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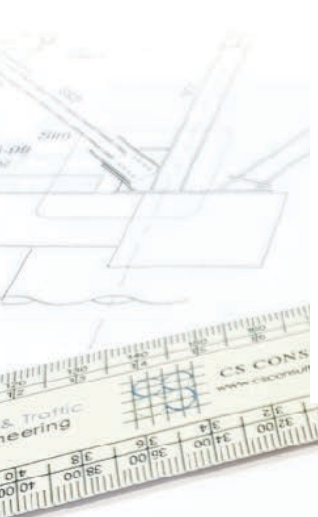
Proposed Residential Development

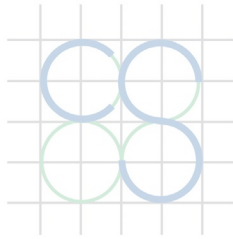
**Bridgegate, Mulladrillen and Rathgory,
Drogheda Road, Ardee, Co. Louth**

Client: The Ardee Partnership

Job No. R086

March 2022





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ENGINEERING SERVICES REPORT

PROPOSED RESIDENTIAL DEVELOPMENT, BRIDGEGATE, MULLADRILLEN AND RATHGORY, DROGHEDA ROAD, ARDEE, CO. LOUTH

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BS 1192 FIELD **ARDEE-CSC-ZZ-XX-RP-C-0001-P11**

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R086	GS	RFM	RFM	14.08.2020	P2
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1.0 INTRODUCTION

Cronin & Sutton Consulting Engineers (CS Consulting) have been commissioned to prepare an Engineering Services Report to accompany a planning application for a proposed residential development at Bridgegate, Mulladrillen and Rathgory, Drogheda Road, Ardee, Co. Louth.

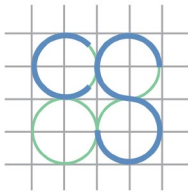
This report assesses the proposed development under the following headings:

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

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

- Louth County Development Plan 2021-2027
- Regional Code of Practice for Development Works, Version 6
- Greater Dublin Regional Code of Practice for Drainage Works
- British Standard BS EN 752:2008 (Drains and Sewer Systems Outside Buildings)
- Part H of the Building Regulations (Building Drainage)
- Irish Water Code of Practice for Water Infrastructure
- Irish Water Code of Practice for Wastewater Infrastructure
- Greater Dublin Strategic Drainage Study

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.



2.0 SITE LOCATION AND PROPOSED DEVELOPMENT

2.1 Site Location

The site of the proposed development lies on the outskirts of Ardee in County Louth, approx. 800m to the south-east of the town centre, in the townland of Rathgory and Mulladrillen. The site has a total area of 13.03ha and is located in the operational area of Louth County Council.

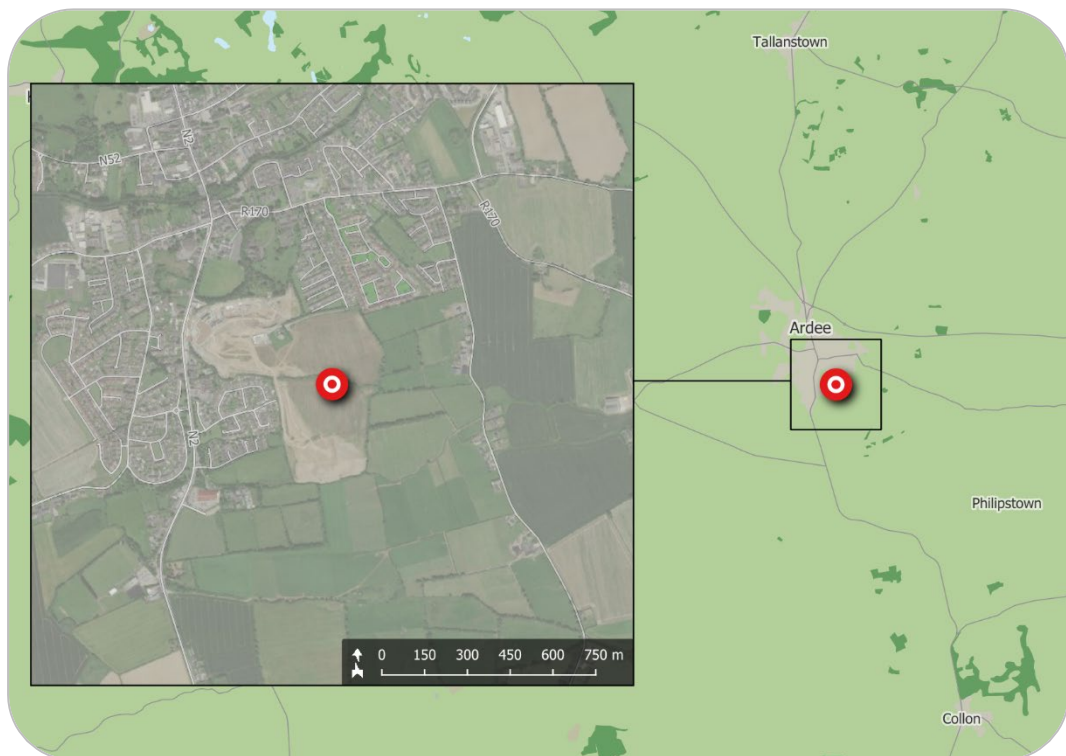


Figure 1 – Location of proposed development site
(map data & imagery: EPA, OSM Contributors, ESRI)

The location of the proposed development site is shown in Figure 1 above; the indicative extents of the development site and the area subject to this application, 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 and north-east by the existing De la Salle Crescent and Moorehall residential developments, to the west by the

existing Cherrybrook residential estate and by lands currently under development (planning ref. 10/174), and on all other sides by agricultural lands.



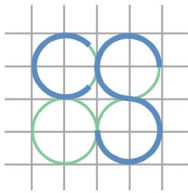
Figure 2 – Site extents and environs
(map data & imagery: NTA, OSi, OSM Contributors, Microsoft)

2.2 Existing Land Use

The subject site is greenfield, containing an existing watercourse. Refer to CS Consulting Drawing **ARDEE-CSC-00-XX-DR-C-1000 Topographical Survey** for the existing topographical survey.

2.3 Description of Proposed Development

The proposed development site extends to c. 13.03 ha at Bridgegate, Rathgory & Mulladrillen, Drogheda Road, Ardee, County Louth and adjoins Phases 1-3 at Bridgegate (under construction) on lands to the west, accessed from the N2 Drogheda Road. The proposals overlap the

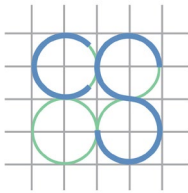


boundary of permitted development Reg. Ref.: 10174; ABP Ref: PL15.238053 (as amended) at the western boundary and will supersede granted development in this area which consists of 31 no. dwellings, crèche and community building and public open space.

The development will consist of:

- A) The construction of 272 no. residential units comprising a mix of 206 no. 2, 3 and 4 bedroom houses (all 2 storeys) including 50 no. 2-bedroom houses (Type 1), 145 no. 3-bedroom houses (Types 2, 3, 6) and 11 no. 4-bedroom houses (Types 4, 5) all with private open space and car parking, alongside 66 no. duplex units (all 3 storeys) including 17 no. 1-bedroom units (Types D5, D8), 24 no. 2-bedroom units (Types D1, D3, D6) and 25 no. 3-bedroom units (Types D2, D4, D7), all with private open space in the form of terrace at upper floor level and external garden space, with 499 sqm of communal open space serving Duplex Blocks A-B (48 no. units) (served by 2 no. bin and bike stores [each c. 51 sqm] adjacent) at Bridgegate Avenue, providing a total residential gross floor area of c. 28,168.9 sqm;
- B) A part 1, part 2 no. storey crèche (c. 484.1 sqm) and playground and a single storey community building (c. 165 sqm) located adjacent at a central community hub (with bin and bike store [c. 23 sqm]) accessed from Bridgegate Avenue served by car parking located on Bridgegate Green and Bridgegate Avenue;
- C) A landscaped Public Park located in the northern part of the site extending to c. 3.6 ha accessed from the community hub and between duplex Blocks B & C at Bridgegate Avenue, with 2 no. pedestrian links to permitted public park adjoining to the west and 1 no. pedestrian footpath extending to the northern perimeter at Hale Street, with a reservation for a future link road to lands to the east facilitated in the northern section of the park;

- D) Works to the Rathgory Tributary located to the south of Bridgegate Avenue comprising the realignment of the channel and regrading and reprofiling of land (as required), implementation of 2 no. vehicular crossings (including culverts and mammal passes) and the provision of a riparian corridor based around the open watercourse comprising landscaping and planting with safe access to the watercourse provided for maintenance purposes and 1 no. pedestrian and cyclist crossing;
- E) A series of landscaped public open spaces provided throughout the site with Public Open Space 01 (c. 1.05 ha) and Public Open Space 2 (c. 0.43 ha) located within the linear park (including riparian corridor) adjacent to the Rathgory Tributary with Public Open Space 03 (c. 0.29 ha) centrally located in the southern part of the site; open spaces will provide a mix of hard and soft landscaping, pedestrian and cycle access (cycle lanes provided at POS 1 and POS 2) and a range of activities including fitness spaces, kickabout area, amphitheatre and nature based play areas;
- F) Provision of shared surfaces, landscaped streetscapes including planting and landscaping at two neighbourhood streets in the southern part of the site, with roads provided to site boundaries to the east, south and west to facilitate possible future connections;
- G) All landscaping including planting to consolidate treelines and hedgerows forming existing site boundaries with agricultural lands to the east and Cherrybrook residential development to the west and all boundary treatments;
- H) Roads and access infrastructure taken from Bridgegate Avenue (permitted under Reg. Ref.: 10/174; ABP Ref: PL15.238053 [as amended]), the provision of a bus stop on the south side of Bridgegate Avenue adjacent to community hub and provision of cycle lanes at this location (continued through Public Open Space 01); a total of 480



no. car parking spaces (362 no. serving houses, 84 no. serving duplexes, 23 no. serving crèche and community building and 11 no. visitor and public open spaces), a total of 296 no. bicycle parking spaces (204 no. spaces serving duplexes [60 visitor spaces], 32 no. spaces at the community hub and 60 no. visitor spaces);

- I) Provision of 2 no. ESB substations, all associated drainage and services infrastructure (surface water, foul and water supply), public lighting, SUDS drainage and works to facilitate the development.

3.0 STORMWATER DRAINAGE

3.1 Existing Storm Water Arrangements

At present the subject lands does not have any engineered drainage system in place. The open nature of the site and the natural existing gradients has led the majority of the site to drain to the south into a tributary of the River Dee. As noted, the site does have an existing watercourse through the centre of the site. See drawing **ARDEE-CSC-00-XX-DR-C-1000 Topographical Survey** for the existing topographical survey of the site.

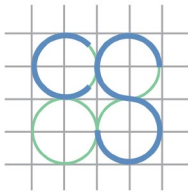
3.2 Proposed Storm Water Arrangements

The proposed new storm water drainage arrangements will be designed and carried out in accordance with:

- i) The Greater Dublin Strategic Drainage Study (GDSDS), Volume 2
- ii) The Greater Dublin Regional Code of Practice for Drainage Works
- iii) British Standard BS EN 752:2008 (Drains and Sewer Systems Outside Buildings)
- iv) Part H of the Building Regulations (Building Drainage)

The GDSDS and the Local Authority's Regional Code of Practice for Drainage Works require that four main criteria to be provided by the developer.

- Criterion 1: River Water Quality Protection – satisfied by providing interception storage and treatment of run-off within SuDS features, e.g. wetlands or bio-retention areas.
- Criterion 2: River Regime Protection - satisfied by attenuating run-off from the site.
- Criterion 3: Level of Service (flooding) for the site – satisfied by the site being outside the 1000-year coastal and fluvial flood extent areas.



Pluvial flood risk addressed by development designed to accommodate a 100-year extreme storm as noted in GDSDS. Planned flood routing for storms greater than 100-year level considered in design and development run-off contained on site.

- Criterion 4: River Flood Protection – attenuation and/or long-term storage provided within the SuDS features.

In accordance with the requirements of Louth County Council, the proposed development shall incorporate Sustainable Drainage Systems (SuDS) principles. These 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 (i.e. greenfield runoff 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 by 20% to account for the predicted effects of climate change.

The **second** aspect requires that storm water quality be improved before disposal and, where applicable, that storm water be permitted to infiltrate into the ground on site rather than discharging to the public drainage system or to watercourses.

3.3 Attenuation Storage

The restriction of post development run-off to pre-development discharge rates at the subject development is to be achieved primarily through the provision of onsite attenuation storage to accommodate excess runoff during extreme rainfall events.

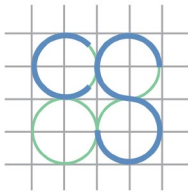
To ensure an accurate calculation of the required attenuation for the site, the following data were obtained:

- a) The SAAR (Standard Annual Average Rainfall) for the area, provided by Met Éireann: 781mm/year.
- b) The sliding duration table for the site indicating the 1:100 year rainwater intensities to be used, provided by Met Éireann.
- c) Soil type value, obtained from the Flood Studies Report carried out by JBA Consulting (for the subject lands this has been established as soil type 2).

The QBar value (greenfield runoff rate) for the site has been established as 2.07 l/s/ha. As the application has three distinct areas (area A, area B and area C), the required discharge rate has been calculated for all three. See drawing **ARDEE-CSC-00-XX-DR-C-1002 Drainage Layout** for details of same. Based on the site's QBar value, the required attenuation volume has been calculated for the three zones. The required storage will be provided in the form of underground storage tanks. See CS Consulting drawing **ARDEE-CSC-00-XX-DR-C-1201 Surface Water Catchments** for details of the storm drainage network and associated attenuation storage locations.

The proposed 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 by 20% to account for predicted climate change effects. The development's attenuation storage volume requirement for such an event has been calculated as 2,957m³. It is proposed to locate 4no. Stormtech attenuation systems in different areas of the development, providing a total attenuation storage volume of 2,951m³.

The proposed storm water network has been designed using the WinDes Micro Drainage Program, to check for suitable capacity in the network to ensure no flooding takes place during extreme storm events. See **Appendix B** for WinDes design, long sections, and simulation calculations for the proposed storm water system.



The outfall into the public system shall be into the adjacent storm sewers or into the River Dee's tributary. As noted above, the site has an existing open channel watercourse which is a tributary of the River Dee. It is proposed to re-align this water course to aid in the most sustainable use of the site to provide the required housing densities for the subject site area. The stream's hydraulic conveyance will be maintained and OPW hydraulic requirements (Section 9 Application) applied for post planning.

We refer to the Flood Risk Assessment Report carried out by JBA, which outlines the following:

- All residential development is located in flood zone C.
- No displacement of flood waters will be encountered as part of the proposed design.
- Finished Floor Levels have been set above the 1-in-1000-year event level, plus freeboard of 500mm.
- JBA will be providing as part of their further works reporting a detailed hydraulic model of the realigned stream based on OPW mapping.
- A Section 9 application will be made in due course for the realignment post planning based on the modelling to be undertaken.
- Section 50 applications will be made in due course for the culverts being placed in the stream, sized and designed based on the modelling to be undertaken.

Please refer to CS Consulting Drawing **ARDEE-CSC-00-XX-DR-C-1002 Drainage Layout** for drainage details. See **Appendix A** for Attenuation Calculation.

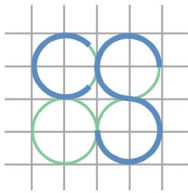
3.4 Proposed Sustainable Drainage System (SuDS) Measures

As previously noted, SuDS measures are integrated into stormwater drainage designs to improve storm water quality before disposal and,

where applicable, to permit storm water to infiltrate into the ground on site rather than discharging to the public drainage system or to watercourses. It is noted that infiltration tests were carried out on the subject site and the results indicate that the existing ground conditions are poor. The aim is to provide an effective system to mitigate the adverse effects of storm water runoff on the environments, through enhanced quality systems and on local infrastructure to aid in preventing downstream flooding. The features proposed shall reduce run-off volumes, pollution concentrations and enhance groundwater recharge and biodiversity.

The proposed SuDS features within the subject development shall consist of:

- a) low water usage sanitary appliances
- b) water butts to retain rainwater for re-use for landscaping and maintenance purposes
- c) permeable paving for car-parking bays



4.0 FOUL DRAINAGE

4.1 Existing Foul Arrangements

The current site is not currently developed and as such no sewers are located on the subject lands. All effluent generated in Ardee is conveyed to the Regional Wastewater Treatment Plant (EPA Licence Number D0117/01). The Regional Treatment Plant has recently been upgraded and has expanded capacity from 5000 PE (population equivalent) to 10,000 PE.

4.2 Proposed Effluent Generation

The proposed development is to consist of 272no. house and duplex units. In accordance with Irish Water guidelines, the foul effluent to be generated by the development may be calculated as follows:

- Unit generation = 2.7 pers./unit x 150 l/pers./day x 1.1 increase factor
= 446 l/day/unit
- Total generation = 446 l/day/unit x 272 units
= 121,312 l/day
= 121.31m³/day;
- Average flow (DWF) = 121,312 l/day / 86,400 seconds/day
= 1.404 l/sec
- Peak flow = 6 x DWF (for population between 0 and 750)
= 6 x 1.404 l/sec
= 8.424 l/sec

4.3 Proposed Foul Drainage Arrangements

The proposed development will require a new separate foul drainage network to collect and convey the effluent generated by the proposed

development. The drainage network for the proposed development has been designed in accordance with:

- the Greater Dublin Regional Code of Practice Drainage Works
- the Greater Dublin Strategic Drainage Study
- the Irish Water Code of Practice for Wastewater Infrastructure

The subject development's foul drainage network shall outfall into that of the adjacent permitted development (planning refs. 10/174 and 19/336) to the west, which is currently under construction. This permitted development's foul drainage network has been designed to cater for the flows from the subject site, in addition to its own.

The proposed foul drainage infrastructure has been designed using the WinDes Micro Drainage Program and a copy of the sewer design is included in **Appendix C**.

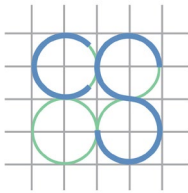
Refer to CS Consulting Drawing **ARDEE-CSC-00-XX-DR-C-1002 Drainage Layout** for further details.

4.4 Irish Water Confirmation of Feasibility and Statement of Design Acceptance

A Pre-Connection Enquiry has been submitted to Irish Water for a 300-unit residential development at the subject site and a Confirmation of Feasibility (CoF) has been received from Irish Water in response. The CoF is enclosed with this planning application submission as part of **Appendix D** to this report.

The CoF confirms that the proposed connection to the Irish Water network can be facilitated at this moment in time. We acknowledge the CoF contents, and we note the following in relation to foul drainage:

- Wastewater – Connection is feasible however upgrades are required as detailed on the COF;



'The existing wastewater network will require upgrades to cater for the additional proposed load. The upgrade will involve upsizing of between 300 and 1000 meters of existing 225mm sewer along the public road. It is not expected that 3rd party permissions will be required outside the requirements for a road opening licence. The exact details of this upgrade can be agreed at connection application stage.'

The applicant acknowledges the commentary on the upgrades required. CS Consulting have been in contact with IW up to the 12.05.2022 on this issue.

We state that as confirmed by Irish Water, the upgrades do not require 3rd-party permission and it will be under the remit and control of Irish Water to implement the upgrade works through the applicant's connection application process post planning grant, hence this CoF does not preclude lodgement of the present SHD planning application to An Bord Pleanála and does not preclude the upgrade works to be carried out on the public network and can be facilitated at connection application stage.

In addition to the above we have received a Statement of Design Acceptance from Irish Water on the proposed scheme (please see **Appendix D**).

5.0 POTABLE WATER

5.1 Existing Potable Water System

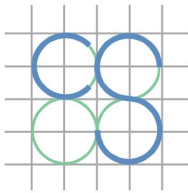
The current site is not developed and as such it does not have an existing connection into the local watermain network. The site is located adjacent to the regional Irish Water reservoir that currently supplies Ardee.

5.2 Proposed Potable Water System

The proposed development is to consist of 272no. house and duplex units. In accordance with Irish Water guidelines, the development's potable water demand may be calculated as follows:

- Unit demand = 2.7 pers./unit x 150 l/pers./day
= 405 l/day/unit
- Total demand = 405 l/day/unit x 272 units
= 110,160 l/day
= 110.16 m³/day
- Average demand (AWD) = 110,160 l/day / 86,400 seconds/day
= 1.275 l/sec
- Peak demand = 5 x AWD
= 5 x 1.275 l/sec
= 6.375 l/sec

The proposed watermain network system has been designed in accordance with the specifications and requirements of Irish Water. The subject development's potable water supply network has been designed to be connected into that of the adjacent permitted development (planning refs. 10/174 and 19/336) to the west, which is currently under construction.



The proposed watermain infrastructure and routing plan is shown on CS Consulting drawing **ARDEE-CSC-00-XX-DR-C-1003 Watermain Layout**, included with this submission.

5.3 Irish Water Confirmation of Feasibility and Statement of Design Acceptance

A Pre-Connection Enquiry has been submitted to Irish Water for a 300-unit residential development at the subject site and a Confirmation of Feasibility (CoF) has been received from Irish Water in response. The CoF is enclosed with this planning application submission as part of **Appendix D** to this report.

The CoF confirms that the proposed connection to the Irish Water network can be facilitated at this moment in time. We acknowledge the CoF contents, and we note the following in relation to potable water supply:

- Water – Connection is feasible, and we acknowledge that the exact connection location and requirements are to be agreed at connection application stage.

In addition to the above we have received a Statement of Design Acceptance from Irish Water on the proposed scheme (please see **Appendix D**).

6.0 COMMENTS RECEIVED FROM PLANNING AUTHORITIES

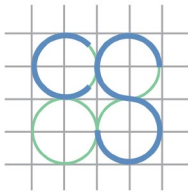
Both An Bord Pleanála and Louth County Council have reviewed the planning documentation submitted in respect of the proposed development during the pre-application consultation phase of the SHD process (including a previous version of the present Engineering Services Report). A tripartite pre-application consultation meeting has also been held with An Bord Pleanála and Louth County Council.

The relevant opinions of An Bord Pleanála that pertain to water and drainage matters, as communicated to the applicant, are reproduced below; also examined in this section are the relevant recommendations of Louth County Council, which were issued to An Bord Pleanála. In each case, we describe measures taken by the design team in response to these opinions and recommendations.

6.1 Opinion Issued by An Bord Pleanála

An Bord Pleanála has on the 11th of December 2020 issued an opinion enumerating the items of specific information that should be submitted with any application for permission. The following items among these are of relevance to this Engineering Services Report:

5. *“Further consideration / amendment of the design of the storm water management proposals having regard the existing high potential for flood risk to residential properties downstream of the site. Further consideration of the concerns raised in the report of the planning authority’s Infrastructure Directorate dated 21st October, 2020. A site specific Flood Risk Assessment should be submitted.”*
6. *“Further consideration / amendment of the layout of the linear park having regard to Inland Fisheries Ireland: ‘Planning for Watercourses in the Urban Environment: A Guide to the Protection of Watercourses*



through the use of Buffer Zones, Sustainable Drainage Systems, Instream Rehabilitation, Climate / Flood Risk and Recreational Planning'."

7. *Address issues raised in the report of Irish Water to An Bord Pleanála dated 15th October, 2020.*

6.1.1 Response to ABP Opinion Items 5+6

A standalone Flood Risk Assessment study has been conducted by JBA Consulting in respect of the subject development, and is submitted under separate cover as part of this planning application. Refer to this document in response to this opinion raised.

Response to ABP Opinion Item 7

The applicant acknowledges the commentary on the upgrades required. CS Consulting have been in contact with IW up to the 12.05.2022 on this issue. We state that as confirmed by Irish Water, the upgrades do not require 3rd-party permission and it will be under the remit and control of Irish Water to implement the upgrade works through the applicant's connection application process post planning grant, hence this CoF does not preclude lodgement of the present SHD planning application to An Bord Pleanála and does not preclude the upgrade works to be carried out on the public network and can be facilitated at connection application stage. In addition to the above we have received a Statement of Design Acceptance from Irish Water on the proposed scheme (please see Appendix D).

6.2 Recommendations of Louth County Council

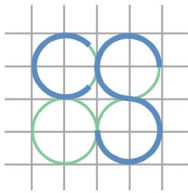
Louth County Council on the 23rd of October 2020 issued an opinion, informed by the internal report of its Infrastructure Section, requesting that further clarification or consideration be given to a number of drainage and flood risk aspects of the subject development. These are addressed below.

6.2.1 LCC Point 7(a) – storm water management

“Louth County Council consider that the proposed development and Storm Water Management proposal is premature pending an upgrade of the existing inadequate storm water drainage network in this area. On completion of a detailed design to upgrade the existing drainage infrastructure, a funding application will be made to the OPW. Please note that Louth County Council has grave concerns that the existing high flood risk to residential properties downstream of the subject site will be exacerbated on implementation of the applicant's proposal to discharge storm water at a controlled rate, from the developed site into the Rathgorey River via the Rathgorey Tributary. As recently as November 2019, the Rathgorey River burst its banks upstream from where it is culverted under the National Road, N2, causing road flooding and threatening properties within the neighbouring Cherrybrook Housing Estate. Furthermore, in December 2015, the bottom floor of the Riverside Apartment Block was inundated with flood waters, emanating from a constriction within the drainage channel along Stoney Lane.”

6.2.2 Response to LCC Point 7(a)

The project team has engaged with Louth County Council in preparation for lodged of this planning application and following the tripartite meeting with An Bord Pleanála. During September 2021 Louth County Council contacted the project team to note that under a series of surveys undertaken in preparation for the Ardee Flood Relief Scheme, culvert no. 7 located west and downstream and outside the subject site was observed to be a certain diameter with some pipe sections offset and out of line requiring some improvement works.



The culvert is located on third party lands not under control of the applicant.

The applicant engaged with LCC on this item to determine how this issue would be most effectively addressed and suggested undertaking like for like reparative works to realign the culvert to negate any increase in downstream flood risk, subject to relevant landowner consents. Any further alteration works to culvert no. 7 could impact lands downstream of culvert no. 7 and should not be carried out in isolation of the Ardee Flood Relief Works. The project team further demonstrated to LCC that the drainage strategy at the subject site contributes to an improved situation at the watercourse in terms of a reduction to the peak flow in reaching the channel. It is highlighted that the subject culvert is located on third party lands, it is subject to an ongoing OPW/Louth CC Flood Relief Scheme and is an OPW Arterial Drainage channel. It is considered that any such works should ultimately be the responsibility of the competent authority and should form part of the Ardee Flood Relief Scheme in due course.

The Flood Report completed by JBA consulting on a separate cover lodged as part of the application demonstrates that the peak stormwater flow reaching culvert no. 7 will be reduced as a result of the development works proposed and not increased. LCC noted *“grave concerns that the existing high flood risk to residential properties downstream of the subject site will be exacerbated on implementation of the applicant's proposal to discharge storm water at a controlled rate, from the developed site into the Rathgorey River via the Rathgorey Tributary”*. The Site-Specific Flood Risk Assessment prepared by JBA Consulting demonstrates that this will not be the case and, accordingly, the development is not *“premature pending*

an upgrade of the existing inadequate storm water drainage network in this area".

It is respectfully considered that the development should not be linked to completion of the flood relief works or other stormwater improvement works in the area, as the development in itself will provide a reduction of the peak flow of water reaching culvert no.7 and downstream areas of the town.

6.2.3 LCC Point 7(b) – further flood risk assessment

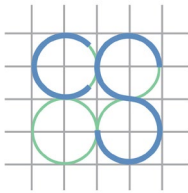
"Undertake further assessment of flood risk to the site. Hydraulic modelling of the channel diversion, taking cognisance of the proposed culverts to facilitate vehicular and pedestrian access will be required. Consents from OPW are needed prior to implementation of these proposals. The areas of the subject site are identified and mapped as benefitting lands in the submitted preliminary Flood Risk Assessment need to be addressed within a detailed Flood Risk Assessment."

6.2.4 Response to LCC Point 7(b)

A standalone Flood Risk Assessment study has been conducted by JBA Consulting in respect of the subject development and is submitted under separate cover as part of this planning application. Refer to this document in response to this opinion raised.

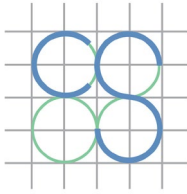
6.2.5 LCC Point 8(d) – flood paths traversing site boundary

"Submitted drawings illustrates Road 3 having a direct link with an existing road within the adjacent Cherrybrook development and the overland flood Route map shows flood paths traversing the site boundary. Please note that the roads pertaining to Cherrybrook are within the ownership of a private entity and as such consent is required in this regard."



6.2.6 Response to LCC Point 8(d)

The proposed scheme overland flood route will not transverse the Cherrybrook development site boundary. Refer to drawing **ARDEE-CSC-00-XX-DR-C-1017 Overland Flood Route**.



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Appendix A

Attenuation Calculations

Project: Ardee SHD-CATCHMENT A
Project No.: R086
Calculation: Attenuation 100-year
Calcs By: DD
Checked By: RFM
Date: 31/7/20



Site Location:	Ardee, Co. Louth	
Design Storm Return Period:	100 years	
Climate Change Factor:	20 %	
Soil Type:	2	
Total Site Area:	4.54 ha	
Hardstand Area:	2.88 ha@ 80% Impervious
Softstand Area:	1.66 ha@ 20% Impervious
Effective Impermeable Area:	2.64 ha	

Allowable Outflow	Calculate	
IH124: $QBAR = 0.00108 \times AREA^{0.89} \times SAAR^{1.17} \times SOIL^{2.17}$		
AREA:	0.05 km ²	
SAAR:	781 mm	From Met Office
SOIL:	0.3	
QBAR/ha	2.07 l/s/ha	
Allowable Outflow	9.4 l/s	Smallest Allowable Discharge Rate (2l/s)

Storage required = 1696 m³

Duration (min)	Rainfall 100-Year (mm)	Rainfall 100-Year with CCF (mm)	Intensity (mm/hr)	Discharge (Q = 2.71iA) (l/s)	Proposed Runoff (m ³)	Contiguous Land Runoff (m ³)	Total Runoff (m ³)	Allowable Outflow (m ³)	Storage Required (m ³)
5	14.3	17.2	205.9	1471	441	0	441	3	438
10	19.9	23.9	143.3	1024	614	0	614	6	608
15	23.4	28.1	112.3	802	722	0	722	8	714
30	28.2	33.8	67.7	483	870	0	870	17	853
60	34.1	40.9	40.9	292	1052	0	1052	34	1018
120	41.1	49.3	24.7	176	1268	0	1268	68	1201
180	45.9	55.1	18.4	131	1416	0	1416	102	1315
240	49.7	59.6	14.9	107	1534	0	1534	135	1398
360	55.4	66.5	11.1	79	1710	0	1710	203	1507
540	61.9	74.3	8.3	59	1910	0	1910	305	1606
720	66.9	80.3	6.7	48	2065	0	2065	406	1658
1080	74.7	89.6	5.0	36	2305	0	2305	609	1696
1440	80.8	97.0	4.0	29	2494	0	2494	813	1681
2880	92.4	110.9	2.3	17	2851	0	2851	1625	1226
4320	102.4	122.9	1.7	12	3160	0	3160	2438	722
5760	111.5	133.8	1.4	10	3441	0	3441	3250	191
8640	127.6	153.1	1.1	8	3938	0	3938	4875	-938
11520	141.9	170.3	0.9	6	4379	0	4379	6501	-2122
14400	155.2	186.2	0.8	6	4789	0	4789	8126	-3336
17280	167.6	201.1	0.7	5	5172	0	5172	9751	-4579
23040	190.7	228.8	0.6	4	5885	0	5885	13001	-7116
28800	212.2	254.6	0.5	4	6549	0	6549	16251	-9703
36000	237.3	284.8	0.5	3	7323	0	7323	20314	-12991

Project: Ardee SHD-CATCHMENT A
Project No.: R086
Calculation: Attenuation 100-year
Calcs By: DD
Checked By: RFM
Date: 31/7/20



Project: Ardee SHD-CATCHMENT B
Project No.: R086
Calculation: Attenuation 100-year
Calcs By: DD
Checked By: RFM
Date: 31/7/20



Site Location:	Ardee, Co. Louth	
Design Storm Return Period:	100 years	
Climate Change Factor:	20 %	
Soil Type:	2	
Total Site Area:	2.20 ha	
Hardstand Area:	1.55 ha@ 80% Impervious
Softstand Area:	0.65 ha@ 20% Impervious
Effective Impermeable Area:	1.37 ha	

Allowable Outflow	Calculate
IH124: $QBAR = 0.00108 \times AREA^{0.89} \times SAAR^{1.17} \times SOIL^{2.17}$	
AREA:	0.02 km ²
SAAR:	781 mm From Met Office
SOIL:	0.3
QBAR/ha	2.07 l/s/ha
Allowable Outflow	4.6 l/s Smallest Allowable Discharge Rate (2l/s)

Storage required =	903 m³
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Duration (min)	Rainfall 100-Year (mm)	Rainfall 100-Year with CCF (mm)	Intensity (mm/hr)	Discharge (Q = 2.71iA) (l/s)	Proposed Runoff (m ³)	Contiguous Land Runoff (m ³)	Total Runoff (m ³)	Allowable Outflow (m ³)	Storage Required (m ³)
5	14.3	17.2	205.9	765	229	0	229	1	228
10	19.9	23.9	143.3	532	319	0	319	3	316
15	23.4	28.1	112.3	417	375	0	375	4	371
30	28.2	33.8	67.7	251	452	0	452	8	444
60	34.1	40.9	40.9	152	547	0	547	16	531
120	41.1	49.3	24.7	92	659	0	659	33	626
180	45.9	55.1	18.4	68	736	0	736	49	687
240	49.7	59.6	14.9	55	797	0	797	66	732
360	55.4	66.5	11.1	41	889	0	889	98	790
540	61.9	74.3	8.3	31	993	0	993	148	845
720	66.9	80.3	6.7	25	1073	0	1073	197	876
1080	74.7	89.6	5.0	18	1198	0	1198	295	903
1440	80.8	97.0	4.0	15	1296	0	1296	394	902
2880	92.4	110.9	2.3	9	1482	0	1482	788	694
4320	102.4	122.9	1.7	6	1642	0	1642	1181	461
5760	111.5	133.8	1.4	5	1788	0	1788	1575	213
8640	127.6	153.1	1.1	4	2047	0	2047	2363	-316
11520	141.9	170.3	0.9	3	2276	0	2276	3150	-874
14400	155.2	186.2	0.8	3	2489	0	2489	3938	-1448
17280	167.6	201.1	0.7	3	2688	0	2688	4725	-2037
23040	190.7	228.8	0.6	2	3059	0	3059	6300	-3242
28800	212.2	254.6	0.5	2	3403	0	3403	7875	-4472
36000	237.3	284.8	0.5	2	3806	0	3806	9844	-6038

Project: Ardee SHD-CATCHMENT B
Project No.: R086
Calculation: Attenuation 100-year
Calcs By: DD
Checked By: RFM
Date: 31/7/20



Project: Ardee SHD-CATCHMENT C
Project No.: R086
Calculation: Attenuation 100-year
Calcs By: DD
Checked By: RFM
Date: 31/7/20



Site Location:	Ardee, Co. Louth	
Design Storm Return Period:	100 years	
Climate Change Factor:	10 %	
Soil Type:	2	
Total Site Area:	0.86 ha	
Hardstand Area:	0.64 ha@ 80% Impervious
Softstand Area:	0.22 ha@ 20% Impervious
Effective Impermeable Area:	0.56 ha	

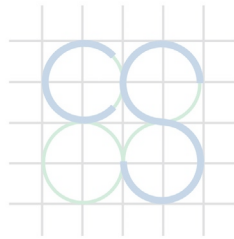
Allowable Outflow	Calculate	
IH124: $QBAR = 0.00108 \times AREA^{0.89} \times SAAR^{1.17} \times SOIL^{2.17}$		
AREA:	0.01 km ²	
SAAR:	781 mm	From Met Office
SOIL:	0.3	
QBAR/ha	2.07 l/s/ha	
Allowable Outflow	2.0 l/s	Smallest Allowable Discharge Rate (2l/s)

Storage required =	318 m³
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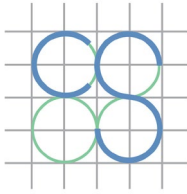
Duration (min)	Rainfall 100-Year (mm)	Rainfall 100-Year with CCF (mm)	Intensity (mm/hr)	Discharge (Q = 2.71iA) (l/s)	Proposed Runoff (m ³)	Contiguous Land Runoff (m ³)	Total Runoff (m ³)	Allowable Outflow (m ³)	Storage Required (m ³)
5	14.3	15.7	188.8	285	86	0	86	1	85
10	19.9	21.9	131.3	199	119	0	119	1	118
15	23.4	25.7	103.0	156	140	0	140	2	138
30	28.2	31.0	62.0	94	169	0	169	4	165
60	34.1	37.5	37.5	57	204	0	204	7	197
120	41.1	45.2	22.6	34	246	0	246	14	232
180	45.9	50.5	16.8	25	275	0	275	22	253
240	49.7	54.7	13.7	21	298	0	298	29	269
360	55.4	60.9	10.2	15	332	0	332	43	288
540	61.9	68.1	7.6	11	371	0	371	65	306
720	66.9	73.6	6.1	9	400	0	400	86	314
1080	74.7	82.2	4.6	7	447	0	447	130	318
1440	80.8	88.9	3.7	6	484	0	484	173	311
2880	92.4	101.6	2.1	3	553	0	553	346	208
4320	102.4	112.6	1.6	2	613	0	613	518	95
5760	111.5	122.7	1.3	2	667	0	667	691	-24
8640	127.6	140.4	1.0	1	764	0	764	1037	-273
11520	141.9	156.1	0.8	1	849	0	849	1382	-533
14400	155.2	170.7	0.7	1	929	0	929	1728	-799
17280	167.6	184.4	0.6	1	1003	0	1003	2074	-1070
23040	190.7	209.8	0.5	1	1142	0	1142	2765	-1623
28800	212.2	233.4	0.5	1	1270	0	1270	3456	-2186
36000	237.3	261.0	0.4	1	1420	0	1420	4320	-2900

Project: Ardee SHD-CATCHMENT C
Project No.: R086
Calculation: Attenuation 100-year
Calcs By: DD
Checked By: RFM
Date: 31/7/20





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Appendix B

Stormwater Drainage WinDes Design

31a Westland Square
Pearse Street
Dublin 2

R086 ARDEE (SHD)
SW CATCHMENT A
+10% CLIMATE CHANGE

Date August 2020

Designed by DD

File R086-STORM CATCHMENT A...

Checked by



Micro Drainage

Network W.12.6

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	5	Add Flow / Climate Change (%)	0
M5-60 (mm)	16.500	Minimum Backdrop Height (m)	0.000
Ratio R	0.300	Maximum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	50	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500
PIMP (%)	100		

Designed with Level Inverts

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)
1.000	33.439	0.557	60.0	0.061	4.00	0.0	0.600	o	225
2.000	16.821	0.280	60.0	0.061	4.00	0.0	0.600	o	225
1.001	37.456	0.624	60.0	0.044	0.00	0.0	0.600	o	225
1.002	8.250	0.083	100.0	0.085	0.00	0.0	0.600	o	225
1.003	36.126	0.181	200.0	0.078	0.00	0.0	0.600	o	300
1.004	7.730	0.031	250.0	0.046	0.00	0.0	0.600	o	300
3.000	22.483	0.090	250.0	0.079	4.00	0.0	0.600	o	225
3.001	13.561	0.054	250.0	0.056	0.00	0.0	0.600	o	225
1.005	12.551	0.050	250.0	0.000	0.00	0.0	0.600	o	300
4.000	32.551	0.543	60.0	0.062	4.00	0.0	0.600	o	225
5.000	92.542	0.463	199.9	0.180	4.00	0.0	0.600	o	300

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	4.33	41.500	0.061	0.0	0.0	0.0	1.69	67.3	8.2
2.000	50.00	4.17	41.500	0.061	0.0	0.0	0.0	1.69	67.3	8.2
1.001	50.00	4.70	40.943	0.165	0.0	0.0	0.0	1.69	67.3	22.4
1.002	50.00	4.80	39.500	0.251	0.0	0.0	0.0	1.31	52.0	33.9
1.003	50.00	5.35	39.418	0.328	0.0	0.0	0.0	1.11	78.3	44.4
1.004	50.00	5.48	39.237	0.374	0.0	0.0	0.0	0.99	70.0	50.7
3.000	50.00	4.46	38.250	0.079	0.0	0.0	0.0	0.82	32.7	10.7
3.001	50.00	4.73	38.160	0.136	0.0	0.0	0.0	0.82	32.7	18.4
1.005	50.00	5.69	38.106	0.510	0.0	0.0	0.0	0.99	70.0	69.0
4.000	50.00	4.32	43.000	0.062	0.0	0.0	0.0	1.69	67.3	8.4
5.000	50.00	5.39	41.450	0.180	0.0	0.0	0.0	1.11	78.4	24.4

31a Westland Square
 Pearse Street
 Dublin 2

R086 ARDEE (SHD)
 SW CATCHMENT A
 +10% CLIMATE CHANGE



Date August 2020
 File R086-STORM CATCHMENT A...

Designed by DD
 Checked by

Micro Drainage

Network W.12.6

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)
4.001	43.266	0.216	200.0	0.195	0.00	0.0	0.600	o	300
6.000	48.850	0.244	200.0	0.096	4.00	0.0	0.600	o	225
4.002	46.925	0.235	200.0	0.128	0.00	0.0	0.600	o	375
4.003	8.015	0.040	200.0	0.094	0.00	0.0	0.600	o	375
7.000	28.051	0.468	60.0	0.075	4.00	0.0	0.600	o	225
7.001	20.102	0.251	80.0	0.072	0.00	0.0	0.600	o	225
7.002	8.715	0.087	100.0	0.055	0.00	0.0	0.600	o	225
7.003	31.039	0.207	149.9	0.080	0.00	0.0	0.600	o	300
7.004	16.184	0.108	150.0	0.075	0.00	0.0	0.600	o	300
7.005	10.194	0.068	149.9	0.032	0.00	0.0	0.600	o	375
7.006	50.245	0.251	200.0	0.121	0.00	0.0	0.600	o	375
7.007	22.546	0.113	200.0	0.094	0.00	0.0	0.600	o	375
7.008	11.684	0.058	200.0	0.081	0.00	0.0	0.600	o	375
4.004	32.011	0.064	500.0	0.000	0.00	0.0	0.600	o	525
1.006	77.735	1.943	40.0	0.032	0.00	0.0	0.600	o	225
8.000	34.622	0.577	60.0	0.029	4.00	0.0	0.600	o	225
9.000	44.086	0.735	60.0	0.141	4.00	0.0	0.600	o	225
1.007	8.922	0.036	250.0	0.118	0.00	0.0	0.600	o	300
1.008	4.382	0.018	250.0	0.027	0.00	0.0	0.600	o	300
1.009	113.095	0.452	250.0	0.024	0.00	0.0	0.600	o	300

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
4.001	50.00	6.04	40.987	0.438	0.0	0.0	0.0	1.11	78.3	59.3
6.000	50.00	4.88	40.700	0.096	0.0	0.0	0.0	0.92	36.6	13.1
4.002	50.00	6.65	39.800	0.662	0.0	0.0	0.0	1.28	141.1	89.7
4.003	50.00	6.76	39.565	0.756	0.0	0.0	0.0	1.28	141.1	102.4
7.000	50.00	4.28	41.000	0.075	0.0	0.0	0.0	1.69	67.3	10.2
7.001	50.00	4.51	40.532	0.148	0.0	0.0	0.0	1.46	58.2	20.0
7.002	50.00	4.62	40.281	0.203	0.0	0.0	0.0	1.31	52.0	27.5
7.003	50.00	5.02	38.800	0.283	0.0	0.0	0.0	1.28	90.6	38.4
7.004	50.00	5.23	38.593	0.359	0.0	0.0	0.0	1.28	90.6	48.6
7.005	50.00	5.35	38.485	0.390	0.0	0.0	0.0	1.48	163.2	52.9
7.006	50.00	6.00	38.417	0.511	0.0	0.0	0.0	1.28	141.1	69.2
7.007	50.00	6.30	38.166	0.605	0.0	0.0	0.0	1.28	141.1	82.0
7.008	50.00	6.45	38.053	0.686	0.0	0.0	0.0	1.28	141.1	92.9
4.004	50.00	7.30	37.995	1.442	0.0	0.0	0.0	0.99	215.4	195.3
1.006	50.00	4.62	37.400	0.000	3.5	0.0	0.0	2.07	82.5	3.5
8.000	50.00	4.34	36.600	0.029	0.0	0.0	0.0	1.69	67.3	4.0
9.000	50.00	4.43	35.900	0.141	0.0	0.0	0.0	1.69	67.3	19.1
1.007	50.00	4.77	35.165	0.288	3.5	0.0	0.0	0.99	70.0	42.5
1.008	50.00	4.85	35.130	0.316	3.5	0.0	0.0	0.99	70.0	46.2
1.009	50.00	6.75	35.112	0.339	3.5	0.0	0.0	0.99	70.0	49.5

31a Westland Square
Pearsé Street
Dublin 2

R086 ARDEE (SHD)
SW CATCHMENT A
+10% CLIMATE CHANGE

Date August 2020

Designed by DD

File R086-STORM CATCHMENT A...

Checked by



Micro Drainage

Network W.12.6

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)
10.000	22.063	0.368	60.0	0.076	4.00	0.0	0.600	o	225
10.001	14.593	0.243	60.0	0.042	0.00	0.0	0.600	o	225
10.002	33.017	0.550	60.0	0.047	0.00	0.0	0.600	o	225
11.000	22.097	0.368	60.0	0.054	4.00	0.0	0.600	o	225
10.003	24.807	0.099	250.0	0.081	0.00	0.0	0.600	o	300
12.000	81.282	0.325	250.1	0.155	4.00	0.0	0.600	o	225
10.004	18.055	0.072	250.0	0.055	0.00	0.0	0.600	o	300
1.010	9.502	0.038	250.1	0.053	0.00	0.0	0.600	o	225

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
10.000	50.00	4.22	36.500	0.076	0.0	0.0	0.0	1.69	67.3	10.3
10.001	50.00	4.36	36.132	0.118	0.0	0.0	0.0	1.69	67.3	16.0
10.002	50.00	4.69	35.000	0.165	0.0	0.0	0.0	1.69	67.2	22.3
11.000	50.00	4.22	34.800	0.054	0.0	0.0	0.0	1.69	67.2	7.3
10.003	50.00	5.10	34.432	0.300	0.0	0.0	0.0	0.99	70.0	40.6
12.000	50.00	5.65	35.000	0.155	0.0	0.0	0.0	0.82	32.7	20.9
10.004	50.00	5.95	34.333	0.510	0.0	0.0	0.0	0.99	70.0	69.0
1.010	50.00	4.19	34.200	0.000	9.4	0.0	0.0	0.82	32.7	9.4

31a Westland Square
 Pearse Street
 Dublin 2

R086 ARDEE (SHD)
 SW CATCHMENT A
 +10% CLIMATE CHANGE



Date August 2020
 File R086-STORM CATCHMENT A...

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Network W.12.6

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
SWMHA.1	43.525	2.025	Open Manhole	1200	1.000	41.500	225				
SWMHA.2	43.375	1.875	Open Manhole	1200	2.000	41.500	225				
SWMHA.3	43.575	2.632	Open Manhole	1200	1.001	40.943	225	1.000	40.943	225	
								2.000	41.220	225	277
SWMHA.4	41.825	2.325	Open Manhole	1200	1.002	39.500	225	1.001	40.318	225	818
SWMHA.5	41.425	2.008	Open Manhole	1200	1.003	39.418	300	1.002	39.418	225	
SWMHA.6	40.200	0.963	Open Manhole	1050	1.004	39.237	300	1.003	39.237	300	
SWMHA.7	39.675	1.425	Open Manhole	1050	3.000	38.250	225				
SWMHA.8	40.025	1.865	Open Manhole	1200	3.001	38.160	225	3.000	38.160	225	
SWMHA.9	40.300	2.194	Open Manhole	1200	1.005	38.106	300	1.004	39.206	300	1100
								3.001	38.106	225	
SWMHA.10	44.425	1.425	Open Manhole	1050	4.000	43.000	225				
SWMHA.11	42.875	1.425	Open Manhole	1050	5.000	41.450	300				
SWMHA.12	43.950	2.963	Open Manhole	1200	4.001	40.987	300	4.000	42.457	225	1395
								5.000	40.987	300	
SWMHA.13	42.125	1.425	Open Manhole	1050	6.000	40.700	225				
SWMHA.14	43.275	3.475	Open Manhole	1350	4.002	39.800	375	4.001	40.771	300	896
								6.000	40.456	225	506
SWMHA.15	41.200	1.635	Open Manhole	1350	4.003	39.565	375	4.002	39.565	375	
SWMHA.16	43.450	2.450	Open Manhole	1200	7.000	41.000	225				
SWMHA.17	42.850	2.318	Open Manhole	1200	7.001	40.532	225	7.000	40.532	225	
SWMHA.18	42.100	1.819	Open Manhole	1200	7.002	40.281	225	7.001	40.281	225	
SWMHA.19	41.775	2.975	Open Manhole	1200	7.003	38.800	300	7.002	40.194	225	1319
SWMHA.20	40.625	2.032	Open Manhole	1200	7.004	38.593	300	7.003	38.593	300	
SWMHA.21	40.050	1.565	Open Manhole	1350	7.005	38.485	375	7.004	38.485	300	
SWMHA.22	39.900	1.483	Open Manhole	1350	7.006	38.417	375	7.005	38.417	375	
SWMHA.23	40.700	2.534	Open Manhole	1350	7.007	38.166	375	7.006	38.166	375	
SWMHA.24	40.800	2.747	Open Manhole	1350	7.008	38.053	375	7.007	38.053	375	
SWMHA.25	41.300	3.305	Open Manhole	1500	4.004	37.995	525	4.003	39.525	375	1381
								7.008	37.995	375	
SWMHA.26	40.300	2.900	Open Manhole	1500	1.006	37.400	225	1.005	38.056	300	731
								4.004	37.931	525	831
SWMHA.27	38.700	2.100	Open Manhole	1200	8.000	36.600	225				
SWMHA.28	37.325	1.425	Open Manhole	1050	9.000	35.900	225				
SWMHA.29	37.475	2.310	Open Manhole	1200	1.007	35.165	300	1.006	35.457	225	217
								8.000	36.023	225	783
								9.000	35.165	225	
SWMHA.30	37.570	2.440	Open Manhole	1200	1.008	35.130	300	1.007	35.130	300	
SWMHA.31	37.570	2.458	Open Manhole	1200	1.009	35.112	300	1.008	35.112	300	
SWMHA.32	39.300	2.800	Open Manhole	1200	10.000	36.500	225				
SWMHA.33	38.225	2.093	Open Manhole	1200	10.001	36.132	225	10.000	36.132	225	
SWMHA.34	37.475	2.475	Open Manhole	1200	10.002	35.000	225	10.001	35.889	225	889
SWMHA.35	36.050	1.250	Open Manhole	1050	11.000	34.800	225				
SWMHA.36	35.725	1.293	Open Manhole	1050	10.003	34.432	300	10.002	34.450	225	
								11.000	34.432	225	
SWMHA.37	37.475	2.475	Open Manhole	1200	12.000	35.000	225				
SWMHA.38	36.025	1.692	Open Manhole	1050	10.004	34.333	300	10.003	34.333	300	

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out		Pipes In			Backdrop (mm)
						Invert Level (m)	Diameter (mm)	PN	Invert Level (m)	Diameter (mm)	
SWMHA.39	36.000	1.800	Open Manhole	1200	1.010	34.200	225	12.000	34.675	225	267
								1.009	34.660	300	535
									10.004	34.261	300
	36.000	1.838	Open Manhole	0		OUTFALL		1.010	34.162	225	

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	225	SWMHA.1	43.525	41.500	1.800	Open Manhole	1200
2.000	o	225	SWMHA.2	43.375	41.500	1.650	Open Manhole	1200
1.001	o	225	SWMHA.3	43.575	40.943	2.407	Open Manhole	1200
1.002	o	225	SWMHA.4	41.825	39.500	2.100	Open Manhole	1200
1.003	o	300	SWMHA.5	41.425	39.418	1.708	Open Manhole	1200
1.004	o	300	SWMHA.6	40.200	39.237	0.663	Open Manhole	1050
3.000	o	225	SWMHA.7	39.675	38.250	1.200	Open Manhole	1050
3.001	o	225	SWMHA.8	40.025	38.160	1.640	Open Manhole	1200
1.005	o	300	SWMHA.9	40.300	38.106	1.894	Open Manhole	1200
4.000	o	225	SWMHA.10	44.425	43.000	1.200	Open Manhole	1050
5.000	o	300	SWMHA.11	42.875	41.450	1.125	Open Manhole	1050
4.001	o	300	SWMHA.12	43.950	40.987	2.663	Open Manhole	1200
6.000	o	225	SWMHA.13	42.125	40.700	1.200	Open Manhole	1050
4.002	o	375	SWMHA.14	43.275	39.800	3.100	Open Manhole	1350
4.003	o	375	SWMHA.15	41.200	39.565	1.260	Open Manhole	1350
7.000	o	225	SWMHA.16	43.450	41.000	2.225	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	33.439	60.0	SWMHA.3	43.575	40.943	2.407	Open Manhole	1200
2.000	16.821	60.0	SWMHA.3	43.575	41.220	2.130	Open Manhole	1200
1.001	37.456	60.0	SWMHA.4	41.825	40.318	1.282	Open Manhole	1200
1.002	8.250	100.0	SWMHA.5	41.425	39.418	1.783	Open Manhole	1200
1.003	36.126	200.0	SWMHA.6	40.200	39.237	0.663	Open Manhole	1050
1.004	7.730	250.0	SWMHA.9	40.300	39.206	0.794	Open Manhole	1200
3.000	22.483	250.0	SWMHA.8	40.025	38.160	1.640	Open Manhole	1200
3.001	13.561	250.0	SWMHA.9	40.300	38.106	1.969	Open Manhole	1200
1.005	12.551	250.0	SWMHA.26	40.300	38.056	1.944	Open Manhole	1500
4.000	32.551	60.0	SWMHA.12	43.950	42.457	1.268	Open Manhole	1200
5.000	92.542	199.9	SWMHA.12	43.950	40.987	2.663	Open Manhole	1200
4.001	43.266	200.0	SWMHA.14	43.275	40.771	2.204	Open Manhole	1350
6.000	48.850	200.0	SWMHA.14	43.275	40.456	2.594	Open Manhole	1350
4.002	46.925	200.0	SWMHA.15	41.200	39.565	1.260	Open Manhole	1350
4.003	8.015	200.0	SWMHA.25	41.300	39.525	1.400	Open Manhole	1500
7.000	28.051	60.0	SWMHA.17	42.850	40.532	2.093	Open Manhole	1200

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
7.001	o	225	SWMHA.17	42.850	40.532	2.093	Open Manhole	1200
7.002	o	225	SWMHA.18	42.100	40.281	1.594	Open Manhole	1200
7.003	o	300	SWMHA.19	41.775	38.800	2.675	Open Manhole	1200
7.004	o	300	SWMHA.20	40.625	38.593	1.732	Open Manhole	1200
7.005	o	375	SWMHA.21	40.050	38.485	1.190	Open Manhole	1350
7.006	o	375	SWMHA.22	39.900	38.417	1.108	Open Manhole	1350
7.007	o	375	SWMHA.23	40.700	38.166	2.159	Open Manhole	1350
7.008	o	375	SWMHA.24	40.800	38.053	2.372	Open Manhole	1350
4.004	o	525	SWMHA.25	41.300	37.995	2.780	Open Manhole	1500
1.006	o	225	SWMHA.26	40.300	37.400	2.675	Open Manhole	1500
8.000	o	225	SWMHA.27	38.700	36.600	1.875	Open Manhole	1200
9.000	o	225	SWMHA.28	37.325	35.900	1.200	Open Manhole	1050
1.007	o	300	SWMHA.29	37.475	35.165	2.010	Open Manhole	1200
1.008	o	300	SWMHA.30	37.570	35.130	2.140	Open Manhole	1200
1.009	o	300	SWMHA.31	37.570	35.112	2.158	Open Manhole	1200
10.000	o	225	SWMHA.32	39.300	36.500	2.575	Open Manhole	1200
10.001	o	225	SWMHA.33	38.225	36.132	1.868	Open Manhole	1200
10.002	o	225	SWMHA.34	37.475	35.000	2.250	Open Manhole	1200
11.000	o	225	SWMHA.35	36.050	34.800	1.025	Open Manhole	1050

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
7.001	20.102	80.0	SWMHA.18	42.100	40.281	1.594	Open Manhole	1200
7.002	8.715	100.0	SWMHA.19	41.775	40.194	1.356	Open Manhole	1200
7.003	31.039	149.9	SWMHA.20	40.625	38.593	1.732	Open Manhole	1200
7.004	16.184	150.0	SWMHA.21	40.050	38.485	1.265	Open Manhole	1350
7.005	10.194	149.9	SWMHA.22	39.900	38.417	1.108	Open Manhole	1350
7.006	50.245	200.0	SWMHA.23	40.700	38.166	2.159	Open Manhole	1350
7.007	22.546	200.0	SWMHA.24	40.800	38.053	2.372	Open Manhole	1350
7.008	11.684	200.0	SWMHA.25	41.300	37.995	2.930	Open Manhole	1500
4.004	32.011	500.0	SWMHA.26	40.300	37.931	1.844	Open Manhole	1500
1.006	77.735	40.0	SWMHA.29	37.475	35.457	1.793	Open Manhole	1200
8.000	34.622	60.0	SWMHA.29	37.475	36.023	1.227	Open Manhole	1200
9.000	44.086	60.0	SWMHA.29	37.475	35.165	2.085	Open Manhole	1200
1.007	8.922	250.0	SWMHA.30	37.570	35.130	2.140	Open Manhole	1200
1.008	4.382	250.0	SWMHA.31	37.570	35.112	2.158	Open Manhole	1200
1.009	113.095	250.0	SWMHA.39	36.000	34.660	1.040	Open Manhole	1200
10.000	22.063	60.0	SWMHA.33	38.225	36.132	1.868	Open Manhole	1200
10.001	14.593	60.0	SWMHA.34	37.475	35.889	1.361	Open Manhole	1200
10.002	33.017	60.0	SWMHA.36	35.725	34.450	1.050	Open Manhole	1050
11.000	22.097	60.0	SWMHA.36	35.725	34.432	1.068	Open Manhole	1050

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
10.003	o	300	SWMHA.36	35.725	34.432	0.993	Open Manhole	1050
12.000	o	225	SWMHA.37	37.475	35.000	2.250	Open Manhole	1200
10.004	o	300	SWMHA.38	36.025	34.333	1.392	Open Manhole	1050
1.010	o	225	SWMHA.39	36.000	34.200	1.575	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
10.003	24.807	250.0	SWMHA.38	36.025	34.333	1.392	Open Manhole	1050
12.000	81.282	250.1	SWMHA.38	36.025	34.675	1.125	Open Manhole	1050
10.004	18.055	250.0	SWMHA.39	36.000	34.261	1.439	Open Manhole	1200
1.010	9.502	250.1		36.000	34.162	1.613	Open Manhole	0

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.061	0.061	0.061
2.000	User	-	100	0.061	0.061	0.061
1.001	User	-	100	0.044	0.044	0.044
1.002	User	-	100	0.085	0.085	0.085
1.003	User	-	100	0.078	0.078	0.078
1.004	User	-	100	0.046	0.046	0.046
3.000	User	-	100	0.079	0.079	0.079
3.001	User	-	100	0.056	0.056	0.056
1.005	-	-	100	0.000	0.000	0.000
4.000	User	-	100	0.062	0.062	0.062
5.000	User	-	100	0.180	0.180	0.180
4.001	User	-	100	0.195	0.195	0.195
6.000	User	-	100	0.096	0.096	0.096
4.002	User	-	100	0.128	0.128	0.128
4.003	User	-	100	0.094	0.094	0.094
7.000	User	-	100	0.075	0.075	0.075
7.001	User	-	100	0.072	0.072	0.072
7.002	User	-	100	0.055	0.055	0.055
7.003	User	-	100	0.080	0.080	0.080
7.004	User	-	100	0.075	0.075	0.075
7.005	User	-	100	0.032	0.032	0.032
7.006	User	-	100	0.121	0.121	0.121
7.007	User	-	100	0.094	0.094	0.094
7.008	User	-	100	0.081	0.081	0.081
4.004	-	-	100	0.000	0.000	0.000
1.006	User	-	100	0.032	0.032	0.032
8.000	User	-	100	0.029	0.029	0.029
9.000	User	-	100	0.141	0.141	0.141
1.007	User	-	100	0.073	0.073	0.073
	User	-	100	0.045	0.045	0.118
1.008	User	-	100	0.027	0.027	0.027
1.009	User	-	100	0.024	0.024	0.024
10.000	User	-	100	0.076	0.076	0.076
10.001	User	-	100	0.042	0.042	0.042
10.002	User	-	100	0.047	0.047	0.047
11.000	User	-	100	0.054	0.054	0.054
10.003	User	-	100	0.081	0.081	0.081
12.000	User	-	100	0.155	0.155	0.155
10.004	User	-	100	0.055	0.055	0.055
1.010	User	-	100	0.053	0.053	0.053
				Total	Total	Total
				2.886	2.886	2.886

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
1.010		36.000	34.162	34.000	0	0

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Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	10.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	5760
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	24
Number of Input Hydrographs	0	Number of Offline Controls	0
Number of Online Controls	2	Number of Time/Area Diagrams	0
		Number of Storage Structures	2
		Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	16.500	Storm Duration (mins)	2880
Ratio R	0.300		

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Online Controls for Storm

Depth/Flow Relationship Manhole: SWMHA.26, DS/PN: 1.006, Volume (m³): 12.5

Invert Level (m) 37.400

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.200	3.5000	1.400	3.5000	2.600	3.5000	3.800	3.5000	5.000	3.5000
0.400	3.5000	1.600	3.5000	2.800	3.5000	4.000	3.5000	5.200	3.5000
0.600	3.5000	1.800	3.5000	3.000	3.5000	4.200	3.5000	5.400	3.5000
0.800	3.5000	2.000	3.5000	3.200	3.5000	4.400	3.5000	5.600	3.5000
1.000	3.5000	2.200	3.5000	3.400	3.5000	4.600	3.5000	5.800	3.5000
1.200	3.5000	2.400	3.5000	3.600	3.5000	4.800	3.5000	6.000	3.5000

Depth/Flow Relationship Manhole: SWMHA.39, DS/PN: 1.010, Volume (m³): 11.1

Invert Level (m) 34.200

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.200	9.4000	1.400	9.4000	2.600	9.4000	3.800	9.4000	5.000	9.4000
0.400	9.4000	1.600	9.4000	2.800	9.4000	4.000	9.4000	5.200	9.4000
0.600	9.4000	1.800	9.4000	3.000	9.4000	4.200	9.4000	5.400	9.4000
0.800	9.4000	2.000	9.4000	3.200	9.4000	4.400	9.4000	5.600	9.4000
1.000	9.4000	2.200	9.4000	3.400	9.4000	4.600	9.4000	5.800	9.4000
1.200	9.4000	2.400	9.4000	3.600	9.4000	4.800	9.4000	6.000	9.4000

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Network W.12.6

Storage Structures for Storm

Tank or Pond Manhole: SWMHA.26, DS/PN: 1.006

Invert Level (m) 37.400

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	595.5	1.200	595.5	2.400	0.0	3.600	0.0	4.800	0.0
0.200	595.5	1.400	595.5	2.600	0.0	3.800	0.0	5.000	0.0
0.400	595.5	1.600	595.5	2.800	0.0	4.000	0.0		
0.600	595.5	1.800	595.5	3.000	0.0	4.200	0.0		
0.800	595.5	2.000	595.5	3.200	0.0	4.400	0.0		
1.000	595.5	2.200	0.0	3.400	0.0	4.600	0.0		

Tank or Pond Manhole: SWMHA.39, DS/PN: 1.010

Invert Level (m) 34.200

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	220.0	1.200	220.0	2.400	0.0	3.600	0.0	4.800	0.0
0.200	220.0	1.400	220.0	2.600	0.0	3.800	0.0	5.000	0.0
0.400	220.0	1.600	0.0	2.800	0.0	4.000	0.0		
0.600	220.0	1.800	0.0	3.000	0.0	4.200	0.0		
0.800	220.0	2.000	0.0	3.200	0.0	4.400	0.0		
1.000	220.0	2.200	0.0	3.400	0.0	4.600	0.0		

31a Westland Square
 Pearse Street
 Dublin 2

R086 ARDEE (SHD)
 SW CATCHMENT A
 +10% CLIMATE CHANGE



Date August 2020
 File R086-STORM CATCHMENT A...

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Micro Drainage

Network W.12.6

Summary of Results for 15 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
 Analysis Timestep Fine Inertia Status OFF
 DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	SWMHA.1	41.595	-0.130	0.000	0.38	0.0	23.8	OK
2.000	SWMHA.2	41.598	-0.127	0.000	0.40	0.0	23.8	OK
1.001	SWMHA.3	41.177	0.009	0.000	0.99	0.0	62.8	SURCHARGED
1.002	SWMHA.4	40.613	0.888	0.000	2.20	0.0	89.0	SURCHARGED
1.003	SWMHA.5	40.217	0.499	0.000	1.57	0.0	113.2	SURCHARGED
1.004	SWMHA.6	39.760	0.223	0.000	2.47	0.0	128.1	SURCHARGED
3.000	SWMHA.7	39.024	0.549	0.000	0.87	0.0	26.1	SURCHARGED
3.001	SWMHA.8	38.955	0.570	0.000	1.56	0.0	44.2	SURCHARGED
1.005	SWMHA.9	38.822	0.417	0.000	3.00	0.0	170.9	SURCHARGED
4.000	SWMHA.10	43.097	-0.128	0.000	0.39	0.0	24.4	OK
5.000	SWMHA.11	42.160	0.410	0.000	0.75	0.0	56.7	SURCHARGED
4.001	SWMHA.12	41.899	0.612	0.000	1.92	0.0	140.8	SURCHARGED
6.000	SWMHA.13	40.954	0.029	0.000	1.02	0.0	35.7	SURCHARGED
4.002	SWMHA.14	40.793	0.618	0.000	1.54	0.0	200.2	SURCHARGED
4.003	SWMHA.15	40.215	0.275	0.000	2.26	0.0	222.4	SURCHARGED
7.000	SWMHA.16	41.109	-0.116	0.000	0.47	0.0	29.6	OK
7.001	SWMHA.17	40.965	0.208	0.000	1.03	0.0	54.3	SURCHARGED
7.002	SWMHA.18	40.693	0.187	0.000	1.78	0.0	74.1	SURCHARGED
7.003	SWMHA.19	40.166	1.066	0.000	1.13	0.0	93.7	SURCHARGED
7.004	SWMHA.20	39.890	0.997	0.000	1.48	0.0	113.5	SURCHARGED
7.005	SWMHA.21	39.647	0.787	0.000	1.13	0.0	121.4	SURCHARGED
7.006	SWMHA.22	39.552	0.760	0.000	1.13	0.0	147.8	SURCHARGED
7.007	SWMHA.23	39.225	0.684	0.000	1.40	0.0	169.0	SURCHARGED
7.008	SWMHA.24	38.996	0.568	0.000	1.76	0.0	188.4	SURCHARGED
4.004	SWMHA.25	38.760	0.241	0.000	2.26	0.0	411.4	SURCHARGED
1.006	SWMHA.26	37.962	0.337	0.000	0.04	0.0	3.5	SURCHARGED
8.000	SWMHA.27	36.664	-0.161	0.000	0.18	0.0	11.5	OK
9.000	SWMHA.28	36.584	0.459	0.000	0.68	0.0	43.5	SURCHARGED
1.007	SWMHA.29	36.248	0.783	0.000	1.64	0.0	87.8	SURCHARGED
1.008	SWMHA.30	36.121	0.692	0.000	2.00	0.0	95.6	SURCHARGED
1.009	SWMHA.31	35.973	0.561	0.000	1.50	0.0	101.9	SURCHARGED
10.000	SWMHA.32	36.611	-0.114	0.000	0.49	0.0	29.9	OK
10.001	SWMHA.33	36.284	-0.073	0.000	0.79	0.0	46.5	OK
10.002	SWMHA.34	35.770	0.545	0.000	0.95	0.0	59.7	SURCHARGED
11.000	SWMHA.35	35.353	0.328	0.000	0.27	0.0	16.5	SURCHARGED
10.003	SWMHA.36	35.317	0.585	0.000	1.62	0.0	101.0	SURCHARGED
12.000	SWMHA.37	35.940	0.715	0.000	1.56	0.0	49.5	SURCHARGED
10.004	SWMHA.38	35.065	0.432	0.000	2.66	0.0	160.4	SURCHARGED
1.010	SWMHA.39	34.833	0.408	0.000	0.35	0.0	9.4	SURCHARGED

31a Westland Square
 Pearse Street
 Dublin 2

R086 ARDEE (SHD)
 SW CATCHMENT A
 +10% CLIMATE CHANGE



Date August 2020
 File R086-STORM CATCHMENT A...

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Micro Drainage

Network W.12.6

Summary of Results for 30 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
 Analysis Timestep Fine Inertia Status OFF
 DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	SWMHA.1	41.583	-0.142	0.000	0.29	0.0	18.5	OK
2.000	SWMHA.2	41.586	-0.139	0.000	0.31	0.0	18.6	OK
1.001	SWMHA.3	41.096	-0.072	0.000	0.80	0.0	50.7	OK
1.002	SWMHA.4	40.303	0.578	0.000	1.86	0.0	75.1	SURCHARGED
1.003	SWMHA.5	40.019	0.302	0.000	1.34	0.0	96.9	SURCHARGED
1.004	SWMHA.6	39.686	0.149	0.000	2.12	0.0	109.9	SURCHARGED
3.000	SWMHA.7	38.841	0.366	0.000	0.74	0.0	22.3	SURCHARGED
3.001	SWMHA.8	38.790	0.405	0.000	1.34	0.0	38.0	SURCHARGED
1.005	SWMHA.9	38.690	0.284	0.000	2.59	0.0	147.9	SURCHARGED
4.000	SWMHA.10	43.085	-0.140	0.000	0.30	0.0	19.0	OK
5.000	SWMHA.11	41.825	0.075	0.000	0.65	0.0	49.1	SURCHARGED
4.001	SWMHA.12	41.631	0.344	0.000	1.63	0.0	119.0	SURCHARGED
6.000	SWMHA.13	40.860	-0.065	0.000	0.84	0.0	29.4	OK
4.002	SWMHA.14	40.594	0.419	0.000	1.37	0.0	177.6	SURCHARGED
4.003	SWMHA.15	40.147	0.207	0.000	2.04	0.0	200.3	SURCHARGED
7.000	SWMHA.16	41.095	-0.130	0.000	0.37	0.0	23.0	OK
7.001	SWMHA.17	40.773	0.015	0.000	0.84	0.0	44.3	SURCHARGED
7.002	SWMHA.18	40.595	0.089	0.000	1.46	0.0	60.6	SURCHARGED
7.003	SWMHA.19	39.796	0.696	0.000	0.97	0.0	80.4	SURCHARGED
7.004	SWMHA.20	39.603	0.710	0.000	1.29	0.0	98.8	SURCHARGED
7.005	SWMHA.21	39.424	0.564	0.000	0.99	0.0	106.1	SURCHARGED
7.006	SWMHA.22	39.371	0.579	0.000	1.03	0.0	134.5	SURCHARGED
7.007	SWMHA.23	39.099	0.558	0.000	1.30	0.0	156.5	SURCHARGED
7.008	SWMHA.24	38.906	0.478	0.000	1.64	0.0	175.6	SURCHARGED
4.004	SWMHA.25	38.702	0.183	0.000	2.06	0.0	375.1	SURCHARGED
1.006	SWMHA.26	38.161	0.536	0.000	0.04	0.0	3.5	SURCHARGED
8.000	SWMHA.27	36.656	-0.169	0.000	0.14	0.0	8.9	OK
9.000	SWMHA.28	36.264	0.139	0.000	0.62	0.0	39.6	SURCHARGED
1.007	SWMHA.29	36.012	0.546	0.000	1.49	0.0	79.8	SURCHARGED
1.008	SWMHA.30	35.910	0.480	0.000	1.81	0.0	86.5	SURCHARGED
1.009	SWMHA.31	35.789	0.377	0.000	1.35	0.0	92.1	SURCHARGED
10.000	SWMHA.32	36.596	-0.129	0.000	0.38	0.0	23.4	OK
10.001	SWMHA.33	36.260	-0.097	0.000	0.61	0.0	36.1	OK
10.002	SWMHA.34	35.434	0.209	0.000	0.77	0.0	48.6	SURCHARGED
11.000	SWMHA.35	35.171	0.146	0.000	0.24	0.0	14.6	SURCHARGED
10.003	SWMHA.36	35.143	0.411	0.000	1.33	0.0	83.2	SURCHARGED
12.000	SWMHA.37	35.580	0.355	0.000	1.35	0.0	43.1	SURCHARGED
10.004	SWMHA.38	35.043	0.410	0.000	2.21	0.0	133.2	SURCHARGED
1.010	SWMHA.39	35.039	0.614	0.000	0.35	0.0	9.4	SURCHARGED

31a Westland Square
Pearse Street
Dublin 2

R086 ARDEE (SHD)
SW CATCHMENT A
+10% CLIMATE CHANGE

Date August 2020

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File R086-STORM CATCHMENT A...

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Micro Drainage

Network W.12.6

Summary of Results for 45 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	SWMHA.1	41.574	-0.151	0.000	0.23	0.0	14.6	OK
2.000	SWMHA.2	41.576	-0.149	0.000	0.25	0.0	14.7	OK
1.001	SWMHA.3	41.073	-0.094	0.000	0.63	0.0	39.8	OK
1.002	SWMHA.4	40.016	0.291	0.000	1.49	0.0	60.2	SURCHARGED
1.003	SWMHA.5	39.830	0.112	0.000	1.09	0.0	78.5	SURCHARGED
1.004	SWMHA.6	39.619	0.082	0.000	1.72	0.0	88.9	SURCHARGED
3.000	SWMHA.7	38.686	0.211	0.000	0.62	0.0	18.5	SURCHARGED
3.001	SWMHA.8	38.645	0.260	0.000	1.11	0.0	31.6	SURCHARGED
1.005	SWMHA.9	38.576	0.170	0.000	2.11	0.0	120.1	SURCHARGED
4.000	SWMHA.10	43.075	-0.150	0.000	0.24	0.0	15.0	OK
5.000	SWMHA.11	41.615	-0.135	0.000	0.57	0.0	42.9	OK
4.001	SWMHA.12	41.469	0.182	0.000	1.37	0.0	100.0	SURCHARGED
6.000	SWMHA.13	40.836	-0.089	0.000	0.66	0.0	23.3	OK
4.002	SWMHA.14	40.402	0.227	0.000	1.15	0.0	150.1	SURCHARGED
4.003	SWMHA.15	40.077	0.137	0.000	1.73	0.0	170.5	SURCHARGED
7.000	SWMHA.16	41.083	-0.142	0.000	0.29	0.0	18.2	OK
7.001	SWMHA.17	40.670	-0.088	0.000	0.67	0.0	35.4	OK
7.002	SWMHA.18	40.533	0.027	0.000	1.18	0.0	49.0	SURCHARGED
7.003	SWMHA.19	39.417	0.317	0.000	0.80	0.0	66.2	SURCHARGED
7.004	SWMHA.20	39.284	0.391	0.000	1.07	0.0	81.8	SURCHARGED
7.005	SWMHA.21	39.158	0.298	0.000	0.82	0.0	87.8	SURCHARGED
7.006	SWMHA.22	39.121	0.329	0.000	0.87	0.0	114.0	SURCHARGED
7.007	SWMHA.23	38.925	0.384	0.000	1.11	0.0	133.9	SURCHARGED
7.008	SWMHA.24	38.783	0.355	0.000	1.41	0.0	150.7	SURCHARGED
4.004	SWMHA.25	38.632	0.112	0.000	1.77	0.0	321.6	SURCHARGED
1.006	SWMHA.26	38.274	0.649	0.000	0.04	0.0	3.5	SURCHARGED
8.000	SWMHA.27	36.650	-0.175	0.000	0.11	0.0	7.1	OK
9.000	SWMHA.28	36.018	-0.107	0.000	0.53	0.0	33.9	OK
1.007	SWMHA.29	35.767	0.301	0.000	1.30	0.0	69.6	SURCHARGED
1.008	SWMHA.30	35.688	0.258	0.000	1.58	0.0	75.3	SURCHARGED
1.009	SWMHA.31	35.595	0.183	0.000	1.18	0.0	80.5	SURCHARGED
10.000	SWMHA.32	36.585	-0.140	0.000	0.30	0.0	18.5	OK
10.001	SWMHA.33	36.243	-0.114	0.000	0.48	0.0	28.4	OK
10.002	SWMHA.34	35.238	0.013	0.000	0.62	0.0	38.9	SURCHARGED
11.000	SWMHA.35	35.172	0.147	0.000	0.19	0.0	11.6	SURCHARGED
10.003	SWMHA.36	35.168	0.436	0.000	1.06	0.0	66.0	SURCHARGED
12.000	SWMHA.37	35.338	0.113	0.000	1.13	0.0	35.9	SURCHARGED
10.004	SWMHA.38	35.160	0.527	0.000	1.78	0.0	107.2	SURCHARGED
1.010	SWMHA.39	35.155	0.730	0.000	0.35	0.0	9.4	SURCHARGED

31a Westland Square
Pearse Street
Dublin 2

R086 ARDEE (SHD)
SW CATCHMENT A
+10% CLIMATE CHANGE

Date August 2020

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File R086-STORM CATCHMENT A...

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Network W.12.6

Summary of Results for 60 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	SWMHA.1	41.568	-0.157	0.000	0.20	0.0	12.4	OK
2.000	SWMHA.2	41.569	-0.156	0.000	0.21	0.0	12.4	OK
1.001	SWMHA.3	41.060	-0.108	0.000	0.53	0.0	33.6	OK
1.002	SWMHA.4	39.872	0.147	0.000	1.25	0.0	50.6	SURCHARGED
1.003	SWMHA.5	39.738	0.021	0.000	0.92	0.0	66.4	SURCHARGED
1.004	SWMHA.6	39.582	0.045	0.000	1.46	0.0	75.7	SURCHARGED
3.000	SWMHA.7	38.593	0.118	0.000	0.53	0.0	15.8	SURCHARGED
3.001	SWMHA.8	38.558	0.173	0.000	0.95	0.0	27.0	SURCHARGED
1.005	SWMHA.9	38.508	0.102	0.000	1.80	0.0	102.7	SURCHARGED
4.000	SWMHA.10	43.068	-0.157	0.000	0.20	0.0	12.7	OK
5.000	SWMHA.11	41.598	-0.152	0.000	0.48	0.0	36.3	OK
4.001	SWMHA.12	41.359	0.072	0.000	1.17	0.0	85.6	SURCHARGED
6.000	SWMHA.13	40.821	-0.104	0.000	0.56	0.0	19.5	OK
4.002	SWMHA.14	40.263	0.088	0.000	0.99	0.0	129.0	SURCHARGED
4.003	SWMHA.15	40.026	0.085	0.000	1.49	0.0	146.7	SURCHARGED
7.000	SWMHA.16	41.076	-0.149	0.000	0.25	0.0	15.4	OK
7.001	SWMHA.17	40.655	-0.102	0.000	0.57	0.0	30.2	OK
7.002	SWMHA.18	40.467	-0.039	0.000	0.99	0.0	41.2	OK
7.003	SWMHA.19	39.152	0.052	0.000	0.68	0.0	56.3	SURCHARGED
7.004	SWMHA.20	39.058	0.165	0.000	0.90	0.0	69.4	SURCHARGED
7.005	SWMHA.21	38.969	0.109	0.000	0.70	0.0	74.7	SURCHARGED
7.006	SWMHA.22	38.939	0.147	0.000	0.75	0.0	97.5	SURCHARGED
7.007	SWMHA.23	38.796	0.255	0.000	0.95	0.0	114.8	SURCHARGED
7.008	SWMHA.24	38.692	0.264	0.000	1.21	0.0	129.5	SURCHARGED
4.004	SWMHA.25	38.580	0.060	0.000	1.52	0.0	277.2	SURCHARGED
1.006	SWMHA.26	38.355	0.730	0.000	0.04	0.0	3.5	SURCHARGED
8.000	SWMHA.27	36.646	-0.179	0.000	0.09	0.0	6.0	OK
9.000	SWMHA.28	36.006	-0.119	0.000	0.45	0.0	28.9	OK
1.007	SWMHA.29	35.553	0.088	0.000	1.14	0.0	61.0	SURCHARGED
1.008	SWMHA.30	35.507	0.077	0.000	1.39	0.0	66.4	SURCHARGED
1.009	SWMHA.31	35.437	0.025	0.000	1.03	0.0	70.3	SURCHARGED
10.000	SWMHA.32	36.577	-0.148	0.000	0.25	0.0	15.6	OK
10.001	SWMHA.33	36.233	-0.124	0.000	0.41	0.0	24.2	OK
10.002	SWMHA.34	35.263	0.038	0.000	0.53	0.0	33.5	SURCHARGED
11.000	SWMHA.35	35.253	0.228	0.000	0.17	0.0	10.4	SURCHARGED
10.003	SWMHA.36	35.251	0.519	0.000	0.89	0.0	55.6	SURCHARGED
12.000	SWMHA.37	35.258	0.033	0.000	0.97	0.0	30.8	SURCHARGED
10.004	SWMHA.38	35.244	0.612	0.000	1.50	0.0	90.6	SURCHARGED
1.010	SWMHA.39	35.240	0.815	0.000	0.35	0.0	9.4	SURCHARGED

31a Westland Square
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R086 ARDEE (SHD)
SW CATCHMENT A
+10% CLIMATE CHANGE

Date August 2020

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File R086-STORM CATCHMENT A...

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Micro Drainage

Network W.12.6

Summary of Results for 90 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	SWMHA.1	41.558	-0.167	0.000	0.15	0.0	9.5	OK
2.000	SWMHA.2	41.560	-0.165	0.000	0.16	0.0	9.5	OK
1.001	SWMHA.3	41.042	-0.125	0.000	0.41	0.0	25.8	OK
1.002	SWMHA.4	39.706	-0.019	0.000	0.96	0.0	38.8	OK
1.003	SWMHA.5	39.628	-0.089	0.000	0.70	0.0	50.4	OK
1.004	SWMHA.6	39.537	0.000	0.000	1.10	0.0	56.9	OK
3.000	SWMHA.7	38.506	0.031	0.000	0.41	0.0	12.2	SURCHARGED
3.001	SWMHA.8	38.479	0.094	0.000	0.73	0.0	20.7	SURCHARGED
1.005	SWMHA.9	38.477	0.071	0.000	1.37	0.0	77.9	SURCHARGED
4.000	SWMHA.10	43.059	-0.166	0.000	0.15	0.0	9.7	OK
5.000	SWMHA.11	41.576	-0.174	0.000	0.37	0.0	27.9	OK
4.001	SWMHA.12	41.215	-0.072	0.000	0.92	0.0	67.4	OK
6.000	SWMHA.13	40.803	-0.122	0.000	0.43	0.0	15.0	OK
4.002	SWMHA.14	40.120	-0.055	0.000	0.78	0.0	101.4	OK
4.003	SWMHA.15	39.972	0.031	0.000	1.18	0.0	116.2	SURCHARGED
7.000	SWMHA.16	41.066	-0.159	0.000	0.19	0.0	11.8	OK
7.001	SWMHA.17	40.637	-0.121	0.000	0.44	0.0	23.1	OK
7.002	SWMHA.18	40.429	-0.077	0.000	0.76	0.0	31.7	OK
7.003	SWMHA.19	38.957	-0.143	0.000	0.53	0.0	44.1	OK
7.004	SWMHA.20	38.807	-0.086	0.000	0.71	0.0	54.8	OK
7.005	SWMHA.21	38.752	-0.108	0.000	0.55	0.0	59.2	OK
7.006	SWMHA.22	38.728	-0.064	0.000	0.59	0.0	77.1	OK
7.007	SWMHA.23	38.640	0.099	0.000	0.76	0.0	91.1	SURCHARGED
7.008	SWMHA.24	38.576	0.148	0.000	0.96	0.0	102.9	SURCHARGED
4.004	SWMHA.25	38.523	0.003	0.000	1.20	0.0	219.2	SURCHARGED
1.006	SWMHA.26	38.477	0.852	0.000	0.04	0.0	3.5	SURCHARGED
8.000	SWMHA.27	36.640	-0.185	0.000	0.07	0.0	4.6	OK
9.000	SWMHA.28	35.991	-0.134	0.000	0.34	0.0	22.1	OK
1.007	SWMHA.29	35.459	-0.006	0.000	0.91	0.0	48.5	OK
1.008	SWMHA.30	35.430	0.000	0.000	1.10	0.0	52.6	OK
1.009	SWMHA.31	35.372	-0.040	0.000	0.81	0.0	55.4	OK
10.000	SWMHA.32	36.567	-0.158	0.000	0.19	0.0	11.9	OK
10.001	SWMHA.33	36.218	-0.139	0.000	0.31	0.0	18.4	OK
10.002	SWMHA.34	35.376	0.151	0.000	0.41	0.0	25.7	SURCHARGED
11.000	SWMHA.35	35.368	0.343	0.000	0.13	0.0	8.0	SURCHARGED
10.003	SWMHA.36	35.366	0.634	0.000	0.68	0.0	42.5	SURCHARGED
12.000	SWMHA.37	35.372	0.147	0.000	0.75	0.0	23.8	SURCHARGED
10.004	SWMHA.38	35.362	0.729	0.000	1.16	0.0	69.9	SURCHARGED
1.010	SWMHA.39	35.357	0.932	0.000	0.35	0.0	9.4	SURCHARGED

31a Westland Square
Pearse Street
Dublin 2

R086 ARDEE (SHD)
SW CATCHMENT A
+10% CLIMATE CHANGE

Date August 2020

Designed by DD

File R086-STORM CATCHMENT A...

Checked by



Micro Drainage

Network W.12.6

Summary of Results for 120 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	SWMHA.1	41.552	-0.173	0.000	0.12	0.0	7.8	OK
2.000	SWMHA.2	41.554	-0.171	0.000	0.13	0.0	7.8	OK
1.001	SWMHA.3	41.032	-0.136	0.000	0.33	0.0	21.3	OK
1.002	SWMHA.4	39.652	-0.073	0.000	0.80	0.0	32.2	OK
1.003	SWMHA.5	39.582	-0.135	0.000	0.58	0.0	42.2	OK
1.004	SWMHA.6	39.464	-0.073	0.000	0.93	0.0	48.1	OK
3.000	SWMHA.7	38.570	0.095	0.000	0.34	0.0	10.2	SURCHARGED
3.001	SWMHA.8	38.569	0.184	0.000	0.61	0.0	17.4	SURCHARGED
1.005	SWMHA.9	38.568	0.162	0.000	1.15	0.0	65.5	SURCHARGED
4.000	SWMHA.10	43.053	-0.172	0.000	0.13	0.0	8.0	OK
5.000	SWMHA.11	41.563	-0.187	0.000	0.31	0.0	23.2	OK
4.001	SWMHA.12	41.185	-0.102	0.000	0.77	0.0	56.2	OK
6.000	SWMHA.13	40.792	-0.133	0.000	0.35	0.0	12.4	OK
4.002	SWMHA.14	40.022	-0.153	0.000	0.65	0.0	85.0	OK
4.003	SWMHA.15	39.862	-0.078	0.000	0.98	0.0	96.9	OK
7.000	SWMHA.16	41.059	-0.166	0.000	0.15	0.0	9.7	OK
7.001	SWMHA.17	40.626	-0.132	0.000	0.36	0.0	19.0	OK
7.002	SWMHA.18	40.411	-0.096	0.000	0.63	0.0	26.1	OK
7.003	SWMHA.19	38.939	-0.161	0.000	0.44	0.0	36.4	OK
7.004	SWMHA.20	38.761	-0.132	0.000	0.60	0.0	46.1	OK
7.005	SWMHA.21	38.665	-0.195	0.000	0.47	0.0	50.2	OK
7.006	SWMHA.22	38.607	-0.185	0.000	0.50	0.0	65.6	OK
7.007	SWMHA.23	38.574	0.033	0.000	0.64	0.0	76.9	SURCHARGED
7.008	SWMHA.24	38.571	0.143	0.000	0.81	0.0	87.1	SURCHARGED
4.004	SWMHA.25	38.569	0.049	0.000	1.00	0.0	181.8	SURCHARGED
1.006	SWMHA.26	38.567	0.942	0.000	0.04	0.0	3.5	SURCHARGED
8.000	SWMHA.27	36.635	-0.190	0.000	0.06	0.0	3.8	OK
9.000	SWMHA.28	35.981	-0.144	0.000	0.28	0.0	18.2	OK
1.007	SWMHA.29	35.462	-0.003	0.000	0.76	0.0	40.6	OK
1.008	SWMHA.30	35.457	0.028	0.000	0.92	0.0	44.1	SURCHARGED
1.009	SWMHA.31	35.454	0.042	0.000	0.69	0.0	46.8	SURCHARGED
10.000	SWMHA.32	36.560	-0.165	0.000	0.16	0.0	9.8	OK
10.001	SWMHA.33	36.209	-0.148	0.000	0.26	0.0	15.2	OK
10.002	SWMHA.34	35.456	0.231	0.000	0.34	0.0	21.2	SURCHARGED
11.000	SWMHA.35	35.450	0.425	0.000	0.10	0.0	6.4	SURCHARGED
10.003	SWMHA.36	35.448	0.716	0.000	0.57	0.0	35.3	FLOOD RISK
12.000	SWMHA.37	35.453	0.228	0.000	0.62	0.0	19.8	SURCHARGED
10.004	SWMHA.38	35.443	0.810	0.000	0.95	0.0	57.4	SURCHARGED
1.010	SWMHA.39	35.439	1.014	0.000	0.35	0.0	9.4	SURCHARGED

31a Westland Square
Pearse Street
Dublin 2

R086 ARDEE (SHD)
SW CATCHMENT A
+10% CLIMATE CHANGE

Date August 2020

Designed by DD

File R086-STORM CATCHMENT A...

Checked by



Micro Drainage

Network W.12.6

Summary of Results for 180 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	SWMHA.1	41.546	-0.179	0.000	0.09	0.0	5.9	OK
2.000	SWMHA.2	41.547	-0.178	0.000	0.10	0.0	5.9	OK
1.001	SWMHA.3	41.019	-0.148	0.000	0.25	0.0	16.2	OK
1.002	SWMHA.4	39.627	-0.098	0.000	0.61	0.0	24.5	OK
1.003	SWMHA.5	39.557	-0.160	0.000	0.44	0.0	32.1	OK
1.004	SWMHA.6	39.424	-0.113	0.000	0.70	0.0	36.5	OK
3.000	SWMHA.7	38.703	0.228	0.000	0.26	0.0	7.7	SURCHARGED
3.001	SWMHA.8	38.703	0.318	0.000	0.46	0.0	13.2	SURCHARGED
1.005	SWMHA.9	38.702	0.296	0.000	0.87	0.0	49.7	SURCHARGED
4.000	SWMHA.10	43.047	-0.178	0.000	0.10	0.0	6.1	OK
5.000	SWMHA.11	41.548	-0.202	0.000	0.23	0.0	17.6	OK
4.001	SWMHA.12	41.152	-0.135	0.000	0.58	0.0	42.7	OK
6.000	SWMHA.13	40.779	-0.146	0.000	0.27	0.0	9.4	OK
4.002	SWMHA.14	39.987	-0.188	0.000	0.50	0.0	64.5	OK
4.003	SWMHA.15	39.809	-0.132	0.000	0.75	0.0	73.7	OK
7.000	SWMHA.16	41.051	-0.174	0.000	0.12	0.0	7.4	OK
7.001	SWMHA.17	40.612	-0.145	0.000	0.27	0.0	14.5	OK
7.002	SWMHA.18	40.391	-0.115	0.000	0.48	0.0	19.9	OK
7.003	SWMHA.19	38.920	-0.180	0.000	0.34	0.0	27.7	OK
7.004	SWMHA.20	38.735	-0.158	0.000	0.46	0.0	35.1	OK
7.005	SWMHA.21	38.712	-0.148	0.000	0.36	0.0	38.1	OK
7.006	SWMHA.22	38.711	-0.082	0.000	0.38	0.0	49.8	OK
7.007	SWMHA.23	38.707	0.166	0.000	0.49	0.0	58.9	SURCHARGED
7.008	SWMHA.24	38.704	0.276	0.000	0.62	0.0	66.7	SURCHARGED
4.004	SWMHA.25	38.703	0.183	0.000	0.77	0.0	140.3	SURCHARGED
1.006	SWMHA.26	38.702	1.077	0.000	0.04	0.0	3.5	SURCHARGED
8.000	SWMHA.27	36.631	-0.194	0.000	0.05	0.0	2.9	OK
9.000	SWMHA.28	35.971	-0.154	0.000	0.22	0.0	13.8	OK
1.007	SWMHA.29	35.567	0.101	0.000	0.59	0.0	31.7	SURCHARGED
1.008	SWMHA.30	35.563	0.133	0.000	0.72	0.0	34.4	SURCHARGED
1.009	SWMHA.31	35.560	0.148	0.000	0.54	0.0	36.6	SURCHARGED
10.000	SWMHA.32	36.552	-0.173	0.000	0.12	0.0	7.5	OK
10.001	SWMHA.33	36.199	-0.158	0.000	0.20	0.0	11.6	OK
10.002	SWMHA.34	35.559	0.334	0.000	0.26	0.0	16.1	SURCHARGED
11.000	SWMHA.35	35.555	0.530	0.000	0.08	0.0	4.8	SURCHARGED
10.003	SWMHA.36	35.554	0.822	0.000	0.43	0.0	27.0	FLOOD RISK
12.000	SWMHA.37	35.557	0.332	0.000	0.47	0.0	15.1	SURCHARGED
10.004	SWMHA.38	35.551	0.918	0.000	0.73	0.0	43.8	SURCHARGED
1.010	SWMHA.39	35.547	1.122	0.000	0.35	0.0	9.4	SURCHARGED

31a Westland Square
Pearse Street
Dublin 2

R086 ARDEE (SHD)
SW CATCHMENT A
+10% CLIMATE CHANGE

Date August 2020

Designed by DD

File R086-STORM CATCHMENT A...

Checked by



Micro Drainage

Network W.12.6

Summary of Results for 240 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	SWMHA.1	41.541	-0.184	0.000	0.08	0.0	4.8	OK
2.000	SWMHA.2	41.542	-0.183	0.000	0.08	0.0	4.8	OK
1.001	SWMHA.3	41.012	-0.156	0.000	0.21	0.0	13.2	OK
1.002	SWMHA.4	39.612	-0.113	0.000	0.50	0.0	20.0	OK
1.003	SWMHA.5	39.542	-0.175	0.000	0.36	0.0	26.2	OK
1.004	SWMHA.6	39.401	-0.136	0.000	0.58	0.0	29.9	OK
3.000	SWMHA.7	38.801	0.326	0.000	0.21	0.0	6.3	SURCHARGED
3.001	SWMHA.8	38.801	0.416	0.000	0.38	0.0	10.8	SURCHARGED
1.005	SWMHA.9	38.800	0.394	0.000	0.71	0.0	40.8	SURCHARGED
4.000	SWMHA.10	43.042	-0.183	0.000	0.08	0.0	5.0	OK
5.000	SWMHA.11	41.538	-0.212	0.000	0.19	0.0	14.4	OK
4.001	SWMHA.12	41.133	-0.154	0.000	0.48	0.0	35.0	OK
6.000	SWMHA.13	40.771	-0.154	0.000	0.22	0.0	7.7	OK
4.002	SWMHA.14	39.966	-0.209	0.000	0.41	0.0	52.9	OK
4.003	SWMHA.15	39.778	-0.162	0.000	0.61	0.0	60.4	OK
7.000	SWMHA.16	41.047	-0.178	0.000	0.10	0.0	6.0	OK
7.001	SWMHA.17	40.604	-0.153	0.000	0.22	0.0	11.8	OK
7.002	SWMHA.18	40.379	-0.128	0.000	0.39	0.0	16.3	OK
7.003	SWMHA.19	38.907	-0.193	0.000	0.27	0.0	22.7	OK
7.004	SWMHA.20	38.810	-0.083	0.000	0.37	0.0	28.7	OK
7.005	SWMHA.21	38.807	-0.053	0.000	0.29	0.0	31.2	OK
7.006	SWMHA.22	38.806	0.014	0.000	0.31	0.0	40.9	SURCHARGED
7.007	SWMHA.23	38.804	0.263	0.000	0.40	0.0	48.3	SURCHARGED
7.008	SWMHA.24	38.802	0.373	0.000	0.51	0.0	54.7	SURCHARGED
4.004	SWMHA.25	38.800	0.281	0.000	0.63	0.0	114.9	SURCHARGED
1.006	SWMHA.26	38.800	1.175	0.000	0.04	0.0	3.5	SURCHARGED
8.000	SWMHA.27	36.628	-0.197	0.000	0.04	0.0	2.3	OK
9.000	SWMHA.28	35.963	-0.162	0.000	0.18	0.0	11.3	OK
1.007	SWMHA.29	35.631	0.166	0.000	0.50	0.0	26.6	SURCHARGED
1.008	SWMHA.30	35.628	0.198	0.000	0.60	0.0	28.7	SURCHARGED
1.009	SWMHA.31	35.625	0.213	0.000	0.45	0.0	30.6	SURCHARGED
10.000	SWMHA.32	36.547	-0.178	0.000	0.10	0.0	6.1	OK
10.001	SWMHA.33	36.192	-0.165	0.000	0.16	0.0	9.5	OK
10.002	SWMHA.34	35.623	0.398	0.000	0.21	0.0	13.1	SURCHARGED
11.000	SWMHA.35	35.620	0.595	0.000	0.06	0.0	3.9	SURCHARGED
10.003	SWMHA.36	35.619	0.887	0.000	0.36	0.0	22.2	FLOOD RISK
12.000	SWMHA.37	35.621	0.396	0.000	0.39	0.0	12.4	SURCHARGED
10.004	SWMHA.38	35.615	0.983	0.000	0.60	0.0	36.0	SURCHARGED
1.010	SWMHA.39	35.612	1.187	0.000	0.35	0.0	9.4	SURCHARGED

31a Westland Square
 Pearse Street
 Dublin 2

R086 ARDEE (SHD)
 SW CATCHMENT A
 +10% CLIMATE CHANGE



Date August 2020
 File R086-STORM CATCHMENT A...

Designed by DD
 Checked by

Micro Drainage

Network W.12.6

Summary of Results for 360 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
 Analysis Timestep Fine Inertia Status OFF
 DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	SWMHA.1	41.535	-0.190	0.000	0.06	0.0	3.6	OK
2.000	SWMHA.2	41.536	-0.189	0.000	0.06	0.0	3.6	OK
1.001	SWMHA.3	41.002	-0.166	0.000	0.16	0.0	9.9	OK
1.002	SWMHA.4	39.594	-0.131	0.000	0.37	0.0	15.0	OK
1.003	SWMHA.5	39.523	-0.194	0.000	0.27	0.0	19.6	OK
1.004	SWMHA.6	39.374	-0.163	0.000	0.43	0.0	22.4	OK
3.000	SWMHA.7	38.944	0.469	0.000	0.16	0.0	4.7	SURCHARGED
3.001	SWMHA.8	38.944	0.559	0.000	0.28	0.0	8.1	SURCHARGED
1.005	SWMHA.9	38.944	0.538	0.000	0.53	0.0	30.4	SURCHARGED
4.000	SWMHA.10	43.035	-0.190	0.000	0.06	0.0	3.7	OK
5.000	SWMHA.11	41.525	-0.225	0.000	0.14	0.0	10.8	OK
4.001	SWMHA.12	41.111	-0.176	0.000	0.36	0.0	26.2	OK
6.000	SWMHA.13	40.761	-0.164	0.000	0.16	0.0	5.8	OK
4.002	SWMHA.14	39.941	-0.234	0.000	0.30	0.0	39.6	OK
4.003	SWMHA.15	39.743	-0.197	0.000	0.46	0.0	45.2	OK
7.000	SWMHA.16	41.040	-0.185	0.000	0.07	0.0	4.5	OK
7.001	SWMHA.17	40.594	-0.164	0.000	0.17	0.0	8.8	OK
7.002	SWMHA.18	40.364	-0.142	0.000	0.29	0.0	12.2	OK
7.003	SWMHA.19	38.952	-0.148	0.000	0.21	0.0	17.0	OK
7.004	SWMHA.20	38.950	0.057	0.000	0.28	0.0	21.5	SURCHARGED
7.005	SWMHA.21	38.949	0.089	0.000	0.22	0.0	23.4	SURCHARGED
7.006	SWMHA.22	38.948	0.156	0.000	0.23	0.0	30.6	SURCHARGED
7.007	SWMHA.23	38.946	0.405	0.000	0.30	0.0	35.7	SURCHARGED
7.008	SWMHA.24	38.944	0.516	0.000	0.37	0.0	40.1	SURCHARGED
4.004	SWMHA.25	38.944	0.424	0.000	0.46	0.0	84.4	SURCHARGED
1.006	SWMHA.26	38.943	1.318	0.000	0.04	0.0	3.5	SURCHARGED
8.000	SWMHA.27	36.625	-0.200	0.000	0.03	0.0	1.8	OK
9.000	SWMHA.28	35.954	-0.171	0.000	0.13	0.0	8.5	OK
1.007	SWMHA.29	35.720	0.254	0.000	0.39	0.0	20.7	SURCHARGED
1.008	SWMHA.30	35.716	0.287	0.000	0.47	0.0	22.4	SURCHARGED
1.009	SWMHA.31	35.714	0.302	0.000	0.35	0.0	23.8	SURCHARGED
10.000	SWMHA.32	36.540	-0.185	0.000	0.07	0.0	4.6	OK
10.001	SWMHA.33	36.184	-0.173	0.000	0.12	0.0	7.1	OK
10.002	SWMHA.34	35.710	0.485	0.000	0.16	0.0	9.8	SURCHARGED
11.000	SWMHA.35	35.708	0.683	0.000	0.05	0.0	2.9	SURCHARGED
10.003	SWMHA.36	35.707	0.975	0.000	0.27	0.0	16.6	FLOOD RISK
12.000	SWMHA.37	35.709	0.484	0.000	0.29	0.0	9.2	SURCHARGED
10.004	SWMHA.38	35.705	1.072	0.000	0.45	0.0	27.1	SURCHARGED
1.010	SWMHA.39	35.701	1.276	0.000	0.35	0.0	9.4	FLOOD RISK

31a Westland Square
Pearse Street
Dublin 2

R086 ARDEE (SHD)
SW CATCHMENT A
+10% CLIMATE CHANGE

Date August 2020

Designed by DD

File R086-STORM CATCHMENT A...

Checked by



Micro Drainage

Network W.12.6

Summary of Results for 720 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	SWMHA.1	41.527	-0.198	0.000	0.03	0.0	2.2	OK
2.000	SWMHA.2	41.528	-0.197	0.000	0.04	0.0	2.2	OK
1.001	SWMHA.3	40.989	-0.179	0.000	0.09	0.0	6.0	OK
1.002	SWMHA.4	39.572	-0.153	0.000	0.22	0.0	9.1	OK
1.003	SWMHA.5	39.499	-0.219	0.000	0.16	0.0	11.9	OK
1.004	SWMHA.6	39.341	-0.196	0.000	0.26	0.0	13.6	OK
3.000	SWMHA.7	39.187	0.712	0.000	0.09	0.0	2.8	SURCHARGED
3.001	SWMHA.8	39.186	0.801	0.000	0.16	0.0	4.7	SURCHARGED
1.005	SWMHA.9	39.185	0.780	0.000	0.31	0.0	17.6	SURCHARGED
4.000	SWMHA.10	43.027	-0.198	0.000	0.04	0.0	2.3	OK
5.000	SWMHA.11	41.509	-0.241	0.000	0.09	0.0	6.5	OK
4.001	SWMHA.12	41.081	-0.206	0.000	0.22	0.0	15.9	OK
6.000	SWMHA.13	40.747	-0.178	0.000	0.10	0.0	3.5	OK
4.002	SWMHA.14	39.908	-0.267	0.000	0.18	0.0	24.0	OK
4.003	SWMHA.15	39.700	-0.241	0.000	0.28	0.0	27.4	OK
7.000	SWMHA.16	41.030	-0.195	0.000	0.04	0.0	2.7	OK
7.001	SWMHA.17	40.580	-0.177	0.000	0.10	0.0	5.4	OK
7.002	SWMHA.18	40.345	-0.162	0.000	0.18	0.0	7.4	OK
7.003	SWMHA.19	39.191	0.091	0.000	0.12	0.0	10.3	SURCHARGED
7.004	SWMHA.20	39.190	0.297	0.000	0.17	0.0	13.0	SURCHARGED
7.005	SWMHA.21	39.189	0.329	0.000	0.13	0.0	14.2	SURCHARGED
7.006	SWMHA.22	39.189	0.397	0.000	0.14	0.0	18.5	SURCHARGED
7.007	SWMHA.23	39.188	0.647	0.000	0.18	0.0	21.2	SURCHARGED
7.008	SWMHA.24	39.186	0.758	0.000	0.22	0.0	23.3	SURCHARGED
4.004	SWMHA.25	39.186	0.666	0.000	0.27	0.0	50.0	SURCHARGED
1.006	SWMHA.26	39.184	1.559	0.000	0.04	0.0	3.5	SURCHARGED
8.000	SWMHA.27	36.618	-0.207	0.000	0.02	0.0	1.1	OK
9.000	SWMHA.28	35.942	-0.183	0.000	0.08	0.0	5.1	OK
1.007	SWMHA.29	35.722	0.257	0.000	0.26	0.0	13.9	SURCHARGED
1.008	SWMHA.30	35.719	0.290	0.000	0.31	0.0	14.9	SURCHARGED
1.009	SWMHA.31	35.717	0.305	0.000	0.23	0.0	15.8	SURCHARGED
10.000	SWMHA.32	36.530	-0.195	0.000	0.04	0.0	2.8	OK
10.001	SWMHA.33	36.172	-0.185	0.000	0.07	0.0	4.3	OK
10.002	SWMHA.34	35.713	0.488	0.000	0.09	0.0	5.9	SURCHARGED
11.000	SWMHA.35	35.711	0.686	0.000	0.03	0.0	1.8	SURCHARGED
10.003	SWMHA.36	35.710	0.978	0.000	0.16	0.0	10.1	FLOOD RISK
12.000	SWMHA.37	35.712	0.487	0.000	0.17	0.0	5.6	SURCHARGED
10.004	SWMHA.38	35.708	1.075	0.000	0.28	0.0	16.6	SURCHARGED
1.010	SWMHA.39	35.705	1.280	0.000	0.35	0.0	9.4	FLOOD RISK

31a Westland Square
Pearse Street
Dublin 2

R086 ARDEE (SHD)
SW CATCHMENT A
+10% CLIMATE CHANGE

Date August 2020

Designed by DD

File R086-STORM CATCHMENT A...

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Micro Drainage

Network W.12.6

Summary of Results for 1440 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	SWMHA.1	41.522	-0.203	0.000	0.02	0.0	1.3	OK
2.000	SWMHA.2	41.523	-0.202	0.000	0.02	0.0	1.3	OK
1.001	SWMHA.3	40.977	-0.191	0.000	0.06	0.0	3.6	OK
1.002	SWMHA.4	39.555	-0.170	0.000	0.14	0.0	5.5	OK
1.003	SWMHA.5	39.481	-0.237	0.000	0.10	0.0	7.2	OK
1.004	SWMHA.6	39.389	-0.148	0.000	0.16	0.0	8.2	OK
3.000	SWMHA.7	39.389	0.914	0.000	0.05	0.0	1.6	FLOOD RISK
3.001	SWMHA.8	39.389	1.004	0.000	0.09	0.0	2.7	SURCHARGED
1.005	SWMHA.9	39.389	0.983	0.000	0.19	0.0	10.8	SURCHARGED
4.000	SWMHA.10	43.023	-0.202	0.000	0.02	0.0	1.4	OK
5.000	SWMHA.11	41.494	-0.256	0.000	0.05	0.0	3.9	OK
4.001	SWMHA.12	41.059	-0.228	0.000	0.13	0.0	9.6	OK
6.000	SWMHA.13	40.736	-0.189	0.000	0.06	0.0	2.1	OK
4.002	SWMHA.14	39.883	-0.292	0.000	0.11	0.0	14.5	OK
4.003	SWMHA.15	39.668	-0.272	0.000	0.17	0.0	16.5	OK
7.000	SWMHA.16	41.024	-0.201	0.000	0.03	0.0	1.6	OK
7.001	SWMHA.17	40.568	-0.189	0.000	0.06	0.0	3.2	OK
7.002	SWMHA.18	40.330	-0.176	0.000	0.11	0.0	4.4	OK
7.003	SWMHA.19	39.393	0.293	0.000	0.08	0.0	6.2	SURCHARGED
7.004	SWMHA.20	39.392	0.499	0.000	0.10	0.0	7.9	SURCHARGED
7.005	SWMHA.21	39.391	0.531	0.000	0.08	0.0	8.5	SURCHARGED
7.006	SWMHA.22	39.391	0.599	0.000	0.09	0.0	11.1	SURCHARGED
7.007	SWMHA.23	39.390	0.849	0.000	0.10	0.0	12.3	SURCHARGED
7.008	SWMHA.24	39.389	0.961	0.000	0.13	0.0	13.5	SURCHARGED
4.004	SWMHA.25	39.389	0.869	0.000	0.16	0.0	29.7	SURCHARGED
1.006	SWMHA.26	39.388	1.763	0.000	0.04	0.0	3.5	SURCHARGED
8.000	SWMHA.27	36.611	-0.214	0.000	0.01	0.0	0.6	OK
9.000	SWMHA.28	35.932	-0.193	0.000	0.05	0.0	3.1	OK
1.007	SWMHA.29	35.565	0.100	0.000	0.18	0.0	9.8	SURCHARGED
1.008	SWMHA.30	35.562	0.132	0.000	0.22	0.0	10.4	SURCHARGED
1.009	SWMHA.31	35.560	0.148	0.000	0.16	0.0	10.9	SURCHARGED
10.000	SWMHA.32	36.525	-0.200	0.000	0.03	0.0	1.7	OK
10.001	SWMHA.33	36.162	-0.195	0.000	0.04	0.0	2.6	OK
10.002	SWMHA.34	35.556	0.331	0.000	0.06	0.0	3.6	SURCHARGED
11.000	SWMHA.35	35.553	0.528	0.000	0.02	0.0	1.1	SURCHARGED
10.003	SWMHA.36	35.553	0.821	0.000	0.10	0.0	6.2	FLOOD RISK
12.000	SWMHA.37	35.555	0.330	0.000	0.11	0.0	3.4	SURCHARGED
10.004	SWMHA.38	35.550	0.918	0.000	0.17	0.0	10.1	SURCHARGED
1.010	SWMHA.39	35.547	1.122	0.000	0.35	0.0	9.4	SURCHARGED

31a Westland Square
 Pearse Street
 Dublin 2

R086 ARDEE (SHD)
 SW CATCHMENT A
 +10% CLIMATE CHANGE



Date August 2020
 File R086-STORM CATCHMENT A...

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Micro Drainage

Network W.12.6

Summary of Results for 2880 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
 Analysis Timestep Fine Inertia Status OFF
 DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	SWMHA.1	41.514	-0.211	0.000	0.01	0.0	0.8	OK
2.000	SWMHA.2	41.514	-0.211	0.000	0.01	0.0	0.8	OK
1.001	SWMHA.3	40.970	-0.198	0.000	0.03	0.0	2.2	OK
1.002	SWMHA.4	39.543	-0.182	0.000	0.08	0.0	3.3	OK
1.003	SWMHA.5	39.496	-0.222	0.000	0.06	0.0	4.4	OK
1.004	SWMHA.6	39.495	-0.042	0.000	0.10	0.0	5.0	OK
3.000	SWMHA.7	39.495	1.020	0.000	0.03	0.0	1.0	FLOOD RISK
3.001	SWMHA.8	39.495	1.110	0.000	0.06	0.0	1.7	SURCHARGED
1.005	SWMHA.9	39.494	1.088	0.000	0.12	0.0	6.6	SURCHARGED
4.000	SWMHA.10	43.014	-0.211	0.000	0.01	0.0	0.8	OK
5.000	SWMHA.11	41.485	-0.265	0.000	0.03	0.0	2.4	OK
4.001	SWMHA.12	41.043	-0.244	0.000	0.08	0.0	5.8	OK
6.000	SWMHA.13	40.728	-0.197	0.000	0.04	0.0	1.3	OK
4.002	SWMHA.14	39.863	-0.312	0.000	0.07	0.0	8.8	OK
4.003	SWMHA.15	39.645	-0.295	0.000	0.10	0.0	10.0	OK
7.000	SWMHA.16	41.017	-0.208	0.000	0.02	0.0	1.0	OK
7.001	SWMHA.17	40.560	-0.197	0.000	0.04	0.0	2.0	OK
7.002	SWMHA.18	40.318	-0.188	0.000	0.06	0.0	2.7	OK
7.003	SWMHA.19	39.497	0.397	0.000	0.05	0.0	3.8	SURCHARGED
7.004	SWMHA.20	39.497	0.604	0.000	0.06	0.0	4.8	SURCHARGED
7.005	SWMHA.21	39.496	0.636	0.000	0.05	0.0	5.2	SURCHARGED
7.006	SWMHA.22	39.496	0.704	0.000	0.05	0.0	6.7	SURCHARGED
7.007	SWMHA.23	39.496	0.955	0.000	0.06	0.0	7.3	SURCHARGED
7.008	SWMHA.24	39.495	1.067	0.000	0.08	0.0	8.2	SURCHARGED
4.004	SWMHA.25	39.494	0.975	0.000	0.10	0.0	18.1	SURCHARGED
1.006	SWMHA.26	39.494	1.869	0.000	0.04	0.0	3.5	SURCHARGED
8.000	SWMHA.27	36.607	-0.218	0.000	0.01	0.0	0.4	OK
9.000	SWMHA.28	35.925	-0.200	0.000	0.03	0.0	1.9	OK
1.007	SWMHA.29	35.239	-0.226	0.000	0.14	0.0	7.3	OK
1.008	SWMHA.30	35.210	-0.220	0.000	0.16	0.0	7.7	OK
1.009	SWMHA.31	35.199	-0.213	0.000	0.12	0.0	8.0	OK
10.000	SWMHA.32	36.518	-0.207	0.000	0.02	0.0	1.0	OK
10.001	SWMHA.33	36.156	-0.201	0.000	0.03	0.0	1.6	OK
10.002	SWMHA.34	35.183	-0.042	0.000	0.03	0.0	2.2	OK
11.000	SWMHA.35	35.181	0.156	0.000	0.01	0.0	0.7	SURCHARGED
10.003	SWMHA.36	35.180	0.448	0.000	0.06	0.0	3.8	SURCHARGED
12.000	SWMHA.37	35.182	-0.043	0.000	0.06	0.0	2.1	OK
10.004	SWMHA.38	35.178	0.545	0.000	0.11	0.0	6.4	SURCHARGED
1.010	SWMHA.39	35.174	0.749	0.000	0.35	0.0	9.4	SURCHARGED

31a Westland Square
 Pearse Street
 Dublin 2

R086 ARDEE (SHD)
 SW CATCHMENT A
 +10% CLIMATE CHANGE



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MH Name	SWMHA.6	SWMHA.5	SWMHA.3	SWMHA.1
Hor Scale 900				
Ver Scale 150				
Datum (m) 36.000				
PN		1.003	1.001	1.000
Dia (mm)		300	225	225
Slope (1:X)		200.0	60.0	60.0
Cover Level (m)	40.200	41.425	43.575	43.525
Invert Level (m)	39.237	39.418 39.418 39.500 40.318	40.943 40.943	41.500
Length (m)		36.126	37.456	33.439

MH Name	SWMHA.31	SWMHA.26	SWMHA.9
Hor Scale 900			
Ver Scale 150			
Datum (m) 33.000			
PN		1.006	1.005
Dia (mm)		225	300
Slope (1:X)		40.0	250.0
Cover Level (m)	37.570	37.570	40.300
Invert Level (m)	35.130 35.130	35.165 35.457	37.400 38.056 38.106 39.206 39.237
Length (m)		77.735	12.551

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MH Name	SWMHA.39		SWMHA.31
Hor Scale 900			
Ver Scale 150			
Datum (m)	31.000		
PN		1.009	
Dia (mm)		300	
Slope (1:X)		250.0	
Cover Level (m)	36.000		37.570
Invert Level (m)	34.660		35.112
Length (m)		113.095	

MH Name			
Hor Scale 900			
Ver Scale 150			
Datum (m)	30.000		
PN			
Dia (mm)			
Slope (1:X)			
Cover Level (m)		36.000	36.000
Invert Level (m)		34.162	34.200
Length (m)			

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Network W.12.6

MH Name	SWMHA.3	SWMHA.2
Hor Scale 900		
Ver Scale 150		
Datum (m) 37.000		
PN		2.000
Dia (mm)		225
Slope (1:X)		60.0
Cover Level (m)	43.575	43.375
Invert Level (m)	41.220	41.500
Length (m)		16.821

MH Name	SWMHA.9	SWMHA.8	SWMHA.7
Hor Scale 900			
Ver Scale 150			
Datum (m) 34.000			
PN		3.001	3.000
Dia (mm)		225	225
Slope (1:X)		250.0	250.0
Cover Level (m)	40.300	40.025	39.675
Invert Level (m)	38.106	38.160 38.160	38.250
Length (m)		13.561	22.483

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MH Name	SWMHA.14	SWMHA.12	SWMHA.10
Hor Scale 900			
Ver Scale 150			
Datum (m) 37.000			
PN			
Dia (mm)	300		225
Slope (1:X)	200.0		60.0
Cover Level (m)	43.275	43.950	44.425
Invert Level (m)	40.771	40.987 42.457	43.000
Length (m)		43.266	32.551

MH Name	SWMHA.26	SWMHA.25	SWMHA.14
Hor Scale 900			
Ver Scale 150			
Datum (m) 35.000			
PN			
Dia (mm)	525		375
Slope (1:X)	500.0		200.0
Cover Level (m)	40.300	41.300 41.200	43.275
Invert Level (m)	37.931	37.995 39.525 39.565 39.565	39.800
Length (m)		32.011	46.925

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MH Name	SWMHA.12	SWMHA.11
<p>Hor Scale 900</p> <p>Ver Scale 150</p> <p>Datum (m) 37.000</p>		
PN		5.000
Dia (mm)		300
Slope (1:X)		199.9
Cover Level (m)	43.950	42.875
Invert Level (m)	40.987	41.450
Length (m)		92.542

MH Name	SWMHA.14	SWMHA.13
<p>Hor Scale 900</p> <p>Ver Scale 150</p> <p>Datum (m) 37.000</p>		
PN		6.000
Dia (mm)		225
Slope (1:X)		200.0
Cover Level (m)	43.275	42.125
Invert Level (m)	40.456	40.700
Length (m)		48.850

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MH Name	SWMHA.22		SWMHA.20		SWMHA.19		SWMHA.17		SWMHA.16				
Hor Scale 900													
Ver Scale 150													
Datum (m)	36.000												
PN			7.004		7.003			7.001		7.000			
Dia (mm)			300		300			225		225			
Slope (1:X)			150.0		149.9			80.0		60.0			
Cover Level (m)		39.900	40.050		40.625		41.775	42.100		42.850	43.450		
Invert Level (m)		38.417	38.485	38.485	38.593	38.593	38.800	40.194	40.281	40.281	40.532	40.532	41.000
Length (m)				16.184		31.039			20.102		28.051		

MH Name	SWMHA.25		SWMHA.24		SWMHA.23		SWMHA.22	
Hor Scale 900								
Ver Scale 150								
Datum (m)	35.000							
PN			7.008		7.007			7.006
Dia (mm)			375		375			375
Slope (1:X)			200.0		200.0			200.0
Cover Level (m)			41.300		40.800		40.700	39.900
Invert Level (m)			37.995	38.053	38.053	38.166	38.166	38.417
Length (m)			11.684		22.546			50.245

31a Westland Square
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 File R086-STORM CATCHMENT A...

R086 ARDEE (SHD)
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Micro Drainage Network W.12.6

MH Name	SWMHA.29	SWMHA.27
Hor Scale 900		
Ver Scale 150		
Datum (m) 32.000		
PN		8.000
Dia (mm)		225
Slope (1:X)		60.0
Cover Level (m)	37.475	38.700
Invert Level (m)	36.023	36.600
Length (m)	34.622	

MH Name	SWMHA.29	SWMHA.28
Hor Scale 900		
Ver Scale 150		
Datum (m) 31.000		
PN		9.000
Dia (mm)		225
Slope (1:X)		60.0
Cover Level (m)	37.475	37.325
Invert Level (m)	35.165	35.900
Length (m)	44.086	

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Network W.12.6

MH Name	SWMHA.39	SWMHA.38	SWMHA.36	SWMHA.34	SWMHA.33	SWMHA.32
Hor Scale 900 Ver Scale 150 Datum (m) 32.000						
PN		10.004	10.003	10.002	10.001	10.000
Dia (mm)		300	300	225	225	225
Slope (1:X)		250.0	250.0	60.0	60.0	60.0
Cover Level (m)	36.000	36.025	35.725	37.475	38.225	39.300
Invert Level (m)	34.261	34.333 34.333	34.432 34.450	35.000 35.889	36.132 36.132	36.500
Length (m)		18.055	24.807	33.017	14.593	22.063

MH Name	SWMHA.36	SWMHA.35
Hor Scale 900 Ver Scale 150 Datum (m) 30.000		
PN		11.000
Dia (mm)		225
Slope (1:X)		60.0
Cover Level (m)	35.725	36.050
Invert Level (m)	34.432	34.800
Length (m)		22.097

31a Westland Square
 Pearse Street
 Dublin 2

R086 ARDEE (SHD)
 SW CATCHMENT A
 +10% CLIMATE CHANGE



Date August 2020
 File R086-STORM CATCHMENT A...

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Network W.12.6

MH Name	SWMHA.38	SWMHA.37
Hor Scale 900		
Ver Scale 150		
Datum (m)	31.000	
PN	12.000	
Dia (mm)	225	
Slope (1:X)	250.1	
Cover Level (m)	36.025	37.475
Invert Level (m)	34.675	35.000
Length (m)	81.282	

31a Westland Square
Pearse Street
Dublin 2

R086 ARDEE (SHD)
SW CATCHMENT B
+20% CLIMATE CHANGE

Date March 2021

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File R086-STORM CATCHMENT B...

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	5	Add Flow / Climate Change (%)	0
M5-60 (mm)	16.500	Minimum Backdrop Height (m)	0.000
Ratio R	0.300	Maximum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	50	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500
PIMP (%)	100		

Designed with Level Inverts

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)
1.000	30.657	0.510	60.1	0.066	4.00	0.0	0.600	o	225
1.001	32.945	0.349	94.4	0.105	0.00	0.0	0.600	o	225
1.002	8.046	0.077	104.9	0.080	0.00	0.0	0.600	o	225
1.003	47.376	0.371	127.7	0.101	0.00	0.0	0.600	o	300
2.000	51.010	1.102	46.3	0.054	4.00	0.0	0.600	o	225
2.001	6.696	0.033	200.0	0.049	0.00	0.0	0.600	o	225
2.002	72.695	0.242	300.0	0.152	0.00	0.0	0.600	o	375
2.003	66.803	0.272	245.6	0.191	0.00	0.0	0.600	o	375
3.000	31.695	0.158	200.6	0.093	4.00	0.0	0.600	o	225
1.004	68.679	0.343	200.2	0.227	0.00	0.0	0.600	o	450
4.000	65.797	0.329	200.0	0.129	4.00	0.0	0.600	o	225
4.001	37.303	0.187	199.5	0.148	0.00	0.0	0.600	o	375
5.000	27.864	0.139	200.5	0.071	4.00	0.0	0.600	o	225

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	4.30	39.800	0.066	0.0	0.0	0.0	1.69	67.2	9.0
1.001	50.00	4.71	39.290	0.171	0.0	0.0	0.0	1.35	53.5	23.2
1.002	50.00	4.82	38.941	0.252	0.0	0.0	0.0	1.28	50.7	34.1
1.003	50.00	5.38	37.700	0.353	0.0	0.0	0.0	1.39	98.2	47.8
2.000	50.00	4.44	37.800	0.054	0.0	0.0	0.0	1.93	76.6	7.3
2.001	50.00	4.56	36.698	0.102	0.0	0.0	0.0	0.92	36.6	13.9
2.002	50.00	5.73	36.665	0.254	0.0	0.0	0.0	1.04	115.0	34.4
2.003	50.00	6.69	36.422	0.445	0.0	0.0	0.0	1.15	127.2	60.2
3.000	50.00	4.57	37.600	0.093	0.0	0.0	0.0	0.92	36.6	12.6
1.004	50.00	7.49	36.150	1.117	0.0	0.0	0.0	1.43	227.9	151.3
4.000	50.00	5.19	36.200	0.129	0.0	0.0	0.0	0.92	36.6	17.4
4.001	50.00	5.68	35.871	0.277	0.0	0.0	0.0	1.28	141.3	37.5
5.000	50.00	4.50	36.500	0.071	0.0	0.0	0.0	0.92	36.6	9.6

31a Westland Square
 Pearse Street
 Dublin 2

R086 ARDEE (SHD)
 SW CATCHMENT B
 +20% CLIMATE CHANGE

Date March 2021

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File R086-STORM CATCHMENT B...

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)
1.005	4.028	0.020	201.4	0.095	0.00	0.0	0.600	o	450
1.006	66.411	0.033	2000.0	0.024	0.00	0.0	0.600	o	750
1.007	10.262	0.041	250.3	0.000	0.00	0.0	0.600	o	225

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.005	50.00	7.54	35.684	1.560	0.0	0.0	0.0	1.43	227.3	211.3
1.006	49.45	9.33	35.664	1.584	0.0	0.0	0.0	0.62	272.3	212.1
1.007	50.00	4.21	35.200	0.000	4.8	0.0	0.0	0.82	32.7	4.8

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	Pipe Out		Pipes In			Backdrop (mm)	
					PN	Invert Level (m)	Diameter (mm)	PN	Invert Level (m)		Diameter (mm)
SWMHB.1	42.150	2.350	Open Manhole	1200	1.000	39.800	225				
SWMHB.2	40.675	1.385	Open Manhole	1200	1.001	39.290	225	1.000	39.290	225	
SWMHB.3	40.200	1.259	Open Manhole	1200	1.002	38.941	225	1.001	38.941	225	
SWMHB.4	40.000	2.300	Open Manhole	1200	1.003	37.700	300	1.002	38.864	225	1089
SWMHB.5	39.825	2.025	Open Manhole	1200	2.000	37.800	225				
SWMHB.6	38.425	1.727	Open Manhole	1200	2.001	36.698	225	2.000	36.698	225	
SWMHB.7	38.555	1.890	Open Manhole	1200	2.002	36.665	375	2.001	36.665	225	
SWMHB.8	38.125	1.703	Open Manhole	1200	2.003	36.422	375	2.002	36.422	375	
SWMHB.9	39.050	1.450	Open Manhole	1200	3.000	37.600	225				
SWMHB.10	38.725	2.575	Open Manhole	1200	1.004	36.150	450	1.003	37.329	300	1029
								2.003	36.150	375	
								3.000	37.442	225	1067
SWMHB.11	38.350	2.150	Open Manhole	1200	4.000	36.200	225				
SWMHB.12	37.250	1.379	Open Manhole	1200	4.001	35.871	375	4.000	35.871	225	
SWMHB.13	37.900	1.400	Open Manhole	1200	5.000	36.500	225				
SWMHB.14	37.550	1.866	Open Manhole	1200	1.005	35.684	450	1.004	35.807	450	123
								4.001	35.684	375	
								5.000	36.361	225	452
SWMHB.15	37.650	1.986	Open Manhole	1800	1.006	35.664	750	1.005	35.664	450	
SWMHB.16	37.600	2.400	Open Manhole	1800	1.007	35.200	225	1.006	35.631	750	956
	37.600	2.441	Open Manhole	0		OUTFALL		1.007	35.159	225	

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	225	SWMHB.1	42.150	39.800	2.125	Open Manhole	1200
1.001	o	225	SWMHB.2	40.675	39.290	1.160	Open Manhole	1200
1.002	o	225	SWMHB.3	40.200	38.941	1.034	Open Manhole	1200
1.003	o	300	SWMHB.4	40.000	37.700	2.000	Open Manhole	1200
2.000	o	225	SWMHB.5	39.825	37.800	1.800	Open Manhole	1200
2.001	o	225	SWMHB.6	38.425	36.698	1.502	Open Manhole	1200
2.002	o	375	SWMHB.7	38.555	36.665	1.515	Open Manhole	1200
2.003	o	375	SWMHB.8	38.125	36.422	1.328	Open Manhole	1200
3.000	o	225	SWMHB.9	39.050	37.600	1.225	Open Manhole	1200
1.004	o	450	SWMHB.10	38.725	36.150	2.125	Open Manhole	1200
4.000	o	225	SWMHB.11	38.350	36.200	1.925	Open Manhole	1200
4.001	o	375	SWMHB.12	37.250	35.871	1.004	Open Manhole	1200
5.000	o	225	SWMHB.13	37.900	36.500	1.175	Open Manhole	1200
1.005	o	450	SWMHB.14	37.550	35.684	1.416	Open Manhole	1200
1.006	o	750	SWMHB.15	37.650	35.664	1.236	Open Manhole	1800
1.007	o	225	SWMHB.16	37.600	35.200	2.175	Open Manhole	1800

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	30.657	60.1	SWMHB.2	40.675	39.290	1.160	Open Manhole	1200
1.001	32.945	94.4	SWMHB.3	40.200	38.941	1.034	Open Manhole	1200
1.002	8.046	104.9	SWMHB.4	40.000	38.864	0.911	Open Manhole	1200
1.003	47.376	127.7	SWMHB.10	38.725	37.329	1.096	Open Manhole	1200
2.000	51.010	46.3	SWMHB.6	38.425	36.698	1.502	Open Manhole	1200
2.001	6.696	200.0	SWMHB.7	38.555	36.665	1.665	Open Manhole	1200
2.002	72.695	300.0	SWMHB.8	38.125	36.422	1.328	Open Manhole	1200
2.003	66.803	245.6	SWMHB.10	38.725	36.150	2.200	Open Manhole	1200
3.000	31.695	200.6	SWMHB.10	38.725	37.442	1.058	Open Manhole	1200
1.004	68.679	200.2	SWMHB.14	37.550	35.807	1.293	Open Manhole	1200
4.000	65.797	200.0	SWMHB.12	37.250	35.871	1.154	Open Manhole	1200
4.001	37.303	199.5	SWMHB.14	37.550	35.684	1.491	Open Manhole	1200
5.000	27.864	200.5	SWMHB.14	37.550	36.361	0.964	Open Manhole	1200
1.005	4.028	201.4	SWMHB.15	37.650	35.664	1.536	Open Manhole	1800
1.006	66.411	2000.0	SWMHB.16	37.600	35.631	1.219	Open Manhole	1800
1.007	10.262	250.3		37.600	35.159	2.216	Open Manhole	0

31a Westland Square
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R086 ARDEE (SHD)
 SW CATCHMENT B
 +20% CLIMATE CHANGE

Date March 2021

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.066	0.066	0.066
1.001	User	-	100	0.105	0.105	0.105
1.002	User	-	100	0.080	0.080	0.080
1.003	User	-	100	0.101	0.101	0.101
2.000	User	-	100	0.054	0.054	0.054
2.001	User	-	100	0.049	0.049	0.049
2.002	User	-	100	0.152	0.152	0.152
2.003	User	-	100	0.191	0.191	0.191
3.000	User	-	100	0.093	0.093	0.093
1.004	User	-	100	0.227	0.227	0.227
4.000	User	-	100	0.129	0.129	0.129
4.001	User	-	100	0.148	0.148	0.148
5.000	User	-	100	0.071	0.071	0.071
1.005	User	-	100	0.095	0.095	0.095
1.006	User	-	100	0.024	0.024	0.024
1.007	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				1.584	1.584	1.584

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.007		37.600	35.159	35.400	0	0

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Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	20.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	5760
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	24
Number of Input Hydrographs	0	Number of Offline Controls	0
Number of Online Controls	1	Number of Time/Area Diagrams	0
		Number of Storage Structures	1
		Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	16.500	Storm Duration (mins)	2880
Ratio R	0.300		

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Online Controls for Storm

Depth/Flow Relationship Manhole: SWMHB.16, DS/PN: 1.007, Volume (m³): 34.7

Invert Level (m) 35.200

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.200	4.6000	1.400	4.6000	2.600	4.6000	3.800	4.6000	5.000	4.6000
0.400	4.6000	1.600	4.6000	2.800	4.6000	4.000	4.6000	5.200	4.6000
0.600	4.6000	1.800	4.6000	3.000	4.6000	4.200	4.6000	5.400	4.6000
0.800	4.6000	2.000	4.6000	3.200	4.6000	4.400	4.6000	5.600	4.6000
1.000	4.6000	2.200	4.6000	3.400	4.6000	4.600	4.6000	5.800	4.6000
1.200	4.6000	2.400	4.6000	3.600	4.6000	4.800	4.6000	6.000	4.6000

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R086 ARDEE (SHD)
 SW CATCHMENT B
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Storage Structures for Storm

Tank or Pond Manhole: SWMHB.16, DS/PN: 1.007

Invert Level (m) 35.200

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	531.2	0.600	531.2	1.200	531.2	1.800	0.0	2.400	0.0
0.100	531.2	0.700	531.2	1.300	531.2	1.900	0.0	2.500	0.0
0.200	531.2	0.800	531.2	1.400	531.2	2.000	0.0		
0.300	531.2	0.900	531.2	1.500	531.2	2.100	0.0		
0.400	531.2	1.000	531.2	1.600	531.2	2.200	0.0		
0.500	531.2	1.100	531.2	1.700	531.2	2.300	0.0		

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SW CATCHMENT B
+20% CLIMATE CHANGE

Date March 2021

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Summary of Results for 15 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	SWMHB.1	40.105	0.080	0.000	0.42	0.0	26.6	SURCHARGED
1.001	SWMHB.2	40.030	0.515	0.000	1.22	0.0	61.3	SURCHARGED
1.002	SWMHB.3	39.501	0.335	0.000	2.32	0.0	90.7	SURCHARGED
1.003	SWMHB.4	38.423	0.423	0.000	1.36	0.0	125.1	SURCHARGED
2.000	SWMHB.5	38.222	0.197	0.000	0.30	0.0	22.4	SURCHARGED
2.001	SWMHB.6	38.178	1.254	0.000	1.16	0.0	33.1	FLOOD RISK
2.002	SWMHB.7	38.149	1.109	0.000	0.64	0.0	69.6	SURCHARGED
2.003	SWMHB.8	38.059	1.262	0.000	0.93	0.0	111.3	FLOOD RISK
3.000	SWMHB.9	37.889	0.064	0.000	1.11	0.0	38.2	SURCHARGED
1.004	SWMHB.10	37.808	1.207	0.000	1.46	0.0	310.7	SURCHARGED
4.000	SWMHB.11	37.596	1.171	0.000	1.12	0.0	39.9	SURCHARGED
4.001	SWMHB.12	37.134	0.888	0.000	0.66	0.0	83.7	FLOOD RISK
5.000	SWMHB.13	37.107	0.382	0.000	0.82	0.0	27.7	SURCHARGED
1.005	SWMHB.14	37.047	0.913	0.000	3.63	0.0	431.1	SURCHARGED
1.006	SWMHB.15	36.454	0.040	0.000	1.28	0.0	435.7	SURCHARGED
1.007	SWMHB.16	35.742	0.317	0.000	0.17	0.0	4.6	SURCHARGED

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R086 ARDEE (SHD)
SW CATCHMENT B
+20% CLIMATE CHANGE

Date March 2021

Designed by DD

File R086-STORM CATCHMENT B...

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Micro Drainage

Network W.12.6

Summary of Results for 30 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	SWMHB.1	39.892	-0.133	0.000	0.35	0.0	22.1	OK
1.001	SWMHB.2	39.778	0.263	0.000	1.06	0.0	53.1	SURCHARGED
1.002	SWMHB.3	39.385	0.219	0.000	1.99	0.0	77.6	SURCHARGED
1.003	SWMHB.4	38.139	0.139	0.000	1.18	0.0	108.5	SURCHARGED
2.000	SWMHB.5	37.995	-0.030	0.000	0.24	0.0	17.8	OK
2.001	SWMHB.6	37.952	1.029	0.000	1.07	0.0	30.4	SURCHARGED
2.002	SWMHB.7	37.926	0.886	0.000	0.58	0.0	63.2	SURCHARGED
2.003	SWMHB.8	37.843	1.045	0.000	0.89	0.0	106.8	FLOOD RISK
3.000	SWMHB.9	37.768	-0.057	0.000	0.91	0.0	31.0	OK
1.004	SWMHB.10	37.614	1.013	0.000	1.37	0.0	291.1	SURCHARGED
4.000	SWMHB.11	37.369	0.944	0.000	0.99	0.0	35.1	SURCHARGED
4.001	SWMHB.12	37.026	0.780	0.000	0.59	0.0	74.7	FLOOD RISK
5.000	SWMHB.13	37.007	0.282	0.000	0.65	0.0	22.0	SURCHARGED
1.005	SWMHB.14	36.960	0.826	0.000	3.41	0.0	404.7	SURCHARGED
1.006	SWMHB.15	36.441	0.027	0.000	1.21	0.0	410.0	SURCHARGED
1.007	SWMHB.16	35.923	0.498	0.000	0.17	0.0	4.6	SURCHARGED

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R086 ARDEE (SHD)
SW CATCHMENT B
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Summary of Results for 45 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	SWMHB.1	39.881	-0.144	0.000	0.28	0.0	17.4	OK
1.001	SWMHB.2	39.560	0.045	0.000	0.88	0.0	44.0	SURCHARGED
1.002	SWMHB.3	39.290	0.124	0.000	1.65	0.0	64.4	SURCHARGED
1.003	SWMHB.4	37.938	-0.062	0.000	0.98	0.0	90.3	OK
2.000	SWMHB.5	37.867	-0.158	0.000	0.19	0.0	14.1	OK
2.001	SWMHB.6	37.541	0.618	0.000	0.88	0.0	25.1	SURCHARGED
2.002	SWMHB.7	37.519	0.480	0.000	0.52	0.0	56.1	SURCHARGED
2.003	SWMHB.8	37.455	0.658	0.000	0.80	0.0	95.9	SURCHARGED
3.000	SWMHB.9	37.743	-0.082	0.000	0.71	0.0	24.4	OK
1.004	SWMHB.10	37.283	0.682	0.000	1.19	0.0	252.0	SURCHARGED
4.000	SWMHB.11	37.061	0.636	0.000	0.84	0.0	29.8	SURCHARGED
4.001	SWMHB.12	36.847	0.601	0.000	0.49	0.0	62.3	SURCHARGED
5.000	SWMHB.13	36.838	0.113	0.000	0.54	0.0	18.4	SURCHARGED
1.005	SWMHB.14	36.800	0.666	0.000	2.93	0.0	348.2	SURCHARGED
1.006	SWMHB.15	36.416	0.002	0.000	1.04	0.0	353.5	SURCHARGED
1.007	SWMHB.16	36.024	0.599	0.000	0.17	0.0	4.6	SURCHARGED

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Summary of Results for 60 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	SWMHB.1	39.874	-0.151	0.000	0.24	0.0	14.8	OK
1.001	SWMHB.2	39.441	-0.074	0.000	0.75	0.0	37.9	OK
1.002	SWMHB.3	39.238	0.072	0.000	1.43	0.0	55.6	SURCHARGED
1.003	SWMHB.4	37.914	-0.086	0.000	0.85	0.0	78.1	OK
2.000	SWMHB.5	37.861	-0.164	0.000	0.16	0.0	12.0	OK
2.001	SWMHB.6	37.130	0.206	0.000	0.75	0.0	21.2	SURCHARGED
2.002	SWMHB.7	37.111	0.071	0.000	0.48	0.0	51.9	SURCHARGED
2.003	SWMHB.8	37.062	0.264	0.000	0.74	0.0	88.4	SURCHARGED
3.000	SWMHB.9	37.727	-0.098	0.000	0.60	0.0	20.6	OK
1.004	SWMHB.10	36.919	0.319	0.000	1.05	0.0	221.9	SURCHARGED
4.000	SWMHB.11	36.764	0.339	0.000	0.75	0.0	26.6	SURCHARGED
4.001	SWMHB.12	36.576	0.330	0.000	0.45	0.0	56.9	SURCHARGED
5.000	SWMHB.13	36.608	-0.117	0.000	0.46	0.0	15.7	OK
1.005	SWMHB.14	36.533	0.399	0.000	2.61	0.0	310.6	SURCHARGED
1.006	SWMHB.15	36.230	-0.184	0.000	0.92	0.0	313.2	OK
1.007	SWMHB.16	36.097	0.672	0.000	0.17	0.0	4.6	SURCHARGED

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Summary of Results for 90 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	SWMHB.1	39.864	-0.161	0.000	0.18	0.0	11.3	OK
1.001	SWMHB.2	39.413	-0.102	0.000	0.58	0.0	29.2	OK
1.002	SWMHB.3	39.172	0.005	0.000	1.09	0.0	42.7	SURCHARGED
1.003	SWMHB.4	37.877	-0.123	0.000	0.65	0.0	59.8	OK
2.000	SWMHB.5	37.853	-0.172	0.000	0.12	0.0	9.2	OK
2.001	SWMHB.6	36.846	-0.077	0.000	0.61	0.0	17.4	OK
2.002	SWMHB.7	36.829	-0.211	0.000	0.39	0.0	42.9	OK
2.003	SWMHB.8	36.691	-0.107	0.000	0.60	0.0	72.1	OK
3.000	SWMHB.9	37.707	-0.118	0.000	0.46	0.0	15.8	OK
1.004	SWMHB.10	36.593	-0.007	0.000	0.85	0.0	179.5	OK
4.000	SWMHB.11	36.498	0.073	0.000	0.59	0.0	21.0	SURCHARGED
4.001	SWMHB.12	36.382	0.136	0.000	0.35	0.0	44.8	SURCHARGED
5.000	SWMHB.13	36.593	-0.132	0.000	0.36	0.0	12.1	OK
1.005	SWMHB.14	36.348	0.214	0.000	2.11	0.0	250.2	SURCHARGED
1.006	SWMHB.15	36.201	-0.213	0.000	0.74	0.0	253.0	OK
1.007	SWMHB.16	36.201	0.776	0.000	0.17	0.0	4.6	SURCHARGED

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Summary of Results for 120 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	SWMHB.1	39.857	-0.168	0.000	0.15	0.0	9.3	OK
1.001	SWMHB.2	39.399	-0.116	0.000	0.48	0.0	24.0	OK
1.002	SWMHB.3	39.108	-0.058	0.000	0.90	0.0	35.3	OK
1.003	SWMHB.4	37.856	-0.144	0.000	0.54	0.0	49.5	OK
2.000	SWMHB.5	37.848	-0.177	0.000	0.10	0.0	7.5	OK
2.001	SWMHB.6	36.827	-0.097	0.000	0.51	0.0	14.4	OK
2.002	SWMHB.7	36.812	-0.228	0.000	0.33	0.0	35.6	OK
2.003	SWMHB.8	36.615	-0.183	0.000	0.52	0.0	62.2	OK
3.000	SWMHB.9	37.696	-0.129	0.000	0.38	0.0	13.0	OK
1.004	SWMHB.10	36.444	-0.156	0.000	0.73	0.0	155.8	OK
4.000	SWMHB.11	36.372	-0.053	0.000	0.50	0.0	17.8	OK
4.001	SWMHB.12	36.287	0.041	0.000	0.30	0.0	37.9	SURCHARGED
5.000	SWMHB.13	36.583	-0.142	0.000	0.29	0.0	10.0	OK
1.005	SWMHB.14	36.280	0.146	0.000	1.81	0.0	215.3	SURCHARGED
1.006	SWMHB.15	36.279	-0.135	0.000	0.64	0.0	218.9	OK
1.007	SWMHB.16	36.279	0.854	0.000	0.17	0.0	4.6	SURCHARGED

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Summary of Results for 180 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	SWMHB.1	39.850	-0.175	0.000	0.11	0.0	7.1	OK
1.001	SWMHB.2	39.384	-0.131	0.000	0.36	0.0	18.3	OK
1.002	SWMHB.3	39.079	-0.087	0.000	0.69	0.0	26.9	OK
1.003	SWMHB.4	37.833	-0.167	0.000	0.41	0.0	37.7	OK
2.000	SWMHB.5	37.842	-0.183	0.000	0.08	0.0	5.7	OK
2.001	SWMHB.6	36.806	-0.117	0.000	0.38	0.0	10.9	OK
2.002	SWMHB.7	36.791	-0.248	0.000	0.25	0.0	27.1	OK
2.003	SWMHB.8	36.586	-0.211	0.000	0.39	0.0	47.2	OK
3.000	SWMHB.9	37.682	-0.143	0.000	0.29	0.0	9.9	OK
1.004	SWMHB.10	36.408	-0.193	0.000	0.56	0.0	118.7	OK
4.000	SWMHB.11	36.407	-0.018	0.000	0.39	0.0	13.7	OK
4.001	SWMHB.12	36.402	0.156	0.000	0.23	0.0	29.5	SURCHARGED
5.000	SWMHB.13	36.572	-0.153	0.000	0.22	0.0	7.6	OK
1.005	SWMHB.14	36.400	0.266	0.000	1.39	0.0	165.6	SURCHARGED
1.006	SWMHB.15	36.398	-0.016	0.000	0.50	0.0	168.2	OK
1.007	SWMHB.16	36.390	0.965	0.000	0.17	0.0	4.6	SURCHARGED

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Summary of Results for 240 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	SWMHB.1	39.846	-0.179	0.000	0.09	0.0	5.8	OK
1.001	SWMHB.2	39.374	-0.141	0.000	0.30	0.0	14.9	OK
1.002	SWMHB.3	39.062	-0.104	0.000	0.56	0.0	22.0	OK
1.003	SWMHB.4	37.819	-0.181	0.000	0.33	0.0	30.8	OK
2.000	SWMHB.5	37.837	-0.188	0.000	0.06	0.0	4.7	OK
2.001	SWMHB.6	36.794	-0.129	0.000	0.31	0.0	8.9	OK
2.002	SWMHB.7	36.779	-0.261	0.000	0.20	0.0	22.2	OK
2.003	SWMHB.8	36.569	-0.229	0.000	0.32	0.0	38.8	OK
3.000	SWMHB.9	37.674	-0.151	0.000	0.24	0.0	8.1	OK
1.004	SWMHB.10	36.480	-0.121	0.000	0.46	0.0	97.3	OK
4.000	SWMHB.11	36.479	0.054	0.000	0.32	0.0	11.2	SURCHARGED
4.001	SWMHB.12	36.476	0.230	0.000	0.19	0.0	24.2	SURCHARGED
5.000	SWMHB.13	36.564	-0.161	0.000	0.18	0.0	6.2	OK
1.005	SWMHB.14	36.475	0.341	0.000	1.14	0.0	136.0	SURCHARGED
1.006	SWMHB.15	36.474	0.060	0.000	0.40	0.0	137.2	SURCHARGED
1.007	SWMHB.16	36.474	1.049	0.000	0.17	0.0	4.6	SURCHARGED

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Summary of Results for 360 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	SWMHB.1	39.838	-0.187	0.000	0.07	0.0	4.3	OK
1.001	SWMHB.2	39.362	-0.153	0.000	0.22	0.0	11.2	OK
1.002	SWMHB.3	39.043	-0.123	0.000	0.42	0.0	16.4	OK
1.003	SWMHB.4	37.801	-0.199	0.000	0.25	0.0	23.0	OK
2.000	SWMHB.5	37.831	-0.194	0.000	0.05	0.0	3.5	OK
2.001	SWMHB.6	36.778	-0.145	0.000	0.24	0.0	6.7	OK
2.002	SWMHB.7	36.762	-0.278	0.000	0.15	0.0	16.6	OK
2.003	SWMHB.8	36.596	-0.201	0.000	0.24	0.0	29.0	OK
3.000	SWMHB.9	37.663	-0.162	0.000	0.18	0.0	6.1	OK
1.004	SWMHB.10	36.594	-0.006	0.000	0.34	0.0	72.9	OK
4.000	SWMHB.11	36.594	0.169	0.000	0.24	0.0	8.4	SURCHARGED
4.001	SWMHB.12	36.592	0.346	0.000	0.14	0.0	17.8	SURCHARGED
5.000	SWMHB.13	36.591	-0.134	0.000	0.14	0.0	4.6	OK
1.005	SWMHB.14	36.591	0.457	0.000	0.84	0.0	99.8	SURCHARGED
1.006	SWMHB.15	36.589	0.175	0.000	0.30	0.0	100.5	SURCHARGED
1.007	SWMHB.16	36.590	1.165	0.000	0.17	0.0	4.6	SURCHARGED

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Summary of Results for 720 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	SWMHB.1	39.829	-0.196	0.000	0.04	0.0	2.6	OK
1.001	SWMHB.2	39.345	-0.170	0.000	0.13	0.0	6.8	OK
1.002	SWMHB.3	39.018	-0.148	0.000	0.26	0.0	10.0	OK
1.003	SWMHB.4	37.777	-0.223	0.000	0.15	0.0	14.0	OK
2.000	SWMHB.5	37.825	-0.200	0.000	0.03	0.0	2.1	OK
2.001	SWMHB.6	36.772	-0.151	0.000	0.14	0.0	4.0	OK
2.002	SWMHB.7	36.772	-0.268	0.000	0.09	0.0	10.0	OK
2.003	SWMHB.8	36.771	-0.026	0.000	0.15	0.0	17.6	OK
3.000	SWMHB.9	37.649	-0.176	0.000	0.11	0.0	3.7	OK
1.004	SWMHB.10	36.770	0.170	0.000	0.21	0.0	44.2	SURCHARGED
4.000	SWMHB.11	36.770	0.345	0.000	0.14	0.0	5.1	SURCHARGED
4.001	SWMHB.12	36.768	0.522	0.000	0.08	0.0	10.2	SURCHARGED
5.000	SWMHB.13	36.768	0.043	0.000	0.08	0.0	2.8	SURCHARGED
1.005	SWMHB.14	36.768	0.634	0.000	0.49	0.0	58.5	SURCHARGED
1.006	SWMHB.15	36.767	0.353	0.000	0.17	0.0	59.0	SURCHARGED
1.007	SWMHB.16	36.767	1.342	0.000	0.17	0.0	4.6	SURCHARGED

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Summary of Results for 1440 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	SWMHB.1	39.824	-0.201	0.000	0.03	0.0	1.6	OK
1.001	SWMHB.2	39.333	-0.182	0.000	0.08	0.0	4.1	OK
1.002	SWMHB.3	39.000	-0.166	0.000	0.15	0.0	6.0	OK
1.003	SWMHB.4	37.761	-0.239	0.000	0.09	0.0	8.4	OK
2.000	SWMHB.5	37.819	-0.206	0.000	0.02	0.0	1.3	OK
2.001	SWMHB.6	36.871	-0.052	0.000	0.09	0.0	2.4	OK
2.002	SWMHB.7	36.871	-0.169	0.000	0.06	0.0	6.1	OK
2.003	SWMHB.8	36.871	0.073	0.000	0.09	0.0	10.6	SURCHARGED
3.000	SWMHB.9	37.637	-0.188	0.000	0.06	0.0	2.2	OK
1.004	SWMHB.10	36.870	0.269	0.000	0.13	0.0	26.6	SURCHARGED
4.000	SWMHB.11	36.869	0.444	0.000	0.09	0.0	3.1	SURCHARGED
4.001	SWMHB.12	36.868	0.622	0.000	0.05	0.0	6.1	SURCHARGED
5.000	SWMHB.13	36.868	0.143	0.000	0.05	0.0	1.7	SURCHARGED
1.005	SWMHB.14	36.868	0.734	0.000	0.30	0.0	35.1	SURCHARGED
1.006	SWMHB.15	36.867	0.453	0.000	0.10	0.0	35.4	SURCHARGED
1.007	SWMHB.16	36.867	1.442	0.000	0.17	0.0	4.6	SURCHARGED

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Summary of Results for 2880 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	SWMHB.1	39.816	-0.209	0.000	0.02	0.0	1.0	OK
1.001	SWMHB.2	39.322	-0.193	0.000	0.05	0.0	2.5	OK
1.002	SWMHB.3	38.987	-0.179	0.000	0.09	0.0	3.6	OK
1.003	SWMHB.4	37.745	-0.255	0.000	0.06	0.0	5.1	OK
2.000	SWMHB.5	37.811	-0.214	0.000	0.01	0.0	0.8	OK
2.001	SWMHB.6	36.816	-0.108	0.000	0.05	0.0	1.5	OK
2.002	SWMHB.7	36.815	-0.224	0.000	0.03	0.0	3.7	OK
2.003	SWMHB.8	36.815	0.018	0.000	0.05	0.0	6.4	SURCHARGED
3.000	SWMHB.9	37.629	-0.196	0.000	0.04	0.0	1.3	OK
1.004	SWMHB.10	36.815	0.215	0.000	0.08	0.0	16.2	SURCHARGED
4.000	SWMHB.11	36.815	0.390	0.000	0.05	0.0	1.9	SURCHARGED
4.001	SWMHB.12	36.813	0.567	0.000	0.03	0.0	3.7	SURCHARGED
5.000	SWMHB.13	36.813	0.088	0.000	0.03	0.0	1.0	SURCHARGED
1.005	SWMHB.14	36.814	0.680	0.000	0.18	0.0	21.4	SURCHARGED
1.006	SWMHB.15	36.813	0.399	0.000	0.06	0.0	21.6	SURCHARGED
1.007	SWMHB.16	36.813	1.388	0.000	0.17	0.0	4.6	SURCHARGED

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	5	Add Flow / Climate Change (%)	0
M5-60 (mm)	16.500	Minimum Backdrop Height (m)	0.000
Ratio R	0.300	Maximum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	50	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500
PIMP (%)	100		

Designed with Level Inverts

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)
1.000	50.795	0.339	149.8	0.119	4.00	0.0	0.600	o	300
1.001	45.228	0.226	200.0	0.137	0.00	0.0	0.600	o	300
1.002	60.716	0.304	200.0	0.177	0.00	0.0	0.600	o	300
2.000	42.379	0.706	60.0	0.038	4.00	0.0	0.600	o	225
1.003	4.016	0.020	200.0	0.098	0.00	0.0	0.600	o	300
1.004	28.475	0.142	200.0	0.081	0.00	0.0	0.600	o	375
1.005	14.540	0.073	199.2	0.000	0.00	0.0	0.600	o	225

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	4.66	36.575	0.119	0.0	0.0	0.0	1.28	90.6	16.1
1.001	50.00	5.34	36.236	0.256	0.0	0.0	0.0	1.11	78.3	34.7
1.002	50.00	6.25	36.010	0.433	0.0	0.0	0.0	1.11	78.3	58.6
2.000	50.00	4.42	37.000	0.038	0.0	0.0	0.0	1.69	67.2	5.2
1.003	50.00	6.31	35.706	0.568	0.0	0.0	0.0	1.11	78.3	77.0
1.004	50.00	6.69	35.686	0.650	0.0	0.0	0.0	1.28	141.1	88.0
1.005	50.00	4.26	35.400	0.000	2.0	0.0	0.0	0.92	36.7	2.0

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	Pipe Out		Pipes In			Backdrop (mm)	
					PN	Invert Level (m)	Diameter (mm)	PN	Invert Level (m)		Diameter (mm)
SWMHC.1	38.000	1.425	Open Manhole	1050	1.000	36.575	300				
SWMHC.2	39.800	3.564	Open Manhole	1200	1.001	36.236	300	1.000	36.236	300	
SWMHC.3	39.300	3.290	Open Manhole	1200	1.002	36.010	300	1.001	36.010	300	
SWMHC.4	38.975	1.975	Open Manhole	1200	2.000	37.000	225				
SWMHC.5	37.850	2.144	Open Manhole	1200	1.003	35.706	300	1.002	35.706	300	
								2.000	36.294	225	513
SWMHC.6	38.000	2.314	Open Manhole	1350	1.004	35.686	375	1.003	35.686	300	
SWMHC.7	38.000	2.600	Open Manhole	1350	1.005	35.400	225	1.004	35.544	375	294
	39.000	3.673	Open Manhole	0		OUTFALL		1.005	35.327	225	

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	300	SWMHC.1	38.000	36.575	1.125	Open Manhole	1050
1.001	o	300	SWMHC.2	39.800	36.236	3.264	Open Manhole	1200
1.002	o	300	SWMHC.3	39.300	36.010	2.990	Open Manhole	1200
2.000	o	225	SWMHC.4	38.975	37.000	1.750	Open Manhole	1200
1.003	o	300	SWMHC.5	37.850	35.706	1.844	Open Manhole	1200
1.004	o	375	SWMHC.6	38.000	35.686	1.939	Open Manhole	1350
1.005	o	225	SWMHC.7	38.000	35.400	2.375	Open Manhole	1350

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	50.795	149.8	SWMHC.2	39.800	36.236	3.264	Open Manhole	1200
1.001	45.228	200.0	SWMHC.3	39.300	36.010	2.990	Open Manhole	1200
1.002	60.716	200.0	SWMHC.5	37.850	35.706	1.844	Open Manhole	1200
2.000	42.379	60.0	SWMHC.5	37.850	36.294	1.331	Open Manhole	1200
1.003	4.016	200.0	SWMHC.6	38.000	35.686	2.014	Open Manhole	1350
1.004	28.475	200.0	SWMHC.7	38.000	35.544	2.081	Open Manhole	1350
1.005	14.540	199.2		39.000	35.327	3.448	Open Manhole	0

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.119	0.119	0.119
1.001	User	-	100	0.137	0.137	0.137
1.002	User	-	100	0.119	0.119	0.119
	User	-	100	0.058	0.058	0.177
2.000	User	-	100	0.034	0.034	0.034
	User	-	100	0.005	0.005	0.038
1.003	User	-	100	0.030	0.030	0.030
	User	-	100	0.068	0.068	0.098
1.004	User	-	100	0.081	0.081	0.081
1.005	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.650	0.650	0.650

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
1.005		39.000	35.327	35.200	0	0

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Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	10.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1
Number of Input Hydrographs	0	Number of Offline Controls	0
Number of Online Controls	1	Number of Time/Area Diagrams	0
		Number of Storage Structures	1
		Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	16.500	Storm Duration (mins)	15
Ratio R	0.300		

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Online Controls for Storm

Depth/Flow Relationship Manhole: SWMHC.7, DS/PN: 1.005, Volume (m³): 6.7

Invert Level (m) 35.400

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.200	3.5000	1.400	3.5000	2.600	3.5000	3.800	3.5000	5.000	3.5000
0.400	3.5000	1.600	3.5000	2.800	3.5000	4.000	3.5000	5.200	3.5000
0.600	3.5000	1.800	3.5000	3.000	3.5000	4.200	3.5000	5.400	3.5000
0.800	3.5000	2.000	3.5000	3.200	3.5000	4.400	3.5000	5.600	3.5000
1.000	3.5000	2.200	3.5000	3.400	3.5000	4.600	3.5000	5.800	3.5000
1.200	3.5000	2.400	3.5000	3.600	3.5000	4.800	3.5000	6.000	3.5000

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Storage Structures for Storm

Tank or Pond Manhole: SWMHC.7, DS/PN: 1.005

Invert Level (m) 35.400

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	303.0	2.400	0.0	4.800	0.0	7.200	0.0	9.600	0.0
0.400	303.0	2.800	0.0	5.200	0.0	7.600	0.0	10.000	0.0
0.800	303.0	3.200	0.0	5.600	0.0	8.000	0.0		
1.200	303.0	3.600	0.0	6.000	0.0	8.400	0.0		
1.600	303.0	4.000	0.0	6.400	0.0	8.800	0.0		
2.000	303.0	4.400	0.0	6.800	0.0	9.200	0.0		

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Summary of Results for 15 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
 Analysis Timestep Fine Inertia Status OFF
 DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	SWMHC.1	37.704	0.829	0.000	0.41	0.0	35.1	FLOOD RISK
1.001	SWMHC.2	37.654	1.118	0.000	0.97	0.0	71.1	SURCHARGED
1.002	SWMHC.3	37.431	1.121	0.000	1.58	0.0	117.7	SURCHARGED
2.000	SWMHC.4	37.074	-0.151	0.000	0.24	0.0	15.1	OK
1.003	SWMHC.5	36.598	0.592	0.000	3.21	0.0	156.1	SURCHARGED
1.004	SWMHC.6	36.205	0.144	0.000	1.44	0.0	178.5	SURCHARGED
1.005	SWMHC.7	35.752	0.127	0.000	0.11	0.0	3.5	SURCHARGED

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Summary of Results for 30 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
 Analysis Timestep Fine Inertia Status OFF
 DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	SWMHC.1	37.335	0.460	0.000	0.36	0.0	31.1	SURCHARGED
1.001	SWMHC.2	37.290	0.754	0.000	0.87	0.0	63.9	SURCHARGED
1.002	SWMHC.3	37.115	0.805	0.000	1.43	0.0	106.6	SURCHARGED
2.000	SWMHC.4	37.065	-0.160	0.000	0.18	0.0	11.7	OK
1.003	SWMHC.5	36.462	0.456	0.000	2.89	0.0	140.7	SURCHARGED
1.004	SWMHC.6	36.144	0.083	0.000	1.30	0.0	160.6	SURCHARGED
1.005	SWMHC.7	35.871	0.246	0.000	0.11	0.0	3.5	SURCHARGED

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Summary of Results for 45 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
 Analysis Timestep Fine Inertia Status OFF
 DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	SWMHC.1	36.928	0.053	0.000	0.32	0.0	27.5	SURCHARGED
1.001	SWMHC.2	36.889	0.353	0.000	0.73	0.0	53.7	SURCHARGED
1.002	SWMHC.3	36.763	0.453	0.000	1.20	0.0	89.8	SURCHARGED
2.000	SWMHC.4	37.057	-0.168	0.000	0.14	0.0	9.2	OK
1.003	SWMHC.5	36.303	0.296	0.000	2.43	0.0	118.4	SURCHARGED
1.004	SWMHC.6	36.076	0.014	0.000	1.09	0.0	135.6	SURCHARGED
1.005	SWMHC.7	35.939	0.314	0.000	0.11	0.0	3.5	SURCHARGED

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Summary of Results for 60 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
 Analysis Timestep Fine Inertia Status OFF
 DTS Status ON

PN	US/MH Name	Water	Surcharged	Flooded	Pipe		Status	
		Level (m)	Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)		Flow (l/s)
1.000	SWMHC.1	36.684	-0.191	0.000	0.28	0.0	24.2	OK
1.001	SWMHC.2	36.618	0.082	0.000	0.66	0.0	48.2	SURCHARGED
1.002	SWMHC.3	36.523	0.214	0.000	1.08	0.0	80.2	SURCHARGED
2.000	SWMHC.4	37.052	-0.173	0.000	0.12	0.0	7.8	OK
1.003	SWMHC.5	36.163	0.157	0.000	2.16	0.0	105.2	SURCHARGED
1.004	SWMHC.6	35.994	-0.067	0.000	0.97	0.0	120.2	OK
1.005	SWMHC.7	35.988	0.363	0.000	0.11	0.0	3.5	SURCHARGED

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Summary of Results for 90 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
 Analysis Timestep Fine Inertia Status OFF
 DTS Status ON

PN	US/MH Name	Water	Surcharged	Flooded	Flow / Cap.	Overflow	Pipe	Status
		Level (m)	Depth (m)	Volume (m ³)		(1/s)	Flow (1/s)	
1.000	SWMHC.1	36.670	-0.205	0.000	0.22	0.0	18.6	OK
1.001	SWMHC.2	36.397	-0.139	0.000	0.54	0.0	39.7	OK
1.002	SWMHC.3	36.331	0.021	0.000	0.88	0.0	65.8	SURCHARGED
2.000	SWMHC.4	37.046	-0.179	0.000	0.09	0.0	6.0	OK
1.003	SWMHC.5	36.090	0.084	0.000	1.77	0.0	86.1	SURCHARGED
1.004	SWMHC.6	36.062	0.001	0.000	0.79	0.0	98.2	SURCHARGED
1.005	SWMHC.7	36.057	0.432	0.000	0.11	0.0	3.5	SURCHARGED

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Summary of Results for 120 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
 Analysis Timestep Fine Inertia Status OFF
 DTS Status ON

PN	US/MH Name	Water	Surcharged	Flooded	Pipe		Status	
		Level (m)	Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)		Flow (l/s)
1.000	SWMHC.1	36.660	-0.215	0.000	0.18	0.0	15.3	OK
1.001	SWMHC.2	36.377	-0.159	0.000	0.45	0.0	32.9	OK
1.002	SWMHC.3	36.224	-0.086	0.000	0.74	0.0	55.1	OK
2.000	SWMHC.4	37.041	-0.184	0.000	0.08	0.0	4.9	OK
1.003	SWMHC.5	36.114	0.108	0.000	1.49	0.0	72.4	SURCHARGED
1.004	SWMHC.6	36.111	0.049	0.000	0.67	0.0	82.6	SURCHARGED
1.005	SWMHC.7	36.107	0.482	0.000	0.11	0.0	3.5	SURCHARGED

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Summary of Results for 180 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
 Analysis Timestep Fine Inertia Status OFF
 DTS Status ON

PN	US/MH Name	Water	Surcharged	Flooded	Pipe			Status
		Level (m)	Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)	
1.000	SWMHC.1	36.648	-0.227	0.000	0.14	0.0	11.7	OK
1.001	SWMHC.2	36.357	-0.179	0.000	0.34	0.0	25.0	OK
1.002	SWMHC.3	36.187	-0.123	0.000	0.57	0.0	42.2	OK
2.000	SWMHC.4	37.035	-0.190	0.000	0.06	0.0	3.8	OK
1.003	SWMHC.5	36.178	0.172	0.000	1.14	0.0	55.4	SURCHARGED
1.004	SWMHC.6	36.176	0.115	0.000	0.51	0.0	63.2	SURCHARGED
1.005	SWMHC.7	36.173	0.548	0.000	0.11	0.0	3.5	SURCHARGED

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Summary of Results for 240 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
 Analysis Timestep Fine Inertia Status OFF
 DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe	Status
							Flow (l/s)	
1.000	SWMHC.1	36.641	-0.234	0.000	0.11	0.0	9.5	OK
1.001	SWMHC.2	36.343	-0.193	0.000	0.28	0.0	20.5	OK
1.002	SWMHC.3	36.228	-0.082	0.000	0.46	0.0	34.6	OK
2.000	SWMHC.4	37.031	-0.194	0.000	0.05	0.0	3.1	OK
1.003	SWMHC.5	36.221	0.214	0.000	0.93	0.0	45.4	SURCHARGED
1.004	SWMHC.6	36.220	0.159	0.000	0.42	0.0	51.6	SURCHARGED
1.005	SWMHC.7	36.216	0.591	0.000	0.11	0.0	3.5	SURCHARGED

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File R086-STORM CATCHMENT C...

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Micro Drainage

Network W.12.6

Summary of Results for 360 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
 Analysis Timestep Fine Inertia Status OFF
 DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	SWMHC.1	36.633	-0.242	0.000	0.08	0.0	7.1	OK
1.001	SWMHC.2	36.328	-0.208	0.000	0.21	0.0	15.3	OK
1.002	SWMHC.3	36.278	-0.032	0.000	0.35	0.0	25.9	OK
2.000	SWMHC.4	37.027	-0.198	0.000	0.04	0.0	2.3	OK
1.003	SWMHC.5	36.273	0.266	0.000	0.69	0.0	33.6	SURCHARGED
1.004	SWMHC.6	36.271	0.210	0.000	0.31	0.0	38.2	SURCHARGED
1.005	SWMHC.7	36.269	0.644	0.000	0.11	0.0	3.5	SURCHARGED

31a Westland Square
 Pearse Street
 Dublin 2

R086-ARDEE (SHD)
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Summary of Results for 720 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
 Analysis Timestep Fine Inertia Status OFF
 DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	SWMHC.1	36.618	-0.257	0.000	0.05	0.0	4.3	OK
1.001	SWMHC.2	36.320	-0.216	0.000	0.13	0.0	9.3	OK
1.002	SWMHC.3	36.317	0.007	0.000	0.21	0.0	15.7	SURCHARGED
2.000	SWMHC.4	37.023	-0.202	0.000	0.02	0.0	1.4	OK
1.003	SWMHC.5	36.313	0.307	0.000	0.41	0.0	19.9	SURCHARGED
1.004	SWMHC.6	36.312	0.251	0.000	0.18	0.0	22.6	SURCHARGED
1.005	SWMHC.7	36.310	0.685	0.000	0.11	0.0	3.5	SURCHARGED

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Summary of Results for 1440 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
 Analysis Timestep Fine Inertia Status OFF
 DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe	Status
							Flow (l/s)	
1.000	SWMHC.1	36.609	-0.266	0.000	0.03	0.0	2.6	OK
1.001	SWMHC.2	36.291	-0.245	0.000	0.08	0.0	5.6	OK
1.002	SWMHC.3	36.281	-0.029	0.000	0.13	0.0	9.5	OK
2.000	SWMHC.4	37.014	-0.211	0.000	0.01	0.0	0.8	OK
1.003	SWMHC.5	36.277	0.271	0.000	0.25	0.0	12.1	SURCHARGED
1.004	SWMHC.6	36.276	0.215	0.000	0.11	0.0	13.8	SURCHARGED
1.005	SWMHC.7	36.274	0.649	0.000	0.11	0.0	3.5	SURCHARGED

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Summary of Results for 2880 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
 Analysis Timestep Fine Inertia Status OFF
 DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	SWMHC.1	36.601	-0.274	0.000	0.02	0.0	1.6	OK
1.001	SWMHC.2	36.277	-0.259	0.000	0.05	0.0	3.4	OK
1.002	SWMHC.3	36.132	-0.178	0.000	0.08	0.0	5.7	OK
2.000	SWMHC.4	37.008	-0.217	0.000	0.01	0.0	0.5	OK
1.003	SWMHC.5	36.127	0.121	0.000	0.15	0.0	7.4	SURCHARGED
1.004	SWMHC.6	36.126	0.065	0.000	0.07	0.0	8.4	SURCHARGED
1.005	SWMHC.7	36.124	0.499	0.000	0.11	0.0	3.5	SURCHARGED

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MH Name	SWMHC.3	SWMHC.2	SWMHC.1
Hor Scale 900			
Ver Scale 150			
Datum (m) 33.000			
PN		1.001	1.000
Dia (mm)		300	300
Slope (1:X)		200.0	149.8
Cover Level (m)	39.300	39.800	38.000
Invert Level (m)	36.010	36.236 36.236	36.575
Length (m)		45.228	50.795

MH Name	SWMHC.7	SWMHC.6	SWMHC.3
Hor Scale 900			
Ver Scale 150			
Datum (m) 32.000			
PN	1.005	1.004	1.002
Dia (mm)	225	375	300
Slope (1:X)	199.2	200.0	200.0
Cover Level (m)	39.000	38.000	39.300
Invert Level (m)	35.327 35.400 35.544	35.686 35.706 35.706	36.010
Length (m)	14.540	28.475	60.716

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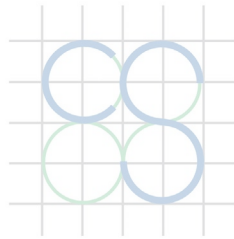
Date August 2020
 File R086-STORM CATCHMENT C...

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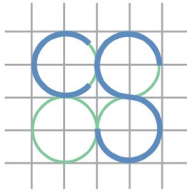
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MH Name	SWMHC.5	SWMHC.4	
Hor Scale 900			
Ver Scale 150			
Datum (m) 32.000			
PN			2.000
Dia (mm)			225
Slope (1:X)	60.0		
Cover Level (m)	37.850	38.975	
Invert Level (m)	36.294	37.000	
Length (m)	42.379		



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Appendix C

Foul Drainage WinDes Design

FOUL SEWERAGE DESIGN














Design Criteria for Foul - Main

Pipe Sizes STANDARD Manhole Sizes STANDARD

Industrial Flow (l/s/ha)	0.00	Add Flow / Climate Change (%)	0
Industrial Peak Flow Factor	0.00	Minimum Backdrop Height (m)	0.000
Flow Per Person (l/per/day)	150.00	Maximum Backdrop Height (m)	0.000
Persons per House	3.00	Min Design Depth for Optimisation (m)	0.000
Domestic (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	0.75
Domestic Peak Flow Factor	6.00	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits




















Network Design Table for Foul - Main

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
F1.000	70.020	0.350	200.0	0.000	6	0.0	1.500	o	225	Pipe/Conduit	
F1.001	56.865	0.284	200.0	0.000	6	0.0	1.500	o	225	Pipe/Conduit	
F2.000	33.406	0.557	60.0	0.000	5	0.0	1.500	o	150	Pipe/Conduit	
F3.000	48.303	0.805	60.0	0.000	5	0.0	1.500	o	150	Pipe/Conduit	
F3.001	47.614	0.317	150.0	0.000	13	0.0	1.500	o	150	Pipe/Conduit	
F2.001	42.699	0.213	200.0	0.000	2	0.0	1.500	o	225	Pipe/Conduit	
F1.002	60.284	0.301	200.0	0.000	9	0.0	1.500	o	225	Pipe/Conduit	
F4.000	63.003	1.497	42.1	0.000	10	0.0	1.500	o	150	Pipe/Conduit	
F4.001	47.729	1.134	42.1	0.000	9	0.0	1.500	o	150	Pipe/Conduit	
F4.002	11.978	0.080	150.0	0.000	1	0.0	1.500	o	150	Pipe/Conduit	
F4.003	68.541	0.527	130.0	0.000	4	0.0	1.500	o	225	Pipe/Conduit	
F4.004	63.553	0.318	200.0	0.000	14	0.0	1.500	o	225	Pipe/Conduit	
F5.000	26.793	0.670	40.0	0.000	8	0.0	1.500	o	150	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	E Area (ha)	E Base Flow (l/s)	E Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F1.000	37.500	0.000	0.0	6	0.0	13	0.21	0.81	32.2	0.2
F1.001	37.150	0.000	0.0	12	0.0	17	0.27	0.81	32.2	0.4
F2.000	43.000	0.000	0.0	5	0.0	10	0.32	1.13	20.0	0.2
F3.000	41.475	0.000	0.0	5	0.0	10	0.32	1.13	20.0	0.2
F3.001	40.670	0.000	0.0	18	0.0	22	0.35	0.71	12.6	0.6
F2.001	40.278	0.000	0.0	25	0.0	24	0.33	0.81	32.2	0.8
F1.002	36.866	0.000	0.0	46	0.0	33	0.40	0.81	32.2	1.4
F4.000	40.000	0.000	0.0	10	0.0	12	0.45	1.35	23.9	0.3
F4.001	38.503	0.000	0.0	19	0.0	17	0.56	1.35	23.9	0.6
F4.002	37.369	0.000	0.0	20	0.0	23	0.36	0.71	12.6	0.6
F4.003	37.214	0.000	0.0	24	0.0	22	0.38	1.01	40.0	0.8
F4.004	36.687	0.000	0.0	38	0.0	30	0.38	0.81	32.2	1.2
F5.000	39.245	0.000	0.0	8	0.0	11	0.43	1.39	24.5	0.3

Network Design Table for Foul - Main

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
F5.001	7.910	0.198	40.0	0.000	1	0.0	1.500	o	150	Pipe/Conduit	
F5.002	46.125	1.153	40.0	0.000	10	0.0	1.500	o	150	Pipe/Conduit	
F4.005	69.750	0.349	200.0	0.000	8	0.0	1.500	o	225	Pipe/Conduit	
F6.000	51.086	1.460	35.0	0.000	7	0.0	1.500	o	150	Pipe/Conduit	
F4.006	58.635	0.293	200.0	0.000	7	0.0	1.500	o	225	Pipe/Conduit	
F1.003	74.029	0.370	200.0	0.000	14	0.0	1.500	o	225	Pipe/Conduit	
F7.000	31.495	0.787	40.0	0.000	4	0.0	1.500	o	150	Pipe/Conduit	
F7.001	20.555	0.514	40.0	0.000	7	0.0	1.500	o	150	Pipe/Conduit	
F7.002	8.832	0.221	40.0	0.000	1	0.0	1.500	o	150	Pipe/Conduit	
F7.003	27.396	0.685	40.0	0.000	6	0.0	1.500	o	150	Pipe/Conduit	
F7.004	27.080	0.677	40.0	0.000	4	0.0	1.500	o	225	Pipe/Conduit	
F1.004	5.124	0.026	200.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.005	22.157	0.111	200.0	0.000	4	0.0	1.500	o	225	Pipe/Conduit	
F1.006	15.285	0.076	200.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.007	32.798	0.219	150.0	0.000	5	0.0	1.500	o	225	Pipe/Conduit	
F8.000	62.001	1.033	60.0	0.000	5	0.0	1.500	o	225	Pipe/Conduit	
F8.001	34.339	0.572	60.0	0.000	4	0.0	1.500	o	225	Pipe/Conduit	
F9.000	58.870	1.472	40.0	0.000	4	0.0	1.500	o	150	Pipe/Conduit	
F8.002	43.495	0.290	150.0	0.000	5	0.0	1.500	o	225	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse Add	Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F5.001	38.575	0.000	0.0	9	0.0	12	0.45	1.39	24.5	0.3
F5.002	38.377	0.000	0.0	19	0.0	16	0.57	1.39	24.5	0.6
F4.005	36.369	0.000	0.0	65	0.0	38	0.45	0.81	32.2	2.0
F6.000	39.500	0.000	0.0	7	0.0	10	0.43	1.48	26.2	0.2
F4.006	36.020	0.000	0.0	79	0.0	42	0.48	0.81	32.2	2.5
F1.003	35.727	0.000	0.0	139	0.0	56	0.56	0.81	32.2	4.3
F7.000	41.000	0.000	0.0	4	0.0	8	0.34	1.39	24.5	0.1
F7.001	40.213	0.000	0.0	11	0.0	13	0.48	1.39	24.5	0.3
F7.002	39.699	0.000	0.0	12	0.0	13	0.49	1.39	24.5	0.4
F7.003	39.478	0.000	0.0	18	0.0	16	0.56	1.39	24.5	0.6
F7.004	38.718	0.000	0.0	22	0.0	16	0.56	1.82	72.3	0.7
F1.004	35.357	0.000	0.0	161	0.0	60	0.59	0.81	32.2	5.0
F1.005	35.331	0.000	0.0	165	0.0	61	0.59	0.81	32.2	5.2
F1.006	35.221	0.000	0.0	165	0.0	61	0.59	0.81	32.2	5.2
F1.007	35.144	0.000	0.0	170	0.0	57	0.66	0.94	37.2	5.3
F8.000	36.800	0.000	0.0	5	0.0	9	0.30	1.48	59.0	0.2
F8.001	35.767	0.000	0.0	9	0.0	12	0.37	1.48	59.0	0.3
F9.000	37.400	0.000	0.0	4	0.0	8	0.34	1.39	24.5	0.1
F8.002	35.195	0.000	0.0	18	0.0	20	0.33	0.94	37.2	0.6

1st Floor, 19-22 Dame Street
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Network Design Table for Foul - Main

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
F8.003	48.756	0.244	200.0	0.000	6	0.0	1.500	o	225	Pipe/Conduit	
F8.004	76.966	0.385	200.0	0.000	10	0.0	1.500	o	225	Pipe/Conduit	
F8.005	56.332	0.282	200.0	0.000	5	0.0	1.500	o	225	Pipe/Conduit	
F1.008	24.553	0.123	200.0	0.000	3	0.0	1.500	o	225	Pipe/Conduit	
F1.009	26.543	0.133	200.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F10.000	50.341	0.336	150.0	0.000	14	0.0	1.500	o	225	Pipe/Conduit	
F10.001	45.062	0.300	150.0	0.000	10	0.0	1.500	o	225	Pipe/Conduit	
F10.002	61.927	0.413	150.0	0.000	16	0.0	1.500	o	225	Pipe/Conduit	
F10.003	57.014	0.285	200.0	0.000	8	0.0	1.500	o	225	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F8.003	34.905	0.000	0.0	24	0.0	24	0.33	0.81	32.2	0.8
F8.004	34.661	0.000	0.0	34	0.0	28	0.37	0.81	32.2	1.1
F8.005	34.276	0.000	0.0	39	0.0	30	0.38	0.81	32.2	1.2
F1.008	33.995	0.000	0.0	212	0.0	69	0.64	0.81	32.2	6.6
F1.009	33.300	0.000	0.0	212	0.0	69	0.64	0.81	32.2	6.6
F10.000	36.525	0.000	0.0	14	0.0	17	0.31	0.94	37.2	0.4
F10.001	36.189	0.000	0.0	24	0.0	22	0.37	0.94	37.2	0.8
F10.002	35.889	0.000	0.0	40	0.0	28	0.43	0.94	37.2	1.3
F10.003	35.476	0.000	0.0	48	0.0	33	0.41	0.81	32.2	1.5

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Manhole Schedules for Foul - Main

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
FFMH1	43.500	6.000	Open Manhole	1200	F1.000	37.500	225				
FFMH2	41.650	4.500	Open Manhole	1200	F1.001	37.150	225	F1.000	37.150	225	
FFMH3	44.425	1.425	Open Manhole	1050	F2.000	43.000	150				
FFMH4	42.900	1.425	Open Manhole	1050	F3.000	41.475	150				
FFMH5	43.450	2.780	Open Manhole	1200	F3.001	40.670	150	F3.000	40.670	150	
FFMH6	43.950	3.672	Open Manhole	1200	F2.001	40.278	225	F2.000	42.443	150	2090
								F3.001	40.353	150	
FFMH7	42.800	5.934	Open Manhole	1200	F1.002	36.866	225	F1.001	36.866	225	
								F2.001	40.064	225	3199
FFMH8	42.850	2.850	Open Manhole	1200	F4.000	40.000	150				
FFMH9	39.975	1.472	Open Manhole	1050	F4.001	38.503	150	F4.000	38.503	150	
FFMH10	38.475	1.106	Open Manhole	1050	F4.002	37.369	150	F4.001	37.369	150	
FFMH11	38.555	1.341	Open Manhole	1050	F4.003	37.214	225	F4.002	37.289	150	
FFMH12	38.125	1.438	Open Manhole	1050	F4.004	36.687	225	F4.003	36.687	225	
FFMH13	40.595	1.350	Open Manhole	1050	F5.000	39.245	150				
FFMH14	40.175	1.600	Open Manhole	1050	F5.001	38.575	150	F5.000	38.575	150	
FFMH15	40.000	1.623	Open Manhole	1050	F5.002	38.377	150	F5.001	38.377	150	
FFMH16	38.700	2.331	Open Manhole	1200	F4.005	36.369	225	F4.004	36.369	225	
								F5.002	37.224	150	780
FFMH17	41.350	1.850	Open Manhole	1200	F6.000	39.500	150				
FFMH18	39.475	3.455	Open Manhole	1200	F4.006	36.020	225	F4.005	36.020	225	
								F6.000	38.040	150	1945
FFMH19	40.100	4.373	Open Manhole	1200	F1.003	35.727	225	F1.002	36.564	225	837
								F4.006	35.727	225	
FFMH20	43.275	2.275	Open Manhole	1200	F7.000	41.000	150				
FFMH21	42.350	2.137	Open Manhole	1200	F7.001	40.213	150	F7.000	40.213	150	
FFMH22	41.625	1.926	Open Manhole	1200	F7.002	39.699	150	F7.001	39.699	150	
FFMH23	41.300	1.822	Open Manhole	1200	F7.003	39.478	150	F7.002	39.478	150	
FFMH24	40.300	1.582	Open Manhole	1050	F7.004	38.718	225	F7.003	38.793	150	
FFMH25	39.450	4.093	Open Manhole	1200	F1.004	35.357	225	F1.003	35.357	225	
								F7.004	38.041	225	2684
FFMH26	39.275	3.944	Open Manhole	1200	F1.005	35.331	225	F1.004	35.331	225	
FFMH27	38.275	3.054	Open Manhole	1200	F1.006	35.221	225	F1.005	35.221	225	
FFMH28	37.500	2.356	Open Manhole	1200	F1.007	35.144	225	F1.006	35.144	225	
FFMH29	38.225	1.425	Open Manhole	1050	F8.000	36.800	225				
FFMH30	37.200	1.433	Open Manhole	1050	F8.001	35.767	225	F8.000	35.767	225	
FFMH31	38.750	1.350	Open Manhole	1050	F9.000	37.400	150				
FFMH32	37.475	2.280	Open Manhole	1200	F8.002	35.195	225	F8.001	35.195	225	
								F9.000	35.928	150	658
FFMH33	37.350	2.445	Open Manhole	1200	F8.003	34.905	225	F8.002	34.905	225	
FFMH34	37.475	2.814	Open Manhole	1200	F8.004	34.661	225	F8.003	34.661	225	
FFMH35	36.575	2.299	Open Manhole	1200	F8.005	34.276	225	F8.004	34.276	225	
FFMH36	36.350	2.355	Open Manhole	1200	F1.008	33.995	225	F1.007	34.926	225	931
								F8.005	33.995	225	
FFMH37	36.650	3.350	Open Manhole	1200	F1.009	33.300	225	F1.008	33.872	225	572
FEX MHF75	36.940	3.773	Open Manhole	0		OUTFALL		F1.009	33.167	225	

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Manhole Schedules for Foul - Main

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
FFMH38	37.950	1.425	Open Manhole	1050	F10.000	36.525	225				
FFMH39	39.750	3.561	Open Manhole	1200	F10.001	36.189	225	F10.000	36.189	225	
FFMH40	39.300	3.411	Open Manhole	1200	F10.002	35.889	225	F10.001	35.889	225	
FFMH41	37.775	2.299	Open Manhole	1200	F10.003	35.476	225	F10.002	35.476	225	
FEX MHF47	39.240	4.049	Open Manhole	0		OUTFALL		F10.003	35.191	225	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
FFMH1	696617.233	789496.606	696617.233	789496.606	Required	
FFMH2	696615.884	789566.613	696615.884	789566.613	Required	
FFMH3	696559.538	789489.449	696559.538	789489.449	Required	
FFMH4	696468.012	789492.867	696468.012	789492.867	Required	
FFMH5	696513.924	789507.878	696513.924	789507.878	Required	
FFMH6	696559.122	789522.852	696559.122	789522.852	Required	
FFMH7	696559.029	789565.551	696559.029	789565.551	Required	
FFMH8	696633.835	789531.639	696633.835	789531.639	Required	
FFMH9	696695.793	789543.066	696695.793	789543.066	Required	
FFMH10	696742.731	789551.717	696742.731	789551.717	Required	
FFMH11	696751.359	789560.026	696751.359	789560.026	Required	
FFMH12	696750.334	789628.559	696750.334	789628.559	Required	
FFMH13	696685.272	789547.356	696685.272	789547.356	Required	
FFMH14	696684.748	789574.144	696684.748	789574.144	Required	
FFMH15	696687.631	789581.510	696687.631	789581.510	Required	

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Manhole Schedules for Foul - Main

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
FFMH16	696686.787	789627.628	696686.787	789627.628	Required	
FFMH17	696617.959	789575.314	696617.959	789575.314	Required	
FFMH18	696617.048	789626.392	696617.048	789626.392	Required	
FFMH19	696558.416	789625.832	696558.416	789625.832	Required	
FFMH20	696499.692	789511.608	696499.692	789511.608	Required	
FFMH21	696490.671	789541.783	696490.671	789541.783	Required	
FFMH22	696488.603	789562.233	696488.603	789562.233	Required	
FFMH23	696489.903	789570.969	696489.903	789570.969	Required	
FFMH24	696485.972	789598.081	696485.972	789598.081	Required	
FFMH25	696484.390	789625.114	696484.390	789625.114	Required	
FFMH26	696479.741	789627.271	696479.741	789627.271	Required	
FFMH27	696474.576	789648.818	696474.576	789648.818	Required	
FFMH28	696466.593	789661.852	696466.593	789661.852	Required	
FFMH29	696780.033	789682.569	696780.033	789682.569	Required	
FFMH30	696720.044	789698.233	696720.044	789698.233	Required	
FFMH31	696686.576	789638.905	696686.576	789638.905	Required	
FFMH32	696685.708	789697.768	696685.708	789697.768	Required	
FFMH33	696642.221	789696.966	696642.221	789696.966	Required	
FFMH34	696593.471	789696.150	696593.471	789696.150	Required	

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Manhole Schedules for Foul - Main

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
FFMH35	696516.515	789694.914	696516.515	789694.914	Required	
FFMH36	696460.190	789694.020	696460.190	789694.020	Required	
FFMH37	696454.074	789717.798	696454.074	789717.798	Required	
FEX MHF75	696455.214	789744.316			No Entry	
FFMH38	696802.521	789797.673	696802.521	789797.673	Required	
FFMH39	696756.961	789776.261	696756.961	789776.261	Required	
FFMH40	696714.476	789761.241	696714.476	789761.241	Required	
FFMH41	696653.732	789749.195	696653.732	789749.195	Required	
FEX MHF47	696596.851	789745.306			No Entry	

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PIPELINE SCHEDULES for Foul - Main

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
F1.000	o	225	FFMH1	43.500	37.500	5.775	Open Manhole	1200
F1.001	o	225	FFMH2	41.650	37.150	4.275	Open Manhole	1200
F2.000	o	150	FFMH3	44.425	43.000	1.275	Open Manhole	1050
F3.000	o	150	FFMH4	42.900	41.475	1.275	Open Manhole	1050
F3.001	o	150	FFMH5	43.450	40.670	2.630	Open Manhole	1200
F2.001	o	225	FFMH6	43.950	40.278	3.447	Open Manhole	1200
F1.002	o	225	FFMH7	42.800	36.866	5.709	Open Manhole	1200
F4.000	o	150	FFMH8	42.850	40.000	2.700	Open Manhole	1200
F4.001	o	150	FFMH9	39.975	38.503	1.322	Open Manhole	1050
F4.002	o	150	FFMH10	38.475	37.369	0.956	Open Manhole	1050
F4.003	o	225	FFMH11	38.555	37.214	1.116	Open Manhole	1050
F4.004	o	225	FFMH12	38.125	36.687	1.213	Open Manhole	1050
F5.000	o	150	FFMH13	40.595	39.245	1.200	Open Manhole	1050
F5.001	o	150	FFMH14	40.175	38.575	1.450	Open Manhole	1050
F5.002	o	150	FFMH15	40.000	38.377	1.473	Open Manhole	1050
F4.005	o	225	FFMH16	38.700	36.369	2.106	Open Manhole	1200
F6.000	o	150	FFMH17	41.350	39.500	1.700	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
F1.000	70.020	200.0	FFMH2	41.650	37.150	4.275	Open Manhole	1200
F1.001	56.865	200.0	FFMH7	42.800	36.866	5.709	Open Manhole	1200
F2.000	33.406	60.0	FFMH6	43.950	42.443	1.357	Open Manhole	1200
F3.000	48.303	60.0	FFMH5	43.450	40.670	2.630	Open Manhole	1200
F3.001	47.614	150.0	FFMH6	43.950	40.353	3.447	Open Manhole	1200
F2.001	42.699	200.0	FFMH7	42.800	40.064	2.511	Open Manhole	1200
F1.002	60.284	200.0	FFMH19	40.100	36.564	3.311	Open Manhole	1200
F4.000	63.003	42.1	FFMH9	39.975	38.503	1.322	Open Manhole	1050
F4.001	47.729	42.1	FFMH10	38.475	37.369	0.956	Open Manhole	1050
F4.002	11.978	150.0	FFMH11	38.555	37.289	1.116	Open Manhole	1050
F4.003	68.541	130.0	FFMH12	38.125	36.687	1.213	Open Manhole	1050
F4.004	63.553	200.0	FFMH16	38.700	36.369	2.106	Open Manhole	1200
F5.000	26.793	40.0	FFMH14	40.175	38.575	1.450	Open Manhole	1050
F5.001	7.910	40.0	FFMH15	40.000	38.377	1.473	Open Manhole	1050
F5.002	46.125	40.0	FFMH16	38.700	37.224	1.326	Open Manhole	1200
F4.005	69.750	200.0	FFMH18	39.475	36.020	3.230	Open Manhole	1200
F6.000	51.086	35.0	FFMH18	39.475	38.040	1.285	Open Manhole	1200

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PIPELINE SCHEDULES for Foul - Main

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
F4.006	o	225	FFMH18	39.475	36.020	3.230	Open Manhole	1200
F1.003	o	225	FFMH19	40.100	35.727	4.148	Open Manhole	1200
F7.000	o	150	FFMH20	43.275	41.000	2.125	Open Manhole	1200
F7.001	o	150	FFMH21	42.350	40.213	1.987	Open Manhole	1200
F7.002	o	150	FFMH22	41.625	39.699	1.776	Open Manhole	1200
F7.003	o	150	FFMH23	41.300	39.478	1.672	Open Manhole	1200
F7.004	o	225	FFMH24	40.300	38.718	1.357	Open Manhole	1050
F1.004	o	225	FFMH25	39.450	35.357	3.868	Open Manhole	1200
F1.005	o	225	FFMH26	39.275	35.331	3.719	Open Manhole	1200
F1.006	o	225	FFMH27	38.275	35.221	2.829	Open Manhole	1200
F1.007	o	225	FFMH28	37.500	35.144	2.131	Open Manhole	1200
F8.000	o	225	FFMH29	38.225	36.800	1.200	Open Manhole	1050
F8.001	o	225	FFMH30	37.200	35.767	1.208	Open Manhole	1050
F9.000	o	150	FFMH31	38.750	37.400	1.200	Open Manhole	1050
F8.002	o	225	FFMH32	37.475	35.195	2.055	Open Manhole	1200
F8.003	o	225	FFMH33	37.350	34.905	2.220	Open Manhole	1200
F8.004	o	225	FFMH34	37.475	34.661	2.589	Open Manhole	1200
F8.005	o	225	FFMH35	36.575	34.276	2.074	Open Manhole	1200
F1.008	o	225	FFMH36	36.350	33.995	2.130	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
F4.006	58.635	200.0	FFMH19	40.100	35.727	4.148	Open Manhole	1200
F1.003	74.029	200.0	FFMH25	39.450	35.357	3.868	Open Manhole	1200
F7.000	31.495	40.0	FFMH21	42.350	40.213	1.987	Open Manhole	1200
F7.001	20.555	40.0	FFMH22	41.625	39.699	1.776	Open Manhole	1200
F7.002	8.832	40.0	FFMH23	41.300	39.478	1.672	Open Manhole	1200
F7.003	27.396	40.0	FFMH24	40.300	38.793	1.357	Open Manhole	1050
F7.004	27.080	40.0	FFMH25	39.450	38.041	1.184	Open Manhole	1200
F1.004	5.124	200.0	FFMH26	39.275	35.331	3.719	Open Manhole	1200
F1.005	22.157	200.0	FFMH27	38.275	35.221	2.829	Open Manhole	1200
F1.006	15.285	200.0	FFMH28	37.500	35.144	2.131	Open Manhole	1200
F1.007	32.798	150.0	FFMH36	36.350	34.926	1.199	Open Manhole	1200
F8.000	62.001	60.0	FFMH30	37.200	35.767	1.208	Open Manhole	1050
F8.001	34.339	60.0	FFMH32	37.475	35.195	2.055	Open Manhole	1200
F9.000	58.870	40.0	FFMH32	37.475	35.928	1.397	Open Manhole	1200
F8.002	43.495	150.0	FFMH33	37.350	34.905	2.220	Open Manhole	1200
F8.003	48.756	200.0	FFMH34	37.475	34.661	2.589	Open Manhole	1200
F8.004	76.966	200.0	FFMH35	36.575	34.276	2.074	Open Manhole	1200
F8.005	56.332	200.0	FFMH36	36.350	33.995	2.130	Open Manhole	1200
F1.008	24.553	200.0	FFMH37	36.650	33.872	2.553	Open Manhole	1200

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PIPELINE SCHEDULES for Foul - Main

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
F1.009	o	225	FFMH37	36.650	33.300	3.125	Open Manhole	1200
F10.000	o	225	FFMH38	37.950	36.525	1.200	Open Manhole	1050
F10.001	o	225	FFMH39	39.750	36.189	3.336	Open Manhole	1200
F10.002	o	225	FFMH40	39.300	35.889	3.186	Open Manhole	1200
F10.003	o	225	FFMH41	37.775	35.476	2.074	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
F1.009	26.543	200.0	FEX MHF75	36.940	33.167	3.548	Open Manhole	0
F10.000	50.341	150.0	FFMH39	39.750	36.189	3.336	Open Manhole	1200
F10.001	45.062	150.0	FFMH40	39.300	35.889	3.186	Open Manhole	1200
F10.002	61.927	150.0	FFMH41	37.775	35.476	2.074	Open Manhole	1200
F10.003	57.014	200.0	FEX MHF47	39.240	35.191	3.824	Open Manhole	0

Free Flowing Outfall Details for Foul - Main

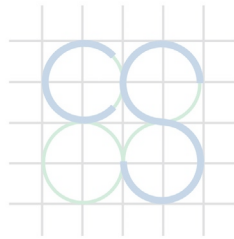
Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
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F1.009 FEX MHF75 36.940 33.167 33.000 0 0

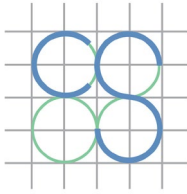
Free Flowing Outfall Details for Foul - Main

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
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F10.003 FEX MHF47 39.240 35.191 35.144 0 0



CS CONSULTING
GROUP



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GROUP

Appendix D

Irish Water Confirmation of Feasibility & Statement of Design Acceptance

Gessica Silva and Frank Duggan
 CS Consulting
 19-22 Dame Street
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 Ireland
 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

22 September 2020

Re: CDS20003735 pre-connection enquiry - Subject to contract | Contract denied

Connection for Housing Development of 300 unit(s) at Lands at Rathgory, Mulladrillen Ardee, Louth

Dear Sir/Madam,

Irish Water has reviewed your pre-connection enquiry in relation to a Water & Wastewater connection at Lands at Rathgory, Mulladrillen Ardee, Louth (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 <u>THIS IS NOT A CONNECTION OFFER. YOU MUST APPLY FOR A CONNECTION(S) TO THE IRISH WATER NETWORK(S) IF YOU WISH TO PROCEED.</u>
Water Connection	Feasible without infrastructure upgrade by Irish Water
Wastewater Connection	Feasible Subject to upgrades
SITE SPECIFIC COMMENTS	
Water Connection	Feasible. Exact location and requirements to be agreed at connection application stage.
Wastewater Connection	The existing wastewater network will require upgrades to cater for the additional proposed load. The upgrade will involve upsizing of between 300 and 1000 meters of existing 225mm sewer along the public road. It is not expected that 3 rd party permissions will be required outside the requirements for a road opening licence. The exact details of this upgrade can be agreed at connection application stage.

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

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



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

General Notes:

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

If you have any further questions, please contact Jonathon Edgeworth from the design team on 01-8925808 or email joedgeworth@water.ie For further information, visit **www.water.ie/connections**.

Yours sincerely,



Maria O'Dwyer

Connections and Developer Services

Ciaran Shields
Embassy House
Ballsbridge
Dublin 4

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

18 November 2021

**Re: Design Submission for Lands at Rathgory, Mulladrillen Ardee, Louth (the “Development”)
(the “Design Submission”) / Connection Reference No: CDS20003735**

Dear Ciaran Shields,

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 www.water.ie/connections. 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)(https://www.cru.ie/document_group/irish-waters-water-charges-plan-2018/).

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: Dario Alvarez

Email: dalvarez@water.ie

Yours sincerely,



Yvonne Harris
Head of Customer Operations

Appendix A

Document Title & Revision

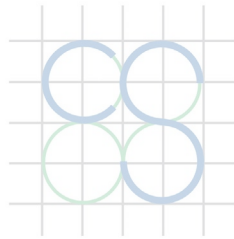
- [ARDEE-CSC-00-XX-DR-C-1002 Proposed Drainage Layout]
- [ARDEE-CSC-00-XX-DR-C-1003 Proposed Watermain Layout]
- [ARDEE-CSC-00-XX-DR-C-1021 Foul Longitudinal Sections Sheet 1 of 2]
- [ARDEE-CSC-00-XX-DR-C-1021 Foul Longitudinal Sections Sheet 2 of 2]

Standard Details/Code of Practice Exemption:

Foul Sewer line FMH1 to FMH7 serving less than 20 units will be laid at 1:200, as future lands to the south will be discharging here, and due to topography of those lands, manhole will need to be located deep.

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

Notwithstanding any matters listed above, the Customer (including any appointed designers/contractors, etc.) is entirely responsible for the design and construction of the Self-Lay Works. 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.



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GROUP