 57 57 57 57 57		60						(1.50)		• • • • • • • • •		
57 57 57 57 57 57 50 50 50 50 50 50 50 50 50 50							-3 1/	8.00		**************************************		
57 50 50 50 50 50 50 50 50 50 50	.00						-0.14		Stiff dark brown slightly sandy gravelly CLAY with a abnd of light brown firm to stiff clay at the bottom	I.		
50 50 50 500 Suit brown slightly sandy slightly gravely CLAY.		57						(1.25)				
Remarks o groundwater encountered during cable percussion drilling. able percussion borehole complete at 5.50m BGL with Rotary follow on complete at 15.00m BGL.	50						-4.39	9.25	Stiff brown slightly sandy slightly gravelly CLAY.			
o groundwater encountered during cable percussion drilling. able percussion borehole complete at 5.50m BGL with Rotary follow on complete at 15.00m BGL.										· · · · · · · · · · · · · · · · · · ·		
able percussion borenole complete at 5.50m BGL with Rotary follow on complete at 15.00m BGL.	o groundwa	ater encou	ntered dur	ing cable	percussi	on drilling.	n 00mml-4	ot 15 00 D.C	N	Scale (approx)	Lo By	ogge /
otted standpipe with gravel filter zone installed from 15.00m to 12.00m BGL with plain pipe and bentonite seal from 12.00m BGL to GL. Finished ith a raised cover. hiselling from 5.40m to 5.50m for 1 hour.	able percus	ssion bore bipe with	nole comp gravel filte	r zone ins	oum BGL talled fro	with Rotary follow or m 15.00m to 12.00m	n complete n BGL with j	at 15.00m BG plain pipe and	⊳∟. bentonite seal from 12.00m BGL to GL. Finished		-	RM

		Grou	nd In	vesti ww	gations Ire /w.gii.ie	land	Ltd	Site St. Vincent's Fairview		N	orehole umber 3H14
Machine : D B Flush : Core Dia: 63	eretta T44) +	200	Diameter Omm case		Ground	Level (mOD) 4.86	Client		N	ob umber 927-08-21
Method : C		ission follow on.	Location 716		736588.4 N	Dates 14 15	4/09/2021- 5/09/2021	Engineer OCSC		S	heet 2/2
Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
11.00	21					-6.14	(1.75)	Grey slightly clayey sandy subrounded to subangular GRAVEL with occasional subangular cobbles			
12.50	33		_								
	40										
14.00	45					-9.14	14.00 (1.00)	Stiff dark grey slightly sandy slightly gravelly CLA Gravel is subangular fine to coarse.		•	
15.00						-10.14		Complete at 15.00m			
Remarks	1	1				1	,		Scale (approx)	B	ogged y
									1:50 Figure N 10927-0		RM 1.BH14

Image: constraint of the	B	ando 2000 + eretta T44 able Percussion	Casing I 200 96r)mm cas	r ed to 8.60m d to 15.50m		Level (mOD) 10.28	Client			b Imbei 27-08-
00-1.45 SPT(C) N=10 1.22.3.2.3 10.06 (0.20) (0.20) TOPSOL. Film provide-how slightly gardy slightly slightly gardy slightly	W	ith Rotary follow on			736637.2 N	27	/09/2021- /10/2021			Sh	
00-1.45 SPT(C) N=10 1.22.3.2.3 First gravely clave is sub-angliar to sub-rounded medium to coanse. Sector (C) N=10 Sector (Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Inst
0.0 B 1 7.68 2.60 Stiff grey slightly sandy slightly gravelly CLAY with rootels. Gravel is subangular to subroounded fine 1 0.0-3.45 SPT(C) N=28 3.5/5,7,8,8 (1.40)	.00-1.45 .00	SPT(C) N=10 B			1,2/2,3,2,3	10.08		Firm greyish-brown slightly sandy slightly gravelly CLAY with rootlets. Gravel is sub-angular to			
OD-3.45 SPT(C) N=28 3.5/5.7.8.8 (1.40) 00-3.45 SPT(C) N=28 3.5/5.7.8.8 (1.40) 00-4.45 SPT(C) N=35 4.6/6.8.10,11 6.28 4.00 00-5.45 SPT(C) N=50 5.8/10,13,15,12 4.6/6 4.00 00-6.45 SPT(C) N=50 5.9/12,14,14,10 4.6/6 4.6/6 00-7.45 SPT(C) N=50 5.9/12,14,14,10 4.6/6 4.6/6 00-6.45 SPT(C) N=50 5.9/12,14,14,10 4.6/6 4.6/6 00-7.45 SPT(C) N=50 6.11/14,18,18 4.6/6 4.6/6 70 50 50 18/50 0.7/8 9.50 50-9.05 50 18/50 0.7/8 9.50 50.5/7	2.00-2.45 2.00	SPT(C) N=14 B			2,3/3,3,4,4						
OD-4.45 SPT(C) N=50 5,8/10,13,15,12 Very stiff grey slightly sandy slightly gravely CLAY Z = 1 00-6.45 SPT(C) N=50 5,8/10,13,15,12 Image: stress of the subangular to subroounded fine to coarse. Image: stress of the subangular to subroounded fine to coarse. Image: stress of the subangular to subroounded fine to coarse. 00-6.45 SPT(C) N=50 5,9/12,14,14,10 Image: stress of the subangular to subroounded fine to coarse. Image: stress of the subangular to subroounded fine to coarse. 00-7.45 SPT(C) N=50 5,9/12,14,14,10 Image: stress of the subangular to subroounded fine to coarse. Image: stress of the subangular to subroounded fine to coarse. 00-7.45 SPT(C) N=50 6,11/14,17,19 Image: stress of the subangular to subroounded fine to coarse. Image: stress of the subangular to subroounded fine to coarse. 00-8.45 SPT(C) N=50 6,11/14,18,18 Image: stress of the subangular to subroounded fine to coarse. Image: stress of the subangular to subroounded fine to coarse. 00-8.45 SPT(C) N=50 6,11/14,18,18 Image: stress of the subangular to subroounded fine to coarse. Image: stress of the subangular to subroounded fine to coarse. 50 50 SPT N=50 0,78 0,78 Image: stress of the subangular to subroound	9.00-3.45 9.00				3,5/5,7,8,8	7.68		rootlets. Gravel is subangular to subroounded fine			
0.0 B	.00-4.45 .00	SPT(C) N=35 B			4,6/6,8,10,11	6.28	4.00	with rootlets. Gravel is subangular to subroounded			
00 B (4.60) 00-7.45 SPT(C) N=50 00-8.45 SPT(C) N=50 00-8.45 SPT(C) N=50 00 6,11/14,17,19 00-8.45 SPT(C) N=50 00 6,11/14,18,18 1.68 8.60 Very stiff grey slightly sandy slightly gravelly CLAY 00-9.95 18/50 50 18/50 00-78 9.50	5.00-5.45 5.00	SPT(C) N=50 B			5,8/10,13,15,12						
00-7.45 00 00-8.45 00 8 SPT(C) N=50 B CO-8.45 B SPT(C) N=50 B CO-8.45 B CO-8.45 B CO-8.45 B CO-8.45 B CO-8.45 B CO-8.45 B CO-8.45 B CO-8.45 B CO-7.45 B CO-8.45 CO	.00-6.45 .00	SPT(C) N=50 B			5,9/12,14,14,10		(4.60)				
00 B TCR SCR RQD FI 70 50 50 1.68 8.60 50 <td>.00-7.45 .00</td> <td></td> <td></td> <td></td> <td>7,10/14,17,19</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	.00-7.45 .00				7,10/14,17,19						
70 Very still grey slightly sandy slightly gravelly CLAY 0 0 50 50 18/50 (0.90) 18/50 50 18/50 9.50 Dense grey clayey sandy sub angular to sub 0	.00-8.45 .00				6,11/14,18,18					D 0 '''0 n 0 0 ''' 0 0 ''' 0 n 0 0	20 00 00 00 00 00 00 00 00 00 00 00 00 0
50-9.95 50 0.78 9.50 Dense grey clayey sandy sub angular to sub	.70		RQD	FI	18/50	1.68		with occasional cobbles. Gravel is angular to	0 1020	<u>a.oo.</u> o 0. <u>a</u> 000 a.oo.º 0 0.a00	000 00 - 00 - 00 - 00 - 00 - 00 - 00 -
	.50-9.95 .50		-			0.78	9.50	Dense grey clayey sandy sub angular to sub rounded fine to coarse GRAVEL.		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	50,40,50,00,00,00,00,00,00,00,00 0,0,00,00,00,00,00,00,00,00,00,00,00,00

second	SI				W١	igations Ire ww.gii.ie			Site St. Vincent's Fairview		E	orehole umber 8H15
Constrained of Location Description Englineer OCSC SR Constrained of Code Persussion With Rotary Visions on With Rotary	Be	retta T44	+	20	0mm ca	sed to 8.60m			Client		N	umber
under Service Tre770 6 E 739837 2 N CCSC Depth CR SCR ROD F Feld Records Into Service Description Legend		.5 mm		96	mm case	ed to 15.50m			-			
66 2550 0.02 10.00 Very stiff brown slightly sandy slightly gravely angular to sub rounded the to costset. 2550 37 37 1650 39710*775 3.72 14.00 4.25 10.00 00 14.08 30 1750 3.72 14.00 Very stiff brown slightly sandy slightly gravely conditional cobbins. Gravel is sub- rounded obtain. Gravel is sub- rounded cobbins. Gr	Method : Ca wit	ible Percu h Rotary f	ssion follow on			E 736637.2 N	27				Sheet 2/2	
00 00 0.32 10.00 Important set of the set of set o	Depth (m)				FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
50 - 5.22 - 15.50 Complete at 15.50m - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	11.00-11.00 11.00 12.50-12.58 12.50 14.00-14.08 4.00	37				SPT 25*/0 50/0 16/50 SPT 16*/75 50/0 17/50 SPT 17*/75	-3.72	(3.40) (3.40) (0.50) (0.50)	Very stiff light brown slightly sandy slightly gravell CLAY with occassional sub angular to sub rounded cobbles. Gravel is subangular fine to coarse. Poor recovery. Recovery consists of subangular fine to coarse GRAVEL with occasional	A A A A A A A A A A A A A A A A A A A		All and a second s
(approx) By	15.50						-5.22		Complete at 15.50m			
1:50 C. E	Remarks	I								Scale (approx)	Lo B	ogged y
										1:50	C.	Byrne
Figure No.										Figure N		-

Burnet in Control 1:44 Note that Control 1:44 Note that Control 1:44 Note that Reserve to the to					WW	gations Ire /w.gii.ie			St. Vincent's Fairview		В	umber H16
with Rolary follow Location Path Prior Prior Prior Prior Series Cost Cost <thcost< th=""></thcost<>	Be	eretta T44							Client			b Imbe 27-08-
3:00 B Image: Constraint of the constraint of						736658.1 N	Dates 01	/11/2021			Sh	1/2
150 B<	Depth (m)	Sample	/ Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Inst
100-135 SP1 N=11 2,33,2,3,3 Image: constraint or sub-rounded fine to consub-rounded fi	.50	В						(0.90)	Brown slightly sandy slightly gravelly CLAY. Grave	I 		
0.0 B 3,5/5,6,7,7 7,32 2,70 0.03,45 SPT N=25 3,5/5,6,7,7 7,32 2,70 0.03,45 SPT N=25 3,5/5,6,7,7 1,11 0.0-4,45 SPT N=41 5,7/9,10,11,11 (2,40) 0.0-5,30 SPT 50/150 7,11/21,29 4,52 5,10 0.0-5,30 SPT 50/150 7,11/21,29 4,52 5,10 0.0-6,66 70 12,19/50 12,19/50 50 11 10,10/12,17,21 10,10/12,17,21 0.0-8,38 43 19,0/50 50-9,58 11 19,0/50 50-9,58 11 19,0/50 50-9,58 19,0/50 19,0/50 50-9,58 10,10/12,17,21 10,10/12,17,21 50-9,58 11 10,10/12,17,21 50-9,58 11 10,10/12,17,21 50-9,58 11 10,0/50,17,7		SPT N= B	11			2,3/3,2,3,3	9.02		CLAY. Gravel is sub-angular to sub-rounded fine to	D		
0.0-3.45 B SPT N=25 3,5/5,6,7,7 Image: Constraint of the second se		SPT N= B	13			2,3/3,3,3,4	7.32	2.70	Stiff greyish brown slightly sandy slightly gravelly CLAY Gravel is sub-angular to sub-rounded fine to			
0.00-4.45 SPT N=41 5.7/9,10,11,11 5.7/9,10,11,11 Image: second sec			25			3,5/5,6,7,7			coarse.	- + + + + + + + + + + + + + + + + + + +		
0.0 B Image: Section of the section of			41			5,7/9,10,11,11						
150-6.65 11 12,15/50 12,15/50 11 11 11 100-8.38 11 100 11 100 10,10/12,17,21 SPT 50/225 150 43 13,6/50 SPT 25'/75 13,6/50 SPT 25'/75 14	.00	В		RQD	FI	7,11/21,29	4.92	5.10	subangular cobbles. Gravel is subangular and fine			
1.00-8.38 10,10/12,17,21 10,10/12,17,21 1.00-8.38 43 43 19,6/50 1.50-9.58 19,6/50 SPT 25*/75 50/0		70		_		12,15/50 SPT 50/0						
.50-9.58 .50	.00-8.38 .00	11		_		10,10/12,17,21 SPT 50/225		(5.90)				
.50-9.58 .50 .50/0		43										
Remarks						SPT 25*/75						
o groundwater encountered during drilling able percention drilling complete of 5 20m PCL with retent follow on complete at 15 00m PCL	Remarks	ater encou	ntered du	ring drilling		th roton follow	malata =1	15 00~ DOL		Scale (approx)	Lo By	ogge /
o groundwater encountered during drilling able percussion drilling complete at 5.30m BGL with rotary follow on complete at 15.00m BGL. Jotted standpipe installed from 15.00m BGL to 12.00m BGL with plain pipe from 12.00m BGL to GL. Finished with a raised cover. hiselling from 5.10m to 5.30m for 1 hour.	lotted stand	ipipe instai	lied from '	15.00m BG	GL to 12.0	00000000000000000000000000000000000000	bipe from 1	2.00m BGL.	GL. Finished with a raised cover.			

SI		Grou	nd In		igations Ire vw.gii.ie	land	_td	Site St. Vincent's Fairview		Nu	mber H16
lachine : Da Be Flush : wa	eretta T44	+	Casing 20		er sed to 5.20m		Level (mOD) 10.02	Client			b Imber 27-08-2
Core Dia: 63 Method : Ca wit		ission follow on	Locatio		736658.1 N	Dates 01	/11/2021	Engineer OCSC			eet 2/2
Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
1.00-11.38 - 1.00 2.50-12.58 - 2.50 4.00-14.00 - 5.00	13 27 68 10				8,11/14,19,17 SPT 50/225 15,10/50 SPT 25*/75 50/0 25/50 SPT 25*/0 50/0	-0.98 -2.48 -3.98 -4.98		Very stiff light brown slightly sandy slightly gravelly CLAY with occasional subangular cobbles. Sand into clay. Gravel is subangular fine to coarse.			
Remarks						-			Scale (approx)	Lo By	gged
										1	
								-	1:50 Figure N		

Method : Ca	eretta T44 able Percus	sion	200	Diamete)mm cas nm case	r ed to 8.30m d to 25.30m		Level (mOD) 10.14	Client			b Imbei 27-08-
wi	ith Rotary fo	ollow on	Location 716		736669.7 N	Dates 01	/11/2021	Engineer OCSC		Sh	1/3
Depth (m)	Sample	/ Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Inst
0.50	В							MADE GROUND: Brown slightly sandy slightly gravelly Clay with ash and fragments of brick and ceramic. Gravel is sub-angualr to sub-rounded medium to coarse.			
1.00-1.45 1.00	SPT N=9 B)			1,2/2,2,2,3		(3.00)				
2.00-2.45 2.00	SPT N=1 B	0			2,1/2,2,3,3						
3.00-3.45 3.00	SPT N=1 B	3			2,3/3,4,3,3	7.14	3.00	Firm to stiff light brown slightly sandy slightly gravelly CLAY with sub-angular to sub-rounded medium to coarse gravel.			
1.00-4.45 1.00	SPT N=1 B	7			2,3/4,4,5,4		(3.50)				
5.00-5.45 5.00	SPT N=1 B	4			2,3/3,3,4,4						
5.00-6.45 5.00	SPT N=1 B	8			3,4/5,4,4,5	3.64	6.50	Stiff greyish-brown sandy gravelly CLAY with	······································		
7.00-7.45 7.00 7.40	SPT N=5 B TCR	50 SCR	RQD	FI	5,8/10,13,16,11		(1.50)	occašional cobbles. Gravel is sub-angular to sub-rounded medium to coarse. (7.40-8.30m) Redrill of collapsed material			
3.00-8.08 3.00 3.00	50				14,11/50 SPT 25*/75 50/0 B	2.14	8.00 (0.30)	from cable percussion hole. Grey slightly sandy GRAVEL. Sub-angular to rounded fine to coarse gravel.	0 0		
	23					1.84	8.30	Poor recovery: Recovery consist of grey slightly gravelly sandy CLAY. Gravel is subangular fine to coarse. (Very stiff).			
0.50-9.80 0.50					9,9/12,38 SPT 50/150	0.64	9.50	Poor recovery: Recovery consists of brown slightly sandy slightly gravelly CLAY. Gravel is subangular and subrounded fine to coarse. [Driller's notes: sands, gravels and clay] (Very stiff).			
Remarks	ater encoun	tered dur	ing cables e at 8.30r	s percuss	sion drilling				Scale (approx)	Lo	ggeo

S			nd In	vest w	igations Ire vw.gii.ie	land	Ltd	Site St. Vincent's Fairview		Νι	orehol umber 8H17
Machine : Da Be Flush : wa	eretta T44) +		Diamete	er sed to 8.30m		Level (mOD) 10.14	Client			umbei
Core Dia: 63			96	mm case	ed to 25.30m		10.11				27-08-
/lethod : Ca wi	able Percu th Rotary f	ission follow on	Locatio		736669.7 N	Dates 01	1/11/2021	Engineer OCSC		Sł	h eet 2/3
Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Inst
1.00-11.08 1.00 2.50-12.50 2.50 4.00-14.08 4.00	17 17 13				21,4/50 SPT 25*/75 50/0 25/50 SPT 25*/0 50/0 19,6/50 SPT 25*/75 50/0	-3.86	(4.50)	Very stiff brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded medium to coarse.			
5.50-15.50 5.50	30		-		25/50 SPT 25*/0 50/0	-5.36	(1.50)	Poor recovery: Recovery consists of clayey gravelly SAND. Gravel is subangular fine to coarse. [Driller's notes: Black sands and gravels] (Dense)			
7.00-17.00 7.00	17		-		25/50 SPT 25*/0 50/0		(2.40)				
8.50-18.50 8.50	37		-		25/50 SPT 25*/0 50/0	-7.76	17.90	Very stiff brownish-grey slightly sandy gravelly CLAY. Gravel is subangular fine to coarse.			
0.00 -	60						(2.10)				
Remarks			1	<u> </u>	1	1	1	1	Scale		Dader
									Scale (approx)	B	oggeo y
									1:50 Figure N 10927-0	No.	RM

			nd In		igations Ire vw.gii.ie	eland	Ltd	Site St. Vincent's Fairview	N	orehole lumber 3H17
lush : wa	retta T44 iter	+	20	Diamete Omm case	er sed to 8.30m ed to 25.30m		Level (mOD) 10.14	Client	N	ob lumber 927-08-2
Core Dia: 63 Nethod : Ca wit		ission follow on	Locatio		736669.7 N	Dates 01	/11/2021	Engineer OCSC	S	heet 3/3
Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Water	Instr
1.50-21.50 1.50 2.00 3.00 4.50 5.30	50 65 83 96	37 57 93	45	9 19 9	25/50 SPT 25*/0 50/0	-11.86		Very stiff grey slightly sandy slightly gravelly CLAY with subangular cobbles. Gravel is subangular to subrounded fine to coarse. Image: Comparison of the subangular to subrounded fine to coarse. Image: Comparison of the subangular to subrounded fine to coarse. Medium-strong to strong dark grey medium grained LIMESTONE interbedded with weak to medium-strong MUDSTONE with some clay smearing. Partially weathered. Image: Comparison of the subangular to subrounded fine to coarse. Image: Comparison of the subangular to subrounded fine to coarse. Medium-strong to strong dark grey medium grained LIMESTONE interbedded with weak to medium-strong MUDSTONE with some clay smearing. Partially weathered. Image: Comparison of the subangular to subrounded fine to coarse. Image: Comparison of the subangular to subrounded fine to coarse. Image: Comparison of the subangular to subrounded fine to coarse. Image: Comparison of the subangular to subrounded fine to coarse. 		
Remarks								Costo		00000
								Scale (approx) 1:50	B	ogged y RM
								Figure N 10927-0		

	ando 150 + Be 44.	rretta	Casing		vw.gii.ie ^r	Ground	Level (m	D)	Client		Jo	
ethod :Ca	able percussio	n			ed to 5.50m d to 15.00m		11.09					u mbe 27-08
wi	ith Rotary follo	w on.	Locatio	n		Dates			Engineer		Sł	neet
			710	6713.8 E	736746.7 N		/10/2021- /11/2021		OCSC			1/2
Depth (m)	Sample / Te	ests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickne	ss)	Description	Legend	Water	Inst
							 E(0.:	0)	Slightly gravelly TOPSOIL with occasional rootlets			
						10.79			Firm brown slightly sandy slightly gravelly CLAY.			
50	В								Gravel is subangular to subrounded fine to coarse			
							E			• <u>•</u> ••		
00-1.45	SPT(C) N=1 B	13			2,3/3,4,3,3		-			· · · · · · · · · · · · · · · · · · ·		
00	В						(2.0	0)		**************************************		
							-			· · · · · ·		
										· · · · · · · · · · · · · · · · · · ·		
00-2.45	SPT(C) N=3	31			3,6/7,7,6,11					<u>.</u>		
00	В					8.79	2.	30	Stiff greyish brown slightly sandy slightly gravelly	· · · · · · · · · · · · · · · · · · ·		
							E (0.1	·0)	CLAY. Gravel is subangular to subrounded fine to coarse.	<u> </u>		
							(0.1	0)		<u>.</u>		
00-3.45	SPT(C) N=3	36			4,5/7,8,9,12	8.09	3.	00	Very stiff dark brown slightly gravelly sandy CLAY	<u></u> 0		
00	B								with occasional subangular to subrounded cobbles. Gravel is subangular to subrounded fine	<u>, 0, 5, 0</u>		
							-		to coarse.	0 <u>.0</u> 0		
							E			<u>, 0, 0, 0</u> , 0		
0-4.45	SPT(C) N=4	19			5,8/9,12,13,15		(2.0	0)		<u>6 0 0</u>		
00	B				0,0/0,12,10,10		E			<u>0 0 0</u> 0		
	TOD		DOD				-			<u>, 6 6 6</u>		
00 70	TCR S	SCR	RQD	FI	B 6,11/15,35		E		(4.70-5.50m) Redrill of collaosed cable	6.0.0		
00-5.30 00	10				SPT(C) 50/150	6.09	5.	00	percussion hole.	<u>, , , , , , , , , , , , , , , , , , , </u>		
							E		Very stiff light brown slightly sandy slightly gravelly slightly silty CLAY. Gravel is subrounded to	×		
									subangular fine to coarse.	× • • ×		
	67									× •		
	01									× ×		
					21,4/50					× • •		
0-6.65					SPT 50/0					× *		
50										× • • ×		
										×		
	100						E			× · · · · · · · · · · · · · · · · · · ·		
	100						Ē			× · · · · · · · · · · · · · · · · · · ·		
					6 10/50					×		
0-8.08					6,19/50 SPT 25*/75					× • • • ×		
0]			50/0					×		
										× · · · · · · · · · · · · · · · · · · ·		
							E-			× • • • • • • • • • • • • • • • • • • •		
	47						É			×		
							E			× • • • ×		
0-9.50					25/50 SPT 25*/0					×		
0					50/0					^ <u>````````````````````````````````````</u>		
										× · · · · · · · · · · · · · · · · · · ·		
emarks ble percus	ssion drilling co	omplete	e at 5.5m	BGL with	rotary drilling compl	ete at 15.0	0m BGL.			Scale (approx)	LC	ogge
groundwa	ater encounter	ed duri	ng drilling	q .				to	GL. Finished with a raised cover.	(~ppi 0A)	-	,

				WV	gations Ire ww.gii.ie			Site St. Vincent's Fairview		B	iorehol lumber 3H18
achine:Da T44 ush :wa	4.	· Berretta	Casing				Level (mOD) 11.09	Client		N	ob lumbe
ore Dia: 63.					ed to 5.50m d to 15.00m						927-08-
ethod : Ca	ble percus h Rotary f	ssion	Locatio		736746.7 N		/10/2021- /11/2021	Engineer OCSC		Sł	heet 2/2
				07 13.0 E	130740.7 N	01					2/2
Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Inst
.00-11.00 .00 .50-12.58 .50 .00-14.00 .00 .00	100				25/50 SPT 25*/0 50/0 21,4/50 SPT 25*/75 50/0 25/50 SPT 25*/0 50/0	-3.91		Complete at 15.00m			
emarks	ter encour	ntered duri	ing drilling	g.					Scale (approx)	L	ogge
										'	-
									1:50 Figure N		RM

Method :C	44 able Percus	ssion	Casing I 200 96r	Diamete)mm cas	/W.gii.ie r ed to 5.00m d to 5.50m		Level (mOD) 10.66	Client		Jo Nu	H19 b mbei 27-08-
w	ith Rotary fo	ollow on	Location 716		736718.3 N		/10/2021- /11/2021	Engineer OCSC		Sh	eet 1/2
Depth (m)	Sample	/ Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.50 .00-1.45 .00	B SPT(C) I B	N=14			2,3/3,3,4,4	10.16		TOPSOIL Firm brown slightly sandy slightly gravelly CLAY with occasional rootlets. Gravel is subangular fine to medium. Firm to stiff brown slightly sandy slightly gravelly CLAY.			
2.00-2.45 2.00	SPT(C) I B				2,3/4,4,3,3	7.66	3.00				
3.00-3.45 3.00	SPT(C) I B	N=40			5,7/8,8,11,13	7.00	(2.00)	Very stiff dark brown/grey slightly gravelly sandy CLAY. Gravel is subangular to subrounded medium to coarse.			
1.00-4.45 1.00	SPT(C) I B	N=62			7,10/14,15,15,18						
5.00 5.00-5.00 5.00	TCR 100	SCR	RQD	FI	B SPT(C) 25*/0 50/0	5.66		Very stiff brown slightly sandy gravelly CLAY with occasional cobbles. Gravel is subangular to subrounded fine to coarse.	84.6984.9984.9984.9984.9984. 19492194921949219491941 8164219492194921944		
5.50-6.58 5.50	100				12,13/50 SPT 25*/75 50/0						
.00-8.00 .00	100				25/50 SPT 25*/0 50/0				၄၃, ၂၄, ၃, ၂၄, ၂၄, ၂၄, ၂၄, ၂۶, ၂۶, ၂۶, ۱۶, ۱۶, ۱۶, ۱۶, ۱۶, ۱۶, ۱۶, ۱۶, ۱۶, ۱		
.50							(8.40)				
able percus	rater encour ssion drilling zone from 1 om 5.00m to	g complet 5.00m B	e at 5.00n GL to 12.0	n BGL w 0m BGL	ith Rotary follow on c	complete at d from 12.0	15.00m BGL. 0m BGL to G	L. Finished with a flush cover.	Scale (approx)	-	ggeo RM

		Grou	nd In	vesti ww	gations Ire /w.gii.ie	land l	_td	Site St. Vincent's Fairview		N	orehole umber 3H19
	44 vater	+ Beretta	20	Diamete Omm cas			Level (mOD) 10.66	Client		N	ob umber 927-08-21
Method : C		ission follow on	Locatio 71		736718.3 N	Dates 12/ 13/	/10/2021- /11/2021	Engineer OCSC		S	heet 2/2
Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
11.00	100		-						00000000000000000000000000000000000000		
	87										
12.50	100					-2.74	13.40	Very stiff light brown slightly sandy slightly gravelly CLAY. Gravel is angular to subangular fine to coarse.			
14.00	15		-			-3.34 -4.34	14.00 (1.00) 15.00	Poor recovery: Recovery consists of brown gravelly SAND. Gravel is fine to coarse angular to subangular fine to coarse.			
								Complete at 15.00m			
Remarks									Scale (approx)		ogged y RM
									Figure N 10927-0	lo.	

	41		Casing 1	Diamete)mm cas	ed to 5.50m		Level (mOD) 10.47	Client		Job Num
Method : C w	able Percus ith Rotary fc	ssion ollow on	96r Locatio	nm case n	d to 21.50m 736724.8 N	Dates 12 13	/10/2021- /11/2021	Engineer OCSC		10927- Shee 1/
Depth (m)	Sample /	/ Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water ul
.50 .00-1.45 .00	B SPT(C) N B	N=11			1,2/2,3,3,3	10.27	(0.20) 0.20 0.20	TOPSOIL Firm brown slightly sandy slightly gravelly CLAY with grass rootlets. Gravel is subangular to subrounded fine to course.		
.00-2.45 .00	SPT(C) M B	N=14			2,3/4,3,3,4					
.00-3.45 .00	SPT(C) M B	N=35			3,5/7,9,9,10	7.77	2.70	Very stiff dark brown/grey slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse.		
.00-4.45 .00	SPT(C) M B	N=47			6,8/9,12,13,13		(2.80)			
.00-5.45 .00	SPT(C) M B TCR	N=33 SCR	RQD	FI	8,11/14,19					
.50 .50-6.65 .50	97		-		12,17/50 SPT 50/0	4.97		Very stiff brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse.		
.00-8.15 .00	60		_		9,18/50 SPT 50/0				0 0 0 0 0 0 0 0 0 0 0 0 0 0	
50-9.50 50	17		-		25/50 SPT 25*/0 50/0					
Remarks able percus	ssion drilling	g complet	ted at 5.50)m BGL v	vith Rotary follow on	complete a	at 21.50m BGL		Scale (approx)	Logg
o groundwa lotted stand hiselling fro	dpipe installe	ed from 2	21.50m to	18.5m B	GL. Finished with a r	aised cove	r.		1:50	RM

S		Grou	nd In		igations Ire ww.gii.ie	land	Ltd	Site St. Vincent's Fairview		Nu	rehole mber H20
Machine : Da T4 Flush : wa	1 ater	Beretta		0mm cas	er sed to 5.50m ed to 21.50m		Level (mOD) 10.47	Client			o mber 7-08-2
Core Dia: 63 Method : Ca wit		ssion ollow on	Locatio		736724.8 N		/10/2021- /11/2021	Engineer OCSC		Sh	eet 2/3
Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
11.00-11.08 - 11.00	100		_		21,4/50 SPT 25*/75 50/0		(10.00)				
	97				25/50				2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		
12.50-12.50 - 12.50	92		-		SPT 25*/0 50/0						
4.00-14.08 - 4.00	33				12,13/50 SPT 25*/75 50/0						
15.50-15.65 15.50			-		17,17/50 SPT 50/0	-5.03	15.50	Poor recovery: Recovery consists of subrounded to subangular medium to coarse GRAVELS. (Dense) [Driller notes: grey sand and gravel.			
17.00-17.08 17.00	25		-		20,5/50 SPT 25*/75 50/0	-6.53	(1.50)	Very stiff dark grey slightly sandy gravelly CLAY			
	56						(1.50)	with occasional subangular cobbles. Gravel is fine to coarse subangular and subrounded.	2010 1000		
18.50-18.58 18.50	80	73	72	NI	26/50 SPT 26*/75 50/0	-8.03 -8.38	18.50 (0.35) 18.85	Very weak fine to medium grained grey LIMESTONE. Highly weathered, mostly non-intact Medium-strong to strong thinly to thickly laminated grey fine to medium grained argillaceous LIMESTONE with calcite veins interbedded with medium to strong thinly laminated dark grey medium to fine grained MUDSTONE. Partially weathered. 2 sets of fractures. F1 5-15 degrees closely to			
20.00					-			medium spaced undulating rough occasionally open with clay smearing. F2		2000 0 0 0	
Remarks No groundwa	iter encour	ntered dur	ing drillin	g					Scale (approx)	Lo By	gged
									1:50 Figure N 10927-03	о.	RM BH20

				WV	gations Ire w.gii.ie			Site St. Vincent's Fairview		E	orehole umber 3H20
Machine : Dar T41 Flush : wat Core Dia: 63.4	1 ter	⊦ Beretta	20 96	mm case	r ed to 5.50m d to 21.50m		Level (mOD) 10.47				ob umber 027-08-2
Method : Cal with		ssion ollow on	Locatio 71		736724.8 N		/10/2021- /11/2021	Engineer OCSC			heet 3/3
Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
21.50	100	86	65	5		-11.03		70-80 degrees medium spaced undulating occasionally stepped rough with occasional clay smearing.			
Remarks No groundwat	ter encou	ntered dur	ing drillin	g					Scale (approx)	Lo B	ogged y
									1:50 Figure N 10927-0	No.	RM 1.BH20

				WW	gations Ire /w.gii.ie			St. Vincent's Fairview		В	umber 3H21
Machine : Da T ² Method : Ca	14		200		r ed to 5.10m d to 26.00m		Level (mOD) 11.18	Client			ob umbei 27-08-
	ith Rotary f		Locatio	n			2/10/2021-	Engineer		Sł	neet
				6766.1 E	736771.7 N	13	8/11/2021	OCSC			1/3
Depth (m)	Sample	/ Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Inst
							(0.30)	Brown sandy TOPSOIL			
						10.88	0.30	Firm brown slightly sandy slightly gravelly CLAY with rootlets. Gravel is subangular to subrounded			
.50	В							fine to course.	······································		
									• <u>; • • •</u> • •		
.00-1.45 .00	SPT N= B	10			1,2/2,2,3,3		(1.70)		••••••••••••••••••••••••••••••••••••••		
							E E		· · · · · · · · · · · · · · · · · · ·		
									· · · · · · · · · · · · · · · · · · ·		
						9.18	2.00		<u></u>		
.00-2.45 .00	SPT N= B	:11			2,3/2,2,3,4			Firm light brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to)		
							(0.80)	course.	······································		
						8.38	2.80				
	007.1	~ 1				0.30	2.00	Very stiff dark greyish brown slightly sandy slightl gravelly CLAY with subangular fine to coarse	y <u>, , , , , , , , , , , , , , , , , , ,</u>		
.00-3.45 .00	SPT N= B	:34			4,5/7,8,9,10			gravels.	<u> </u>		
									<u>, o o o o</u>		
									······································		
		50			7 40/44 40 40 4		(2.30)				
00-4.45 00	SPT N= B	:50			7,10/14,16,19,1				······································		
									<u></u>		
.00-5.38					13,12/50 SPT 50/225				······		
.00	TCR	SCR	RQD	FI	B	0.00	E		· · · · · · · · · · · · · · · · · · ·		
.10						6.08	5.10	Very stiff grey slightly sandy gravelly CLAY with subangular cobbles. Gravel is subangular to	0.0.0		
							E- -	subrounded fine to coarse.	0.0.0 0.0.0		
	32						E		<u>6 - 0 - 0 -</u> . <u>0 - 0 -</u> 0 -		
	02						(2.90)		0.00		
					6,6/8,14,17,11		E		<u>, 0, 0, 0</u> , 0,		
50-6.88 50					SPT 50/225		(2.90)		<u>6 0 0 0</u>		
							E `´		0 <u>.0</u> .0		
									· <u>0</u> ,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,		
	53								0 <u>.0</u> 0 0 <u>.0</u> 0 0 0		
									0 <u>.0</u> 0		
					12,12/50				<u>, , , , , , , , , , , , , , , , , , , </u>		
00-8.15 00					SPT 50/0	3.18	8.00	Very stiff brown slightly sandy slightly gravelly	0 0,0 0 0,0		
							-	CLÁY with occasional subangular cobbles.			
							E		<u>6.0.0</u>		
	100								10 0 0 0		
							E		<u>6 • 0 0 •</u>		
E0.0.50					22,3/50				0.000		
50-9.58 50					SPT 25*/75 50/0						
									6 <u>.0</u> 0		
Remarks	ater encou	ntered dur	ing drilling	q .			<u> </u>	1	Scale (approx)	Lc	ogge
able percus	ssion drillir	na complet	e at 5.10r	n BGL wi	th Rotary follow on c Im BGL with plain pi	complete at pe from 13	26.00m BGL .50m BGL to 0	GL. Finished with a raised cover.	(approx)		r M
									1.50		i XIVI

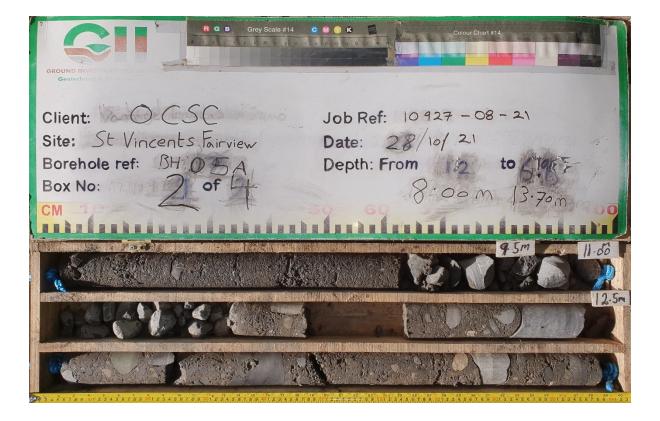
Machine : Da	ando 150 -		Casing	W	igations Ire vw.gii.ie _r		LIQ Level (mOD)	St. Vincent's Fairview Client		Numbe BH2 Job
T4 Flush : wa			20	0mm cas	ed to 5.10m to 26.00m		11.18			Numbe
Core Dia: 63	5.5 mm		96 Locatio		ed to 26.00m	Dates		Engineer		Sheet
Method : Ca wit	able Percu th Rotary f	ssion follow on.			736771.7 N	12	2/10/2021- 3/11/2021	Engineer OCSC		2/3
Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	_egend	Nater Rater
	99				25/50		(4.50)	ער איז איז איז ער ער ער ער ער ער ער ער ער ער ער ער ער	2010 2010	
1.00-11.00 1.00	40				SPT 25*/0 50/0			ار باری باری در ایر در مار در مار در در در مار در در مار در مار در مار در در مرم در مرم در مرم در مرم در مرم در مرم مرم		
12.50-12.88 12.50					5,10/12,25,13 SPT 50/225	-1.32		Poor recovery. Recovery consists of brown slightly sandy gravelly CLAY. Gravel is medium to coarse subangular.(Very stiff) [Driller's notes: yellow		
	9						(1.50)	subangular.(Very stiff) [Driller's notes: yellow brown silty sandy gravels]		
14.00-14.38 _ 14.00	10				8,14/14,21,15 SPT 50/225	-2.82	14.00	Poor recovery, Recovery consists of firm slightly sandy gravelly CLAY. (Dense) [Driller's notes: Grey sands and gravels]		
15.50-15.65 _ 15.50					14,15/18,32 SPT 29*/0 50/150	-4.32	15.50	Poor recovery. Recovery consists of firm slightly sandy slightly gravelly CLAY with occasional subangular cobble. Gravel is subangular medium to coarse. (Very stiff) [Driller's notes: sandy		
	20				17 15/50		(1.50)	subangular cooble. Gravel is subangular medium to coarse. (Very stiff) [Driller's notes: sandy gravelly CLAY]		
17.00-17.15 17.00	30				17,15/50 SPT 50/0	-5.82		Firm to stiff dark grey slightly sandy gravelly CLAY with some subangular cobbles. Gravel is subangular to subrounded fine to coarse.	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
8.50-18.58 8.50					22,4/50 SPT 26*/75 50/0			0		
	49						(5.50)			
0.00							<u> </u>		0 0 0 0 0	****
Remarks								s (ap	Scale oprox)	Logge By
									1:50	RM
									igure No 0927-08	0.

	2		1	WV	igations Ire vw.gii.ie			Site St. Vincent's Fairview		N E	orehole umber 3H21
Machine : Da T4 Flush : wa Core Dia: 63	4 ater	+ Bertta	20 96	mm case	er sed to 5.10m ed to 26.00m		Level (mOD) 11.18			N 109	ob umber 927-08-2
Method : Ca wit	able Percu th Rotary f	ission follow on.	Locatio 71		736771.7 N		2/10/2021- 3/11/2021	Engineer OCSC		S	heet 3/3
Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Insti
21.50-21.50 11.50 22.50 23.00 24.50	47 60 93 100	9 36 29 67	13	30	25/50 50/0 25/50 SPT 25*/0 50/0	-11.32	(1.60) 24.10 (1.90)	Weak to medium strong grey LIMESTONE with calcite veins interbedded with weak MUDSTONE Distinctly weathered. 2 sets of fractures. F1: 0-15 degrees very closely to closely spaced undulating rough with class smearing. F2: 45-90 degrees medium spaced undulating rough with occasional clay smearing. Strong grey LIMESTONE with pyrite and calcite veins interbedded with weak to medium strong MUDSTONE. Partially weathereed. 2 sets of fractures. F1 5-20 degrees extremely closely to closely spaced undulating rough occasionaly stepped with clay smearing. F2 70-90 degrees very closely to medium spaced undulating rough. Complete at 26.00m			
Remarks									Scale (approx)	B	ogged Y
									1:50 Figure N 10927-0		RM 1.BH21

Depth Sample / Tests Chains brows Field Records Locol 4 Description Lageer I 100-1.45 SPT N=12 I	T ²	able percussio	on		Diamete)mm cas	/W.gii.ie r ed to 5.50m d to 15.50m		Level (mOD) 10.52	Client			ob umbe 27-08-
Image: constraint of the second sec	WI	ith Rotary folic	ow on			736765.6 N	12				Sł	neet 1/2
.00-1.45 SPT N=12 2.203.3.3 Find brown slightly sandy slightly gravely CLAY C.T.T. .00-1.45 SPT N=13 2.303.4.3.3	Depth (m)	Sample / T	ests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Inst
0.0-3.45 SPT N=33 4.5/5,7.10,11 7.82 2.70 Very stiff dark provise brown slightly sandy slightly gravelly 0.0-4.45 SPT N=38 6.9/10,13,15,16 2.50 E 5.00 0.0-5.45 SPT N=38 8.9/10,13,15,16 5.52 5.00 E 5.00 0.0-5.45 SPT N=38 8.9/10,13,15,16 4.22 5.00 5.52 5.00 0.0-5.45 SPT N=38 8.117,19 4.42 6.10 E 6.10 0.0-5.45 SPT N=38 8.117,19 4.42 6.10 E 1.10 50-6.58 80 9.17/50 9.12 6.10 E 1.12 50-8.68 80 9.19/50 1.42 9.10 E 9.10 50-9.65 9.00 1.142 9.10 1.42 9.10 E 9.10 Very stiff dark brown slightly sandy graveliy (CLW) 1.42 9.10 E 1.42 9.10 50.9 1.14	.00-1.45	SPT N=12				2,2/3,3,3,3	10.32		Firm brown slightly sandy slightly gravelly CLAY with rootlets. Gravel is angular to subangular fine			
OU-3.45 SPT N=33 4.5/5.7.10,11 Very stiff dark brown slightly sandy	.00-2.45	SPT N=13				2,3/3,4,3,3						
SPT N=54 6.9/10.13.15.16 SPT N=36 SPT N=36 TCR SCR RQD FI 1:00-5.45 5:00 47 47 1:50-6.58 80 80 1:00-8.08 1:50-0.65 68 1:50-0.65	.00-3.45	SPT N=33				4,5/5,7,10,11	7.82	2.70	gravelly CLAY. Gravel is subrounded to angular			
00-5.45 SPT N=36 4.80m, rose to 4.80m, rose to 4.80m, rose to 8.11/17, 19 5.52 5.00 Dense brown slightly clayey slightly sandy GRAVEL. Gravel is fine to coarse subangular to Subrounded. 50 47 8.17/50 1.10 47 8.17/50 SPT 25/75 50 80 68 19/50 00-8.08 68 68 11/17, 18/50 50-9.65 17, 18/50 50 17, 18/50 SPT 50/0 1.42 9.10 Very stiff dark brown slightly sandy slightly gravelly CLAY with occasional subangular fine to coarse. 68 11, 18/50 50-9.65 17, 18/50 50 17, 18/50 SPT 50/0 1.42	.00-4.45	SPT N=54				6,9/10,13,15,16		(2.30)			▼ 1	
47 4.42 6.10 50-6.58 817/50 50 817/50 SPT 25*775 CLAY with occasional subangular cobbles. Gravelis subrounded to subangular fine to coarse. 80 19/50 0.0-8.08 19/50 68 19/50 50-9.65 17,18/50 50-9.65 17,18/50 50-9.65 17,18/50			SCR	RQD	FI	4.80m, rose to 4.30m in 20 mins.	5.52				⊻1	
80 19/50 (3.00) 00-8.08 19/50 .00 SPT 19*/75 50/0 17.18/50 50-9.65 17.18/50 .50 17.18/50	.50-6.58	47				SPT 25*/75	4.42	 	Very stiff brown slightly sandy slightly gravelly CLAY with occasional subangular cobbles. Gravel is subrounded to subangular fine to coarse.	a a a a a a a a a a a a a a a a a a a		
68 17,18/50 9.10 Very stiff dark brown slightly sandy gravelly CLAY with occasional subangular fine to coarse. 50-9.65 17,18/50		80				19/50		(3.00)		၀ (၀) (၀) (၀) (၀) (၀) (၀) (၀) (၀) (၀) (၀		
50-9.65 17,18/50 with occasional subangular cobbles. Gravel is subrounded and subangular fine to coarse. 50 SPT 50/0	00	68					1 42	9 10		କର୍ଥ୍ୟ କର୍ଯ୍ୟ କର୍ଯ୍ୟ ଜାବସାସ କର୍ଯ୍ୟ କର୍ଯ୍ୟ କର୍ଯ୍ୟ କର୍ଯ୍ୟ କର୍ଯ୍ୟ କର୍ଯ୍ୟ କର୍ଯ୍ୟ		
Remarks						17,18/50 SPT 50/0	1.42	3.10	Very stiff dark brown slightly sandy gravelly CLAY with occasional subangular cobbles. Gravel is subrounded and subangular fine to coarse.			
o groundwater encountered during drilling. able percussion drilling complete at 5.50m BGL with Rotary follow on complete at 15.50m BGL.	o aroundwa	ater encounter	red dur	ing drilling	j.					Scale (approx)	Lc B'	ogge /

nine : Dan T44 n : wate	ido 150 +		Casing	WN Diamete	sed to 5.50m	Ground	Level (mOD) 10.52	St. Vincent's Fairview Client		J	3H22 ob umber
Dia: 63.5			96	mm case	ed to 15.50m						927-08-2
od : Cab with	le percus Rotary f	ssion ollow on	Locatio 71		736765.6 N		/10/2021- /11/2021	Engineer OCSC		S	heet 2/2
epth m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Inst
)-11.08)-12.80)-14.08	83 43 30 17				21,4/50 SPT 25*/75 50/0 15,12/17,33 SPT 50/150 18/50 SPT 18*/75 50/0	-1.48 -1.98 -3.48 -4.98		Very stiff light brown slightly sandy slightly gravelly CLAV with occasional subangular cobbles. Gravel is subrounded and subangular fine to coarse. Dense sandy subangular fine to coarse GRAVEL with subrounded to subangular cobbles.			
narks			1				1		Scale (approx)	L	ogged Y
									1:50		RM
									Figure N		1 3171

ale #14 🛛 🖸 🕜 🔀 Client: CCSC Job Ref: 10 927 - 08 - 21 Site: St Vincents Fairview Date: 28/10/21 Borehole ref: BH OFA Depth: From to Box No: CM



BH05A





C 🛯 🕥 K Job Ref: 10927-08-21 Client: VanOCSC Scherker Jenno Site: SE Vincents Fairview Date: 2 / 10/21 Borehole ref: 18H6 000 Depth: From 5 0 m to 10 Box No: of 2 CM II DE LE DE 11.0

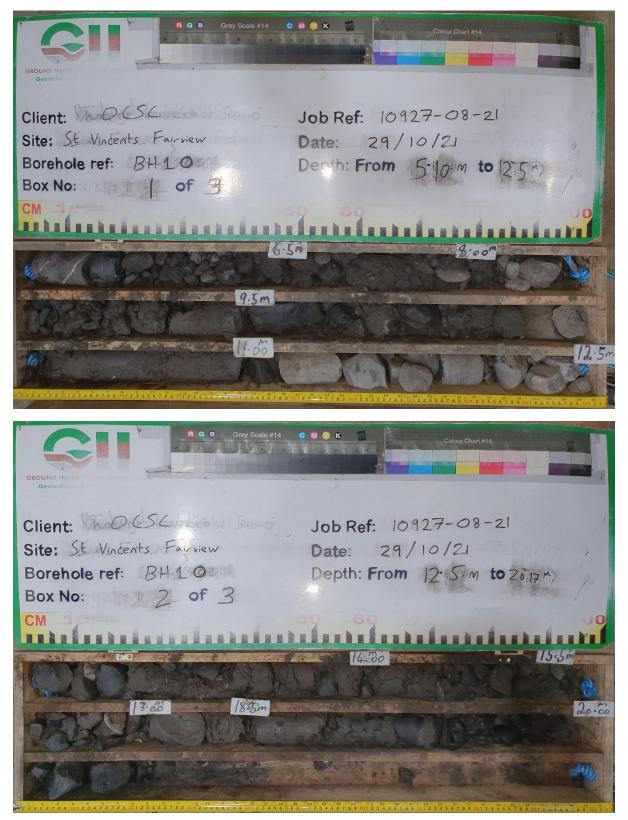


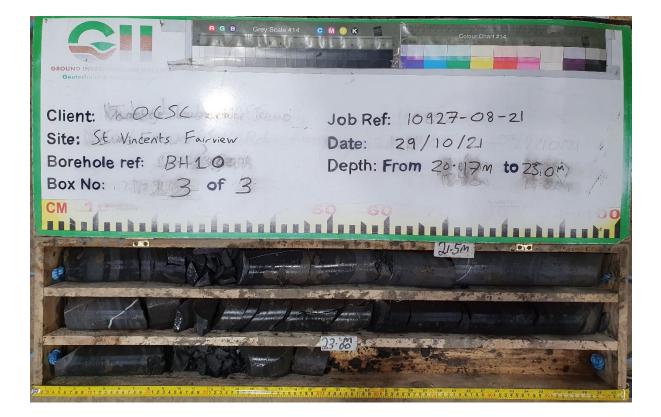
BH06

BH07

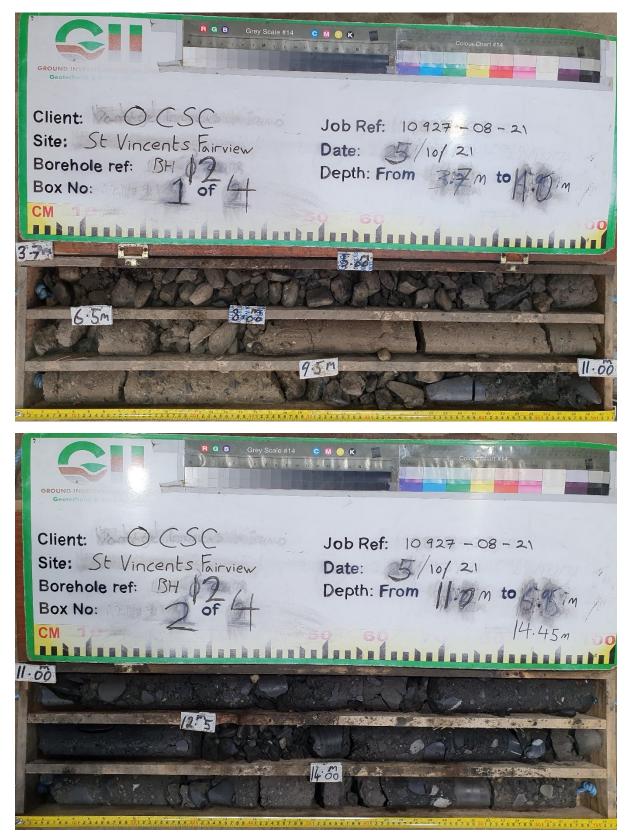






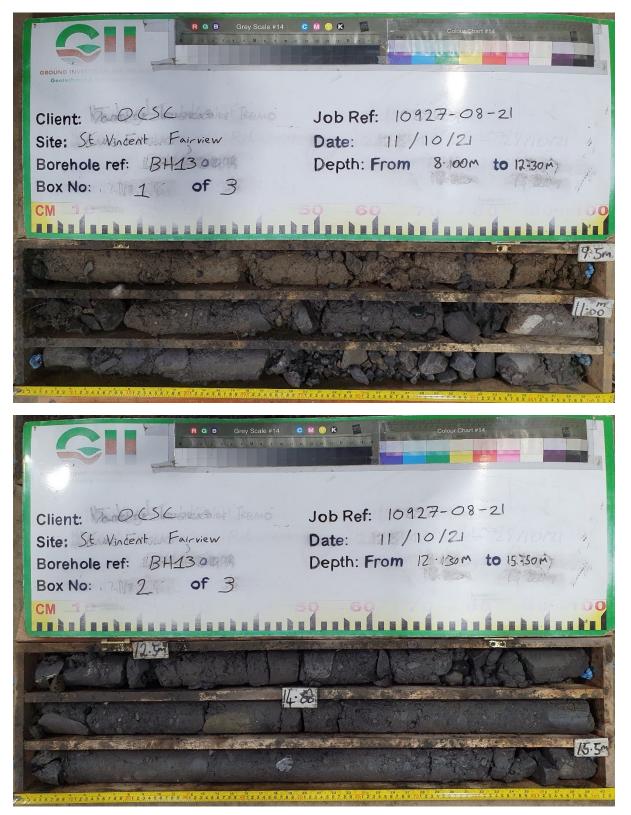


BH12





BH13



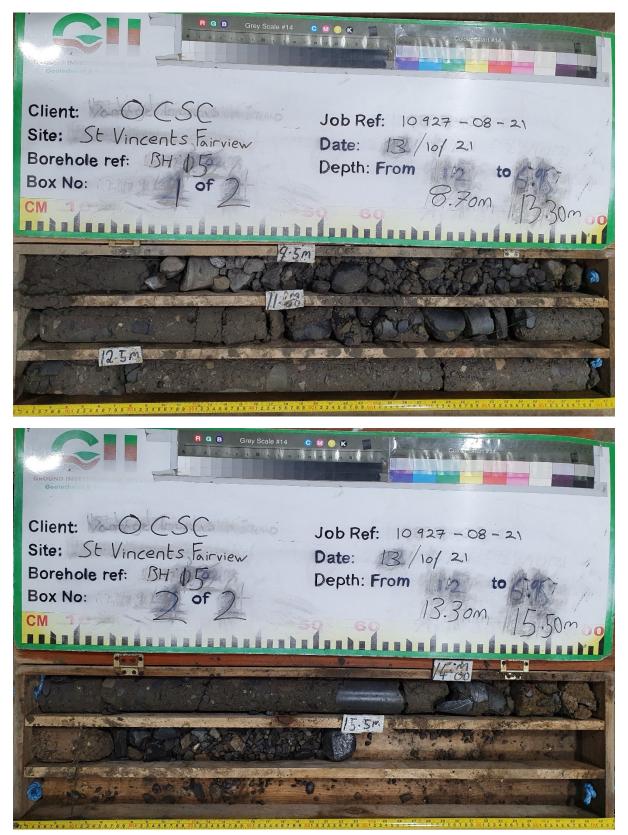


BH14

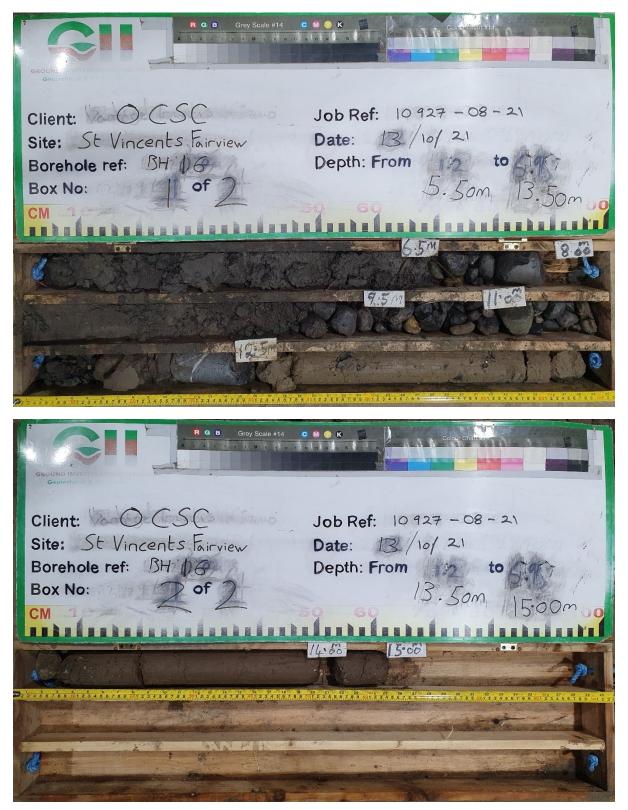
GROUND INVESTIGATION COLOR OF CONTRACT OF COLOR OF COLORO
Client: OCSC Job Ref: 10 927 - 08 - 21
Site: St Vincents Fairview Date: 12/10/21
Borehole ref: BH 14 Depth: From 12 to 19
Box No: 0f2 5.10m 12.15m
5.Im
B.60
150 II.00

GROUND INVESTIGATION OF CONTROL O	Colour Chart #14
Client: COCSC	Job Ref: 10 927 - 08 - 21
Site: St Vincents Fairview Borehole ref: BH 14 Box No: Of O	Date: 12/10/21 Depth: From 12 to 6.95 12.15m 15:0m
14.00	15 00

BH15



BH16

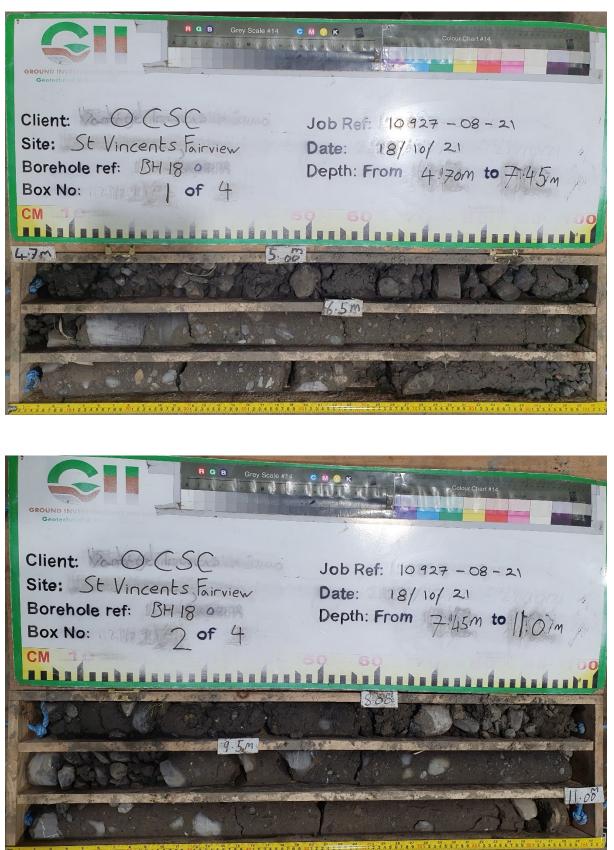




BH17

Colour Chart #14
GROUND INVESTIGATIONS INTO A STATE OF A STAT
Client: 10 0 CSC Job Ref: 10 927 - 08 - 21
Site: St Vincents Fairview Date: 13/10/21
Borehole ref: BH 177 Depth: From 12 to 5.47
Box No: 3 of 3 22.50 25.30m
CM
2350
A grand to the second s
A A A A A A A A A A A A A A A A A A A
2.5.3m

BH18

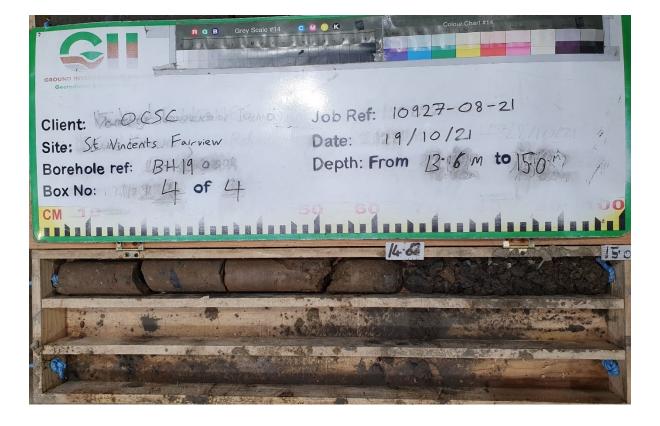






BH19



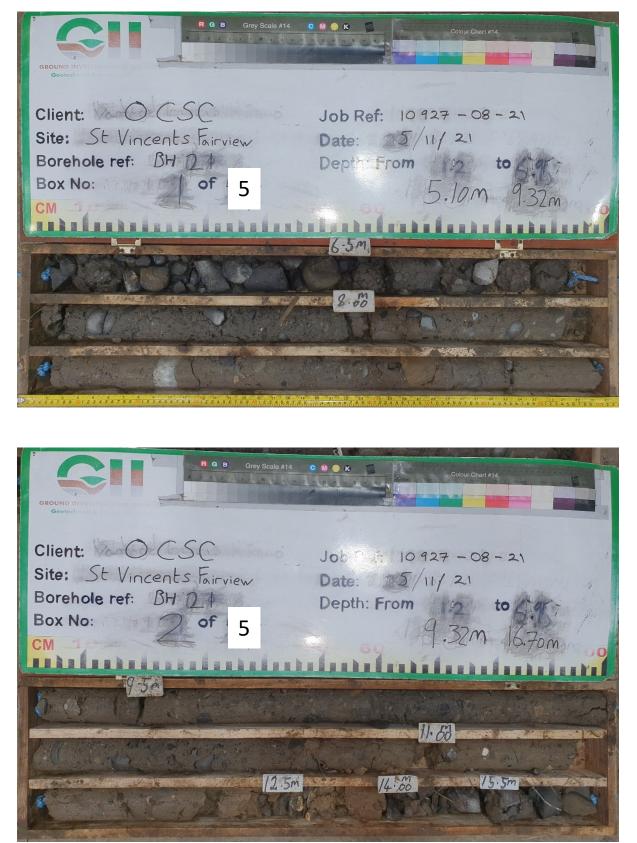


BH20





BH21

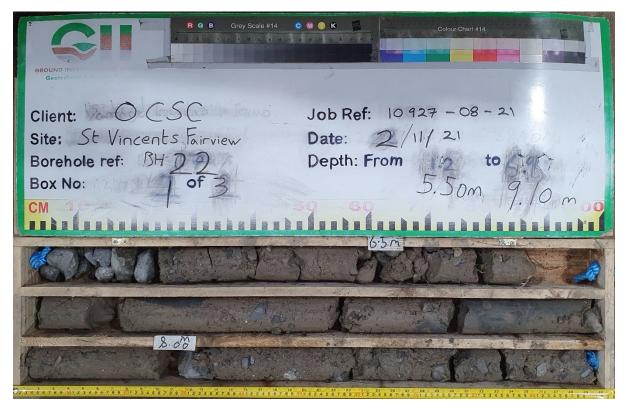


GROUND INVESTIGATION Geotechning & Revenues	Colour Chart #14
Client: OCSC Site: St Vincents Fairview Borehole ref: BH 24 Box No: Of 5	Job Ref: $10927 - 08 - 21$ Date: $5/11/21$ Depth: From 2 to 197 16.70M 21.50M
	Lo foo
CAR ASSA	No BOOL LIST



GROUND INVESTIGATE
Client: OCSC Site: St Vincents Fairview Borehole ref: BH 24 Box No: 5 of 5 CM Job Ref: $10927 - 08 - 21$ Date: $5/11/21$ Depth: From 2 to 50 25.0M 26.0M

BH22



GROUND INV
Geotechniel
Client: OCSC Job Ref: 10 927 - 08 - 21
Site: St Vincents Fairview Date: 2/11/21
Borehole ref: BH D Depth: From 12 to 100
Box No: 2 of 3 9.10m 1250 m
CM 12.24 M 00
9.50
12.5m
29456789.10723436749.20123458789.00123456789.00123458789.00123458789.00123458789.00123458789.00123458789.00000000000000000000000000000000000

St Vincents Fairview – Rotary Core Photos -10927-08-21

GROUND INVESTIGATION AND AND AND AND AND AND AND AND AND AN	Colour Chart #14
Client: OCSC Site: St Vincents Fairview Borehole ref: BH 22 Box No: OF 3	Job Ref: $10927 - 08 - 21$ Date: $2/11/21$ Depth: From 12 to 15.50 m 0
CONTRACTOR OF THE SECOND	

APPENDIX 6 – Plate Bearing Test Records



Applied Load	Gauge settlement
0	0.000
34.5	-0.75
69	-1.595
138	-3.14
0	-2.33
69	-2.83
138	-3.33
0	-2.595

St. Vincents Fairview

10927-08-21

14/09/2021

OCSC

457mm

CBR-01

LOCATION

DATE

CLIENT

TEST NO.

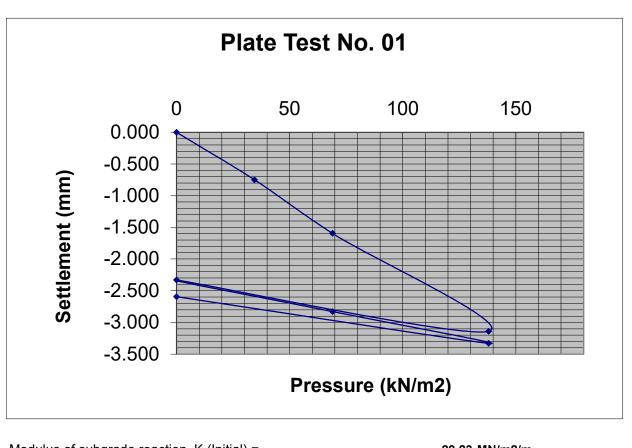
CONTRACT NO.

PLATE DIAMETER



MADE GROUND: Brown slightly sandy slightly gravelly Clay.

0.30m



MATERIAL

DEPTH

NOTES

SAMPLES

Modulus of subgrade reaction, K (Initial) =	29.23 MN/m2/m
Modulus of subgrade reaction, K (Reload) =	93.25 MN/m2/m
Equivalent CBR(initial)in accordance with HD25/94 volume7 section2	2 = 3.35 %
Equivalent CBR(reload)in accordance with HD25/94 volume7 section	n2 = 24.99 %

Applied Load	Gauge settlement
0	0.000
34.5	-0.9
69	-1.88
138	-3.175
0	-2.29
69	-2.96
138	-3.33
0	-2.6

10927-08-21

14/09/2021

OCSC

LOCATION

DATE

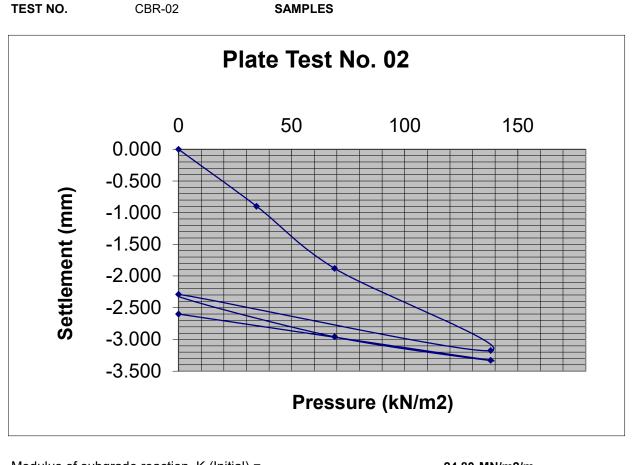
CLIENT

CONTRACT NO.

PLATE DIAMETER 457mm



St. Vincents Fairview MADE GROUND: Dark brown slightly MATERIAL sandy slightly gravelly Clay. 0.30m DEPTH



NOTES

Modulus of subgrade reaction, K (Initial) =	24.80 MN/m2/m
Modulus of subgrade reaction, K (Reload) =	69.59 MN/m2/m
Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 =	2.52 %
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 =	= 15.05 %

Applied Load	Gauge settlement
0	0.000
34.5	-0.97
69	-1.72
138	-3.37
0	-2.06
69	-2.88
138	-3.705
0	-2.425

St. Vincents Fairview

10927-08-21

14/09/2021

OCSC

457mm

CBR-03

LOCATION

DATE

CLIENT

TEST NO.

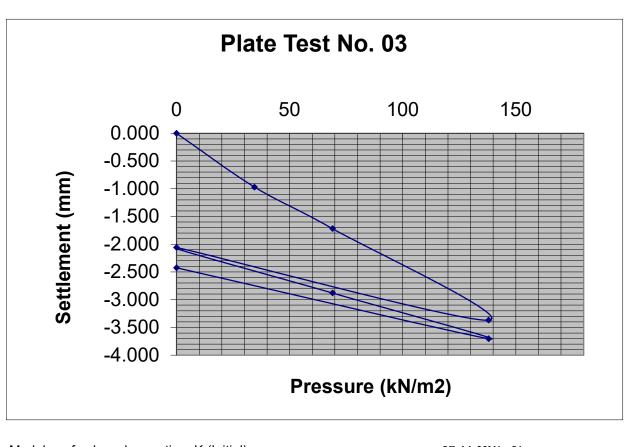
CONTRACT NO.

PLATE DIAMETER



MADE GROUND: Brown slightly sandy slightly gravelly Clay.

0.30m



MATERIAL

DEPTH

NOTES

SAMPLES

Modulus of subgrade reaction, K (Initial) =	27.11 MN/m2/m
Modulus of subgrade reaction, K (Reload) =	56.86 MN/m2/m
Equivalent CBR(initial)in accordance with HD25/94 v	volume7 section2 = 2.94 %
Equivalent CBR(reload)in accordance with HD25/94	volume7 section2 = 10.60 %

APPENDIX 7 – Laboratory Testing





Element Materials Technology Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA P: +44 (0) 1244 833780 F: +44 (0) 1244 833781

W: www.element.com

Ground Investigations Ireland Catherinestown House Hazelhatch Road Newcastle Co. Dublin Ireland ac-MR Attention : Mike Sutton Date : 27th September, 2021 Your reference : 10927-08-21 Our reference : Test Report 21/14659 Batch 1 St. Vincents Location : Date samples received : 18th September, 2021 Status : Final Report 1 Issue :

Five samples were received for analysis on 18th September, 2021 of which two were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

HAPman

Hayley Prowse Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name:
Reference:
Location:
Contact:
EMT Job No:

Ground Investigations Ireland 10927-08-21 St. Vincents Mike Sutton 21/14659

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

ENT JOD NO.	21/14039								
EMT Sample No.	4	11							
Sample ID	TP01	TP07							
Depth	1.50	1.20					Discos		
COC No / misc							Please se abbrevi	e attached n ations and a	otes for all cronyms
Containers	т	т							
Sample Date		16/09/2021							
Sample Type	Soil	Soil							
Batch Number	1	1							Method
Date of Receipt	18/09/2021	18/09/2021					LOD/LOR	Units	No.
Sulphate as SO4 (2:1 Ext) [#]	0.0094	0.0124					<0.0015	g/l	TM38/PM20
#	0.70	0.55							THE (D) (44
рН [#]	8.72	8.55					<0.01	pH units	TM73/PM11

Element Materials Technology

Client Name:Ground Investigations IrelandReference:10927-08-21Location:St. VincentsContact:Mike Sutton

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason				
	No deviating sample report results for job 21/14659									

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 21/14659

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

EMT Job No.: 21/14659

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

ABBREVIATIONS and ACRONYMS USED

ISO17025 (UKAS Ref No. 4225) accredited - UK.
ISO17025 (SANAS Ref No.T0729) accredited - South Africa
Indicates analyte found in associated method blank.
Dilution required.
MCERTS accredited.
Not applicable
No Asbestos Detected.
None Detected (usually refers to VOC and/SVOC TICs).
No Determination Possible
Calibrated against a single substance
Surrogate recovery outside performance criteria. This may be due to a matrix effect.
Results expressed on as received basis.
AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
Analysis subcontracted to an Element Materials Technology approved laboratory.
Samples are dried at 35°C ±5°C
Suspected carry over
Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
Matrix Effect
No Fibres Detected
AQC Sample
Blank Sample
Client Sample
Trip Blank Sample
Outside Calibration Range

HWOL ACRONYMS AND OPERATORS USED

[
HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

Element Materials Technology

EMT Job No: 21/14659

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013I	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377- 3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No

Method Code Appendix



Element Materials Technology Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA P: +44 (0) 1244 833780 F: +44 (0) 1244 833781

W: www.element.com

Ground Investigations Ireland Catherinestown House Hazelhatch Road Newcastle Co. Dublin Ireland ac-MR Attention : Mike Sutton Date : 8th December, 2021 Your reference : 10927-08-21 Our reference : Test Report 21/18949 Batch 1 St Vincents Location : Date samples received : 30th November, 2021 Status : Final Report 1 Issue :

Ten samples were received for analysis on 30th November, 2021 of which ten were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

Phil Sommerton BSc Senior Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name:
Reference:
Location:
Contact:
EMT Job No:

Ground Investigations Ireland 10927-08-21 St Vincents Mike Sutton 21/18949

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Job No:	21/18949										_		
EMT Sample No.	1	2	3	4	5	6	7	8	9	10			
Sample ID	BH03	BH03	BH01	BH12	BH13	BH16	BH16	BH19	BH22	BH22			
Depth	1.00	3.00	2.40	1.00	2.00	1.00	4.00	4.00	1.00	2.00	Please se	e attached n	otes for all
COC No / misc											abbrevi	ations and a	cronyms
Containers	т	т	т	т	т	т	т	т	т	т			
Sample Date	26/11/2021	26/11/2021	26/11/2021	26/11/2021	26/11/2021	26/11/2021	26/11/2021	26/11/2021	26/11/2021	26/11/2021			
Sample Type	Soil												
Batch Number	1	1	1	1	1	1	1	1	1	1	LOD/LOR	Units	Method No.
Date of Receipt							30/11/2021				-0.0045		
Sulphate as SO4 (2:1 Ext) [#]	0.0104	0.0113	0.0126	0.0208	0.2011	0.0173	0.3145	0.2302	0.1231	0.0473	<0.0015	g/l	TM38/PM20
рН #	8.79	8.86	8.85	8.30	8.20	8.12	8.07	8.16	8.00	8.05	<0.01	pH units	TM73/PM11

Element Materials Technology

Client Name:Ground Investigations IrelandReference:10927-08-21Location:St VincentsContact:Mike Sutton

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason						
	No deviating sample report results for job 21/18949											

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 21/18949

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

EMT Job No.: 21/18949

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
со	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
ТВ	Trip Blank Sample
ос	Outside Calibration Range

HWOL ACRONYMS AND OPERATORS USED

[
HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

Element Materials Technology

EMT Job No: 21/18949

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
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ТМ73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377- 3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No



LABORATORY REPORT



4043

Contract Number: PSL21/9612

Report Date: 26 January 2022

Client's Reference: 10927-08-21

Client Name: Ground Investigations Ireland Ltd Catherinestown House Hazelhatch Road Newcastle Co Dublin D22 YD52

For the attention of: Michael Sutton

Contract Title:St Vincent's FairviewDate Received:8/12/2021Date Commenced:8/12/2021Date Completed:26/1/2022

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

A Watkins (Director) R Berriman (Quality Manager) S Royle (Laboratory Manager)

£##

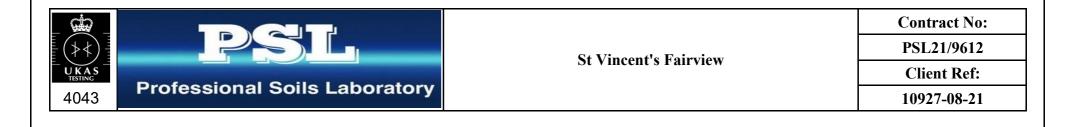
L Knight (Assistant Laboratory Manager) S Eyre (Senior Technician) T Watkins (Senior Technician)

Page 1 of

5 – 7 Hexthorpe Road, Hexthorpe, Doncaster DN4 0AR tel: +44 (0)844 815 6641 fax: +44 (0)844 815 6642 e-mail: rberriman@prosoils.co.uk awatkins@prosoils.co.uk

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
BH01		В	2.40		Brown silty sandy GRAVEL with many cobbles.
BH03		В	1.00		Brown slightly sandy gravelly CLAY.
BH03		В	3.00		Brown clayey sandy GRAVEL of cobbles.
BH06		В	0.50		Brown slightly sandy gravelly CLAY.
BH10		В	0.50		Brown sandy gravelly CLAY.
BH12		В	1.00		Brown slightly sandy slightly gravelly CLAY.
BH13		В	2.00		Brown slightly sandy gravelly CLAY.
BH16		В	1.00		Brown slightly sandy slightly gravelly CLAY.
BH16		В	4.00		Brown mottled grey slightly sandy gravelly CLAY.
BH17		В	3.00		Brown slightly sandy slightly gravelly CLAY.
BH19		В	1.00		Brown slightly sandy gravelly CLAY.
BH19		В	4.00		Grey slightly sandy gravelly CLAY.
BH21		В	0.50		Brown slightly sandy slightly gravelly CLAY.
BH22		В	1.00		Brown slightly sandy slightly gravelly CLAY.
BH22		В	2.00		Brown slightly sandy gravelly CLAY.



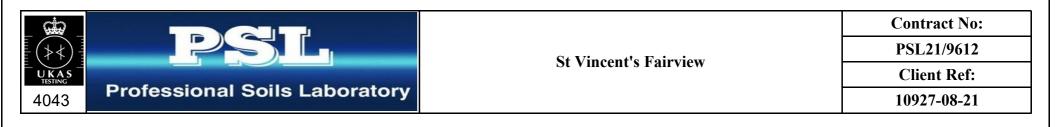
SUMMARY OF SOIL CLASSIFICATION TESTS

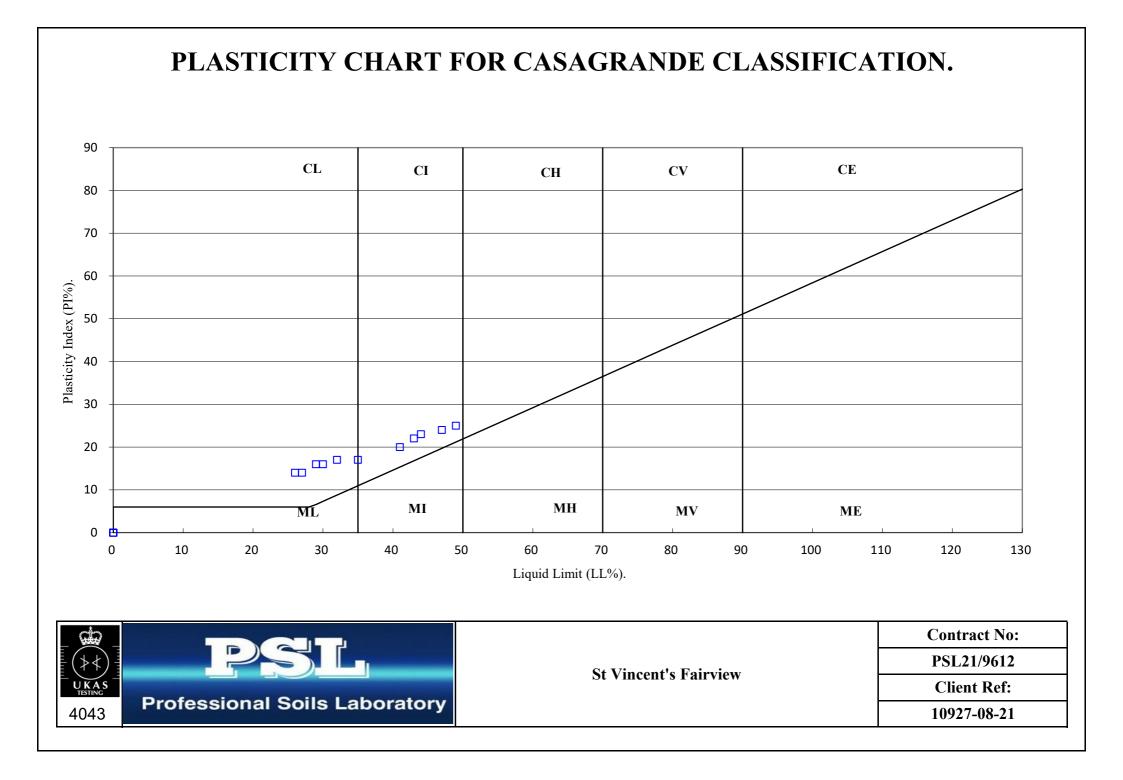
(BS1377 : PART 2 : 1990)

					Moisture	Linear	Particle	Liquid	Plastic	Plasticity	Passing	
Hole	Sample	Sample	Тор	Base	Content	Shrinkage	Density	Limit	Limit	Index	.425mm	Remarks
Number	Number	Туре	Depth	Depth	%	%	Mg/m ³	%	%	%	%	
			m	m	Clause 3.2	Clause 6.5	Clause 8.2	Clause 4.3/4	Clause 5.3	Clause 5.4		
BH01		В	2.40		7.3				NP			
BH03		В	1.00		13			29	13	16	52	Low Plasticity CL
BH06		В	0.50		22			49	24	25	49	Intermediate Plasticity CI
BH13		В	2.00		14			27	13	14	50	Low Plasticity CL
BH16		В	1.00		16			43	21	22	57	Intermediate Plasticity CI
BH16		В	4.00		9.5			30	14	16	44	Low Plasticity CL
BH17		В	3.00		16			32	15	17	53	Low Plasticity CL
BH19		В	1.00		20			35	18	17	47	Intermediate Plasticity CI
BH19		В	4.00		11			26	12	14	48	Low Plasticity CL
BH21		В	0.50		20			44	21	23	66	Intermediate Plasticity CI
BH22		В	1.00		17			47	23	24	54	Intermediate Plasticity CI
BH22		В	2.00		22			41	21	20	49	Intermediate Plasticity CI

SYMBOLS : NP : Non Plastic

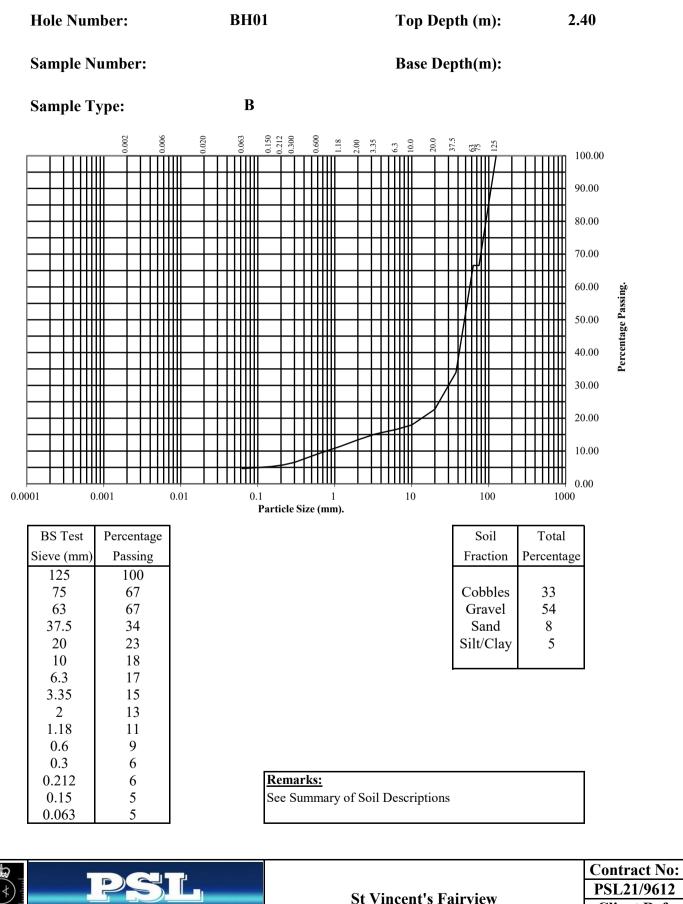
*: Liquid Limit and Plastic Limit Wet Sieved.





BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2



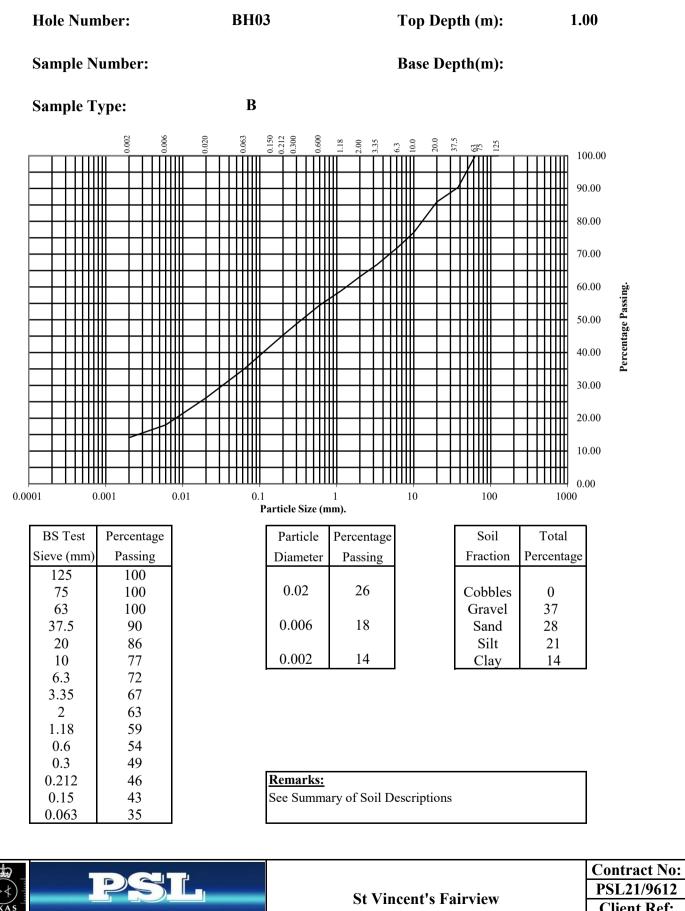
Professional Soils Laboratory

4043

Client Ref: 10927-08-21

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4



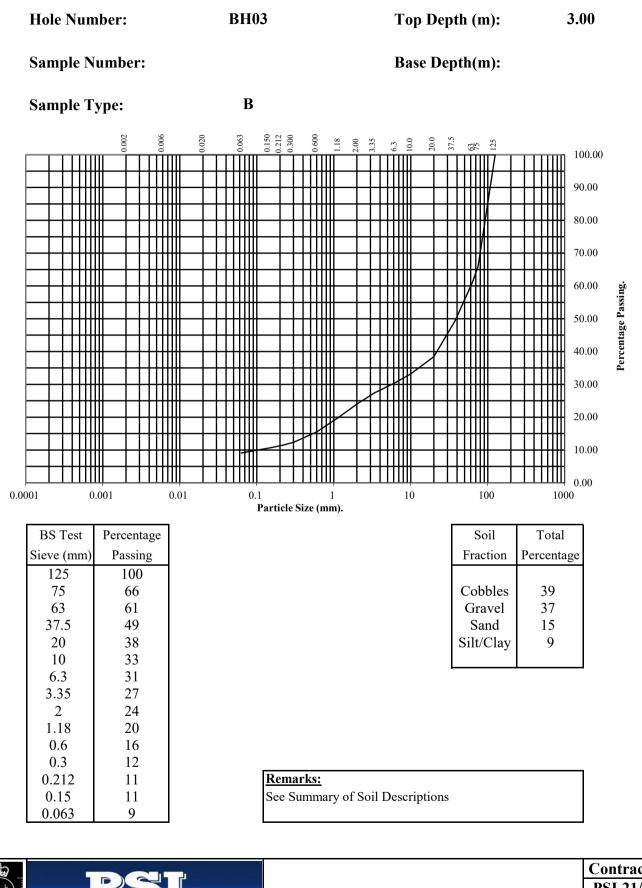
Professional Soils Laboratory

4043

Client Ref: 10927-08-21

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

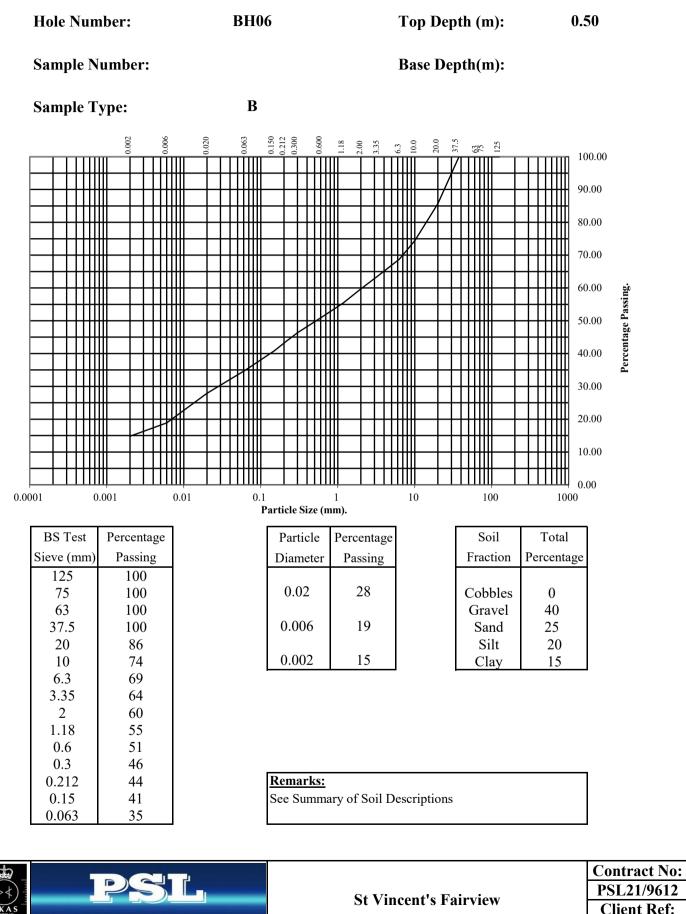






BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4



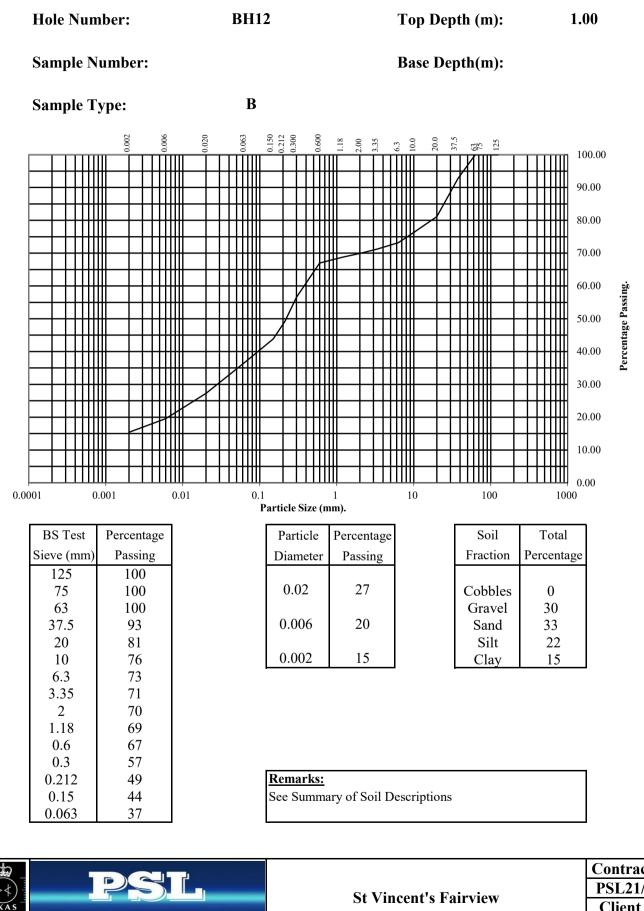
Professional Soils Laboratory

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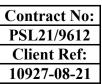
BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4



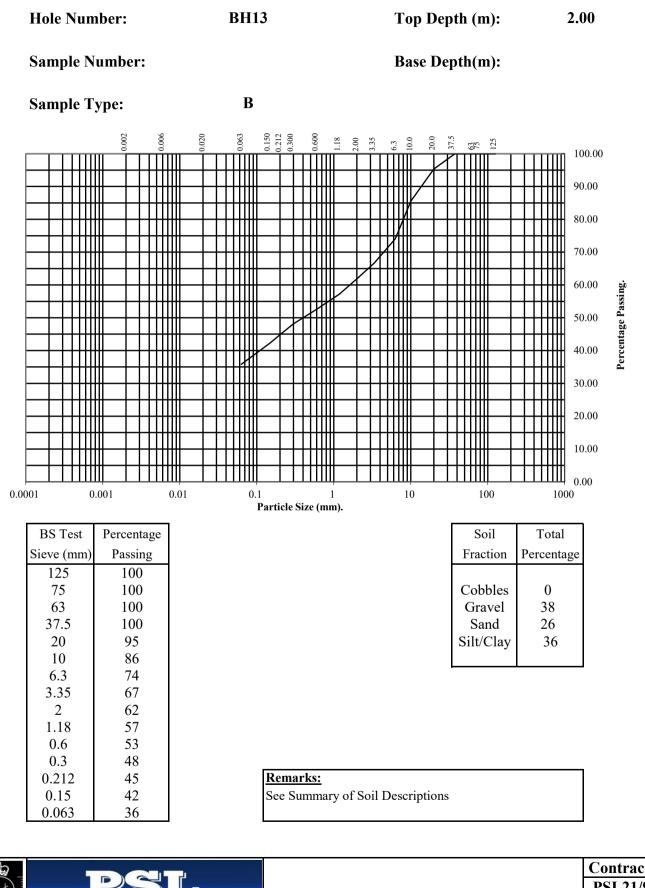
Professional Soils Laboratory

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BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

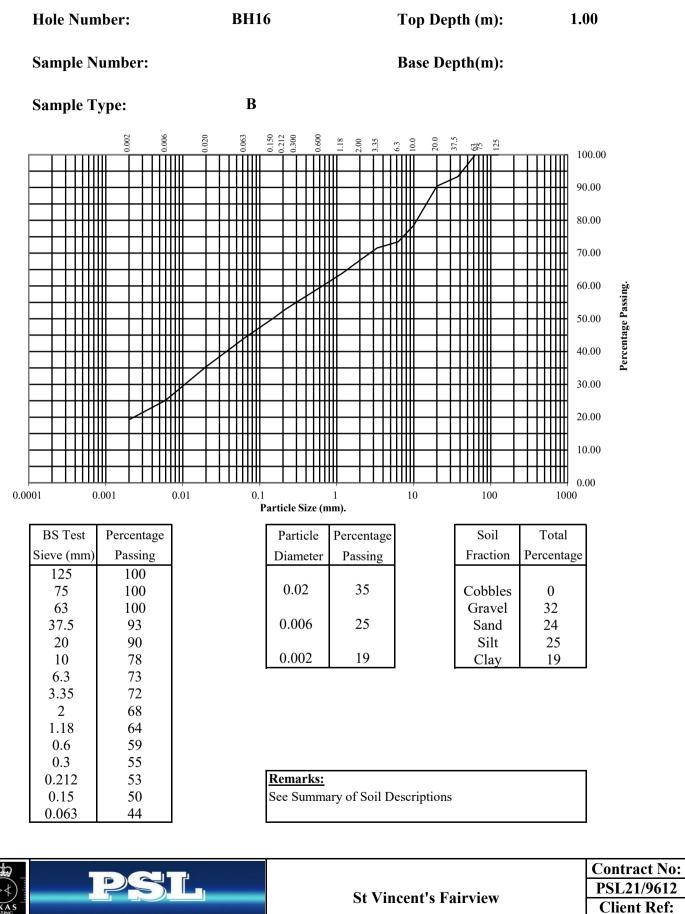






BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4



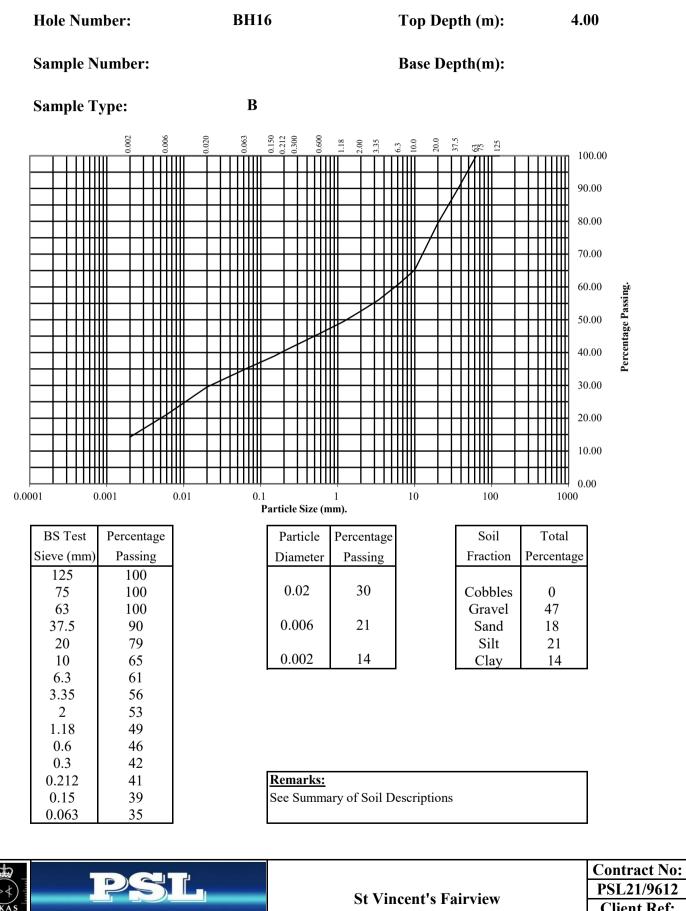
10927-08-21

Professional Soils Laboratory

4043

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4



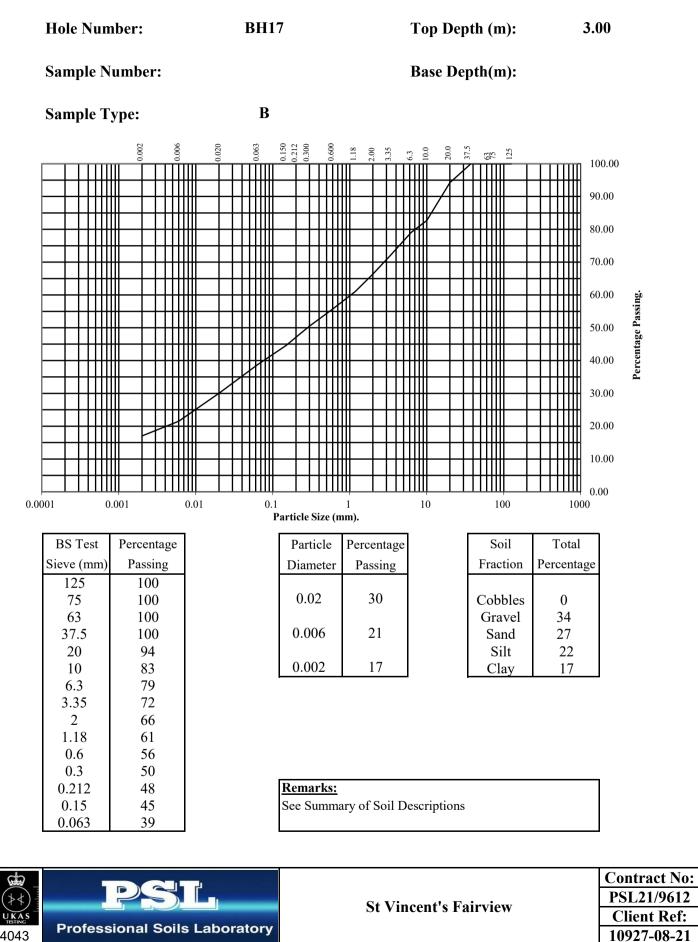
Professional Soils Laboratory

4043

PSL21/9612 **Client Ref:** 10927-08-21

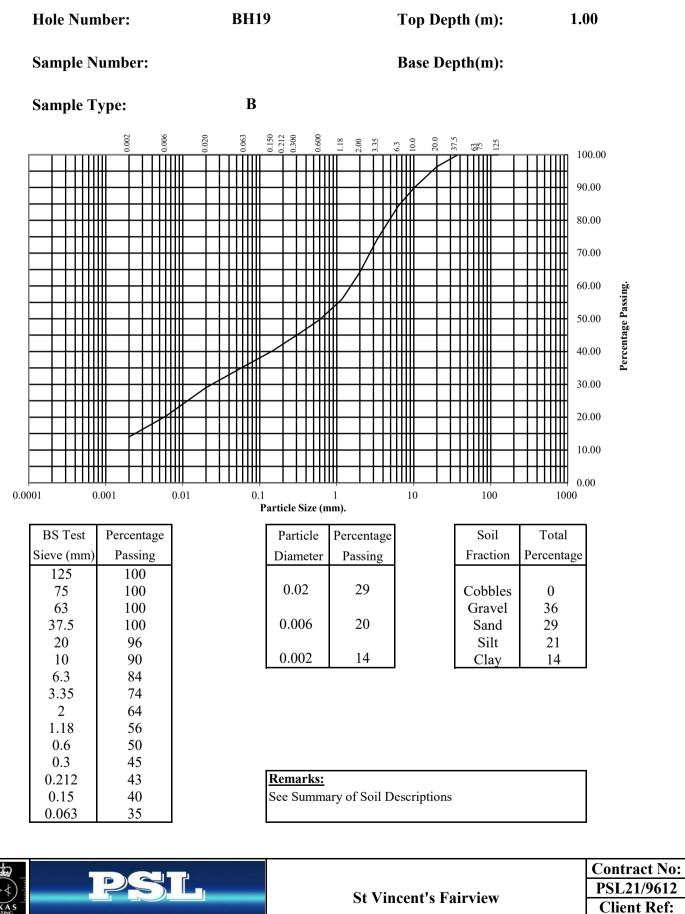
BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4



BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4



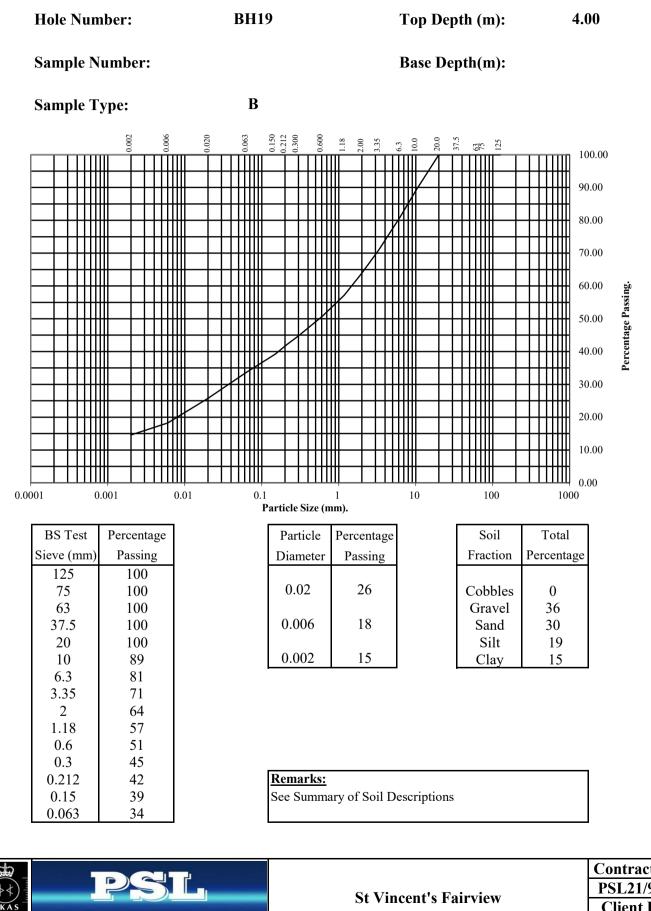
10927-08-21

Professional Soils Laboratory

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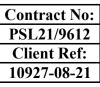
BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4



Professional Soils Laboratory

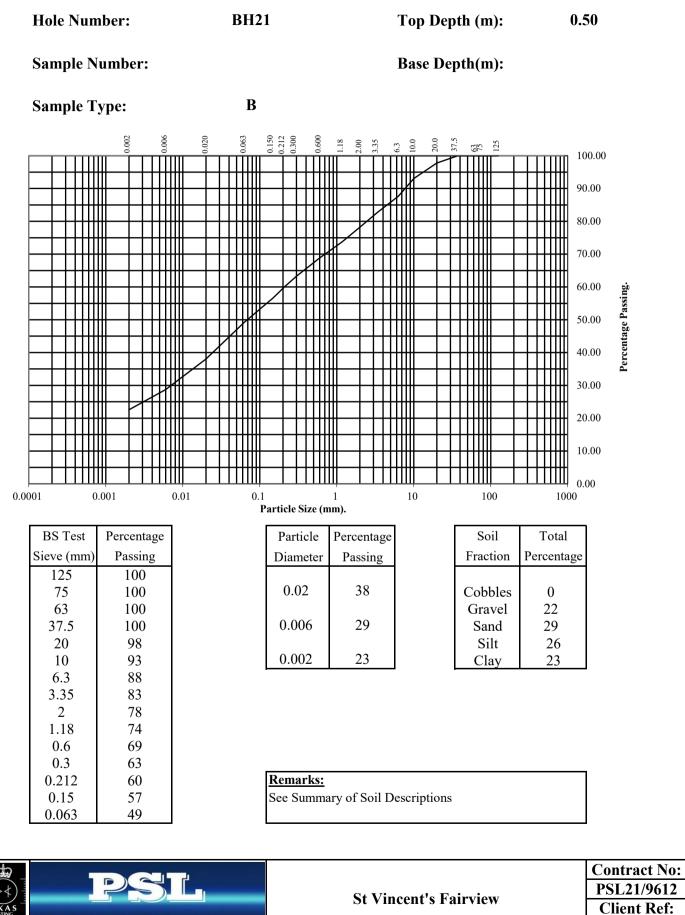
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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4



10927-08-21

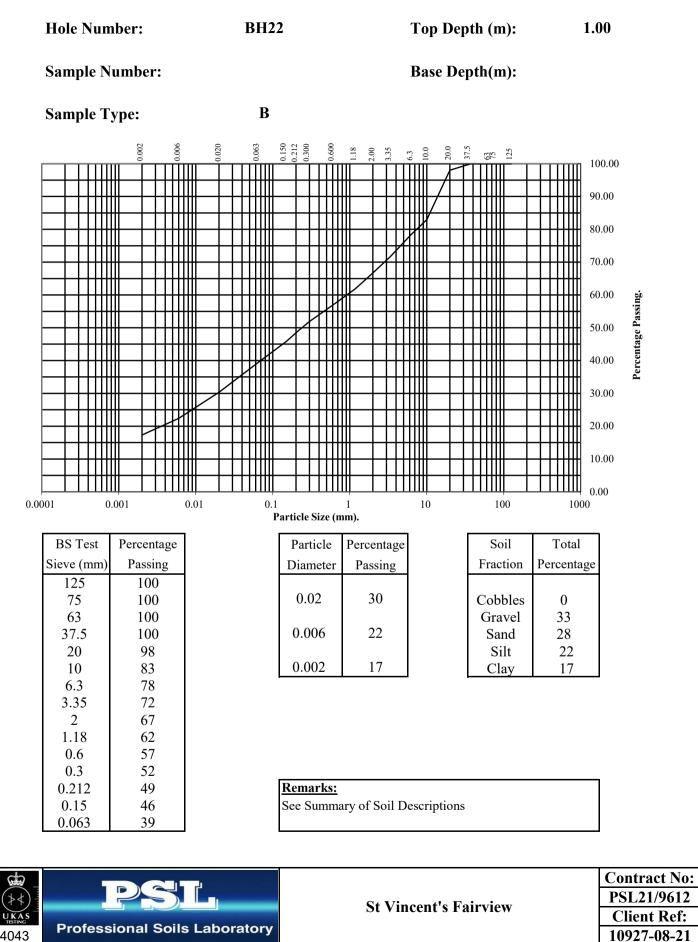
Professional Soils Laboratory

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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

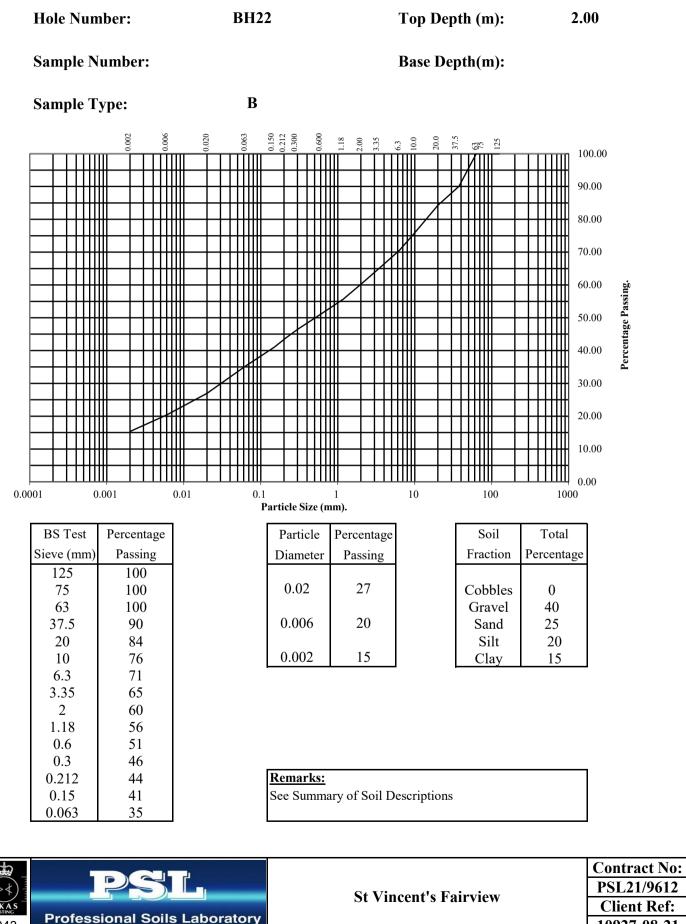
Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4



PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

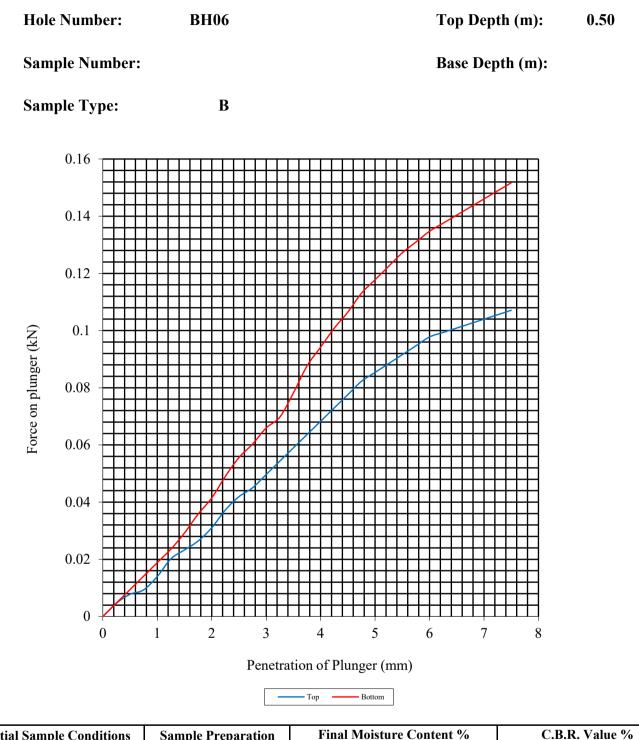
Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4



4043

Client Ref: 10927-08-21

BS 1377 : Part 4 : 1990

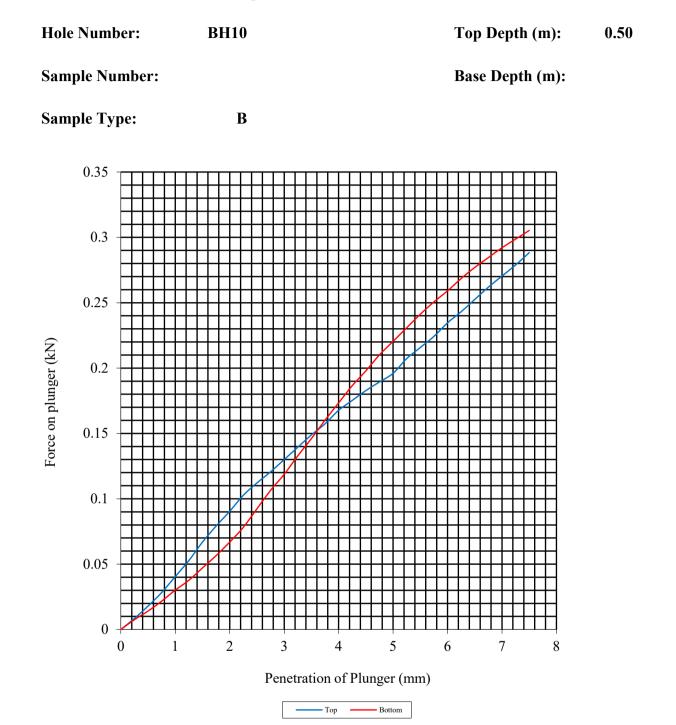


Initial Sample Conditions Sample Prepara		ation Final Moisture Conten		tent %	ent % C.B.R. Value %		
Moisture Content:	22	Surcharge Kg:	4.20	Sample Top	22	Sample Top	0.4
Bulk Density Mg/m3:	1.98	Soaking Time hrs	0	Sample Bottom	22	Sample Bottom	0.6
Dry Density Mg/m3:	1.63	Swelling mm:	0	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:			15]			
Compaction Conditions 2.5kg							



Contract No	
PSL21/9612	
Client Ref:	
10927-08-21	

Non compliance with BS 1377 : Part 4 : 1990

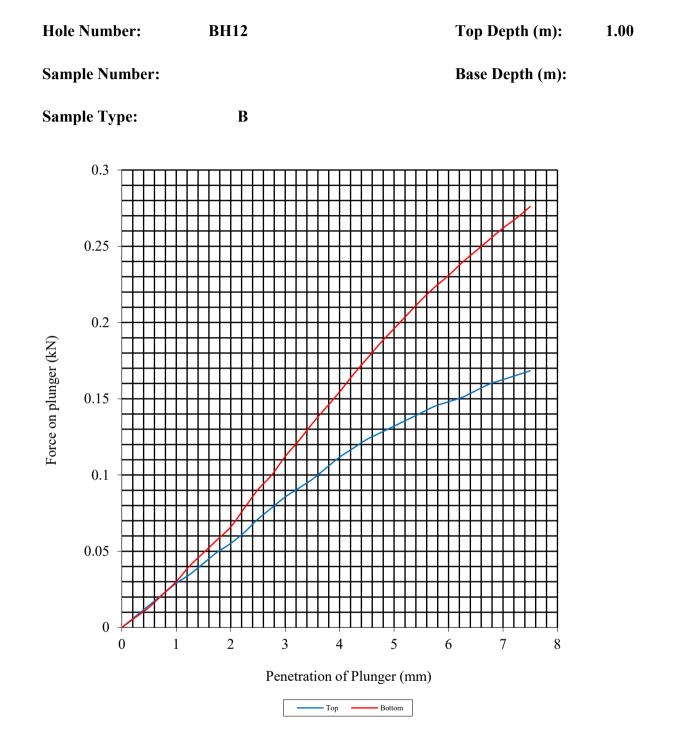


Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	17	Surcharge Kg:	4.20	Sample Top	17	Sample Top	1.0
Bulk Density Mg/m3:	2.04	Soaking Time hrs	0	Sample Bottom	17	Sample Bottom	1.1
Dry Density Mg/m3:	1.74	Swelling mm:	0	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:			30]			
Compaction Conditions	Compaction Conditions 2.5kg						



Contract No:
PSL21/9612
Client Ref:
10927-08-21

BS 1377 : Part 4 : 1990

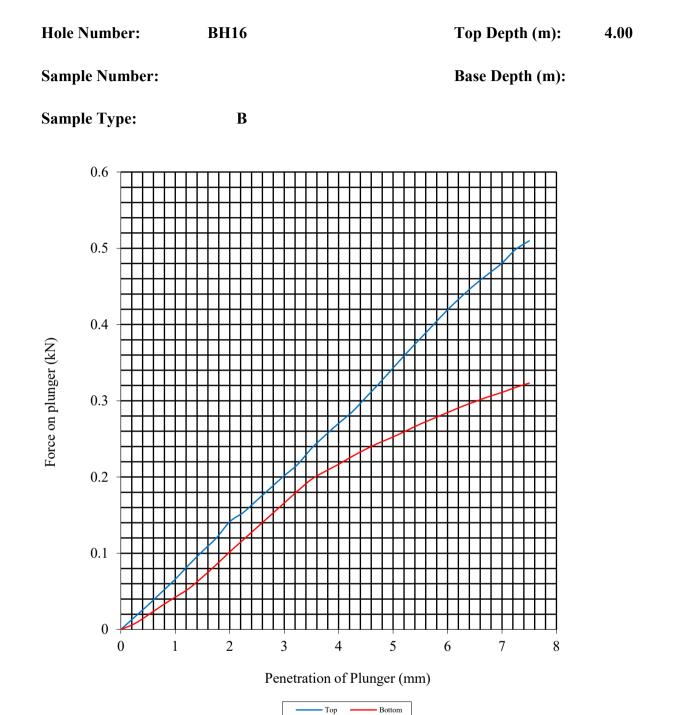


Initial Sample Conditions Sample Prepa		ation	Final Moisture Cont	tent %	C.B.R. Value %		
Moisture Content:	19	Surcharge Kg:	4.20	Sample Top	19	Sample Top	0.7
Bulk Density Mg/m3:	1.97	Soaking Time hrs	0	Sample Bottom	19	Sample Bottom	1.0
Dry Density Mg/m3:	1.65	Swelling mm:	0	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:			19				
Compaction Conditions 2.5kg							



Contract N	0:
PSL21/961	2
Client Ref	
10927-08-2	1

BS 1377 : Part 4 : 1990

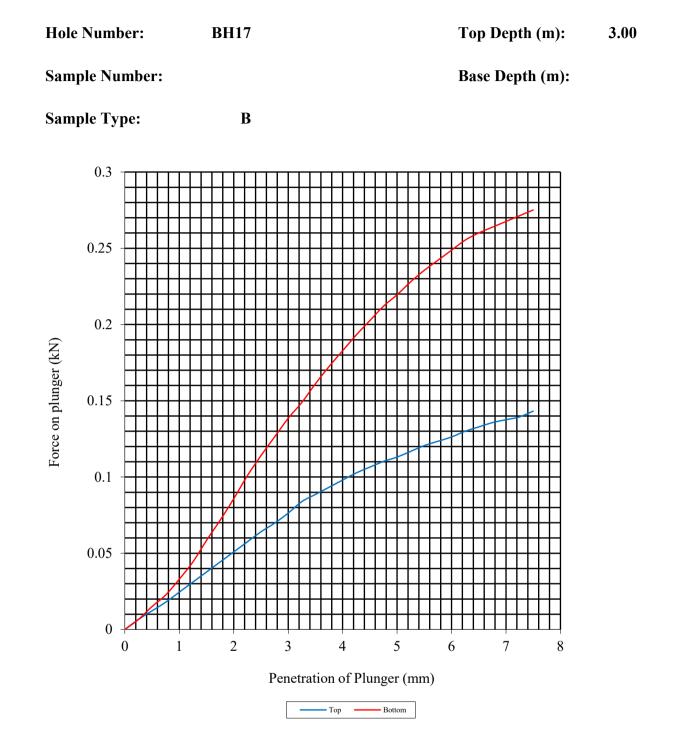


Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	9.5	Surcharge Kg:	4.20	Sample Top	9.4	Sample Top	1.7
Bulk Density Mg/m3:	2.29	Soaking Time hrs	0	Sample Bottom	9.6	Sample Bottom	1.3
Dry Density Mg/m3:	2.09	Swelling mm:	0	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:			21]			
Compaction Conditions 2.5kg							



Contract No:
PSL21/9612
Client Ref:
10927-08-21

BS 1377 : Part 4 : 1990

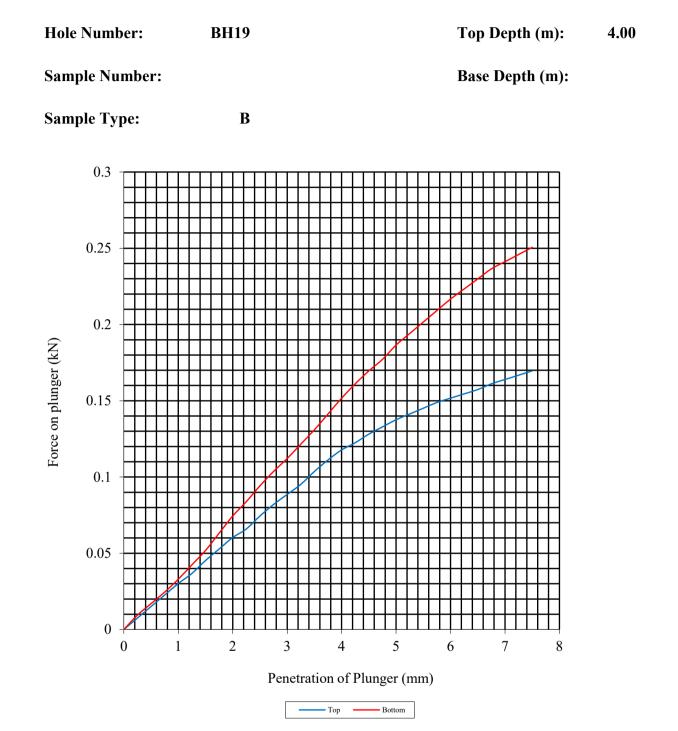


Initial Sample Conditions Sample Prepar		ration Final Moisture Conte		ent % C.B.R. Valu		Value %	
Moisture Content:	16	Surcharge Kg:	4.20	Sample Top	16	Sample Top	0.6
Bulk Density Mg/m3:	2.06	Soaking Time hrs	0	Sample Bottom	16	Sample Bottom	1.1
Dry Density Mg/m3:	1.77	Swelling mm:	0	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:			6]			
Compaction Conditions 2.5kg							



Contract No:
PSL21/9612
Client Ref:
10927-08-21

BS 1377 : Part 4 : 1990

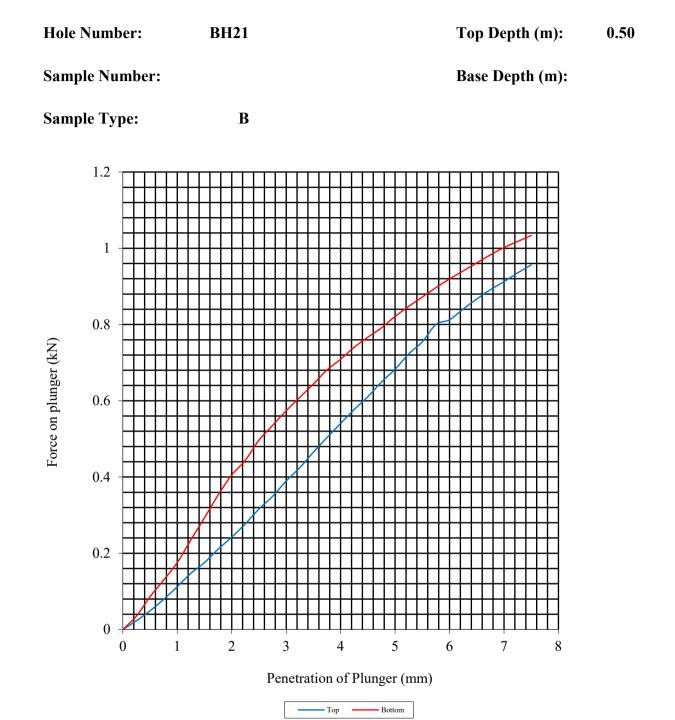


Initial Sample Conditions Sample Prepara		ration Final Moisture Conte		ent % C.B.R. Va		Value %	
Moisture Content:	10	Surcharge Kg:	4.20	Sample Top	10	Sample Top	0.7
Bulk Density Mg/m3:	2.21	Soaking Time hrs	0	Sample Bottom	10	Sample Bottom	0.9
Dry Density Mg/m3:	2.00	Swelling mm:	0	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:			0				
Compaction Conditions 2.5kg							



Contract No	
PSL21/9612	
Client Ref:	
10927-08-21	

BS 1377 : Part 4 : 1990



Initial Sample Cond	Sample Prepara	ation	Final Moisture Cont	C.B.R. Value %			
Moisture Content:	20	Surcharge Kg:	4.20	Sample Top	20	Sample Top	3.4
Bulk Density Mg/m3:	2.02	Soaking Time hrs 0 Sample Bottom		20	Sample Bottom	4.1	
Dry Density Mg/m3:	Dry Density Mg/m3: 1.68 Swelling mr			Remarks : See Summary o	f Soil Desci	riptions.	
Percentage retained on 20mm BS test sieve:							
Compaction Conditions 2.5kg							



Cont	tract No:
PSL	21/9612
Clie	ent Ref:
1092	27-08-21



LABORATORY REPORT



4043

Contract Number: PSL22/0106

Report Date: 24 February 2022

Client's Reference: 10927-08-21

Client Name: Ground Investigations Ireland Ltd Catherinestown House Hazelhatch Road Newcastle Co Dublin D22 YD52

For the attention of: Michael Sutton

Contract Title:	
Date Commenced:	5/1/2022 5/1/2022 24/2/2022

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

A Watkins (Director) R Berriman (Quality Manager) S Royle (Laboratory Manager)

L Knight (Assistant Laboratory Manager) S Eyre (Senior Technician)

T Watkins (Senior Technician)

Page 1 of

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SUMMARY OF POINT LOAD TEST RESULTS

ISRM Suggested Methods : 2007

Borehole Number	Depth (m)	Sample Ref	Test Type	Orientation	Dimer (m		Area	D _e ²	D _e	Failure	Load (P)	Is	Corr Fac	I _{s50}	Failure Type	Remarks
(uniber		Rei	Type	Par / Perp	W	D	(mm2)		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	1,00	
BH05A	20.00		Α	Perp	63	42	2646	3368.99	58.04	-	27.28	8.10	1.069	8.66	Valid	
BH05A	19.82		Α	Perp	63	45	2835	3609.63	60.08	-	19.47	5.39	1.086	5.86	Valid	
BH10	21.50		Α	Perp	63	36	2268	2887.71	53.74	-	15.21	5.27	1.033	5.44	Valid	
BH10	21.07		Α	Perp	63	39	2457	3128.35	55.93	-	23.55	7.53	1.052	7.92	Valid	
BH13	17.53		Α	Perp	63	43	2709	3449.21	58.73	-	24.28	7.04	1.075	7.57	Valid	
BH13	17.15		Α	Perp	63	41	2583	3288.78	57.35	-	15.18	4.62	1.064	4.91	Valid	
BH17	23.38		Α	Perp	63	40	2520	3208.56	56.64	-	25.22	7.86	1.058	8.31	Valid	
BH17	22.28		Α	Perp	63	44	2772	3529.42	59.41	-	26.93	7.63	1.081	8.25	Valid	
BH20	19.55		Α	Perp	63	38	2394	3048.14	55.21	-	23.07	7.57	1.046	7.91	Valid	
BH20	19.16		Α	Perp	63	39	2457	3128.35	55.93	-	21.33	6.82	1.052	7.17	Valid	
BH21	24.90		Α	Perp	63	41	2583	3288.78	57.35	-	20.09	6.11	1.064	6.50	Valid	
BH21	23.15		Α	Perp	63	35	2205	2807.49	52.99	-	7.82	2.79	1.026	2.86	Valid	
*Note	All testing c	arried out or	a samples a	at as received wa	ater conte	ent		Par = j	parallel, Perj	o = perpendio	cular, U = R	andom	I	A = Axial, D	= Diametral,	I = Irregular
â															Co	ontract No:
$(\mathbf{A} \mathbf{A})$			13	5 6						St Vin	aanta				PS	SL22/0106
UKAS										SUVI					C	lient Ref:

Professional Soils Laboratory

4043

10927-08-21

SUMMARY OF POINT LOAD TEST RESULTS

ISRM Suggested Methods : 2007

Borehole Number	Depth (m)	Sample Ref	Test Type	Orientation	Dimer (m	nsions m)	D _e ²	D _e	Failur	e Load	Is	Corr Fac	I _{s50}	Failure Type	Remarks	
Tumber	(11)		Type	Par / Perp	L	L D	L D		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	Type	
BH05A	20.00		D	Par	-	63	3969	63.00	-	23.79	5.994	1.110	6.65	Valid		
BH05A	19.82		D	Par	-	63	3969	63.00	-	16.85	4.245	1.110	4.71	Valid		
BH10	21.50		D	Par	-	63	3969	63.00	-	13.65	3.439	1.110	3.82	Valid		
BH10	21.07		D	Par	-	63	3969	63.00	-	21.98	5.538	1.110	6.14	Valid		
BH13	17.53		D	Par	-	63	3969	63.00	-	21.92	5.523	1.110	6.13	Valid		
BH13	17.15		D	Par	-	63	3969	63.00	-	12.27	3.091	1.110	3.43	Valid		
BH17	23.38		D	Par	-	63	3969	63.00	-	23.15	5.833	1.110	6.47	Valid		
BH17	22.28		D	Par	-	63	3969	63.00	-	24.41	6.150	1.110	6.82	Valid		
BH20	19.55		D	Par	-	63	3969	63.00	-	21.60	5.442	1.110	6.04	Valid		
BH20	19.16		D	Par	-	63	3969	63.00	-	19.26	4.853	1.110	5.38	Valid		
BH21	24.90		D	Par	-	63	3969	63.00	-	17.04	4.293	1.110	4.76	Valid		
BH21	23.15		D	Par	-	63	3969	63.00	-	6.93	1.746	1.110	1.94	Valid		
<u>*Note</u>	All testing	carried out or	n samples a	at as received wa	ater conte	ent		Par =	parallel, Perj	p = perpendi	cular, $U = R$	andom				
															Contract No:	
$(\diamond \langle)$										St Vir	ncents				PSL22/0106	
	Dire	ioooio			ored					St VII	1001115				Client Ref:	
4043	Pro	lessio	nal S	oils Lab	orat	ory									10927-08-21	

DETERMINATION OF UNCONFINED COMPRESSIVE STRENGTH

ISRM Suggested Methods, pp 111 –116, 1981.

Hole Number	Sample Number	Sample Type	Top Depth	Base Depth	Sample Diameter	Sample Length	Height Ratio	Initial Mass	Bulk Density	Moisture Content	Dry Density	Load Failure	UCS	Failure Mode	Date Tested	Remarks
i (unio ci	1 (unioci	1,100	(m)	(m)	(mm)	(mm)	Itutio	(g)	(Mg/m)	(%)	(Mg/m)	(kN)	(MPa)	initiat	1 corea	
BH05A		С	20.22	20.50	63	125	2.0	1024	2.63	1.3	2.59	123.2	39.5	Brittle	22/02/22	
BH10		С	21.67	21.82	63	127	2.0	1075	2.72	1.6	2.67	108.9	34.9	Brittle	22/02/22	
BH13		С	16.70	16.90	63	128	2.0	1076	2.70	1.5	2.66	50.8	16.3	Brittle	22/02/22	
BH17		С	22.57	22.93	63	126	2.0	1058	2.69	1.0	2.67	63.4	20.3	Brittle	22/02/22	
BH20		С	19.70	20.00	63	126	2.0	1080	2.75	0.6	2.73	154.9	49.7	Brittle	22/02/22	
BH21		С	24.15	24.50	63	127	2.0	1076	2.72	1.3	2.68	148.9	47.8	Brittle	22/02/22	

		Contract No:
	St Vincents	PSL22/0106
	St v incents	Client Ref:
Professional Soils Laboratory		10927-08-21

APPENDIX 8 – Groundwater Monitoring





Catherinestown House, Hazelhatch Road, Newcastle, Co. Dublin. D22 YD52

 Tel:
 01 601 5175 / 5176

 Email:
 info@gii.ie

 Web:
 www.gii.ie

GROUNDWATER MONITORING

St. Vincent's Hospital, Fairview

BOREHOLE	DATE	ТІМЕ	GROUNDWATER (m BGL)	Comments
BH01	14/12/2021	09:23	3.38	
BH02	14/12/2021	09:19	2.87	
BH05	14/12/2021	09:29	6.05	
BH06	14/12/2021	09:34	3.41	
BH07	14/12/2021	09:40	4.63	
BH10	14/12/2021	10:09	DRY	Base of pipe at 2.0m BGL
BH12	14/12/2021	09:50	1.78	
BH13	14/12/2021	10:00	+0.24	
BH14	14/12/2021	10:04	0.00	
BH15	14/12/2021	10:12	5.14	
BH16	14/12/2021	10:15	4.88	
BH17	14/12/2021	10:19	5.10	
BH18	14/12/2021	10:28	1.85	
BH19	14/12/2021	10:25	1.95	
BH20	14/12/2021	10:42	5.62	
BH21	14/12/2021	10:33	6.03	
BH22	14/12/2021	10:38	4.66	



Catherinestown House, Hazelhatch Road, Newcastle, Co. Dublin. D22 YD52

 Tel:
 01 601 5175 / 5176

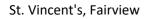
 Email:
 info@gii.ie

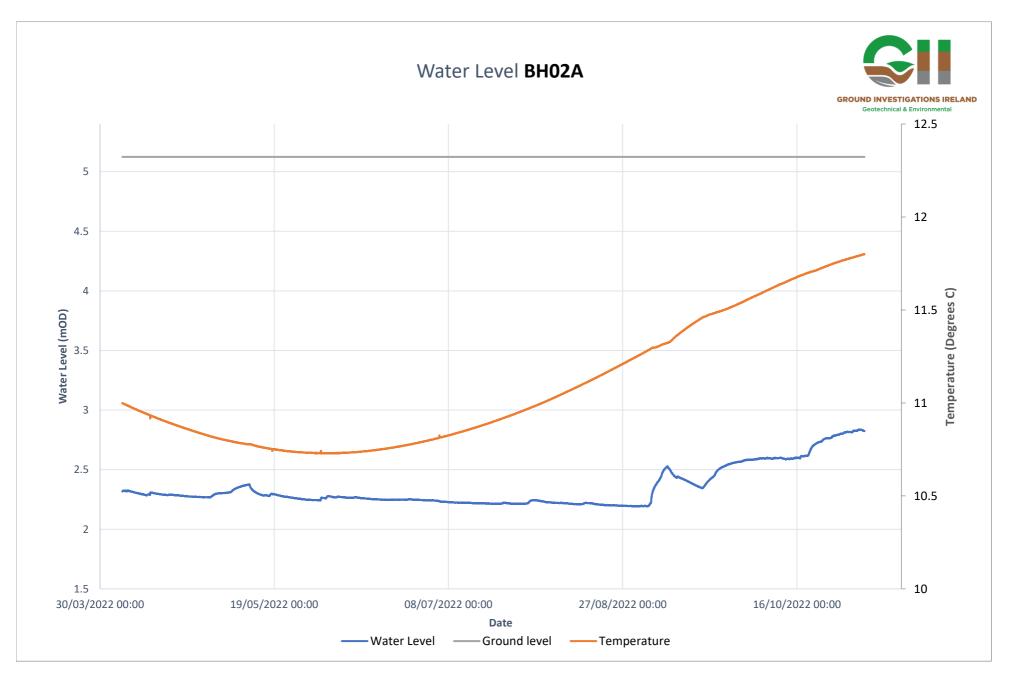
 Web:
 www.gii.ie

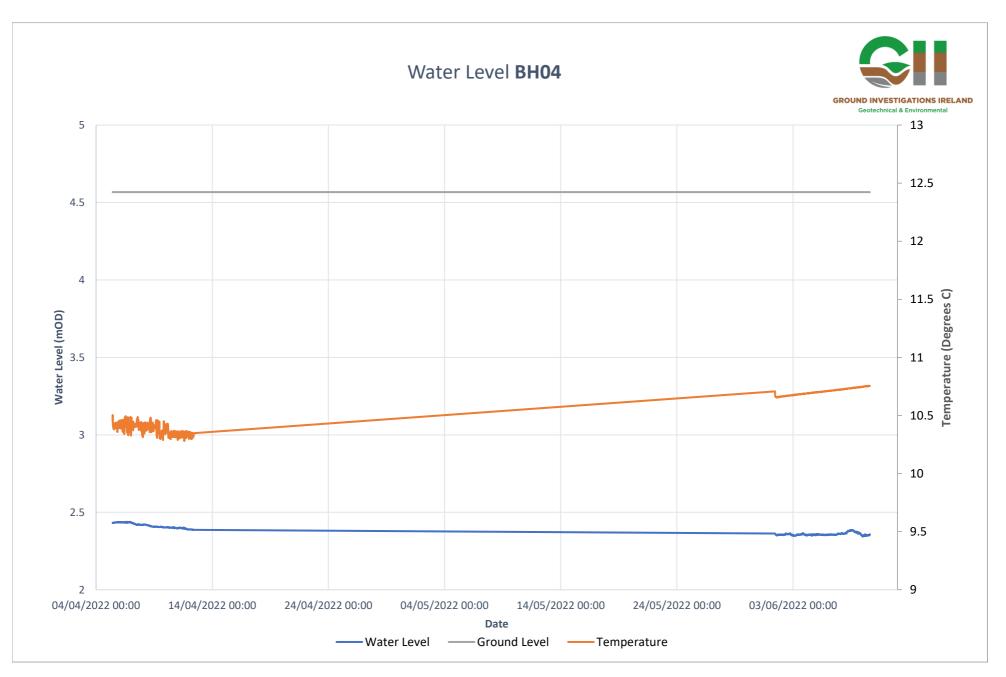
GROUNDWATER MONITORING

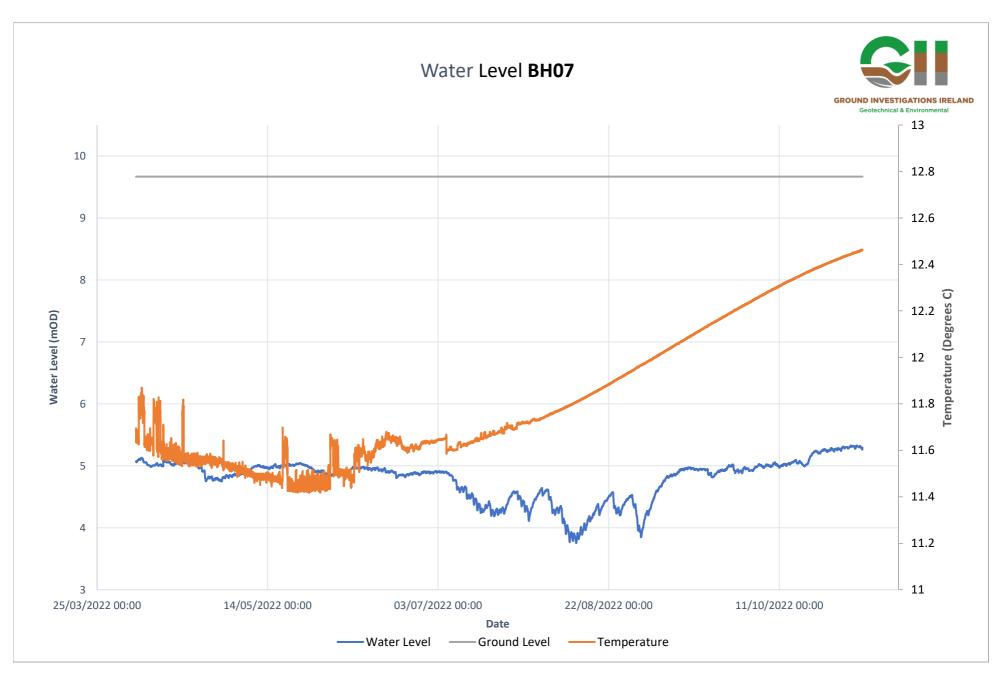
St. Vincent's Hospital, Fairview

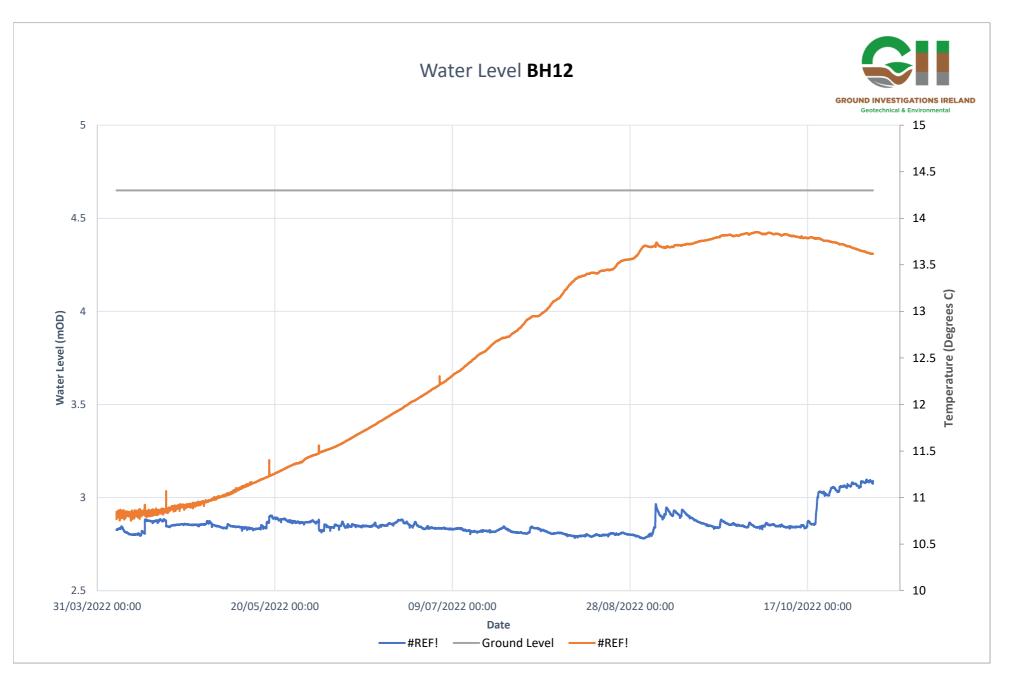
BOREHOLE	DATE	TIME	GROUNDWATER (m BGL)	Comments
BH01	05/04/2022	09:33	3.32	
BH02	05/04/2022	08:51	2.78	Logger installed
BH03				Blocked at 1.40m
BH04	05/04/2022	09:49	2.03	Logger installed
BH05	05/04/2022	09:29	5.93	
BH06	05/04/2022	09:25	3.30	
BH07	05/04/2022	09:09	4.42	Logger installed
BH10	05/04/2022	10:32	DRY	Base of pipe at 2.0m BGL
BH12	05/04/2022	10:11	1.75	Logger installed
BH13	05/04/2022	10:00	Above GL	
BH14	05/04/2022	10:27	Above GL	Logger installed
BH15	05/04/2022	10:51	4.57	
BH16	05/04/2022	11:01	4.06	
BH17	05/04/2022	10:51	4.90	
BH18	05/04/2022	10:46	1.23	
BH19	05/04/2022	10:49	1.05	
BH20	05/04/2022	10:37	5.39	
BH21	05/04/2022	10:44	5.66	
BH22	05/04/2022	10:41	4.24	

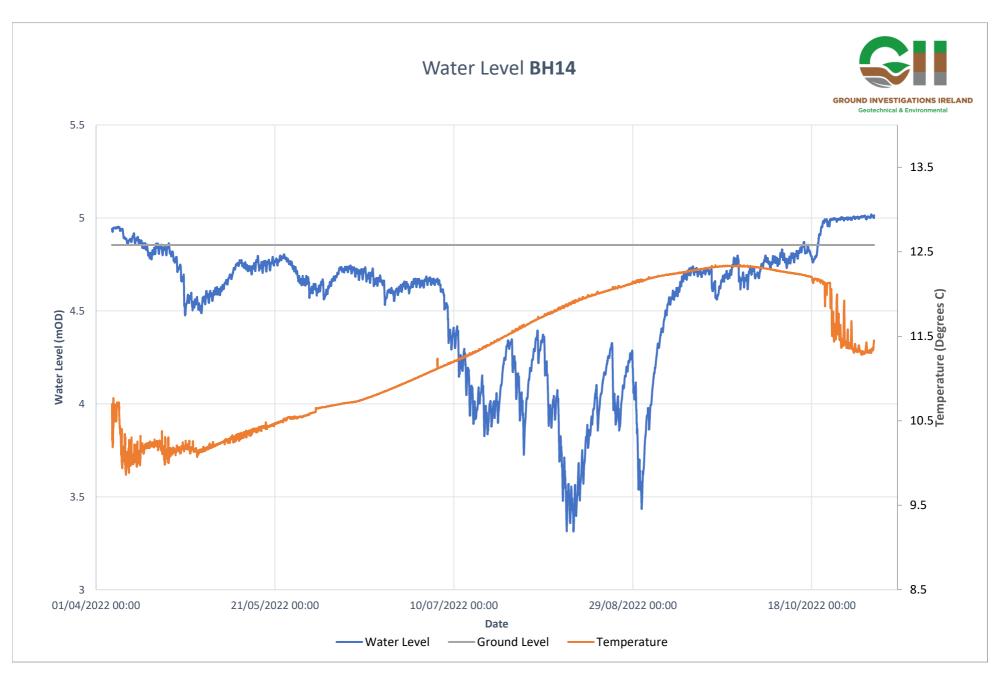














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