UISCE EIREANN : IRISH WATER

Arup / Cid dos Santos Junior

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Bosca OP 448
Oifig Sheachadta na
Cathrach Theas
Cathair Chorcaí

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

www.water.ie

7 October 2021

Re: CDS21004551 pre-connection enquiry - Subject to contract | Contract denied

Connection for Business Connection of 6 units at Profile Business Park, Grangecastle, Dublin

Dear Sir/Madam,

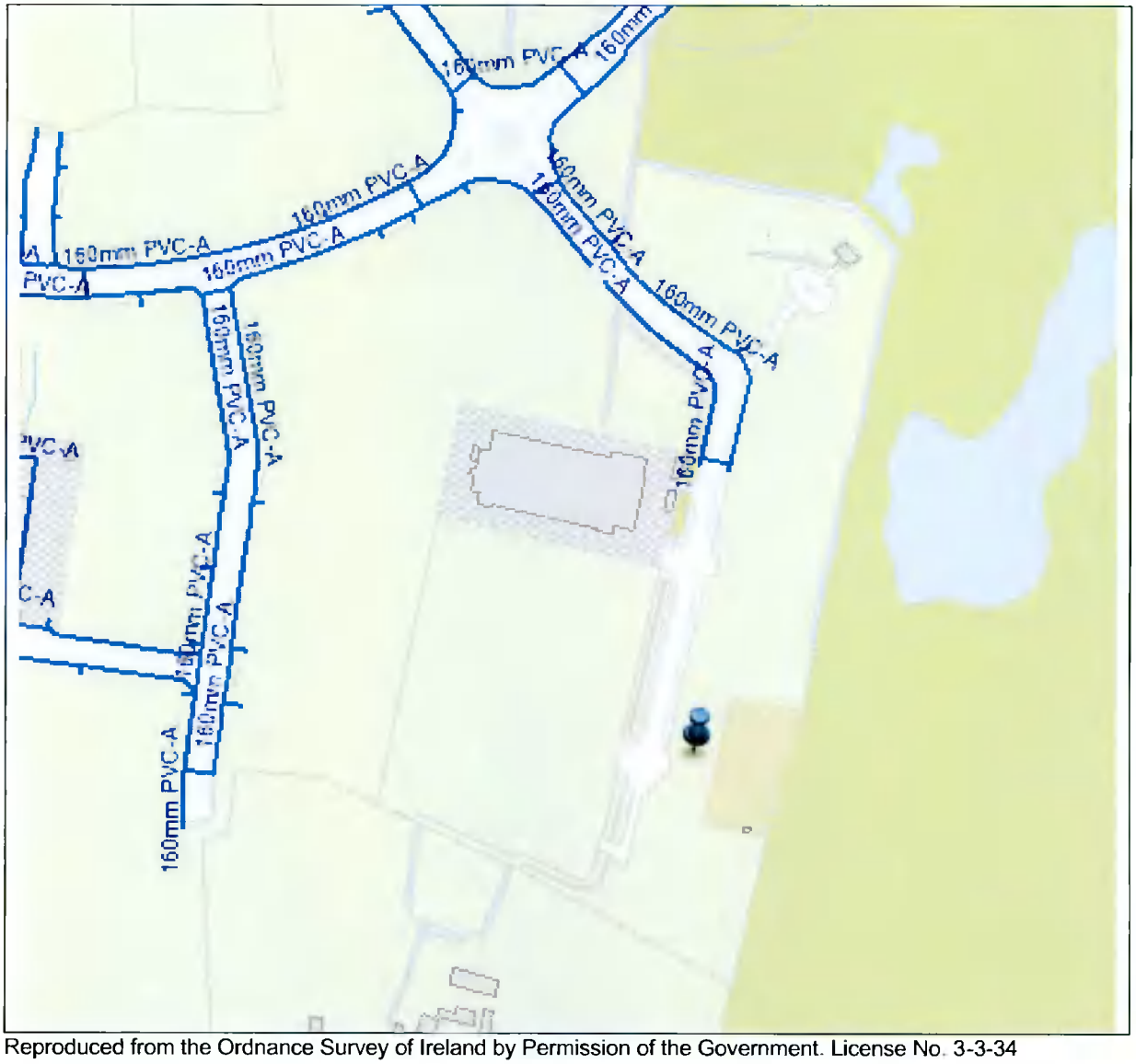
Irish Water has reviewed your pre-connection enquiry in relation to a Water & Wastewater connection at Profile Business Park, Grangecastle, Dublin (the **Premises**). Based upon the details you have provided with your pre-connection enquiry and on our desk top analysis of the capacity currently available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

SERVICE	OUTCOME OF PRE-CONNECTION ENQUIRY THIS IS NOT A CONNECTION OFFER. YOU MUST APPLY FOR A CONNECTION(S) TO THE IRISH WATER NETWORK(S) IF YOU WISH TO PROCEED.
Water Connection	Feasible without infrastructure upgrade by Irish Water
Wastewater Connection	Feasible without infrastructure upgrade by Irish Water
SITE SPECIFIC COMMENTS	
Water Connection	The connection should be from the existing 160mm uPVC main via 150mm ID connection pipe with a bulk meter installed on the line. On-site water storage will be required, for the average day peak week demand rate of the commercial section, for 24-hour period with 12- hour re-fill time. An additional storage for the Data Centre is required.
Wastewater Connection	The proposed wastewater connection for this development connects to the Irish Water network via private infrastructure. Please be advised that at connection application stage you have to provide written confirmation from the owner of the infrastructure that you have received legal permission to connect to and that the infrastructure has capacity to cater for the additional load from the Development. A new connection to the existing network is feasible without Irish Water network upgrade on the condition that the existing (privately owned) Grange

	Castle Pumping Station does not increase maximum output flow rate of Phase 2 PS set up (55l/s). However, should your Development trigger the Phase 3 Pumping Station set up (270 l/s), it will be necessary to carry out further detailed study and investigations to confirm the available capacity and to determine the full extent of any upgrades which may be required to be completed to Irish Water Infrastructure, prior to agreeing to the proposed connection.

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

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



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

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

General Notes:

1) The initial assessment referred to above is carried out taking into account water demand and wastewater discharge volumes and infrastructure details on the date of the assessment. **The availability of capacity may change at any date after this assessment.**
2) This feedback does not constitute a contract in whole or in part to provide a connection to any Irish Water infrastructure. All feasibility assessments are subject to the constraints of the Irish Water Capital Investment Plan.
3) The feedback provided is subject to a Connection Agreement/contract being signed at a later date.
4) A Connection Agreement will be required to commencing the connection works associated with the enquiry this can be applied for at https://www.water.ie/connections/get-connected/
5) A Connection Agreement cannot be issued until all statutory approvals are successfully in place.
6) Irish Water Connection Policy/ Charges can be found at https://www.water.ie/connections/information/connection-charges/
7) Please note the Confirmation of Feasibility does not extend to your fire flow requirements.
8) Irish Water is not responsible for the management or disposal of storm water or ground waters. You are advised to contact the relevant Local Authority to discuss the management or disposal of proposed storm water or ground water discharges
9) To access Irish Water Maps email datarequests@water.ie
10) All works to the Irish Water infrastructure, including works in the Public Space, shall have to be carried out by Irish Water.

If you have any further questions, please contact Marina Byrne from the design team via email mzbyrne@water.ie For further information, visit **www.water.ie/connections.**

Yours sincerely,

Yvonne Harris

Yvonne Harris

Head of Customer Operations

Appendix D

Hydro-International Guide to Surface Water Treatment System

A Guide to The SuDS Manual (C753) Simple Index Approach

Author: Mark Goodger, Regional Technical Manager
Hydro International

Hydro International®

The SuDS Manual (C753) Simple Index Approach

Introduction

In Table 26.1 of The SuDS Manual (C753) four risk based approaches for water quality management are specified:

1. Simple Index Approach
2. Risk Screening (generally used to determine if Simple Index Approach is appropriate)
3. Detailed Risk Assessment
4. Process-Based Treatment Modelling

With the intention that the simpler approaches are applied in lower risk scenarios, with more sophisticated assessments only used when appropriate to the risk.

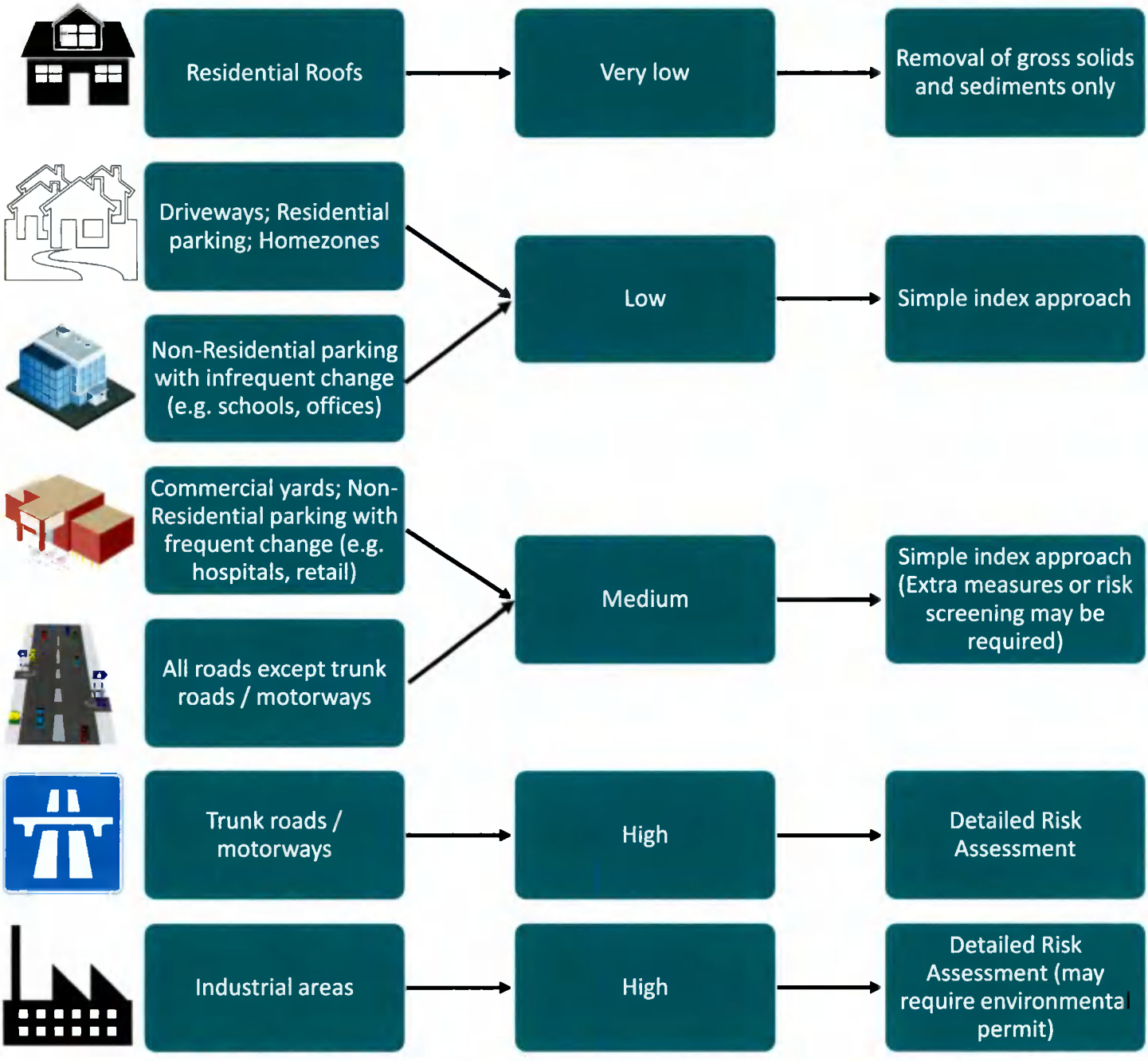


Figure 1: Applying the Risk Based Water Quality Management Approaches (Source: After Table 4.3 of the SuDS Manual)

Applying the Simple Index Approach (SIA)

The Simple Index Approach (SIA) recommended in Section 26.7.1 of The SuDS Manual (C753) was developed from that set out by Middlesex University (as outlined in Annex 5 of Chapter 26 of The SuDS Manual) and follows a three step approach:

Step 1 – Allocate suitable pollution hazard indices for the proposed land use categories

Step 2 – Select SuDS with a total pollution mitigation index that equals or exceeds the pollution hazard index

Step 3 – Where the discharge is to protected[1] surface waters or groundwater, consider the need for a more precautionary approach.

Note:

1 Designated as those protected for the supply of drinking water (see SuDS Manual Table 4.3).

Step 1: Define pollution hazard indices

Pollution hazad indices are presented in Table 26.2 of The SuDS Manual and reproduced here for simplicity. The indices range from 0 (no pollution of this type) to 1 (high pollution hazard for this contaminant type).

Table 1: Pollution hazard indices for different land use classes (Source: Reproduced from The SuDS Manual Table 26.2)

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Liquid Hydrocarbons (free floating oils)
Residential Roofs	Very low	0.2	0.2	0.05
Other Roofs (typically commercial / industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (e.g. cul de sacs, homezones and general access roads) **and non-residential car parks with infrequent change** (e.g. schools, offices) – i.e. <300 traffic movements / day	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential parking with frequent change (e.g. hospitals, retail); **all roads except low traffic roads and trunk roads / motorways**[1]	Medium	0.7	0.6	0.7
Sites with heavy pollution (e.g. haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites); **sites where chemicals and fuels** (other than domestic fuel oil) **are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways**[1]	High	0.8[2]	0.8[2]	0.9[2]

Notes:

1. Motorways and trunk roads should follow the guidance and risk assessment process set out in Highways Agency (2009)
2. These should only be used if considered appropriate as part of a detailed risk assessment – required for all these land use types (see also The SuDS Manual Table 4.3). When dealing with high hazard sites, the environmental regulator should first be consulted for pre-permitting advice. This will help to determine the most appropriate treatment approach to the development of a design solution. **Also consider spill protection – contact Hydro International to find out more about our specialist treatment and containment options for high pollultion hazard sites.**

Where a site land use falls outside of these categories, the indices should be adapted (and agreed with the drainage approving / adopting body) or else a more detailed risk assessment should be carried out.
Equivalent indices should be developed for other contaminants of interest of any given site. **For assistance with development of indices or detailed site analysis, contact Hydro International.**

Step 2: Determine SuDS Pollution Mitigation Indices

To deliver adequate treatment, the selected SuDS components should have a total pollution mitigation index (for each contaminant type) that equals or exceeds the pollution hazard index (for that contaminant type):

Total SuDS Mitigation Index (for each contaminant) ≥ Pollution hazard index (for each contaminant)

If the mitigation index of an individual component is insufficient, two components (or more) in series will be required, with a factor of 0.5 used to account for the reduced performance of secondary or tertiary components, in line with the following equation:

$$\text{Total SuDS Mitigation Index} = \text{Mitigation Index}_1 + 0.5\,(\text{Mitigation Index}_2)$$

Where *Mitigation Index$_n$ = Mitigation Index for Component n.*

If the only runoff destination is to surface water (i.e. there is no infiltration from the SuDS to groundwater), the surface water mitigation indices should be used.

Where the principal destination of the runoff is to groundwater, then the groundwater indices should be used. This will be the case, even for infiltration systems that are designed to discharge to surface waters once the infiltration capacity is exceeded – In this scenario, the overflow will often not need to be treated prior to discharge to surface waters as the risk will be low (highly contaminated flows will have been treated prior to infiltration) and dilution will be high.

In England and Wales, if the principal runoff destination is intended to be to surface water, but some infiltration (even in small amounts) may occur through unlined components, then the groundwater indices should be used for the proportion of runoff that discharges to groundwater and the surface water indices used for the proportion of runoff that discharges to surface waters. In Scotland & Northern Ireland, groundwater risk management is not a requirement for this scenario.

Table 2: SuDS mitigation indices for discharges to surface waters (Source: Extended and reproduced from The SuDS Manual Table 26.3)

Type of SuDS Component	Mitigation Indices[1]		
	TSS	Metals	Liquid Hydrocarbons
Filter Strip	0.4	0.4	0.5
Filter Drain	0.4[2]	0.4	0.4
Swale	0.5	0.6	0.6
Bioretention System	0.8	0.8	0.8
Permeable Pavement	0.7	0.6	0.7
Detention Basin	0.5	0.5	0.6
Pond[3]	0.7[2]	0.7	0.5
Wetland[3]	0.8[2]	0.8	0.8
First Defense® Vortex Separator	0.5[a]	0.33[c]	0.4[d]
Downstream Defender® Advanced Vortex Separator	0.5[a]	0.4[c]	0.8[a]
Up-Flo™ Filter	0.8[a]	0.69[c, e]	0.4[d]
Hydro-BioCell™ Bioretention System	0.8[b]	0.8[b]	0.8[d]

Notes:

1) SuDS components only deliver these indices if they are designed and constructed in accordance with the relevant technical chapters of the SuDS Manual. Designers and installers of SuDS components should be able to demonstrate competence in their respective areas.
2) Filter drains, ponds and wetlands are not recommended for removal of coarse sediments as their use for this purpose will have significant maintenance implications. Sediment (TSS) should be removed upstream where possible.
3) Where a wetland is not specifically designed to provide significantly enhanced treatment performance, it should be considered as having the same mitigation indices as a pond.

a) Derived from 3rd party testing and / or verification programmes. Test reports available on request.
b) Derived from testing and / or monitoring. Test reports available on request.
c) Derived from partitioning of sediment bound and dissolved contaminants and associated testing. Evidence available on request.
d) Based on typical values for components of this type.
e) Dependant on filter media used.

Table 3: SuDS mitigation indices for discharges to groundwater (Source: Extended and reproduced from The SuDS Manual Table 26.4)

Characteristics of the material overlying the proposed infiltration surface, through which the runoff percolates[1]	Mitigation Indices		
	TSS	Metals	Liquid Hydrocarbons
A layer of dense vegetation underlain by soil with good contaminant attenuation potential[2] of at least 300mm in depth[3]	0.6[4]	0.5	0.6
A soil with good contaminant attenuation potential[2] of at least 300mm in depth[3]	0.4[4]	0.3	0.3
Infiltration trench (where a suitable depth of filtration material is included that provides treatment) underlain by soil with good contaminant attenuation potential[2] of at least 300mm in depth[3]	0.4[4]	0.4	0.4
Constructed permeable pavement (where a suitable filtration layer is included that provides treatment and including a geotextile at the base separating the foundation from the subgrade) underlain by soil with good contaminant attenuation potential[2] of at least 300mm in depth[3]	0.7[4]	0.6	0.7
Bioretention underlain by soil with good contaminant attenuation potential[2] of at least 300mm in depth[3]	0.8[4]	0.8	0.8
Flow through Proprietary Treatment System prior to infiltration SuDS	**TSS**	**Metals**	**Liquid Hydrocarbons**
First Defense® Vortex Separator	0.5[a]	0.33[c]	0.4[d]
Downstream Defender® Advanced Vortex Separator	0.5[a]	0.4[c]	0.8[a]
Up-Flo™ Filter	0.8[a]	0.69[c,e]	0.4[d]
Hydro-BioCell™ Bioretention System	0.8[b]	0.8[b]	0.8[d]

Notes:

SuDS components only deliver these indices if they are designed and constructed in accordance with the relevant technical chapters of the SuDS Manual. Designers and installers of SuDS components should be able to demonstrate competence in their respective areas.

1) All designs must include a minimum of 1m unsaturated depth of aquifer material between the infiltration surface and the maximum likely groundwater level (as required by infiltration design – see The SuDS Manual Chapter 25).
2) For example as recommended in Sniffer (2008a and 2008b), Scott Wilson (2010) or other appropriate guidance.
3) Alternative depths may be considered where it can be demonstrated that the combination of the proposed depth and soil characteristics will provide equivalent protection to the underlying groundwater – see note 1.
4) If significant amounts of sediment are allowed to enter an infiltration system, there will be a high risk of rapid clogging and subsequent system failure. It is recommended to remove sediment prior to the infiltration system as far as reasonably practical.

a) Derived from 3rd party testing and / or verification programmes. Test reports available on request.
b) Derived from testing and / or monitoring. Test reports available on request.
c) Derived from partitioning of sediment bound and dissolved contaminants and associated testing. Evidence available on request.
d) Based on typical values for components of this type.
e) Dependant on filter media used.

IMPORTANT NOTES:

- Where the indices are not considered representative by the designer, a more detailed risk assessment can be undertaken.
- Components should always be designed for treatment, as described in the relevant technical guidance set out in the individual component chapters of The SuDS Manual. **If they are incorrectly designed, constructed or inadequately maintained, their treatment performance could be significanty adversely affected.**
- Where the infiltration component itself does not provide sufficient pollution mitigation, the design should include upstream SuDS components that are lined to prevent infiltration from occurring until sufficient treatment has taken place.

Step 3: Consider the need for a precautionary approach where discharges are to protected waters

Reference should be made to local standards, planning requirements and guidance, particularly with reference to discharges to protected waters where more detailed risk assessments or enhanced treatment may be required.

Case Studies:

Small is Beautiful

A First Defense® provided a much-needed small footprint solution to meeting regulatory requirements on a confined site for a new commercial office development in Perkins Township, Ohio.
TSS was the main pollutant of concern and although the Simple Index Approach was not in use in Ohio at the time of installation, retrospectively considering this approach would give:

TSS Hazard Index (Office Development) = 0.5
First Defense® TSS Mitigation Index = 0.5

Mitigation Index ≥ Hazard Index

Pollution Protection in Whisky Country

Poor drainage, flooding and freezing weather led to a landslip and extreme surface degradation along a section of the narrow A95 near Elgin. Although it pre-dated the new SuDS Manual risk based approach, treatment was vital as the surface water runoff destination was to an area world-renowned for the production of single malt whiskey and an important salmon fishery.
A Downstream Defender® advanced hydrodynamic vortex separator minimises the risk of sediment and hydrocarbon pollution reaching the sensitive watercourse.

Downstream Defender® Mitigation Indices:
TSS = 0.5
Heavy Metals = 0.4
Liquid Hydrocarbons = 0.8

Fine Filtration enables Mixed-Use Development

Environment Agency planning conditions for a new commercial access road to retail and light commercial units as part of a mixed-use development in Faversham, Kent, required treatment prior to infiltration.
A bypass separator provides important spill protection for liquid hydrocarbons, prior to an Up-Flo™ Filter that ensures fine filtration of sediments and associated contaminants, such as Polycyclic Aromatic Hydrocarbons (PAHs). Although the installation pre-dates the Simple Index Approach, retrospective consideration of the approach gives:

Contaminant	TSS	Metals	PAHs
Hazard Indices (Commercial Access)	0.7	0.6	0.7
Up-Flo™ Filter Mitigation Indices	0.8	0.69	0.72

Stringent Quality Control, Naturally

Hydro BioCell™ have brought attractive landscaping and stringent surface water quality control to a sensitive location in Barry, South Wales.
3 units were retrofitted to the Business Support Centre car park as part of a wide urban regeneration scheme, effectively removing pollutants prior to discharge into the adjacent, rejuvenated harbourside.

Contaminant	TSS	Metals	Hydro-carbons
Hazard Indices (Commercial / Retail Parking)	0.7	0.6	0.7
Hydro BioCell™ Mitigation Indices	0.8	0.8	0.8

Simple Index Approach (SIA) Tool

A SIA spreadsheet tool has been developed by HR Wallingford on behalf of the Scottish Environment Protection Agency (SEPA) to support the implementation of the Simple Index Approach. The tool is freely available to download at www.susdrain.org/resources/SuDS_Manual.html.
The spreadsheet tool works through the Simple Index Approach Design Steps:

Step 1: Define pollution hazard indices

	Runoff Area Land Use Description	*Hazard Level*	*Pollution Hazard Indices* Suspended Solids	Metals	Hydrocarbons
Select land use type from the drop down list (or 'Other' if none applicable): →	Residential parking	Low	0.5	0.4	0.4
If the generic land use types in the drop down list above are not applicable, select 'Other' and enter a description of the land use of the runoff area and agreed user defined indices in this row:					
	Landuse Pollution Hazard Index	**Low**	**0.5**	**0.4**	**0.4**

Step 2: Determine SuDS Pollution Mitigation Indices

	SuDS Component Description		*Pollution Mitigation Indices* Suspended Solids	Metals	Hydrocarbons
Select SuDS Component 1 (i.e. the upstream SuDS component) from the drop down list: →	Proprietary treatment system	Enter User Defined Indices in row below			
Select SuDS Component 2 (i.e. the second SuDS component in a series) from the drop down list: →	None				
Select SuDS Component 3 (i.e. the third SuDS component in a series) from the drop down list: →	None				
If the proposed SuDS components are bespoke/proprietary and/or the generic indices above are not considered appropriate, select 'Proprietary treatment system' or 'User defined indices' and enter component descriptions and agreed user defined indices in these rows:	Hydro BioCell	SuDS Component 1	0.8	0.8	0.8

Calculation of Total SuDS Mitigation Indices and Results

	Combined Pollution Mitigation Indices Suspended Solids	Metals	Hydrocarbons
Total Pollution Mitigation Indices for the Runoff Area	**0.8**	**0.8**	**0.8**

	Sufficiency of Pollution Mitigation Indices Suspended Solids	Metals	Hydrocarbons
	Sufficient	**Sufficient**	**Sufficient**

The Hydro StormTrain® Series of Surface Water Treatment Devices

Each Hydro StormTrain® device delivers proven, measurable and repeatable surface water treatment performance. Each can be used independently to meet the specific treatment needs of a site; or can combined with one another or in conjunction with other SuDS components to form a mangament train; or can be used to protect and enhance SuDS features less suited to providing the first stage of treatment or more prone to failure due to sedimentation or shock loads associated with spills.

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Downstream Defender®
Advanced Hydrodyanmic Vortex Separator

Up-Flo™ Filter
Fluidised Bed Up Flow Filtration System

Hydro BioCell™
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Hydro International is a global leader in sustainable technologies for the control and treatment of stormwater and wastewater. For more than 30 years, Hydro has been at the forefront of water industry innovation and product development. From housing developments and municipal sewage works to paper mills and public highways, thousands of Hydro products are operating in countries all over the world. With strong bases in both the United States and the United Kinbgdom, and a network of partners and agents, Hydro is strategically placed to deliver winning technological solutions to customers wherever they are in the world.

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INXN DUB15/16

Surface Water Drainage Report

280503-00

Planning RFI Response | 14 March 2022

Job number 280503-00

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Document Verification

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Revision	Date	Filename	INXN_DUB1516_Surface Water Report_Planning RFI Response	
Planning RFI Response	04 Feb 2022	Description	Planning RFI Response Issue	
			Prepared by	Checked by	Approved by
		Name	Cid dos Santos Jr.	Kieran Dowdall	John MacCarthy
		Signature			
Planning RFI Response	14 Mar 2022	Filename	INXN_DUB1516_Surface Water Report_Planning RFI Response	
		Description	Planning RFI Response Issue	
			Prepared by	Checked by	Approved by
		Name	Cid dos Santos Jr.	Kieran Dowdall	John MacCarthy
		Signature			
		Filename		
		Description		
			Prepared by	Checked by	Approved by
		Name			
		Signature			
		Filename		
		Description		
			Prepared by	Checked by	Approved by
		Name			
		Signature			
				Issue Document Verification with Document	✓

Contents

Appendices

1 Introduction

This report was produced following masterplan update and in response to additional information requested by South Dublin County Council regarding the Surface Water strategy and layout related to the planning application under Register Reference SD21A/0217 lodged by Digital Netherlands VIII B.V. for the extension of the existing facility (DUB13/14) at Profile Park, Nangor Road, Clondalkin, Dublin 22.

2 Existing Drainage Systems

The existing DUB 13 and DUB14 Data Centres are served by a surface water drainage network which collects run-off coming from the existing buildings and surrounding hardstanding areas. The related surface water system runs by gravity from the rear of the existing buildings eastwards, combining into one outfall point and discharging at a controlled rate into an existing watercourse which traverses the site from south to north. The related surface water network incorporates four existing attenuation facilities totalling an approximate storage volume of 826 m3, which will all be maintained. Also, there is another existing attenuation system of approximately 128 m3, was meant to cater for an additional site development which is has become now the object of this planning application. Thereby, the 128 m3 facility has being superseded by the new proposed surface water scheme and will be removed.

Downstream of the existing discharge point from the existing development, the watercourse is culverted northwards through a 1100mm diameter pipe up to the existing DUB 13 site boundary where it discharges off the site into an open channel. The watercourse is also culverted upstream a 1100mm diameter within the proposed site boundary. The watercourse will be diverted around the proposed development, and this is detailed in the Arup Flood Risk Assessment, included with this application. Additionally, see Arup drawings in Appendix A.

3 Proposed Drainage

Drainage from the proposed DUB 15 and DUB 16 development shall be drained by a completely separate system from the existing, with separate foul drains and surface water drains and swales. The outfall of the proposed surface water system will discharge into the watercourse, immediately downstream of the end of the proposed watercourse realignment.

After completion of the proposed development, the existing watercourse currently traversing the site will be limited to its segments in front the existing DUB13 and DUB14, therefore catering exclusively for surface water run-off coming from those buildings and immediate surroundings. See Arup drawings in Appendix A.

Surface water discharges from the proposed development will be restricted in line with South Dublin County Council (SDCC) Water Services requirements.

Surface water discharges from the site will be restricted with flows in excess of the allowable discharge rate being retained on site in one single above ground attenuation pond for storms up to and including the 1 in 100-year event plus 20% climate change allowance.

The drainage systems shall be designed in accordance with Part H Building Regulations, BSEN 752 Drain and Sewer Systems outside Buildings, the Greater Dublin Regional Code of Practice for Drainage Works, the Greater Dublin Strategic Drainage Study (GDSDS) and to the requirements of South Dublin County Council and Irish Water.

3.1 Proposed Surface Water Drainage

All the surface water run-off from the proposed development and buildings shall drain by gravity via the swales and pipes network towards the attenuation pond to the northeast of the site, comprised of Hydrobrake flow restricting device limiting the discharge to greenfield run-off rates and approximately 300mm high standing water pool prior to its final outfall discharge.

Surface water discharges from the site will be restricted in line with the Greater Dublin Regional Code of Practice for Drainage Works and South Dublin County Council Water Services requirements. The allowable outflow from the development will be restricted to Qbar of 1.99 litres/second/hectare. See Appendix B for Surface Water Design Summary and Qbar calculation.

Flows in excess of the allowable discharge rate will be stored on site in the form of storm attenuation pond. Additionally, SuDS measures will be incorporated into the development to improve the quality of waters discharging into the receiving surface water systems, see Section 3.1.2 below.

Peak surface water discharges from the site (particularly during storm events) will be substantially reduced due to the restricted outflow from the development, as well as the discharge volume for the majority of small rainfall events through interception provided by the swales and attenuation pond, thereby reducing the impact on the receiving drainage network. Additionally, the proposed watercourse diversion will significantly promote biodiversity and surface water strategy enhancement, with a wide range of benefits related to the quantity and quality of the water, amenity value and biodiversity on the site.

3.1.1 Storm Attenuation and Online Control

The proposed storm attenuation pond is located at the northeast corner of the site and is designed to store a volume with equivalent storage for a 1 in 100-year storm event plus 20% allowance for climate change for all the run-off from the proposed development, totalling 2498.0 m3 of storage provided by the pond. The surface water swales and pipes network will also support in attenuating run-off for the most critical storms up to and including the 1 in 100-year plus 20% climate change. See Appendix B for Micro-drainage source control attenuation pond calculations.

The outflow from the attenuation facility will be gravitational and at a controlled rate of flow. The catchment area of the proposed development is 4.053 hectares. Given calculated Qbar of 1.99 litres / second / hectare, the total allowable discharge rate from the development will be of 8.06 litres / second. The break-up of the contributing areas is described below. See Arup drawings in Appendix A for furhter details.

Attenuation Pond Catchment Area Summary		
Total Catchment Area	**4.053**	ha
Total Impermeable Area	**3.294**	ha
Qbar	**1.99**	l/s/ha
Hydrobrake discharge limited to	**8.06**	l/s
Areas brake up	**m2**	**Runoff coefficient**
Roof	15213.0	1.00
Green Roof	1832.1	0.40
Road	4989.2	1.00
Concrete	5793.8	1.00
Footpath	1868.4	0.95
Permeable Carpark	1097.6	0.50
Landscape	9743.4	0.40
	40537.5	**0.81**

The attenuation outfall manhole will be installed with a Hydrobrake or similar approved flow restricting devices to limit discharges, as outlined above, prior to final discharge, via a 225mm surface water drain into the existing segment of the watercourse immediately downstream of the end of the proposed diversion realignment. See Arup drawings in Appendix A.

3.1.2 SuDS

A number of SuDS features will be incorporated into the development and will include green roofs, roadside swales, permeable paving, proprietary surface water treatment system, full retention petrol interceptors, bypass petrol interceptor and attenuation pond.

The green roof will be incorporated on the Data Centres administration buildings, providing interception and close to source/primary treatment for run-off of that area. The green roof's run-off will posteriorly discharge into proposed surface water drains network and run through Class 1 bypass petrol interceptor before discharging into the attenuation pond.

The roadside swales will be incorporated in areas assessed as low risk of pollutant spillage, collecting surface water run-off from the majority of the roads, surrounding footpaths and landscaping areas, excepting the loading dock areas and areas of refuelling next to the generator yards. The swales are designed to deliver interception via evapotranspiration and infiltration for the majority of the small rainfall events - it is intended that the swales will allow for partial infiltration to ground pending water table levels and to the extent that soil

infiltration rates in the location of the swales allow. Minimum water quality design is achieved for all rainfall events up to and including 1 in 1-year storm event plus 20% allowance for climate change, helping to reduce the contaminant load discharged to surface waters via volumetric control where this is possible, also fine particulates and associated contaminants can be removed by filtration, dissolved pollutant can be removed by sorption of pollutants to the filter medium, and some biological uptake by vegetation and subsoil biota can be achieved. Median pollutant mass removal rates of grass swales have been reported in the region of 76% for total suspended solids, thereby improving the quality of water discharging into the systems. The swales are designed to convey run-off from rainfall events up to and including 1 in 100-year plus 20% allowance for climate change. The run-off from the swales discharges into surface water drains and runs through Class 1 bypass petrol interceptor before discharging into the attenuation pond.

Permeable surfacing for the new car park spaces throughout the proposed development will be provided. It is intended that the permeable surfacing system will allow for partial infiltration to ground pending water table levels and to the extent that soil infiltration rates in the location of these permeable surfaces allow. Permeable paving systems will reduce peak discharges into the drainage system and will provide 70-90% removal efficiency rates for hydrocarbons and 60-95% removal of suspended solids thereby improving the quality of water discharging into the systems. The run-off from the new parking bays in front of DUB15 will discharge into surface water drains and run through Class 1 bypass petrol interceptor before discharging into the attenuation pond. The carpark in front of DUB16 will discharge into surface water drains and run through proprietary surface water treatment system like a "Downstream Defender" or "First Defence". The "First Defence or Downstream Defender" will provide removal efficiency rates of 50% for suspended solids and 80% for hydrocarbons. Refer to Appendix D for Hydro-International Guide to Surface Water Treatment System and their compliance with SuDS Manual C753. Third party testing has confirmed Mitigation Indices for proprietary surface water treatment systems similar to swales and ponds.

The run-off from refuelling areas next to the generator yards will be collect via standard surface water collection systems like road gullies and run through Class 1 Full Retention Petrol Interceptors, which will be fitted with carbon monitors and lockdown valves as well as all manholes immediately upstream of petrol interceptors will be provided of emergency spillage shutdown valve. The run-off from other low risk areas will run through Class 1 bypass Petrol Interceptor which will provide treatment to all storm events resulting in a flow up to 50 litres / second before discharging into the attenuation pond. These Petrol Interceptor systems will provide interception of run-off and oil/hydrocarbons removal with efficiency rates of up to 80% for oil and total suspended solids which will improve the quality of water discharging into the receiving systems in compliance with best drainage practice and SuDS requirements. See Arup drawings in Appendix A.

The attenuation pond is designed to store volume equivalent to a 1 in 100-year rainfall event plus 20% allowance for climate change. The facility will have an

approximately 300mm high standing water pool which will provide additional settling out of particulate pollutants prior to the pond outlet which will be of limited discharge rate as described above. The pool acts as the main treatment zone and helps to protect fine deposited sediments from resuspension. The primary pollutant removal mechanism is the settling of silts and suspended sediments. Uptake of pollutants, particularly nutrients, also occurs to some degree through the biological activity of the pond. Thereby, the pond acts as the main attenuation facility while potentially providing primary, secondary and tertiary water treatments. The outlet of the pond will be via 225mm drain fitted with a manhole comprised of lock down valve as redundant emergency system for any accidental hazardous spillage into the pond. Finally, the headwall downstream of same 225mm drain will be fitted with non-return flow valve.

3.1.3 Flood Risk Assessment

A separate Flood Risk Assessment Report has been provided by Arup for the proposed development. This is submitted with the Planning Application documentation.

4 Watermain & Foul Drainage

4.1 Proposed Watermain & Foul Systems

As part of the proposed development, an Irish Water Pre-connection Enquiry Application has been lodged under Reference Number CDS21004551 based on which a Letter of Confirmation of Feasibility was issued by Irish Water on the 7th of October of 2021, stating as outcomes for both Water and Wastewater Connection "Feasible without infrastructure upgrade by Irish Water". A copy of the letter can be found in Appendix C.

Both Watermain/Firemain Layout and Foul Drainage Layout have been updated in coordination with the new Surface Water Drainage Layout. See Arup drawings in Appendix A.

Appendix A

Arup Drainage and Watermain Drawings