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Engineering Services Report

Proposed Residential Development

Mill Road, Saggart, County Dublin

Client: Tetrarch Residential Ltd

Job No. T060

December 2021

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ENGINEERING SERVICES REPORT

PROPOSED RESIDENTIAL DEVELOPMENT, MILL ROAD, SAGGART, COUNTY DUBLIN

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File Location:
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BS 1192 FIELD	**T060-CSC-ZZ-XX-RP-C-0001_ESR**

Job Ref.	Author	Reviewed By	Authorised By	Issue Date	Rev. No.
T060	GS	GL	DR	16.12.2020	-
T060	GS	GL	NB	15.09.2021	A
T060	MM	GL	NB	10.12.2021	B

1.0 INTRODUCTION

Cronin & Sutton Consulting Engineers (CS Consulting) have been commissioned by Tetrarch Residential Ltd to prepare an Engineering Services Report to accompany a planning application for a residential development at Mill Road, Saggart, County Dublin.

This report assesses the proposed development under the following headings:

- Foul Drainage Infrastructure
- Stormwater Drainage Infrastructure
- Potable Water Infrastructure.

In preparing this report, CS Consulting has made reference to the following:

- South Dublin Development Plan 2016–2022
- Regional Code of Practice for Drainage Works
- The Greater Dublin Strategic Drainage Study
- Irish Water Code of Practice for Water
- Irish Water Code of Practice for Wastewater
- Local Authority Drainage Records.

The Engineering Services Report is to be read in conjunction with the engineering drawings and documents submitted by CS Consulting and with the various additional information submitted by the other members of the design team, as part of the planning submission.

2.0 SITE LOCATION AND PROPOSED DEVELOPMENT

2.1 Site Location

The proposed development site is located on Mill, Saggart, County Dublin. The site is located in the administrative jurisdiction of South Dublin County Council and has a total area of circa 4.95 ha.

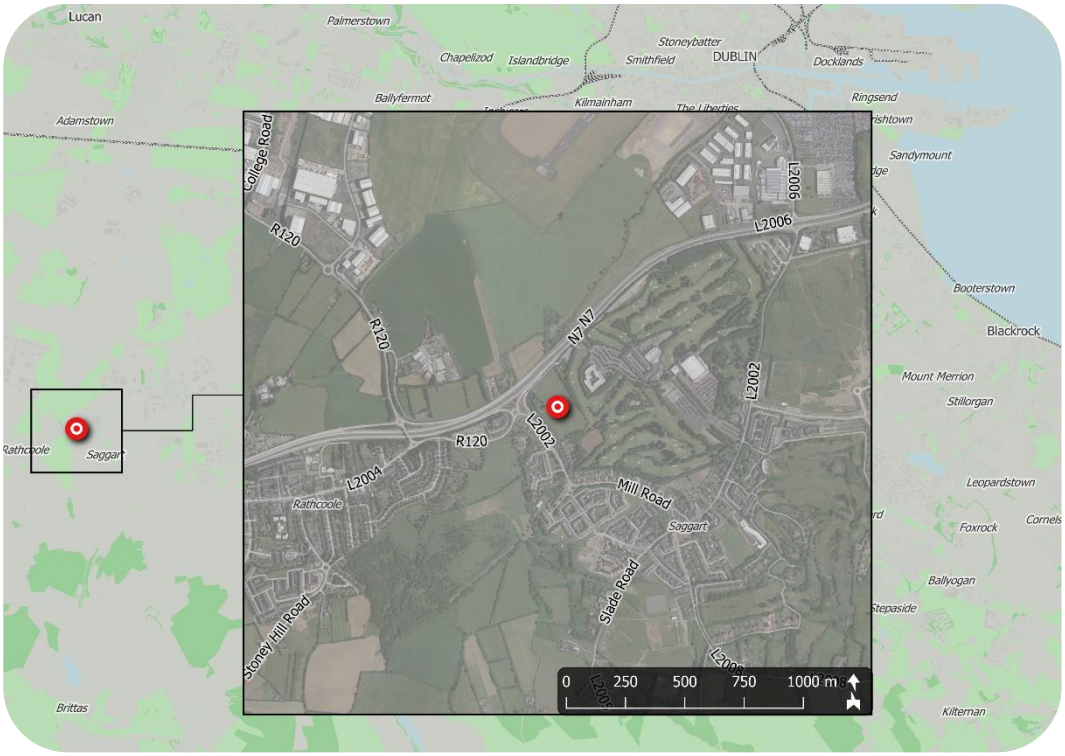

Figure 1 – Site location
(map data: EPA, NTA, OSM Contributors)

The location of the proposed development site is shown in Figure 1 above; the indicative extents of the development site, as well as relevant elements of the surrounding road network, are shown in more detail in Figure 2.

The site is bounded to the north by the N7 Naas Road, to the east the Citywest Campus, by a greenfield site and private dwellings to the south, and by Mill Road and private dwellings to the west.

Figure 2 – Elements of surrounding road network
(*map data & imagery sources: NTA, OSM Contributors, Google*)

2.2 Existing Land Use

The development site is primarily greenfield in nature falls from north to south towards the River Camac which runs along the site's southwestern boundary, flowing in a north-westerly direction towards the N7. An existing residential building is present on the site which will be demolished during the course of the works on site.

2.3 Proposed Development

The proposed development comprises of the construction of 274 No. residential units in a mix of 51 houses, 38 duplex units and 185 apartments (For a further breakdown of unit type please refer to the architectural schedule of accommodation). The scheme provides for a main vehicular access via Mill Road at the south west corner of the development site, to the west and shall also allow for secondary access point from the permitted development to the north west corner.

3.0 FOUL DRAINAGE

3.1 Existing Foul Drainage Infrastructure

Further to a review of the Irish Water drainage records for the area, an existing 450mm diameter foul sewer traversing the N7 carriageway flowing south to north (towards Dublin city centre). An additional 375mm foul sewer is shown on Mill Road, however due to its proximity of the Camac River a connection to this sewer is unattainable. See **Appendix A** for Irish Water drainage records.

The proposed development shall be serviced by a new drainage system with separate sewers and manholes for both foul and storm water within the sites boundary. The proposed foul network has been designed in accordance with the *Building Regulations & the Regional Code of Practice for Drainage* Works, Version 6.

3.2 Proposed Foul Drainage Arrangements

The proposed development is to consist of 274 No. residential units.

Based on Irish Water guidelines, the foul effluent generated shall be:

- <u>For the residential units:</u>
  - ⇒ 446l/day per unit (based on 2.7 persons per unit x 150l/person/day, plus a 10% increase factor);
  - ⇒ 446l/day/apt x 274 units = 122,204 l/day = 124.2 m^3/day;
  - ⇒ 1.414 l/sec Average flow (1 DWF);
  - ⇒ 8.49 l/sec Peak Flow (6 DWF).

All foul effluent generated from the proposed development shall be collected in 150mm and 225mm diameter pipes and flow under gravity, to the existing 450mm diameter foul sewer running adjacent to the N7 carriageway via a new connection. It is proposed to make the connection to the existing 450mm foul sewer by thrust boring a pipe under the carriageway as to avoid affecting traffic movements to existing road network.

The drainage network for the development shall be in accordance with Part H of the Building Regulations and to the requirements and specifications of Irish Water.

A Pre-Connection Enquiry for 310 No. units was submitted to Irish Water and we received a favourable response confirming a connection was feasible without any infrastructure upgrades. Please refer to **Appendix B** for a copy of the confirmation of feasibility from Irish Water.

The proposed foul water drainage infrastructure and routing plan is shown on drawing MILL-CSC-ZZ-XX-DR-C-0001.

4.0 STORMWATER DRAINAGE

4.1 Existing Stormwater Drainage Infrastructure

Following receipt of drainage records (see **Appendix A**) there is an existing 225mm stormwater line running along the northern boundary of the development site, just off the N7 carriageway.

4.2 Proposed Stormwater Drainage Arrangements

In accordance with the requirements of SDCC Drainage Division all new developments are to incorporate the principles of Sustainable Urban Drainage Systems, (SuDS). The SuDS principles require a two-fold approach to address storm water management on new developments.

The first aspect is to reduce any post development run-off to pre-development discharge rates. The development is to retain storm water volumes predicted to be experienced during extreme rainfall events. This is defined as the volume of storm water generated during a 1 in 100-year storm event increased for predicted climate change factors.

Based on the above criteria, the development site shall limit its discharge to 10.6 l/s, in line with the QBAR flow of 2.29 l/s/ha. Due to the size and layout of the development it is proposed to provide this volume of attenuation 2 number attenuation tanks. The first tank is located in the centre of the development site and shall limit its discharge flow to 5.0 l/s and provide 1082m^3 of storage, the second tank is adjacent to the outfall at the northern boundary of the development and provide 1043m^3, with the discharge flow limited to 10.6 l/s at this location. Please see refer to drawing MILL-CSC-ZZ-XX-DR-C-0001 for proposed drainage layout confirming attenuation sizes and location, and **Appendix C** for the respective Attenuation calculations modelled through Windes Microdrainage, which include for 20% climate change factors.

The restricted flow from the development site shall then discharge to the existing 225mm stormwater network along the northern boundary. The last public manhole and network to the existing sewer is to be constructed in accordance with Local Authority's requirements.

The second aspect is the policy of the Local Authority is to include Sustainable Urban Drainage Systems, SuDS, for all new applications, as such it is proposed to use a range of SuDS devises for the scheme they are listed below:

SuDS proposals are as follows:

- Infiltration trenches to rear gardens that shall cater for runoff generated from adjacent roofs.
- Tree Pit Drainage Systems
- Permeable Paving to all new parking spaces
- Waterbutts for local irrigation and washing down
- Attenuation tank with flow control device, sized to contain a 1-in-100-year storm event and increased by 20% for predicted climate change to limit the surface water discharge from the site during extreme rainfall events.
- Swales running adjacent to carriageways and in the communal area of the apartment blocks

We note that green roof systems to the apartment blocks were initially proposed for the scheme. However PV panels are proposed across the apartment roof areas. Together with the green roof this would bring about an increased fire risk to the buildings and the green roof system was discounted from the surface water design.

See Drawing No. MILL-CSC-ZZ-XX-DR-C-0001 for the proposed drainage layout of the development and Drawing MILL-CSC-ZZ-XX-DR-C-0010 for the SuDS layout of the development site.

4.3 South Dublin County Council – Drainage Requirements

South Dublin County Council have developed a drainage *Code of Practice Pre Planning Guidance* document, See **Appendix D**, which is to be consulted prior to formal submission of planning applications.

The document highlights 15 points to be addressed which covers drainage aspects for any submission. The items are noted below.

i) *Separated drainage systems*:
Please refer to drainage layout drawings showing separate foul and storm water networks.

ii) *Plans & Cross sections to be submitted:*
Plan and Sections Drawings included with submission.

iii) *Required technical information pertaining to, a) site areas b) SAAR, c) SPR, & surfaces breakdown*:
Please refer to **Appendix C and Section 4.4**.

iv) *Separation distances to be maintained between structures and sewers*:
Noted, please refer to plan drainage drawings.

v) *Minimum depth to services*:
Noted, please refer to plan drainage drawings.

vi) Location of manholes to be in public areas:
Noted refer to drainage layout drawings.

vii) *Development to comply with Building Regulations Part H*:
Noted.

viii) *Soakaways to conform to BRE Digest 365*:
None proposed for this development, however following a Site Investigation if feasible, the use of soakaways shall be reviewed.

ix) *Sustainable urban drainage systems, SuDs to be included*:
Please see section 3.4 and drawing MILL-CSC-ZZ-XX-DR-C-0010 for details.

x) *Attenuation Systems to be included*, where applicable:
Please refer to drawings MILL-CSC-ZZ-XX-DR-C-0012/0013 for details on proposed attenuation structures.

xi) *Attenuation systems requirements:*
Please refer to drawings MILL-CSC-ZZ-XX-DR-C-0001, MILL-CSC-ZZ-XX-DR-C-0012/0013 for details on proposed attenuation structures and **Appendix C** for attenuation calculations

xii) *Acceptable attenuation tank types:*
Please refer to drawings MILL-CSC-ZZ-XX-DR-C-0001, MILL-CSC-ZZ-XX-DR-C-0012/0013 for details on proposed attenuation structures. It is proposed to use the Stormtech Attenuation Tank system within the development which we understand is acceptable to the local authority.

xiii) *Surface water runoff rates to greenfield rates, as per GDSDS:*
Please refer to Section 4.2. above

xiv) *Site's location relative to 1-in-1000 year flood level:*
Please refer to the Site Specific Flood Risk Assessment, submitted under a separate cover by CS Consulting included with this submission.

xv) *Buildings set back, 10m, from the edge of water course:*
Noted, the layout has taken this into consideration, refer to the drainage layout plan indicating dimensions from the adjacent streams to proposed residential units.

4.4 South Dublin County Council – Confirmation of Areas

As per the above, listed below is the breakdown of surface type areas across the development site and the corresponding surface water coefficient applied to each surface type:

Surface Type	***Gross Area***	***Coefficient***	***Net Area***
Roads	5375 m^2	95%	5105 m^2
Roofs	8735 m^2	100%	8735 m^2
Permeable Paving	3875 m^2	85%	3295 m^2
Footpaths	3490 m^2	85%	2965 m^2
Ancillary Hard Standing	1645 m^2	80%	1315 m^2
Landscaped/Back Garden Areas	25000 m^2	40%	10000 m^2
Existing Roadway	1365 m^2	N/A	0 m^2
Total Area	49485 m^2		31,415 m^2

We confirm, the areas above have been inputted into the WinDES Microdrainage model and output calculations included in ***Appendix C.***

5.0 POTABLE WATER SUPPLY

5.1 Existing Potable Water System

Records obtained from Irish Water indicate public watermains to Mill Road and adjacent to the northern boundary of the development site just to the south of the N7 carriageway.

5.2 Proposed Potable Water System

It is proposed to make a new connection off the existing watermain running along northern boundary to the development site and supply a 150mm diameter watermain to the proposed development site.

Based on Irish Water guidelines, the potable water requirements shall be:

- For the residential units:
  - ⇒ 405l/day per unit (based on 2.7 persons per unit x150l/person/day);
  - ⇒ 405l/day/apt x 274 units = 110,970 l/day = 110.97 m^3/day;
  - ⇒ 1.28 l/sec Average water demand;
  - ⇒ 6.42 l/s Peak Demand (5 times the average water demand).

A Pre-Connection Enquiry for 310 No. residential units was submitted to Irish Water and we received a favourable response, confirming a connection was feasible without any infrastructure upgrades. A copy of the confirmation of feasibility is included in **Appendix B** to the rear of this report.

The proposed watermain infrastructure and routing plan is shown on drawing MILL-CSC-ZZ-XX-DR-C-0002 included with this submission.

Appendix A: Irish Water Drainage Records

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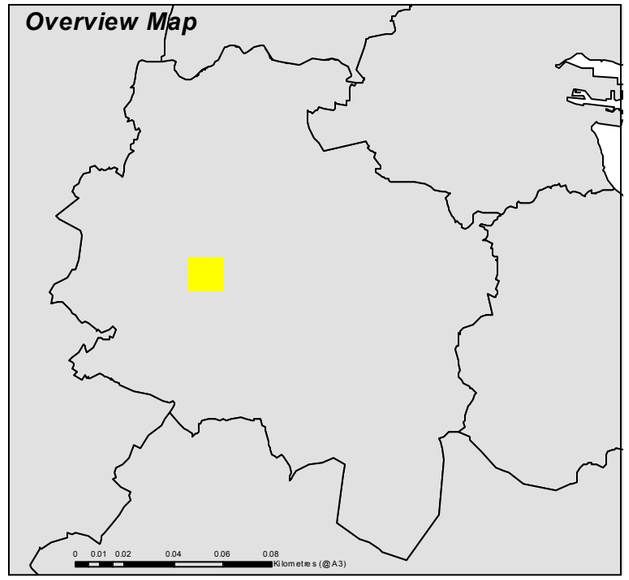
IWGIS Water Utilities Network

Overview Map



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

Reservoir
- Potable
- Raw Water

Water Distribution Mains
- Irish Water
- Private

Trunk Water Mains
- Irish Water
- Private

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

Water Fittings
- Cap
- Other Fitting

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

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

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

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

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

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

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

Sewer Fittings
- Vent/Col
- OTHER Other; Unknown

Storm Water Network

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

Inlet Type
- Gully
- Standard
- OTHER Other; Unknown

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

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

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

ESB Networks

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

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

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

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

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

UISCE ÉIREANN : IRISH WATER

Print Date: 14/08/2020

Printed by: cbolger

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Appendix B: Irish Water Confirmation of Feasibility Letter

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Gary Lindsay

19 - 22 Dame Street
Dublin
D02E267

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

15 December 2020

Re: CDS20005806 pre-connection enquiry - Subject to contract | Contract denied

Connection for Multi/Mixed Use Development of 310 units at Mill Road, Saggart, Co. Dublin

Dear Sir/Madam,

Irish Water has reviewed your pre-connection enquiry in relation to a Water & Wastewater connection at Mill Road, Saggart, Co. 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.

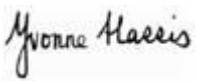
SERVICE	**OUTCOME OF PRE-CONNECTION ENQUIRY** **THIS IS NOT A CONNECTION OFFER. YOU MUST APPLY FOR A CONNECTION(S) TO THE IRISH WATER NETWORK(S) IF YOU WISH TO PROCEED.**
Water Connection	Feasible without infrastructure upgrade by Irish Water
Wastewater Connection	Feasible without infrastructure upgrade by Irish Water
SITE SPECIFIC COMMENTS	
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.	

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
Head of Customer Operations

Appendix C: WinDES Mircodrainage 100 year (+20%) Modelling Data

Attenuation Calculations

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Cascade Summary of Results for Att Tank 1.SRCX

Upstream Structures	Outflow To	Overflow To
(None)	Att Tank 2.SRCX	(None)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	108.709	0.209	2.4	187.8	O K
30 min Summer	108.785	0.285	2.5	256.5	O K
60 min Summer	108.867	0.367	2.5	330.1	O K
120 min Summer	108.957	0.457	2.5	411.5	O K
180 min Summer	109.015	0.515	2.5	463.5	O K
240 min Summer	109.058	0.558	2.5	502.0	O K
360 min Summer	109.121	0.621	2.5	558.9	O K
480 min Summer	109.167	0.667	2.5	600.4	O K
600 min Summer	109.202	0.702	2.5	632.1	Flood Risk
720 min Summer	109.230	0.730	2.5	657.4	Flood Risk
960 min Summer	109.273	0.773	2.5	695.4	Flood Risk
1440 min Summer	109.323	0.823	2.5	740.6	Flood Risk
2160 min Summer	109.354	0.854	2.5	768.3	Flood Risk
2880 min Summer	109.360	0.860	2.5	773.9	Flood Risk
4320 min Summer	109.357	0.857	2.5	771.3	Flood Risk
5760 min Summer	109.345	0.845	2.5	760.3	Flood Risk
7200 min Summer	109.328	0.828	2.5	745.6	Flood Risk
8640 min Summer	109.310	0.810	2.5	728.9	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	100.495	0.0	154.5	26
30 min Summer	68.813	0.0	194.5	41
60 min Summer	44.529	0.0	313.2	70
120 min Summer	28.068	0.0	381.3	128
180 min Summer	21.286	0.0	405.4	188
240 min Summer	17.450	0.0	407.8	248
360 min Summer	13.158	0.0	398.0	368
480 min Summer	10.758	0.0	383.8	488
600 min Summer	9.198	0.0	373.1	606
720 min Summer	8.092	0.0	365.0	726
960 min Summer	6.611	0.0	354.0	966
1440 min Summer	4.966	0.0	346.1	1444
2160 min Summer	3.724	0.0	736.8	2160
2880 min Summer	3.033	0.0	713.8	2624
4320 min Summer	2.269	0.0	677.6	3372
5760 min Summer	1.846	0.0	1320.9	4152
7200 min Summer	1.573	0.0	1373.8	4976
8640 min Summer	1.380	0.0	1329.5	5808

Cascade Summary of Results for Att Tank 1.SRCX

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
10080 min Summer	109.290	0.790	2.5	711.2	Flood Risk
15 min Winter	108.734	0.234	2.5	210.6	O K
30 min Winter	108.820	0.320	2.5	287.7	O K
60 min Winter	108.911	0.411	2.5	370.3	O K
120 min Winter	109.014	0.514	2.5	462.4	O K
180 min Winter	109.079	0.579	2.5	521.5	O K
240 min Winter	109.129	0.629	2.5	565.8	O K
360 min Winter	109.201	0.701	2.5	630.6	Flood Risk
480 min Winter	109.253	0.753	2.5	677.4	Flood Risk
600 min Winter	109.293	0.793	2.5	713.8	Flood Risk
720 min Winter	109.326	0.826	2.5	743.2	Flood Risk
960 min Winter	109.376	0.876	2.5	788.1	Flood Risk
1440 min Winter	109.438	0.938	2.5	844.1	Flood Risk
2160 min Winter	109.482	0.982	2.5	883.7	Flood Risk
2880 min Winter	109.496	0.996	2.5	896.5	Flood Risk
4320 min Winter	109.487	0.987	2.5	888.4	Flood Risk
5760 min Winter	109.470	0.970	2.5	873.3	Flood Risk
7200 min Winter	109.445	0.945	2.5	850.3	Flood Risk
8640 min Winter	109.415	0.915	2.5	823.3	Flood Risk
10080 min Winter	109.382	0.882	2.5	794.0	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
10080 min Summer	1.236	0.0	1257.4	6664
15 min Winter	100.495	0.0	170.4	26
30 min Winter	68.813	0.0	203.2	40
60 min Winter	44.529	0.0	347.4	70
120 min Winter	28.068	0.0	405.2	128
180 min Winter	21.286	0.0	409.5	186
240 min Winter	17.450	0.0	401.7	246
360 min Winter	13.158	0.0	384.3	362
480 min Winter	10.758	0.0	373.1	480
600 min Winter	9.198	0.0	366.0	598
720 min Winter	8.092	0.0	361.6	716
960 min Winter	6.611	0.0	359.4	948
1440 min Winter	4.966	0.0	365.3	1410
2160 min Winter	3.724	0.0	745.3	2084
2880 min Winter	3.033	0.0	732.5	2740
4320 min Winter	2.269	0.0	720.1	3504
5760 min Winter	1.846	0.0	1457.5	4432
7200 min Winter	1.573	0.0	1441.9	5336
8640 min Winter	1.380	0.0	1383.5	6312
10080 min Winter	1.236	0.0	1320.9	7256

Cascade Rainfall Details for Att Tank 1.SRCX

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	19.100	Shortest Storm (mins)	15
Ratio R	0.270	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+20

Time Area Diagram

Total Area (ha) 1.009

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.310	4	8	0.538	8	12	0.161

Cascade Model Details for Att Tank 1.SRCX

Storage is Online Cover Level (m) 109.500

Tank or Pond Structure

Invert Level (m) 108.500

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	900.0	1.000	900.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0075-2500-1000-2500
Design Head (m)	1.000
Design Flow (l/s)	2.5
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	75
Invert Level (m)	108.500
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	2.5
Flush-Flo™	0.307	2.5
Kick-Flo®	0.627	2.0
Mean Flow over Head Range	-	2.2

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.1	1.200	2.7	3.000	4.1	7.000	6.2
0.200	2.4	1.400	2.9	3.500	4.5	7.500	6.4
0.300	2.5	1.600	3.1	4.000	4.7	8.000	6.6
0.400	2.5	1.800	3.3	4.500	5.0	8.500	6.8
0.500	2.4	2.000	3.4	5.000	5.3	9.000	7.0
0.600	2.1	2.200	3.6	5.500	5.5	9.500	7.1
0.800	2.3	2.400	3.7	6.000	5.7		
1.000	2.5	2.600	3.9	6.500	6.0		

Cascade Summary of Results for Att Tank 2.SRCX

Upstream Structures	Outflow To	Overflow To
Att Tank 1.SRCX	(None)	(None)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	104.490	0.490	10.5	392.1	O K
30 min Summer	104.669	0.669	10.5	535.6	O K
60 min Summer	104.859	0.859	10.5	687.4	O K
120 min Summer	105.066	1.066	10.5	852.6	O K
180 min Summer	105.196	1.196	10.5	956.9	O K
240 min Summer	105.290	1.290	10.5	1032.3	O K
360 min Summer	105.419	1.419	10.5	1134.8	O K
480 min Summer	105.503	1.503	10.5	1202.7	O K
600 min Summer	105.564	1.564	10.5	1251.2	O K
720 min Summer	105.609	1.609	10.5	1286.9	O K
960 min Summer	105.666	1.666	10.5	1333.0	O K
1440 min Summer	105.707	1.707	10.5	1365.4	Flood Risk
2160 min Summer	105.713	1.713	10.5	1370.3	Flood Risk
2880 min Summer	105.699	1.699	10.5	1358.9	O K
4320 min Summer	105.646	1.646	10.5	1316.7	O K
5760 min Summer	105.578	1.578	10.5	1262.2	O K
7200 min Summer	105.503	1.503	10.5	1202.7	O K
8640 min Summer	105.425	1.425	10.5	1139.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	100.495	0.0	521.0	34
30 min Summer	68.813	0.0	692.1	49
60 min Summer	44.529	0.0	1000.9	78
120 min Summer	28.068	0.0	1240.5	138
180 min Summer	21.286	0.0	1377.0	198
240 min Summer	17.450	0.0	1468.5	256
360 min Summer	13.158	0.0	1579.0	374
480 min Summer	10.758	0.0	1605.2	492
600 min Summer	9.198	0.0	1598.3	610
720 min Summer	8.092	0.0	1583.0	728
960 min Summer	6.611	0.0	1547.8	966
1440 min Summer	4.966	0.0	1488.0	1384
2160 min Summer	3.724	0.0	2826.3	1736
2880 min Summer	3.033	0.0	2971.5	2136
4320 min Summer	2.269	0.0	2818.3	2956
5760 min Summer	1.846	0.0	4133.5	3816
7200 min Summer	1.573	0.0	4349.1	4632
8640 min Summer	1.380	0.0	4455.1	5472

Cascade Summary of Results for Att Tank 2.SRCX

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
10080 min Summer	105.342	1.342	10.5	1073.7	O K
15 min Winter	104.550	0.550	10.5	440.0	O K
30 min Winter	104.752	0.752	10.5	601.4	O K
60 min Winter	104.966	0.966	10.5	772.8	O K
120 min Winter	105.202	1.202	10.5	961.8	O K
180 min Winter	105.350	1.350	10.5	1079.9	O K
240 min Winter	105.455	1.455	10.5	1164.0	O K
360 min Winter	105.603	1.603	10.5	1282.2	O K
480 min Winter	105.704	1.704	10.5	1363.1	Flood Risk
600 min Winter	105.778	1.778	10.5	1422.0	Flood Risk
720 min Winter	105.833	1.833	10.5	1466.5	Flood Risk
960 min Winter	105.909	1.909	10.5	1526.9	Flood Risk
1440 min Winter	105.976	1.976	10.5	1580.5	Flood Risk
2160 min Winter	105.976	1.976	10.5	1580.9	Flood Risk
2880 min Winter	105.955	1.955	10.5	1564.3	Flood Risk
4320 min Winter	105.871	1.871	10.5	1496.7	Flood Risk
5760 min Winter	105.760	1.760	10.5	1407.7	Flood Risk
7200 min Winter	105.638	1.638	10.5	1310.6	O K
8640 min Winter	105.510	1.510	10.5	1208.3	O K
10080 min Winter	105.373	1.373	10.5	1098.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
10080 min Summer	1.236	0.0	4525.4	6360
15 min Winter	100.495	0.0	580.1	34
30 min Winter	68.813	0.0	757.2	48
60 min Winter	44.529	0.0	1115.3	78
120 min Winter	28.068	0.0	1362.5	136
180 min Winter	21.286	0.0	1495.7	194
240 min Winter	17.450	0.0	1577.4	252
360 min Winter	13.158	0.0	1623.1	366
480 min Winter	10.758	0.0	1615.2	482
600 min Winter	9.198	0.0	1599.6	598
720 min Winter	8.092	0.0	1584.1	714
960 min Winter	6.611	0.0	1559.5	942
1440 min Winter	4.966	0.0	1544.4	1384
2160 min Winter	3.724	0.0	3083.8	1972
2880 min Winter	3.033	0.0	3137.0	2252
4320 min Winter	2.269	0.0	2927.3	3200
5760 min Winter	1.846	0.0	4592.5	4112
7200 min Winter	1.573	0.0	4769.8	5048
8640 min Winter	1.380	0.0	4890.3	5968
10080 min Winter	1.236	0.0	4988.6	6872

Cascade Rainfall Details for Att Tank 2.SRCX

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	19.100	Shortest Storm (mins)	15
Ratio R	0.270	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+20

Time Area Diagram

Total Area (ha) 2.132

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.196	8	12	0.453	16	20	0.612
4	8	0.555	12	16	0.316			

Cascade Model Details for Att Tank 2.SRCX

Storage is Online Cover Level (m) 106.000

Tank or Pond Structure

Invert Level (m) 104.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	800.0	2.000	800.0

Hydro-Brake® Optimum Outflow Control

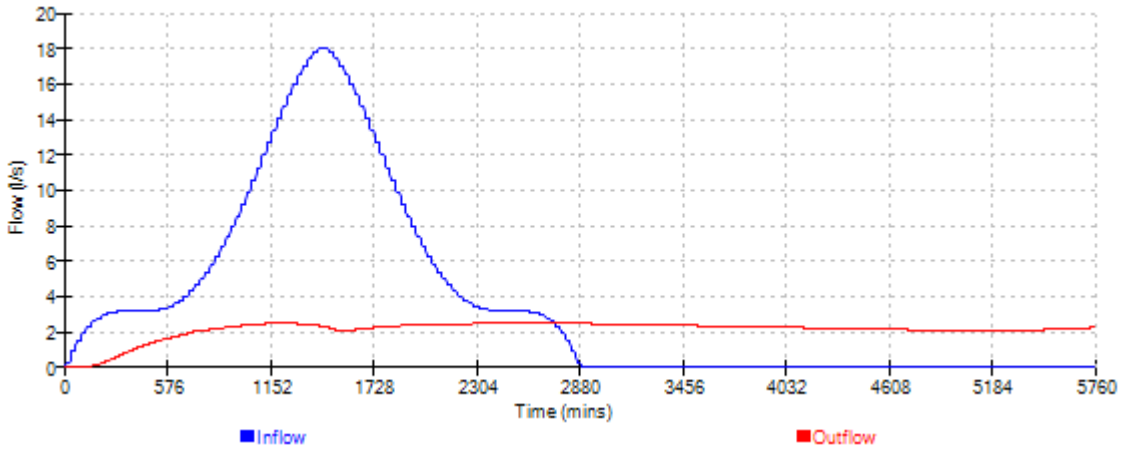
Unit Reference	MD-SHE-0135-1060-2000-1060
Design Head (m)	2.000
Design Flow (l/s)	10.6
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	135
Invert Level (m)	104.000
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1500

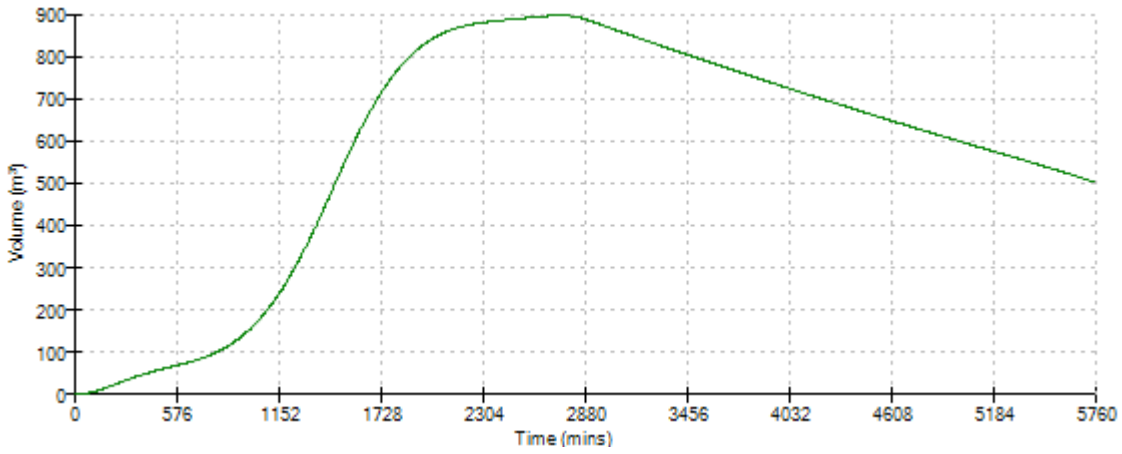
Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.000	10.6
Flush-Flo™	0.593	10.5
Kick-Flo®	1.206	8.4
Mean Flow over Head Range	-	9.3

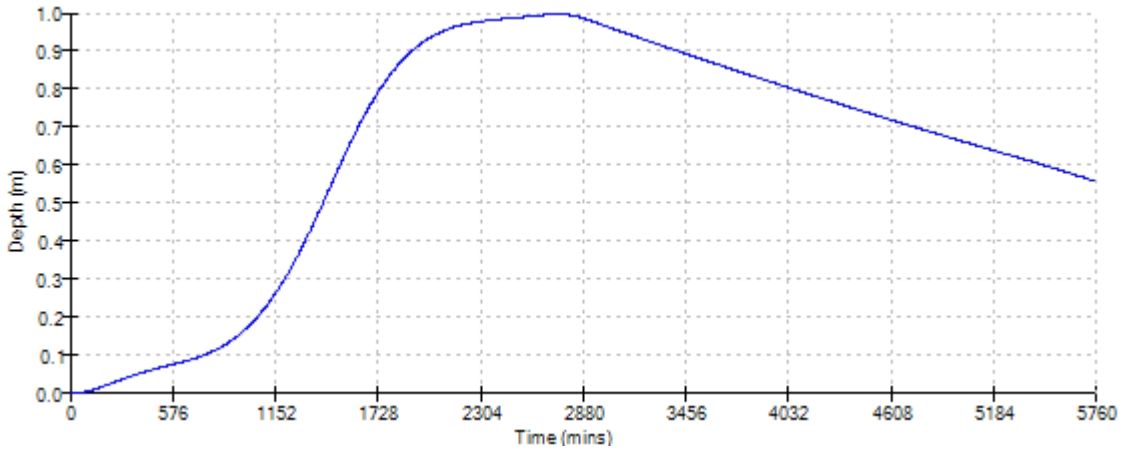
The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.9	1.200	8.4	3.000	12.8	7.000	19.2
0.200	8.8	1.400	9.0	3.500	13.8	7.500	19.9
0.300	9.8	1.600	9.5	4.000	14.7	8.000	20.5
0.400	10.3	1.800	10.1	4.500	15.6	8.500	21.1
0.500	10.5	2.000	10.6	5.000	16.4	9.000	21.7
0.600	10.5	2.200	11.1	5.500	17.1	9.500	22.3
0.800	10.3	2.400	11.6	6.000	17.9		
1.000	9.8	2.600	12.0	6.500	18.6		

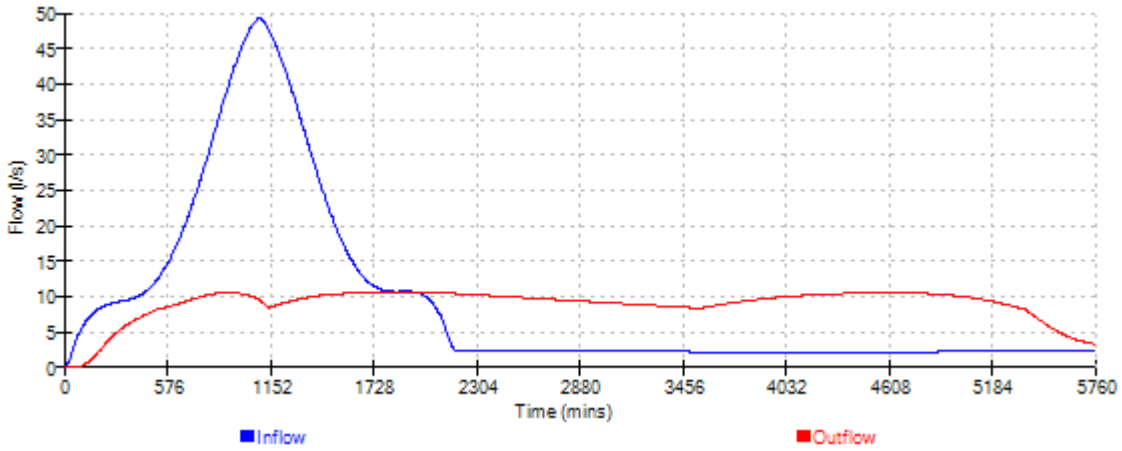
Cascade Event: 2880 min Winter for Att Tank 1.SRCX

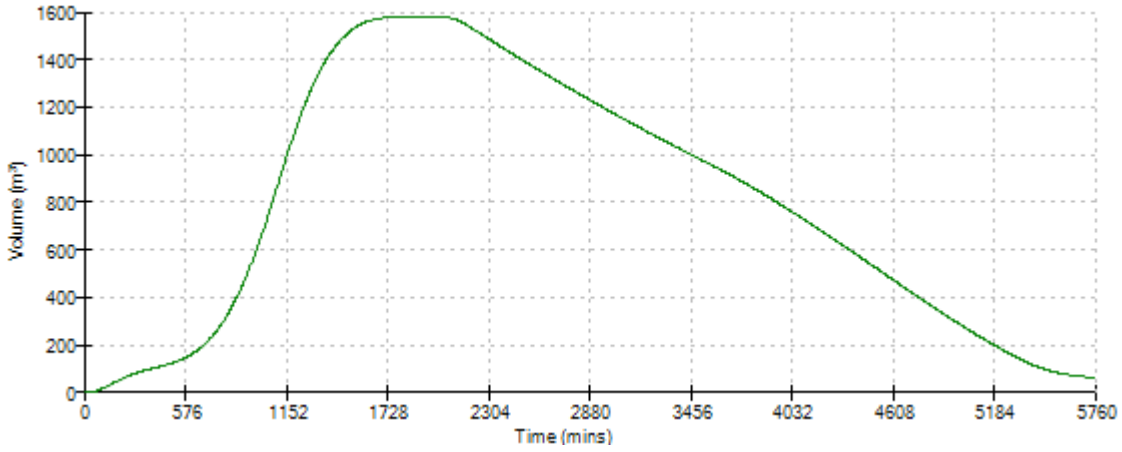


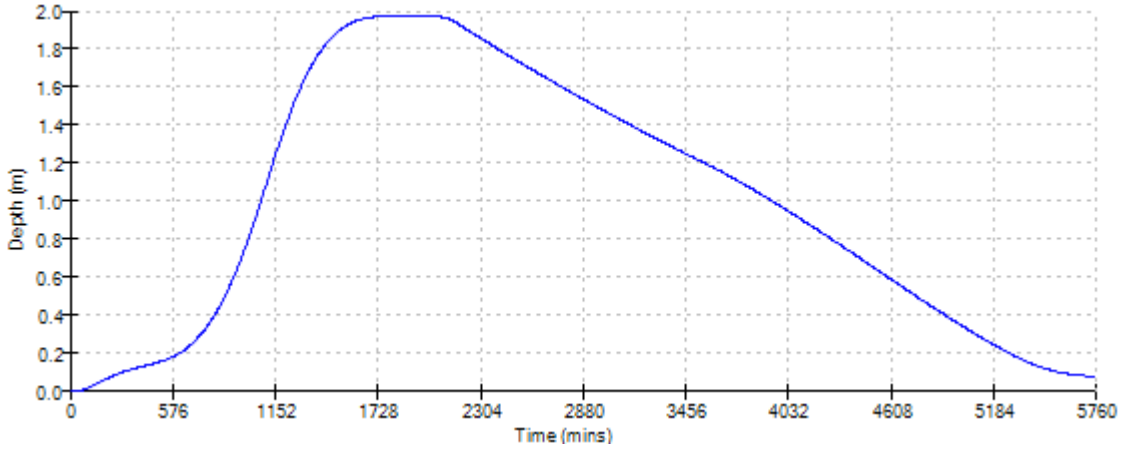




Cascade Event: 2160 min Winter for Att Tank 2.SRCX







Appendix D: SDCC – Drainage Code of Practice Pre-Planning Guidance

6

SDCC Greater Dublin Regional Drainage Code of Practice Pre Planning Guidance

The guiding documents are the Greater Dublin Strategic Drainage Study (GDSDS) and the Greater Dublin Regional Code of Practice for Drainage Works (C of P), available at http://www.sdcc.ie/sites/default/files/publications/greater-dublin-regional-code-of-practice-for-drainage-works.pdf

Maps of the mains foul and surface water drainage networks may be obtained, if available, for required locations in South Dublin County Council by emailing: **servicemaps@sdublincoco.ie**

1. Foul and surface water systems to be designed to discharge to separate pipe networks.

2. Fully detailed drawings showing plan and cross-sectional views of surface and foul networks shall be submitted.

3. The following details shall be submitted as part of surface water drainage calculations:

   - Total Site Area
   - Standard Average Annual Rainfall (SAAR)
   - Standard Percentage Run off value (SPR)
   - A breakdown of surface types, surface areas and surface run off coefficients. (See example of table below)

Structure Type	Area Ha (Hectares)	Runoff Coefficients
Buildings		
Green Roofs (if any)		
Roads		
Pathways		
Permeable Paving		
Grass		
Total		

4. A clear distance of 3m separation required between public sewers and all proposed structures. This clear distance will be increased if the sewer is greater than 3m deep or greater than 375mm in diameter (C of P section 6). Cross-section drawings shall be submitted where the proposed development is in close proximity to a public sewer or any drain with the potential to be taken in charge.

5. The recommended minimum depth of cover over a mains pipeline is 1.2m (C of P 11.8.2). Any utility crossing a sewer is to have a minimum clear distance of 300mm (C of P 3.13).

6. Manholes shall be located in public pavements, roads or public open spaces (C of P 9.9).

7. Developments must comply with the Building Regulations 2010 Part H.

8. Soakaways may be used for the disposal of surface water, and must comply with the BRE Digest 365. Submitted soakaway design details shall include infiltration test results. The design shall be certified to BRE Digest 365 standard by a suitably qualified person. Only clean, uncontaminated surface water shall be discharged to soakaways. The soakaway shall be located fully within the curtilage of the property and shall be:

   (i) at least 5m from any buildings, public sewers, road boundary or structures

   (ii) generally, not within 3m of the boundary of the adjoining site

   (iii) not in such a position that the ground below foundations is likely to be adversely affected.

   (iv) 10m from any sewage treatment percolation area and from any watercourse / flood plain.

   (v) Soakaways to include an overflow connection to a public surface water sewer where possible.

9. Sustainable Drainage Systems (SuDS) are a mandatory requirement for all new developments including domestic extensions and side garden developments (GDSDS chapter 4). Drainage designs shall incorporate SuDS features into drainage designs such as but not limited to the following: Green Roofs, Infiltration systems, Filter Drains/Strips, Tree pits, Swales, Ponds/Wetlands, Detention basins, Bio Retention systems, Pervious pavement, Rain Gardens, Channel Rills, Rainwater harvesting systems.

10. In the event where SuDS features are not sufficient to attenuate surface water, traditional attenuation systems may be accepted as an alternative means to attenuate water. A strong justification will need to be made in this case.

11. Surface Water Attenuation systems generally must satisfy the following requirements:

   (i) Must be at least 5m from any buildings, public sewers, road boundary or structures

   (ii) Must generally not be within 3m of the boundary of the adjoining site

   (iii) Must not in such a position that the ground below foundations is likely to be adversely affected.

   (iv) Must be at least 10m from any sewage treatment percolation area and from any watercourse / flood plain.

12. Where underground attenuation systems are proposed in areas with the potential to be taken in charge by the Local Authority, South Dublin County Council will only accept **Arch Type** attenuation systems.

13. The surface water run-off from the site shall be limited to greenfield runoff and details shall be provided on how surface water up to and including the 1:100 (1%) year critical storm with climate change allowance will be dealt with on site in accordance with the GDSDS. The applicant shall also demonstrate that there will be no reduction in the quality of the surface water.

14. Where sites are located within the 1 in 1000 (0.1%) year flood extent of the OPW's CFRAM maps, the applicant shall submit details of the measures and design features to prevent/mitigate the risk of flooding to the proposed development and to adjoining lands. Compensation storage shall be provided where development is on the flood plain. Finished floor levels shall be at least 0.5m above the highest flood level occurrence at thatlocation.

15. Buildings must be set back at least 10 metres from the top bank edge of any watercourse.

Flood Risk

1. Flood risk must be assessed and commented on for all sites. Submissions must comply with OPW Guidelines for Planning Authorities, available at: https://www.opw.ie/media/Planning%20System%20and%20Flood%20Risk%20Management%20Guidelines.pdf

Water Supply

2. Submissions must comply with Irish Water's Standard Details and Code of Practice requirements available at: https://www.water.ie/connections/developer-services/

Foul Water

3. Submissions must comply with Irish Water's Standard Details and Code of Practice requirements available at: https://www.water.ie/connections/developer-services/

Anyone seeking pre-planning information on drainage prior to the submission of a planning application can e-mail a query to the following address: **servicemaps@sdublincoco.ie.**