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Client : Cavan County Council

Project : A2156 – Cavan Regional Sports Campus

Drainage Assessment

PREPARED BY	CHECKED BY	APPROVED BY	ISSUE	DATE
J Gault	P Alcorn	P Alcorn	1	06/03/2024

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Contents

1 Introduction

1.1 Report Brief and Scope

Cavan County Council (CCC) are planning the development of a regionally significant Sports Campus (hereafter referred to as the 'Proposed Development').

The proposed development will extend to a total of 28 hectares on lands to the Southwest of Cavan Town, located between the Kingspan Breffni stadium and the Royal School, Cavan and to the west of Dublin Road, (IGR 242095, 304048).

The site incorporates existing sporting facilities used by the Royal School for physical education and Cavan GAA for training; this includes one shale gravel hockey pitch and adjoining soccer field and a GAA grass training pitch. The remainder of the lands located within the site are undeveloped.

The proposed development will include but not limited to the below infrastructure;

- Indoor sports complex to include sports halls with spectator seating, fitness studios, changing facilities, reception, café and ancillary accommodation with a gross internal floor area of 6,000sqm.
- 7 no. outdoor sports pitches.
- Covered sports arena with playing pitch, spectator seating and other ancillary accommodation.
- Ancillary sporting facilities include 8 lane athletics track and cricket practice nets.
- New vehicular access / junction and closure of Park Lane (Roscolgan Lane L65072-0)/ Dublin Road (R212) vehicular junction, relocation of existing Breffni Park turnstiles to facilitate reconfiguration of Park Lane (Roscolgan Lane L65072-0), bridge structure, internal roads, cycle/pedestrian paths, associated car/bus/cycle parking, electric charge points and streetlighting.
- Pedestrian access points from Kilnavarragh Lane (L2540-0 & L65091-0) and Dublin Road (R212)
- Hard and soft landscaping including acoustic fencing, wildlife habitat area/corridors, artificial badger-sett, walking trails and other ancillary works such as spectator stands, retaining walls, fencing and ball stop fencing, team shelters, toilet block, floodlighting, signage, drainage infrastructure including attenuation tanks, SUDS and culverting of a minor watercourse / natural catchment ravine, storage space, ESB Substation, ancillary accommodation and all associated site works to accommodate the development.
- Provision of car and cycle parking;

This Drainage Assessment has been completed in relation to the current proposed works as illustrated within the planning application.

The development will further consist of:

- Storm and Foul drainage networks to facilitate the proposed development.
- Illustration of Volumetric & Water Quality mitigation for the storm drainage networks.

2 Site Location, Description and Proposed Development

2.1 Site Location and Context

The proposed development will extend to a total of 28 hectares on lands to the Southwest of Cavan Town, located between the Kingspan Breffni stadium and the Royal School, Cavan and to the west of Dublin Road, (IGR 242095, 304048). The site is located adjacent to Cavan River which is hydraulically linked to Lough Oughter Special Area of Conservation (SAC) and Special Protection Area (SPA).

A Site Location and Boundary Map is presented in Figure 1 below.

Figure 1 – Site Location and Boundary

2.2 Existing Site Description

The site is of 'Greenfield' nature, irregular in shape and extends to approximately 28 Acres. The R212 and Cavan River forms the boundary to the East, agricultural fields and the Kingspan Breffni stadium forms the boundary at the south, Kilnavarragh Lane bounds the west and the town centre of Cavan forms the boundary to the north.

The topography of the Application Site is undulating drumlin landscape with some sections with a steep gradient of up to 30%. The highest ground is to the west of the site adjacent to Kilnavarragh Lane rising to a height of 91mAOD. There are some relatively flat areas adjacent to the Cavan River which are subject to regular fluvial flooding. A detailed Flood Risk Assessment (FRA) has been completed by McCloy Consulting in relation to the Cavan River, this report will be issued along with the planning application for the proposed development.

Levels along the riverbank, separating the site and Breffni Park, are as low as approximately 62 mAOD. The site rises to approximately 77.0m AOD to the east on the R212. The site remains largely undeveloped as agricultural fields with mature hedge boundaries with a number of sports pitches located within.

The Existing Topographical Survey has been presented as Appendix A.

2.3 Proposed Site Development Plans

The development proposals include the following:

- Access road from Dublin Road including internal access roads, bridge crossing of Cavan River, and car parking facilities.
- Indoor sports complex including covered sports arena.
- Several outdoor sports pitches inclusive of natural grass, and artificial grass and hockey synthetic pitches.
- Hard and soft landscaping.
- Ancillary works such as;
    - spectator stands,
    - retaining walls,
    - fencing and ball stop fencing,
    - team shelters, spectator stands, toilet block,
    - drainage infrastructure including attenuation tanks, SUDS and culverting of a minor undesignated watercourse.

A Proposed Site Layout Plan has been presented as Appendix B.

3 Proposed Storm Water Drainage Strategy

3.1 Introduction

In order to assess the drainage requirements a review of pre-development and post development runoff is required.

Surface water drainage design should generally comply with the requirements of the 'Cavan County Development Plan 2022-2028'.

The policies of the Development Plan generally refer to managing Flood Risk through promoting and encouraging the use of Sustainable Drainage Systems (SuDS) for infrastructure and property.

Proposals shall incorporate SuDS and other measures that address adaption to climate change and achieve volumetric and water quality mitigation to the surface water runoff. These could include but are not limited to green roofs, rain harvesting, permeable pavements, infiltration trenches, soakaways, Geocellular attenuation tanks, flow control devices. The selection of SuDS should be considered in relation to the nature and character of the site. The SuDS design should demonstrate how water quantity and quality are dealt with as well as make provision for amenity and biodiversity, where practicable.

The council shall promote the use of Sustainable Drainage Systems (SuDS), flood attenuation areas, controlled release of surface water, and use of open spaces and semi-permeable hard surfaces for appropriate development proposals.

3.2 Pre-Development Runoff

Calculations undertaken as part of the Drainage Assessment indicate that to avoid increasing flood risk off-site, runoff rates should be limited to the pre-development (Greenfield) runoff rates.

Utilising HR Wallingford Greenfield runoff rates for sites with consideration of the site area and characteristics pre-development (Greenfield) runoff rates are calculated as;

Return Period	Runoff Rate (l/s)
1 in 1	160.83
1 in 30	312.21
1 in 100	368.97

Table 1: Pre-development discharge rates

The HR Wallingford runoff estimation sheet reflecting these figures can be seen in Appendix C.

3.3 Post-Development Runoff

The proposed site development consists of a combination of hardstanding (vehicular, cycle, pedestrian pavements, car parks, footpaths, building infrastructure, natural grass pitches, artificial and synthetic sports pitches and soft landscaping areas). These areas of new hardstanding will subsequently result in an increase of impermeable surfacing.

Table 6-3 of the Urban Storm Drainage Critical Manual (Volume 1 January 2016) presents the percentage of imperviousness from different land uses or surface characteristics, for the purpose of calculating runoff rates. For the Hardstanding areas the runoff coefficient is 100% for paved areas. For the

Landscape areas the closest category within the table would be Parks / Cemeteries which illustrate the runoff coefficient as 10%.

In order to be conservative, the drainage calculations detailed within this report have assumed a 100% runoff coefficient for all Hardstanding areas and 20% runoff coefficient for all Landscaped areas.

Due to the scale of the development it is necessary to split the drainage into 5 separate networks, each requiring separate dedicated SuDS infrastructure.

Each of these networks as presented within the proposed drainage design drawings have been modelled and the unrestricted discharge figures for the 1 in 1, 1 in 30 and 1 in 100 year Return Periods including 20% allowance for climate change are summarised in Table 1 below. A copy of the Proposed Drainage Layout can be seen in Appendix D and the un-restricted calculations for the site drainage networks as illustrated within the table below are provided in Appendix E.

Return Period	Redevelopment Discharge Q (l/s) - (Unrestricted)					
	Network 1	Network 2	Network 3	Network 4	Network 5	**Total Flow**
1 in 1 +20%	170.9	51.7	79.1	16.2	166.6	**484.5**
1 in 30 +20%	477.7	114.6	190.0	30.6	413.4	**1226.3**
1 in 100 +20%	656.6	136.2	222.5	33.6	477.8	**1526.7**

Table 2: Post development discharge rates – Unrestricted

3.4 Comparison of Pre and Post Development Storm Water Discharges

With the addition of impermeable surfaces the post development discharge exceeds the pre-development discharge for all returns, a restricted discharge to the existing 'Greenfield' runoff rate with storm water attenuation and associated flow controls will be required.

3.5 Proposed Site Storm Drainage and discharge

It is proposed to maintain the existing pre-development 'Greenfield' run-off rates as illustrated in Table 1 so that run-off rate and overall volume are not exceeded over the lifespan of the development.

The proposed storm sewers will collect storm water via road gullies, channel drains, permeable pavements, land drains, infiltration trenches and convey the flows through a series of dedicated gravity storm sewers following the falls of the proposed pavement networks (where achievable) discharging the collected flows to the Cavan River within the site.

In order to achieve the restricted 'Greenfield' run-off rate a series of SuDs infrastructure are required. Each separate storm network has been designed with dedicated cascading SuDs and associated flow controls to achieve the necessary restriction and attenuation for the runoff. These have been developed with consideration of the site proposals specific to the storm drainage network.

The specific SuDS infrastructure adopted within the design proposals include but not limited to:

- Planters and landscaping incorporating permeable land / filter drainage / infiltration.
- Tree planting / Pits incorporating permeable land / filter drainage / infiltration.
- Storm drainage infrastructure inclusive of Catchit chambers & Oil Separators.
- Rainwater Harvesting.

- Permeable pavements / porous surface infrastructure, permeable pavement subbase materials, Geocellular attenuation tanks, infiltration trenches & filter drains allowing for increased attenuation potential throughout the site and promoting infiltration where possible.
- Flow Control devices to maximise storage potential at specific infrastructure locations.

The proposed drainage layout is provided in Appendix D.

With consideration to the above the storm sewer network has been modelled and the restricted discharge figures for the 1 in 1, 1 in 30 and 1 in 100 year Return Periods including 20% allowance for climate change are summarised in Table 3 below.

The modelling has resulted in a requirement, as illustrated, for stormwater attenuation and associated flow controls restricting the discharge to the 'Greenfield' runoff rates illustrated. The table below illustrates the runoff rates for each storm network as currently designed for the site for each respective storm return period reflecting the 'Greenfield' Runoff calculations.

Return Period	Redevelopment Discharge Q (l/s) - (Restricted)					
	Network 1	Network 2	Network 3	Network 4	Network 5	**Total Flow**
1 in 1 +20%	93.8	9.8	19.8	16.2	21.0	**160.6**
1 in 30 +20%	129.7	9.9	20.0	30.6	23.9	**214.1**
1 in 100 +20%	149.2	11.5	21.9	33.6	24.5	**240.7**

Table 3: Post development discharge rates – Restricted

As illustrated in the Table 3, with the addition of flow control devices and the SuDS infrastructure proposed the discharge runoff for each return period can be restricted to the respective 'Greenfield' Runoff rate (Table 1). See table 4 below for comparison with Greenfield runoff rates.

Return Period	Runoff Rate (l/s)	Redevelopment Discharge Q (l/s) +20% Climate Change
1 in 1	160.83	160.6
1 in 30	312.21	214.1
1 in 100	368.97	240.7

Table 4: Pre / Post-development discharge rates comparison

A copy of the post development calculation inclusive of restricted flow / attenuation for each Storm Network are provided in Appendix F.

3.6 Surface Water (Pluvial) Flood Risk

The proposed development layout & levels along with the storm drainage design inclusive of new storm sewer networks, restricted runoff rates and attenuation have been designed within the below criteria.

- There will be no surcharging of the drainage system for a 1 in 1 year storm with a 20% Climate Change allowance for climate change;
- The drainage can be surcharged with no flooding with a freeboard of 300mm and a 20% Climate Change allowance for climate change for a 1 in 30 year storm; and
- The drainage can flood on-site for a 1 in 100 year storm with a 20% Climate Change allowance provided the flood water remains on site and does not flood habitable areas or affect safe ingress and egress to the site for occupiers.

Based on the design strategy & proposed drainage infrastructure proposed flood risk will not be increased within or beyond the site boundary as a result of the proposed development.

4 Proposed Foul Water Drainage Strategy

The proposed foul network is split in two networks one for the main sports centre building and the other for the GAA changing room accommodation.

The Foul infrastructure for the main sports centre building is proposed to convey flows through a gravity pipe network to connect to an Uisce Éireann sewer adjacent to the site. Consultations with Uisce Éireann have been completed via Pre-Connection Application establishing the suitability for a connection. Approval for this connection will be progressed upon design development. A copy of the Pre-Connection Application response can be seen in Appendix G.

The Foul infrastructure for the GAA changing rooms will be conveyed through a gravity pipe network to connect to an existing pumping station within Breffni Park ground. The client / operator for Breffni Park has confirmed capacity within the pumping station is available for connection of these flows.

A copy of the proposed drainage layout can be found in Appendix D.

5 Drainage Maintenance

The owner(s) shall be responsible for maintenance of drainage networks at the site and ensure that maintenance of the drainage system is provided for. The detailed drainage layout for the site shall ensure that key SuDS features requiring maintenance are assessable and can be easily maintained in accordance with the SuDS Manual criteria for maintenance of the same.

Surface water drainage systems should be maintained in line with best practice, manufacturer specification(s), and requirements specific to the site. In the event of blockage or exceedance (in excess of the 1% AEP + CC design event), surface water will have an available overland flow path away from built development.

Maintenance plans for drainage assets should include (where applicable):

Cyclical (minimum annually) check of all surface water drainage features – in particular, clearing of debris. Cyclical (minimum annually) visual inspection of any surface or underground features – blockages and obstructions to be removed by jetting, as required.

5.1 General Maintenance

All Stormwater management structures to be inspected and records obtained at a minimum two times a year, with cleaning typically in April and October and possible more often, as site conditions warrant. Further inspection of the drainage systems will be required when the forecast for the area is for heavy rainfall. Concurrent with inspection and cleaning, all litter shall be picked up and removed from the site.

Catchpit chambers/ manholes / Channel Drains to be inspected with debris removal monthly. Sediment in chambers sumps, bottom of manholes and channel drain sumps to be removed bi-annually using conventional sump vacuum cleaner and properly disposed by a licenced cleaning company. If during monthly inspections the depth of sediment in the sumps exceeds 50% capacity, sediment must be removed.

Drainage pipe networks to be inspected for blockages as with catchpit chambers/ manholes. All drains and chambers must be inspected from the upstream network end to the outfall. Observe the flow of water and any indication of ponding in the chambers/ manholes indicate a blockage. All blockages must be assessed, and any obstructions removed. Please note rodding or flushing may be necessary. This regime will also be required before each rainy season and after the first heavy storm event. To avoid flooding, water flushed into the drainage system should be pumped or vacuumed to a tank and properly disposed of. All infrastructure such as attenuation tanks/ flow controls/ drainage channels should be maintained as per manufacturer's guidelines.

During winter months ensure the drainage structures are not blocked by ice, snow, debris or trash.

Maintenance of SuDS infrastructure will be required in accordance with manufacturers guidelines and in compliance with the SuDS Manual. Further illustration of maintenance regimes of elements of SuDS infrastructure proposed within the development illustrated within Appendix H. These are provided for illustration only and will need reflected upon scheme completion to the site-specific infrastructure constructed.

6 Conclusion

This Drainage Assessment (DA) has been completed with a review of the existing & proposed development site to illustrate the infrastructure proposed.

The site is located adjacent to the Dublin Road (R212).The site is of 'Greenfield' nature, irregular in shape and extends to approximately 28 Hectares. The R212 forms the boundary to the East, agricultural fields and the Kingspan Breffni stadium forms the boundary at the south, Kilnavarragh Lane bounds the west and the town centre of Cavan forms the boundary to the north. The site falls from West to East from approximately 92.0m AOD on Kilnavarragh Lane to approximately 77.0m AOD on the east on the R212 and 62.0m AOD along the Cavan River. Beyond the site boundary are established residential developments to the north, east and west, and agricultural land to the south. The site experiences fluvial flooding associated with the Cavan River of which a detailed FRA has been completed by McCloy Consulting and issued along with this planning application.

Calculations are presented that show the proposed storm drainage networks for the development will not exceed current 'Greenfield' run-off rates to the adjacent watercourse with the inclusion of appropriately sized storm water attenuation, cascading SuDS infrastructure and associated flow controls.

With consideration of the drainage strategy and the surface water mitigation measures for the scheme illustrated above, flood risk from pluvial flooding will be managed at the development and will not increase the runoff elsewhere. Proposed levels have been developed to ensure that no properties will be subject to flooding in the event that a local drainage system failure should occur.

In addition, foul sewerage is proposed to discharge to Uisce Éireann infrastructure.

Appendices

Appendix A – Existing Site Topographical Survey

Notes:

1. *This drawing should be read in conjunction with all relevant drawings (Architectural and Engineering).*
2. *This drawing is provided to illustrate the contours of the existing ground levels. Existing levels indicated taken from Topographical Survey as received by the Client Cavan County Council.*
3. *All measurements shown are in metres, and all levels are to ordnance datum unless otherwise indicated.*
4. *All Coordinates are to Irish Grid, unless otherwise noted.*

LEGEND

17.045 + Existing Levels

Site boundary

Rev	Issue Date	Description	App
P2	06/03/2024	RLB Added	PC

Status	FOR PLANNING
Client	Cavan County Council
Project	Cavan Regional Sports Campus
Drawing	Existing Site Layout & Levels
Scale	1:2000 @ A1

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Drawn	PC	Checked	PA	Approved	PA
Date	13.02.24	Date	13.02.24	Date	13.02.24

Project	- Organisation	- Zone	- Level	- Type	- Role	- Number	- Revision
CRSP	- MCA	- 00	- 00	- DR	- C	- 1001	- P2

Project Number	Status code & Description
A2156	S4

Appendix B – Proposed Site Layout

LEGEND

1 Sports Building
2 Sports Arena
3 Synthetic Hockey Pitch (non-water based)
4 Athletics Track (400m)
5 External Synthetic Multi-Sport Pitch
6 Sand Mattress GAA Fields
7 Covered Stands (3No.)
8 Toilet Block
9 Cricket Practice Nets

- SITE BOUNDARY
- NATURAL TURF PITCH SURFACE
- SYNTHETIC GRASS PITCH SURAFCE
- ATHLETICS TRACK - EPDM POLYMERIC RUBBER SURFACE
- GRASS SURFACE / SOFT LANDSCAPED AREAS (Refer to Landscape Architects Drawings ref: XXXX)
- EXISTING NATURAL LANDSCAPE AND HABITAT MAINTAINED
- WILDLIFE HABITAT CREATION ZONE (Refer to Landscape Architects Drawings ref: XXXX)
- PEDESTRIAN PAVEMENT - ASPHALT / BITMAC
- PEDESTRIAN PAVEMENT - NATURAL GRANITE AGGREGATE CONCRETE PAVING SLABS
- VEHICULAR PAVEMENT - ACCESS ROAD / PARKING
- EXISTING DENSE HEDGEROW VEGETATION
- EXISTING TREE
- PROPRIETARY CONCRETE BLOCK GEOSYNTHETHIC REINFORCED SEGMENTAL RETAINING WALL SYSTEM (Refer Detail X on Dwg XXXXX)
- TIMBER CRIBB RETAINING WALL STRUCTURE (Refer Detail X on Dwg XXXXX)
- 12M HIGH BALL CATCH NET (Refer Detail X on Dwg XXXXX)
- 1.2M HIGH OPEN MESH FENCING (Refer Detail X on Dwg XXXXX)
- 3.0M HIGH OPEN MESH FENCING (Refer Detail X on Dwg XXXXX)
- 4.2M HIGH OPEN MESH FENCING (Refer Detail X on Dwg XXXXX)
- 1.1M HIGH GALVANISED STEEL SAFETY RAILINGS (Refer Detail X on Dwg XXXXX)
- 1.2M HIGH TIMBER POST & RAIL FENCE (Refer Detail X on Dwg XXXXX)
- 2M HIGH TIMBER ACOUSTIC FENCE (Refer Detail X on Dwg XXXXX)
- 600MM HIGH TIMBER KNEE RAIL FENCE (Refer Detail X on Dwg XXXXX)
- PROPOSED ACCESSIBLE SHARED PEDESTRIAN AND CYCLE ROUTE LINKING DUBLIN ROAD AND KILNAVARRAGH LANE - Max Gradient < 1:21
- PROPOSED LOCATION OF FLOODLIGHT COLUMN (Refer Detail X on Dwg XXXXX)
- PROPOSED BOLLARD PATHWAY LIGHT
- PROPOSED LIGHTING COLUMN - SINGLE LUMINAIRE
- PROPOSED LIGHTING COLUMN - DOUBLE LUMINAIRE
- ECP ELECTRIC VEHICLE (EV) CHARGE POINT
- @ PROPOSED DUCTING PROVIDED FOR FUTURE EV CHARGING POINT
- PROPOSEDF FIXED BOLLARD - STAINLESS STEEL WITH VISIBILITY BAND. REFER TO LANDSCAPE MATERIALITY SHEET CSC-MLA-XX-00-DR-L-3001
- PROPOSED REMOVABLE BOLLARD - STAINLESS STEEL WITH VISIBILITY BAND. REFER TO LANDSCAPE MATERIALITY SHEET CSC-MLA-XX-00-DR-L-3001
- PROPOSED LITTER BIN. REFER TO LANDSCAPE MATERIALITY SHEET CSC-MLA-XX-00-DR-L-3001
- PROPOSED EV CHARGING PARKING SPACE
- PROPOSED ACCESSIBLE PARKING SPACE
- + 75.45 PROPOSED LEVELS

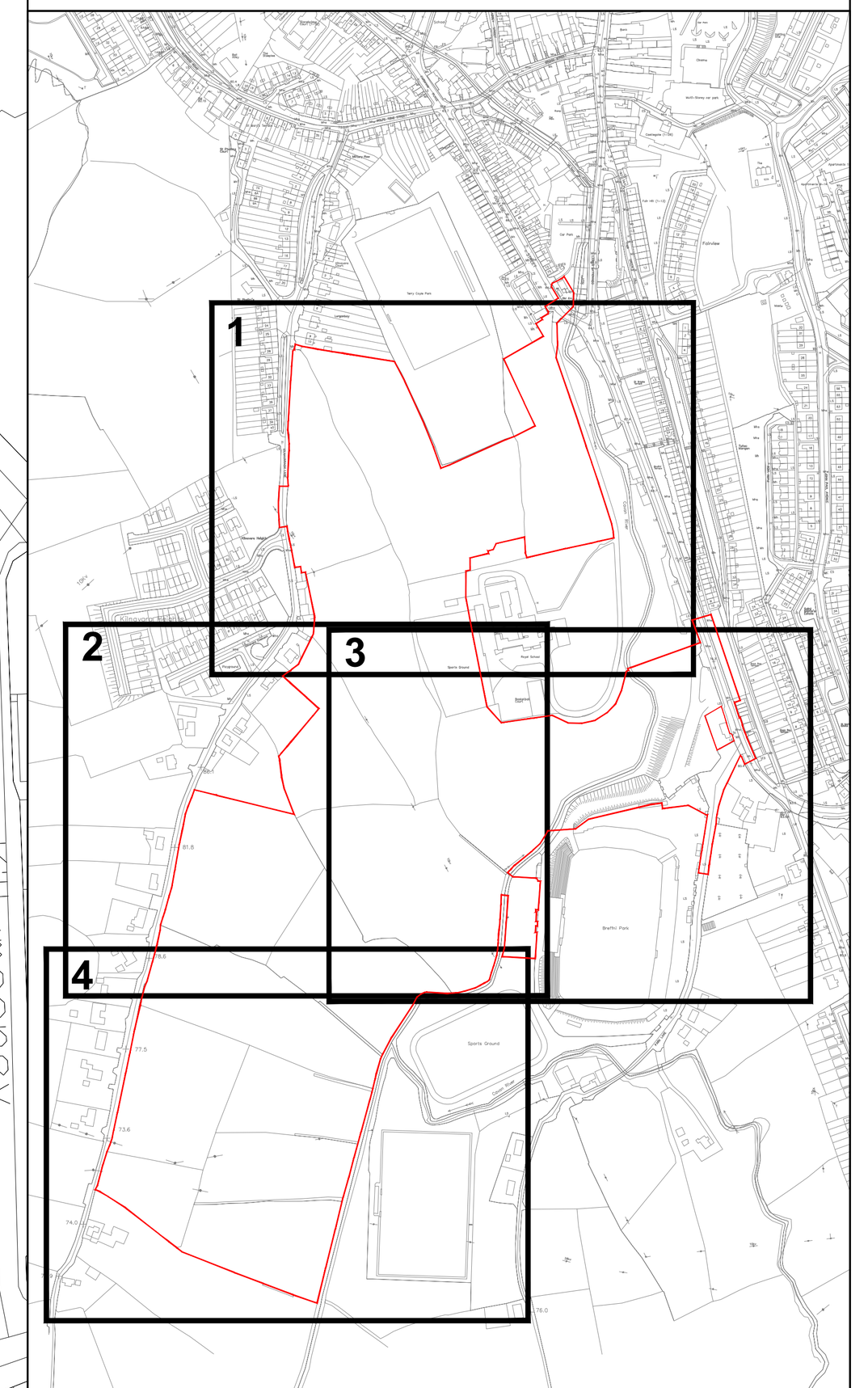
NOTES

1. All measurements shown are in metres, and all levels are to ordnance datum unless otherwise indicated

2. All Coordinates are to Irish Grid, unless otherwise noted.

N

KEY PLAN



Rev	Issue Date	Description	App

Status	PLANNING
Client	Cavan County Council
Project	Cavan Regional Sports Campus
Drawing	Proposed Site Plan Overall
Scale	1:1250 @ A0

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Drawn	moc	Checked	pa	Approved	moc
Date	04/03/24	Date	04/03/24	Date	04/03/24
Project Number	A2156	Drawing Number	100-10	Revision	-

Appendix C – HR Wallingford Greenfield Runoff Output

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Peter Alcorn
Site name:	Cavan Regional Sports Centre
Site location:	Cavan

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	53.98303° N
Longitude:	7.36343° W
Reference:	1337848089
Date:	Feb 06 2024 12:56

Runoff estimation approach

IH124

Site characteristics

Total site area (ha): 25

Methodology

Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics

	Default	Edited
SOIL type:	4	4
HOST class:	N/A	N/A
SPR/SPRHOST:	0.47	0.47

Hydrological characteristics

	Default	Edited
SAAR (mm):	1028	1028
Hydrological region:	13	13
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 30 years:	1.65	1.65
Growth curve factor 100 years:	1.95	1.95
Growth curve factor 200 years:	2.15	2.15

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates

	Default	Edited
Q_{BAR} (l/s):	189.22	189.22
1 in 1 year (l/s):	160.83	160.83
1 in 30 years (l/s):	312.21	312.21
1 in 100 year (l/s):	368.97	368.97
1 in 200 years (l/s):	406.82	406.82

Appendix D – Proposed Drainage Layout

Notes:

1. *This drawing should be read in relation to the subject of the title. All other details illustrated on the drawing (e.g. The proposed layout) are indicative only and are subject to change. For updated details of the proposed layout and finished levels see Proposed Layout & Levels drawings.*
2. *The mapping illustrated on this drawing is taken from the existing topographical survey received from the client with amendments made to illustrate the proposed site layout for the scheme.*
3. *All storm & foul drainage designed in accordance with IS EN 752: 2008*
4. *Drainage works to carried out in accordance with Civil Engineering Specification for the Water Industry 6th Edition; published by WRC plc 2004.*
5. *Manholes to be constructed from precast concrete rings (unless otherwise stated / approved) to IS EN 1917 & BS 5911-3 with a D400 heavy duty cover for driveway/carpark and B125 for remaining surface (in accordance with IS EN 124:1994).*
6. *Pipes to be uPVC to IS EN 1401-1 for sizes Ø100 & Ø150mm. Pipes to be uPVC to WIS 4-35-01, for sizes Ø225 & Ø300mm.*
7. *Pipes for storm drainage to be proprietary plastic twin wall design*
8. *All measurements shown are in meters, and all levels are to ordnance datum unless otherwise indicated.*
9. *All Coordinates are to Irish Grid, unless otherwise noted.*
10. *For indicative location for all sewers and services please see Existing Site Services drawings. It shall be the contractor's responsibility to verify position and level prior to commencing construction. The contractor shall also be responsible for the arrangement of all necessary permits as required prior to commencement.*
11. *Min cover to Clay / Concrete drainage Pipes to be 1200mm under roads/footpaths and 600mm under landscaping. Min cover to Thermoplastic drainage Pipes to be 900mm under roads/footpaths and 600mm under landscaping. Where adequate cover cannot be provided pipes are to be protected with a lean mix concrete surround.*
12. *Changes in invert levels at a manhole (not requiring a drop manhole) shall be graded evenly through the manhole in order to avoid an abrupt change in invert level.*
13. *Where concrete surround is specified for pipes the pipes shall be first wrapped with an approved plastic membrane. Flexibility at joints shall be maintained by insertion of 25mm compressible joint board at each joint to break the continuity of the concrete surround. However the plastic membrane shall be continuous at these locations to protect rubber jointing rings from ingress of grout. The minimum thickness of the concrete surround should be 150mm or the diameter of the pipe whichever is the greater.*
14. *Compressible boards to be laid between crossing pipes where cover between pipes limited.*
14. *All in-curtilage pipes to be minimum ø100mm unless otherwise indicated.*
15. *A drain which is at a level lower than the foundations of a building should either*
    (a) where the trench is within 1m of the foundations, be filled with concrete up to the level of the underside of the foundations,
    (b) where the trench is more than 1m from the foundations, be filled with concrete up to a level, below the level of the underside of the foundations, equal to the distance from the foundations less 150mm,
16. *Existing sewers to be maintained and kept in service at all times.*
17. *This drawing should be read in conjunction with proposed drainage schedule drawings, construction details drawings and all other relevant drawings.*
18. *All internal pipework extending outside the building must be constructed with rocker pipes through the foundations/ trench fill as per construction details.*
19. *To allow connection to the invert levels of the proposed drainage network a change in pipe gradient may be required. To allow this all internal infrastructure (sinks, dishwasher's, floor gullies etc, including rainwater downpipes) to be connected to a back inlet bottle gully prior to connection to the proposed drainage as per construction details with the exception of WCs.*
20. *To achieve invert levels of the foul drainage network all WC internal infrastructure must be connected via backdrop manhole (if required) as per construction details drawings, or similar approved.*
21. *All back inlet bottle gullies for foul drainage to be capped with closed lid with same strength class as adjacent manholes. Perforated lids will not be suitable.*
22. *Back inlet bottle gullies to be constructed directly adjacent to building provided construction achievable above foundations.*
23. *All drainage channels and outfalls to be constructed in accordance with manufactures specifications.*
24. *All details/ dimensions to be checked by the contractor. Any discrepancies to be reported to the engineer immediately.*
25. *Invert levels of catchpit chambers shown denote approximate invert levels of the lowest pipe and do not include for catchpit sump depth.*

LEGEND

- PROPOSED STORM SEWER
- PROPOSED FOUL SEWER
- PROPOSED PERFORATED FILTER / LAND DRAIN / INFILTRATION TRENCH
- Fxxx — PROPOSED FOUL MANHOLE
- Sxxx — PROPOSED STORM MANHOLE
- 600mm Dia CATCHPIT CHAMBERS (LAND DRAINAGE)
- ATTENUATION TANK
- HEADWALL
- SITE BOUNDARY

Rev	Issue Date	Description	App
P4	05/03/2024	Site Layout Amended	PC
P3	26/02/2024	Amendments to Accommodate Bridge	PA
P2	25/02/2024	Minor Amendments	PA

Status	FOR PLANNING
Client	Cavan County Council
Project	Cavan Regional Sports Campus
Drawing	Proposed Drainage Layout - Overview
Scale	1:2000 @ A1

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Drawn	JG	Checked	PA	Approved	PA
Date	23/02/2024	Date	23/02/2024	Date	23/02/2024

Project - Organisation - Zone - Level - Type - Role - Number - Revision
CRSP - MCA - 00 - 00 - DR - C - 2000 - P4

Project Number	Status code & Description
A2156	S4

Existing watercourse / ditch to be culverted through the site. Exact connection location TBC

No Channel drains / Gullies indicated at this stage

No Channel drains / Gullies indicated at this stage

Internal Pop Ups / drainage connections / rainwater downpipes not illustrated

Porous surfacing beneath running track allowing for attenuation & infiltration potential

Grass pitch lateral drains at 8m centres

SUDS PERMEABLE SURFACING

INFILTRATION TRENCH

No Channel drains / Gullies indicated at this stage

No Channel drains / Gullies indicated at this stage

INFILTRATION TRENCH

Retaining wall drainage required (to be detailed at detailed design stage)

Foul gravity connection to Irish Water sewer. Consent for connection to be agreed with Irish Water prior to construction.

Precast concrete Headwall and discharge to Cavan River

INFILTRATION TRENCH

INFILTRATION TRENCH

INFILTRATION TRENCH

Deep drainage required to achieve gravity sewer - Low vibration Sheet piling / temporary works required to construct. Line of sewer could be relocated to provide working room for construction

INFILTRATION TRENCH

SUDS PERMEABLE SURFACING

Synthetic pitch lateral drains at 6m centres

Porous surfacing beneath pitch allowing for infiltration potential

Attenuation Tank (Polystorm Extra (PSM3) or Similar Approved). Tank specification to allow for proposed installation depth (See manhole schedule & Proposed levels) as well as proposed storage volume & tank depth.
Tank Depth 1.05m (5 layers of 0.21m creates)
Tank to have minimum storage Volume of 475m3.
Please refer to manufactures guidelines for construction details.
Tank to be wrapped in a permeable membrane / geotextile

LEGEND

- PROPOSED STORM SEWER
- PROPOSED FOUL SEWER
- PROPOSED PERFORATED FILTER / LAND DRAIN / INFILTRATION TRENCH
- Fxxx PROPOSED FOUL MANHOLE
- Sxxx PROPOSED STORM MANHOLE
- 600mm Dia CATCHPIT CHAMBERS (LAND DRAINAGE)
- ATTENUATION TANK
- HEADWALL
- SITE BOUNDARY

Notes:

1. This drawing should be read in relation to the subject of the title. All other details illustrated on the drawing (e.g. The proposed layout) are indicative only and are subject to change. For updated details of the proposed layout and finished levels see Proposed Layout & Levels drawings.
2. The mapping illustrated on this drawing is taken from the existing topographical survey received from the client with amendments made to illustrate the proposed site layout for the scheme.
3. All storm & foul drainage designed in accordance with IS EN 752: 2008
4. Drainage works to carried out in accordance with Civil Engineering Specification for the Water Industry 6th Edition; published by WRC plc 2004.
5. Manholes to be constructed from precast concrete rings (unless otherwise stated / approved) to IS EN 1917 & BS 5911-3 with a D400 heavy duty cover for driveway/carpark and B125 for remaining surface (in accordance with IS EN 124:1994).
6. Pipes to be uPVC to IS EN 1401-1 for sizes Ø100 & Ø150mm. Pipes to be uPVC to WIS 4-35-01, for sizes Ø225 & Ø300mm.
7. Pipes for storm drainage to be proprietary plastic twin wall design
8. All measurements shown are in meters, and all levels are to ordnance datum unless otherwise indicated.
9. All Coordinates are to Irish Grid, unless otherwise noted.
10. For indicative location for all sewers and services please see Existing Site Services drawings. It shall be the contractor's responsibility to verify position and level prior to commencing construction. The contractor shall also be responsible for the arrangement of all necessary permits as required prior to commencement.
11. Min cover to Clay / Concrete drainage Pipes to be 1200mm under roads/footpaths and 600mm under landscaping. Min cover to Thermoplastic drainage Pipes to be 900mm under roads/footpaths and 600mm under landscaping. Where adequate cover cannot be provided pipes are to be protected with a lean mix concrete surround.
12. Changes in invert levels at a manhole (not requiring a drop manhole) shall be graded evenly through the manhole in order to avoid an abrupt change in invert level.
13. Where concrete surround is specified for pipes the pipes shall be first wrapped with an approved plastic membrane. Flexibility at joints shall be maintained by insertion of 25mm compressible joint board at each joint to break the continuity of the concrete surround. However the plastic membrane shall be continuous at these locations to protect rubber jointing rings from ingress of grout. The minimum thickness of the concrete surround should be 150mm or the diameter of the pipe whichever is the greater.
14. Compressible boards to be laid between crossing pipes where cover between pipes limited.
14. All in-curtilage pipes to be minimum ø100mm unless otherwise indicated.
15. A drain which is at a level lower than the foundations of a building should either
(a) where the trench is within 1m of the foundations, be filled with concrete up to the level of the underside of the foundations,
(b) where the trench is more than 1m from the foundations, be filled with concrete up to a level, below the level of the underside of the foundations, equal to the distance from the foundations less 150mm,
16. Existing sewers to be maintained and kept in service at all times.
17. This drawing should be read in conjunction with proposed drainage schedule drawings, construction details drawings and all other relevant drawings.
18. All internal pipework extending outside the building must be constructed with rocker pipes through the foundations/ trench fill as per construction details.
19. To allow connection to the invert levels of the proposed drainage network a change in pipe gradient may be required. To allow this all internal infrastructure (sinks, dishwasher's, floor gullies etc, including rainwater downpipes) to be connected to a back inlet bottle gully prior to connection to the proposed drainage as per construction details with the exception of WCs.
20. To achieve invert levels of the foul drainage network all WC internal infrastructure must be connected via backdrop manhole (if required) as per construction details drawings, or similar approved.
21. All back inlet bottle gullies for foul drainage to be capped with closed lid with same strength class as adjacent manholes. Perforated lids will not be suitable.
22. Back inlet bottle gullies to be constructed directly adjacent to building provided construction achievable above foundations.
23. All drainage channels and outfalls to be constructed in accordance with manufactures specifications.
24. All details/ dimensions to be checked by the contractor. Any discrepancies to be reported to the engineer immediately.
25. Invert levels of catchpit chambers shown denote approximate invert levels of the lowest pipe and do not include for catchpit sump depth.

Rev	Issue Date	Description	App
P4	05/03/2024	Site Layout Amended	PC
P3	26/02/2024	Amendments to Accommodate Bridge	PA
P2	25/02/2024	Minor Amendments	PA

Status: FOR PLANNING

Client: Cavan County Council

Project: Cavan Regional Sports Campus

Drawing: Proposed Drainage Layout - Sheet 1

Scale: 1:500 @ A1

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Drawn	JG	Checked	PA	Approved	PA
Date	23/02/2024	Date	23/02/2024	Date	23/02/2024

Project - Organisation - Zone - Level - Type - Role - Number - Revision
CRSP - MCA - 00 - 00 - DR - C - 2001 - P4

Project Number: A2156

Status code & Description: S4

INFILTRATION TRENCH

INFILTRATION TRENCH

Rainwater Harvesting water tank. Refer to M&E specification for requirements. (to be detailed upon design development)

Retaining wall drainage required (to be detailed at detailed design stage)

Attenuation Tank (Polystorm Extra (PSM3) or Similar Approved).
Tank specification to allow for proposed installation depth (See manhole schedule & Proposed levels) as well as proposed storage volume & tank depth.
Tank Depth 1.05m (5 layers of 0.21m creates)
Tank to have minimum storage Volume of 430m3.
Please refer to manufactures guidelines for construction details.
Tank to be wrapped in a permeable membrane / geotextile

No Channel drains / Gullies indicated at this stage

Internal Pop Ups / drainage connections / rainwater downpipes not illustrated

No Channel drains / Gullies indicated at this stage

Internal Foul drainage required

Internal Pop Ups / drainage connections / rainwater downpipes not illustrated

Retaining wall drainage required (to be detailed at detailed design stage)

INFILTRATION TRENCH

RELOCATED BADGER SETT

30M EXCLUSION ZONE

Porous surfacing beneath pitch allowing for infiltration potential

Synthetic pitch lateral drains at 6m centres

SUDS PERMEABLE SURFACING

No Channel drains / Gullies indicated at this stage

Tank to have minimum storage Volume of 475m3.
Please refer to manufactures guidelines for construction details.
Tank to be wrapped in a permeable membrane / geotextile

S1-1/5 Flow control Manhole - Hydrobrake Chamber
Unit Ref: MD-SHE-0359-8000-1000-8000 (Hydro International)
Design head - 1.0m
Design Flow Q - 80l/s

No Channel drains / Gullies indicated at this stage

4no. bus parking spaces

160 car parking spaces

AUTOMATIC VEHICLE BARRIER

No Channel drains / Gullies indicated at this stage

S1-1/14 Flow control Manhole - Hydrobrake Chamber
Unit Ref: MD-SHE-0395-1000-1000-1000 (Hydro International)
Design head - 1.0m
Design Flow Q - 100l/s

No Channel drains / Gullies indicated at this stage

INFILTRATION TRENCH

S3-1/9 Flow control

Royal School Cavan

Kilnavara Crescent

LEGEND

- PROPOSED STORM SEWER
- PROPOSED FOUL SEWER
- PROPOSED PERFORATED FILTER / LAND DRAIN / INFILTRATION TRENCH
- Fxxx PROPOSED FOUL MANHOLE
- Sxxx PROPOSED STORM MANHOLE
- 600mm Dia CATCHPIT CHAMBERS (LAND DRAINAGE)
- ATTENUATION TANK
- HEADWALL
- SITE BOUNDARY

Notes:

1. This drawing should be read in relation to the subject of the title. All other details illustrated on the drawing (e.g. The proposed layout) are indicative only and are subject to change. For updated details of the proposed layout and finished levels see Proposed Layout & Levels drawings.
2. The mapping illustrated on this drawing is taken from the existing topographical survey received from the client with amendments made to illustrate the proposed site layout for the scheme.
3. All storm & foul drainage designed in accordance with IS EN 752: 2008
4. Drainage works to carried out in accordance with Civil Engineering Specification for the Water Industry 6th Edition; published by WRC plc 2004.
5. Manholes to be constructed from precast concrete rings (unless otherwise stated / approved) to IS EN 1917 & BS 5911-3 with a D400 heavy duty cover for driveway/carpark and B125 for remaining surface (in accordance with IS EN 124:1994).
6. Pipes to be uPVC to IS EN 1401-1 for sizes Ø100 & Ø150mm. Pipes to be uPVC to WIS 4-35-01, for sizes Ø225 & Ø300mm.
7. Pipes for storm drainage to be proprietary plastic twin wall design
8. All measurements shown are in meters, and all levels are to ordnance datum unless otherwise indicated.
9. All Coordinates are to Irish Grid, unless otherwise noted.
10. For indicative location for all sewers and services please see Existing Site Services drawings. It shall be the contractor's responsibility to verify position and level prior to commencing construction. The contractor shall also be responsible for the arrangement of all necessary permits as required prior to commencement.
11. Min cover to Clay / Concrete drainage Pipes to be 1200mm under roads/footpaths and 600mm under landscaping. Min cover to Thermoplastic drainage Pipes to be 900mm under roads/footpaths and 600mm under landscaping. Where adequate cover cannot be provided pipes are to be protected with a lean mix concrete surround.
12. Changes in invert levels at a manhole (not requiring a drop manhole) shall be graded evenly through the manhole in order to avoid an abrupt change in invert level.
13. Where concrete surround is specified for pipes the pipes shall be first wrapped with an approved plastic membrane. Flexibility at joints shall be maintained by insertion of 25mm compressible joint board at each joint to break the continuity of the concrete surround. However the plastic membrane shall be continuous at these locations to protect rubber jointing rings from ingress of grout. The minimum thickness of the concrete surround should be 150mm or the diameter of the pipe whichever is the greater.
14. Compressible boards to be laid between crossing pipes where cover between pipes limited.
14. All in-curtilage pipes to be minimum ø100mm unless otherwise indicated.
15. A drain which is at a level lower than the foundations of a building should either
(a) where the trench is within 1m of the foundations, be filled with concrete up to the level of the underside of the foundations,
(b) where the trench is more than 1m from the foundations, be filled with concrete up to a level, below the level of the underside of the foundations, equal to the distance from the foundations less 150mm,
16. Existing sewers to be maintained and kept in service at all times.
17. This drawing should be read in conjunction with proposed drainage schedule drawings, construction details drawings and all other relevant drawings.
18. All internal pipework extending outside the building must be constructed with rocker pipes through the foundations/ trench fill as per construction details.
19. To allow connection to the invert levels of the proposed drainage network a change in pipe gradient may be required. To allow this all internal infrastructure (sinks, dishwasher's, floor gullies etc, including rainwater downpipes) to be connected to a back inlet bottle gully prior to connection to the proposed drainage as per construction details with the exception of WCs.
20. To achieve invert levels of the foul drainage network all WC internal infrastructure must be connected via backdrop manhole (if required) as per construction details drawings, or similar approved.
21. All back inlet bottle gullies for foul drainage to be capped with closed lid with same strength class as adjacent manholes. Perforated lids will not be suitable.
22. Back inlet bottle gullies to be constructed directly adjacent to building provided construction achievable above foundations.
23. All drainage channels and outfalls to be constructed in accordance with manufactures specifications.
24. All details/ dimensions to be checked by the contractor. Any discrepancies to be reported to the engineer immediately.
25. Invert levels of catchpit chambers shown denote approximate invert levels of the lowest pipe and do not include for catchpit sump depth.

Rev	Issue Date	Description	App
P4	05/03/2024	Site Layout Amended	PC
P3	26/02/2024	Amendments to Accommodate Bridge	PA
P2	25/02/2024	Minor Amendments	PA

Status: FOR PLANNING

Client: Cavan County Council

Project: Cavan Regional Sports Campus

Drawing: Proposed Drainage Layout - Sheet 2

Scale: 1:500 @ A1

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Drawn	JG	Checked	PA
Date	23/02/2024	Date	23/02/2024
Approved	PA		
Date	23/02/2024		

Project - Organisation - Zone - Level - Type - Role - Number - Revision
CRSP - MCA - 00 - 00 - DR - C - 2002 - P4

Project Number: A2156

Status code & Description: S4

Internal Pop Ups / drainage connections / rainwater downpipes not illustrated

Internal Pop Ups / drainage connections / rainwater downpipes not illustrated

Porous surfacing beneath pitch allowing for infiltration potential

Synthetic pitch lateral drains at 6m centres

UDS PERMEABLE SURFACING

S1-1/14 Flow control Manhole - Hydrobrake Chamber
Unit Ref: MD-SHE-0395-1000-1000-1000 (Hydro International)
Design head - 1.0m
Design Flow Q - 100l/s

Attenuation Tank (Polystorm (PSM1) or Similar Approved).
Tank specification to allow for proposed installation depth (See manhole schedule & Proposed levels) as well as proposed storage volume & tank depth.
Tank Depth 0.8m (2 layers of 0.4m creates)
Tank to have minimum storage Volume of 152m3.
Please refer to manufactures guidelines for construction details.
Tank to be wrapped in an impermeable membrane

Klargester Class 1 Bypass Separator NSBE010 with alarm (or similar approved). Refer to manufacturers specification for inlet and outlet manhole infrastructure. Contractor to allow for all necessary Structural Concrete Bedding / surround / Cover Slab as necessary for specific loading conditions

S2-1/10 Flow control Manhole - Hydrobrake Chamber
Unit Ref: MD-SHE-0146-1000-1000-1000 (Hydro International)
Design head - 1.0m
Design Flow Q - 10l/s

Precast Concrete Headwall and discharge to Cavan River

No Channel drains / Gullies indicated at this stage

No Channel drains / Gullies indicated at this stage

No Channel drains / Gullies indicated at this stage

INFILTRATION TRENCH

Klargester Class 1 Bypass Separator NSBE015 with alarm (or similar approved). Refer to manufacturers specification for inlet and outlet manhole infrastructure. Contractor to allow for all necessary Structural Concrete Bedding / surround / Cover Slab as necessary for specific loading conditions

Attenuation Tank (Polystorm Extra (PSM3) or Similar Approved).
Tank specification to allow for proposed installation depth (See manhole schedule & Proposed levels) as well as proposed storage volume & tank depth.
Tank Depth 0.84m (4 layers of 0.21m creates)
Tank to have minimum storage Volume of 168m3.
Please refer to manufactures guidelines for construction details.
Tank to be wrapped in an impermeable membrane

S3-1/9 Flow control Manhole - Hydrobrake Chamber
Unit Ref: MD-SHE-0199-2000-1000-2000 (Hydro International)
Design head - 1.0m
Design Flow Q - 20 l/s

Attenuation Tank (Polystorm Extra (PSM3) or Similar Approved).
Tank specification to allow for proposed installation depth (See manhole schedule & Proposed levels) as well as proposed storage volume & tank depth.
Tank Depth 1.05m (5 layers of 0.21m creates)
Tank to have minimum storage Volume of 1140m3.
Please refer to manufactures guidelines for construction details.
Tank to be wrapped in an impermeable membrane

Precast Concrete Headwall and discharge to Cavan River

S1-1/19 Flow control Manhole - Hydrobrake Chamber
Unit Ref: MD-SHE-0441-1300-1000-1300 (Hydro International)
Design head - 1.0m
Design Flow Q - 130l/s

Existing watercourse / ditch discharge location / flows to be maintained

Klargester Class 1 Bypass Separator NSBE020 with alarm (or similar approved). Refer to manufacturers

4no. bus parking spaces

150 car parking spaces

150 car parking spaces

CAVAN RIVER

PARK LANE

Royal School Cavan

Notes:

1. This drawing should be read in relation to the subject of the title. All other details illustrated on the drawing (e.g. The proposed layout) are indicative only and are subject to change. For updated details of the proposed layout and finished levels see Proposed Layout & Levels drawings.
2. The mapping illustrated on this drawing is taken from the existing topographical survey received from the client with amendments made to illustrate the proposed site layout for the scheme.
3. All storm & foul drainage designed in accordance with IS EN 752: 2008
4. Drainage works to carried out in accordance with Civil Engineering Specification for the Water Industry 6th Edition; published by WRC plc 2004.
5. Manholes to be constructed from precast concrete rings (unless otherwise stated / approved) to IS EN 1917 & BS 5911-3 with a D400 heavy duty cover for driveway/carpark and B125 for remaining surface (in accordance with IS EN 124:1994).
6. Pipes to be uPVC to IS EN 1401-1 for sizes Ø100 & Ø150mm. Pipes to be uPVC to WIS 4-35-01, for sizes Ø225 & Ø300mm.
7. Pipes for storm drainage to be proprietary plastic twin wall design
8. All measurements shown are in meters, and all levels are to ordnance datum unless otherwise indicated.
9. All Coordinates are to Irish Grid, unless otherwise noted.
10. For indicative location for all sewers and services please see Existing Site Services drawings. It shall be the contractor's responsibility to verify position and level prior to commencing construction. The contractor shall also be responsible for the arrangement of all necessary permits as required prior to commencement.
11. Min cover to Clay / Concrete drainage Pipes to be 1200mm under roads/footpaths and 600mm under landscaping. Min cover to Thermoplastic drainage Pipes to be 900mm under roads/footpaths and 600mm under landscaping. Where adequate cover cannot be provided pipes are to be protected with a lean mix concrete surround.
12. Changes in invert levels at a manhole (not requiring a drop manhole) shall be graded evenly through the manhole in order to avoid an abrupt change in invert level.
13. Where concrete surround is specified for pipes the pipes shall be first wrapped with an approved plastic membrane. Flexibility at joints shall be maintained by insertion of 25mm compressible joint board at each joint to break the continuity of the concrete surround. However the plastic membrane shall be continuous at these locations to protect rubber jointing rings from ingress of grout. The minimum thickness of the concrete surround should be 150mm or the diameter of the pipe whichever is the greater.
14. Compressible boards to be laid between crossing pipes where cover between pipes limited.
15. All in-curtilage pipes to be minimum ø100mm unless otherwise indicated.
16. A drain which is at a level lower than the foundations of a building should either
    (a) where the trench is within 1m of the foundations, be filled with concrete up to the level of the underside of the foundations,
    (b) where the trench is more than 1m from the foundations, be filled with concrete up to a level, below the level of the underside of the foundations, equal to the distance from the foundations less 150mm,
17. Existing sewers to be maintained and kept in service at all times.
18. This drawing should be read in conjunction with proposed drainage schedule drawings, construction details drawings and all other relevant drawings.
19. All internal pipework extending outside the building must be constructed with rocker pipes through the foundations/ trench fill as per construction details.
20. To allow connection to the invert levels of the proposed drainage network a change in pipe gradient may be required. To allow this all internal infrastructure (sinks, dishwasher's, floor gullies etc, including rainwater downpipes) to be connected to a back inlet bottle gully prior to connection to the proposed drainage as per construction details with the exception of WCs.
21. To achieve invert levels of the foul drainage network all WC internal infrastructure must be connected via backdrop manhole (if required) as per construction details drawings, or similar approved.
22. All back inlet bottle gullies for foul drainage to be capped with closed lid with same strength class as adjacent manholes. Perforated lids will not be suitable.
23. Back inlet bottle gullies to be constructed directly adjacent to building provided construction achievable above foundations.
24. All drainage channels and outfalls to be constructed in accordance with manufactures specifications.
25. All details/ dimensions to be checked by the contractor. Any discrepancies to be reported to the engineer immediately.
26. Invert levels of catchpit chambers shown denote approximate invert levels of the lowest pipe and do not include for catchpit sump depth.

LEGEND

- PROPOSED STORM SEWER
- PROPOSED FOUL SEWER
- PROPOSED PERFORATED FILTER / LAND DRAIN / INFILTRATION TRENCH
- Fxxx / Sxxx — PROPOSED FOUL MANHOLE / PROPOSED STORM MANHOLE
- 600mm Dia CATCHPIT CHAMBERS (LAND DRAINAGE)
- ATTENUATION TANK
- HEADWALL
- SITE BOUNDARY

Rev	Issue Date	Description	App
P4	05/03/2024	Site Layout Amended	PC
P3	26/02/2024	Amendments to Accommodate Bridge	PA
P2	25/02/2024	Minor Amendments	PA

Status	FOR PLANNING
Client	Cavan County Council
Project	Cavan Regional Sports Campus
Drawing	Proposed Drainage Layout - Sheet 3
Scale	1:500 @ A1

McAdam ENHANCING LOCAL COMMUNITIES

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Drawn	JG	Checked	PA	Approved	PA
Date	23/02/2024	Date	23/02/2024	Date	23/02/2024

Project	Organisation	Zone	Level	Type	Role	Number	Revision
CRSP	MCA	00	00	DR	C	2003	P4

Project Number	Status code & Description
A2156	S4

LEGEND

- PROPOSED STORM SEWER
- PROPOSED FOUL SEWER
- PROPOSED PERFORATED FILTER / LAND DRAIN / INFILTRATION TRENCH
- Fxxx — PROPOSED FOUL MANHOLE
- Sxxx — PROPOSED STORM MANHOLE
- 600mm Dia CATCHPIT CHAMBERS (LAND DRAINAGE)
- ATTENUATION TANK
- HEADWALL
- SITE BOUNDARY

Retaining wall drainage required (to be detailed at detailed design stage)

No Channel drains / Gullies indicated at this stage

No Channel drains / Gullies indicated at this stage

INFILTRATION TRENCH

INFILTRATION TRENCH

Internal Pop Ups / drainage connections / rainwater downpipes not illustrated

SUDS PERMEABLE SURFACING

S5-1/9 Flow control Manhole - Hydrobrake Chamber
Unit Ref: MD-SHE-0146-1000-1000-1000 (Hydro International)
Design head - 1.0m
Design Flow Q - 10l/s

Roof from stand to connect to land drainage

Internal Pop Ups / drainage connections / rainwater downpipes not illustrated

Porous surfacing sub base beneath pitch allowing for storage & infiltration

SUDS PERMEABLE SURFACING

Grass pitch lateral drains at 8m centres

INFILTRATION TRENCH

Grass pitch lateral drains at 8m centres

Porous surfacing sub base beneath pitch allowing for storage & infiltration

S5-5/3 Flow control Manhole - Hydrobrake Chamber
Unit Ref: MD-SHE-0146-1000-1000-1000 (Hydro International)
Design head - 1.0m
Design Flow Q - 10l/s

INFILTRATION TRENCH

INFILTRATION TRENCH

S5-1/6 Flow control Manhole - Hydrobrake Chamber
Unit Ref: MD-SHE-0146-1000-1000-1000 (Hydro International)
Design head - 1.0m
Design Flow Q - 10l/s

SUDS PERMEABLE SURFACING

Grass pitch lateral drains at 8m centres

Porous surfacing sub base beneath pitch allowing for storage & infiltration

Soakaway to receive flows from pitch land drainage restricted flows to natural catchment Greenfield Runoff Rates. Soakaway to allow for overflow to Cavan River in accordance with restrictions.

Perforated pipe to extent minimum 5m into stone soakaway allowing for effective dispersal of water. Perforated pipe to be surrounded in Permeable membrane to prevent ingress of sediment

Storm Water Discharge to Cavan River to be limited to Equivalent Greenfield Runoff Rates for entire site. See Proposed Drainage Assessment for flow calculations for all networks. All flows maintained within the below Greenfield Runoff Rates
Contributing Site Area - 25 Ha
QBar - 189.22l/s
1 in 1 Year - 160.83l/s
1 in 30 Year - 312.21l/s
1 in 100 Year - 368.97l/s

Precast Concrete Headwall and discharge to Cavan River

150 car parking spaces

Notes:

1. This drawing should be read in relation to the subject of the title. All other details illustrated on the drawing (e.g. The proposed layout) are indicative only and are subject to change. For updated details of the proposed layout and finished levels see Proposed Layout & Levels drawings.
2. The mapping illustrated on this drawing is taken from the existing topographical survey received from the client with amendments made to illustrate the proposed site layout for the scheme.
3. All storm & foul drainage designed in accordance with IS EN 752: 2008
4. Drainage works to carried out in accordance with Civil Engineering Specification for the Water Industry 6th Edition; published by WRC plc 2004.
5. Manholes to be constructed from precast concrete rings (unless otherwise stated / approved) to IS EN 1917 & BS 5911-3 with a D400 heavy duty cover for driveway/carpark and B125 for remaining surface (in accordance with IS EN 124:1994).
6. Pipes to be uPVC to IS EN 1401-1 for sizes Ø100 & Ø150mm. Pipes to be uPVC to WIS 4-35-01, for sizes Ø225 & Ø300mm.
7. Pipes for storm drainage to be proprietary plastic twin wall design
8. All measurements shown are in meters, and all levels are to ordnance datum unless otherwise indicated.
9. All Coordinates are to Irish Grid, unless otherwise noted.
10. For indicative location for all sewers and services please see Existing Site Services drawings. It shall be the contractor's responsibility to verify position and level prior to commencing construction. The contractor shall also be responsible for the arrangement of all necessary permits as required prior to commencement.
11. Min cover to Clay / Concrete drainage Pipes to be 1200mm under roads/footpaths and 600mm under landscaping. Min cover to Thermoplastic drainage Pipes to be 900mm under roads/footpaths and 600mm under landscaping. Where adequate cover cannot be provided pipes are to be protected with a lean mix concrete surround.
12. Changes in invert levels at a manhole (not requiring a drop manhole) shall be graded evenly through the manhole in order to avoid an abrupt change in invert level.
13. Where concrete surround is specified for pipes the pipes shall be first wrapped with an approved plastic membrane. Flexibility at joints shall be maintained by insertion of 25mm compressible joint board at each joint to break the continuity of the concrete surround. However the plastic membrane shall be continuous at these locations to protect rubber jointing rings from ingress of grout. The minimum thickness of the concrete surround should be 150mm or the diameter of the pipe whichever is the greater.
14. Compressible boards to be laid between crossing pipes where cover between pipes limited.
14. All in-curtilage pipes to be minimum ø100mm unless otherwise indicated.
15. A drain which is at a level lower than the foundations of a building should either
(a) where the trench is within 1m of the foundations, be filled with concrete up to the level of the underside of the foundations,
(b) where the trench is more than 1m from the foundations, be filled with concrete up to a level, below the level of the underside of the foundations, equal to the distance from the foundations less 150mm,
16. Existing sewers to be maintained and kept in service at all times.
17. This drawing should be read in conjunction with proposed drainage schedule drawings, construction details drawings and all other relevant drawings.
18. All internal pipework extending outside the building must be constructed with rocker pipes through the foundations/ trench fill as per construction details.
19. To allow connection to the invert levels of the proposed drainage network a change in pipe gradient may be required. To allow this all internal infrastructure (sinks, dishwasher's, floor gullies etc, including rainwater downpipes) to be connected to a back inlet bottle gully prior to connection to the proposed drainage as per construction details with the exception of WCs.
20. To achieve invert levels of the foul drainage network all WC internal infrastructure must be connected via backdrop manhole (if required) as per construction details drawings, or similar approved.
21. All back inlet bottle gullies for foul drainage to be capped with closed lid with same strength class as adjacent manholes. Perforated lids will not be suitable.
22. Back inlet bottle gullies to be constructed directly adjacent to building provided construction achievable above foundations.
23. All drainage channels and outfalls to be constructed in accordance with manufactures specifications.
24. All details/ dimensions to be checked by the contractor. Any discrepancies to be reported to the engineer immediately.
25. Invert levels of catchpit chambers shown denote approximate invert levels of the lowest pipe and do not include for catchpit sump depth.

Rev	Issue Date	Description	App
P4	05/03/2024	Site Layout Amended	PC
P3	26/02/2024	Amendments to Accommodate Bridge	PA
P2	25/02/2024	Minor Amendments	PA

Status	FOR PLANNING
Client	Cavan County Council
Project	Cavan Regional Sports Campus
Drawing	Proposed Drainage Layout - Sheet 4
Scale	1:500 @ A1

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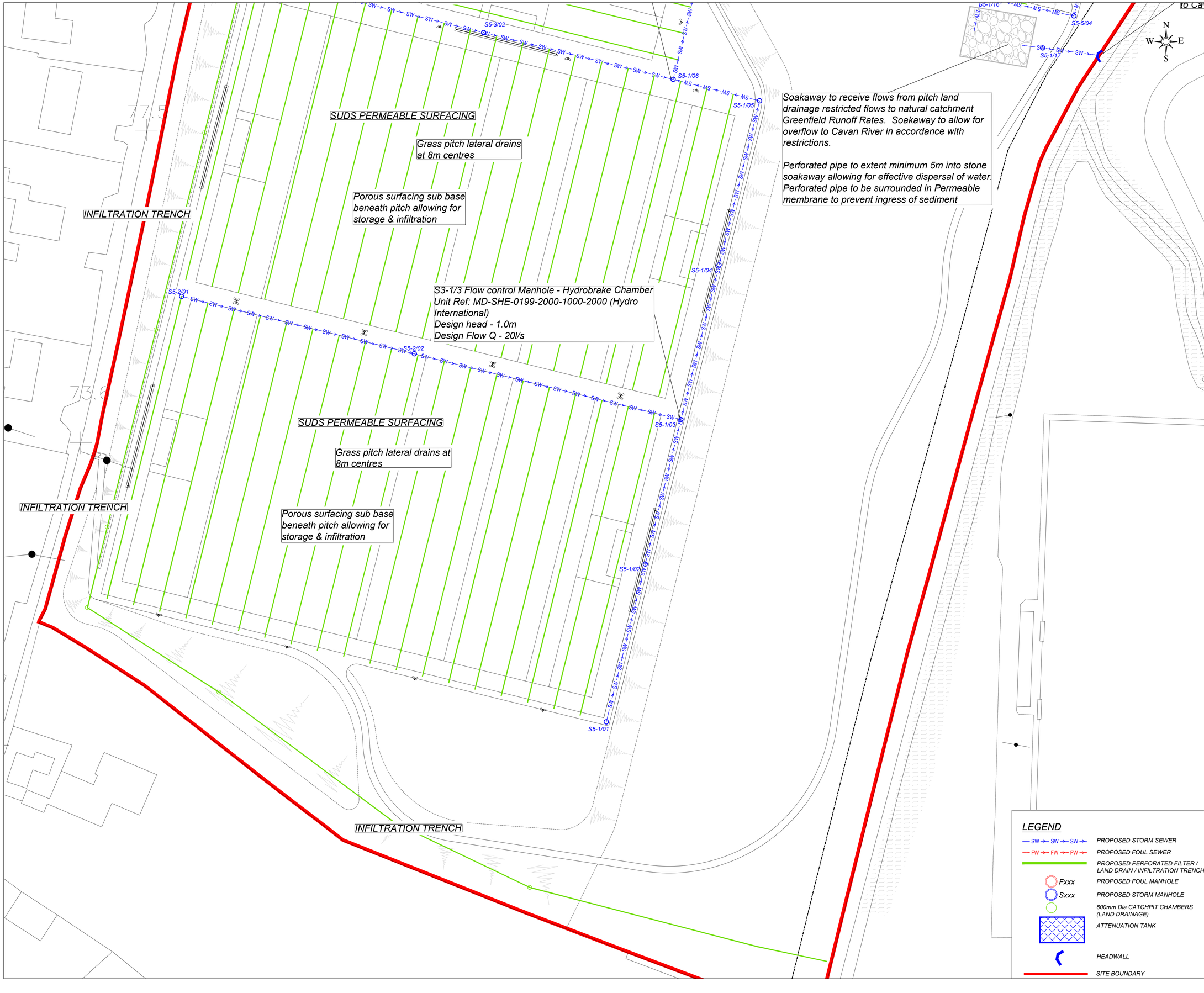
Drawn	JG	Checked	PA
Date	23/02/2024	Date	23/02/2024
Approved	PA		
Date	23/02/2024		

Project	Organisation	Zone	Level	Type	Role	Number	Revision
CRSP	MCA	00	00	DR	C	2004	P4

Project Number	Status code & Description
A2156	S4



Notes:

1. *This drawing should be read in relation to the subject of the title. All other details illustrated on the drawing (e.g. The proposed layout) are indicative only and are subject to change. For updated details of the proposed layout and finished levels see Proposed Layout & Levels drawings.*
2. *The mapping illustrated on this drawing is taken from the existing topographical survey received from the client with amendments made to illustrate the proposed site layout for the scheme.*
3. *All storm & foul drainage designed in accordance with IS EN 752: 2008*
4. *Drainage works to carried out in accordance with Civil Engineering Specification for the Water Industry 6th Edition; published by WRC plc 2004.*
5. *Manholes to be constructed from precast concrete rings (unless otherwise stated / approved) to IS EN 1917 & BS 5911-3 with a D400 heavy duty cover for driveway/carpark and B125 for remaining surface (in accordance with IS EN 124:1994).*
6. *Pipes to be uPVC to IS EN 1401-1 for sizes Ø100 & Ø150mm. Pipes to be uPVC to WIS 4-35-01, for sizes Ø225 & Ø300mm.*
7. *Pipes for storm drainage to be proprietary plastic twin wall design*
8. *All measurements shown are in meters, and all levels are to ordnance datum unless otherwise indicated.*
9. *All Coordinates are to Irish Grid, unless otherwise noted.*
10. *For indicative location for all sewers and services please see Existing Site Services drawings. It shall be the contractor's responsibility to verify position and level prior to commencing construction. The contractor shall also be responsible for the arrangement of all necessary permits as required prior to commencement.*
11. *Min cover to Clay / Concrete drainage Pipes to be 1200mm under roads/footpaths and 600mm under landscaping. Min cover to Thermoplastic drainage Pipes to be 900mm under roads/footpaths and 600mm under landscaping. Where adequate cover cannot be provided pipes are to be protected with a lean mix concrete surround.*
12. *Changes in invert levels at a manhole (not requiring a drop manhole) shall be graded evenly through the manhole in order to avoid an abrupt change in invert level.*
13. *Where concrete surround is specified for pipes the pipes shall be first wrapped with an approved plastic membrane. Flexibility at joints shall be maintained by insertion of 25mm compressible joint board at each joint to break the continuity of the concrete surround. However the plastic membrane shall be continuous at these locations to protect rubber jointing rings from ingress of grout. The minimum thickness of the concrete surround should be 150mm or the diameter of the pipe whichever is the greater.*
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    (a) where the trench is within 1m of the foundations, be filled with concrete up to the level of the underside of the foundations,
    (b) where the trench is more than 1m from the foundations, be filled with concrete up to a level, below the level of the underside of the foundations, equal to the distance from the foundations less 150mm,
16. *Existing sewers to be maintained and kept in service at all times.*
17. *This drawing should be read in conjunction with proposed drainage schedule drawings, construction details drawings and all other relevant drawings.*
18. *All internal pipework extending outside the building must be constructed with rocker pipes through the foundations/ trench fill as per construction details.*
19. *To allow connection to the invert levels of the proposed drainage network a change in pipe gradient may be required. To allow this all internal infrastructure (sinks, dishwasher's, floor gullies etc, including rainwater downpipes) to be connected to a back inlet bottle gully prior to connection to the proposed drainage as per construction details with the exception of WCs.*
20. *To achieve invert levels of the foul drainage network all WC internal infrastructure must be connected via backdrop manhole (if required) as per construction details drawings, or similar approved.*
21. *All back inlet bottle gullies for foul drainage to be capped with closed lid with same strength class as adjacent manholes. Perforated lids will not be suitable.*
22. *Back inlet bottle gullies to be constructed directly adjacent to building provided construction achievable above foundations.*
23. *All drainage channels and outfalls to be constructed in accordance with manufactures specifications.*
24. *All details/ dimensions to be checked by the contractor. Any discrepancies to be reported to the engineer immediately.*
25. *Invert levels of catchpit chambers shown denote approximate invert levels of the lowest pipe and do not include for catchpit sump depth.*

LEGEND

- *PROPOSED STORM SEWER*
- *PROPOSED FOUL SEWER*
- *PROPOSED PERFORATED FILTER / LAND DRAIN / INFILTRATION TRENCH*
- Fxxx — *PROPOSED FOUL MANHOLE*
- Sxxx — *PROPOSED STORM MANHOLE*
- *600mm Dia CATCHPIT CHAMBERS (LAND DRAINAGE)*
- *ATTENUATION TANK*
- *HEADWALL*
- *SITE BOUNDARY*

Rev	Issue Date	Description	App
P4	05/03/2024	Site Layout Amended	PC
P3	26/02/2024	Amendments to Accommodate Bridge	PA
P2	25/02/2024	Minor Amendments	PA

Status	FOR PLANNING
Client	Cavan County Council
Project	Cavan Regional Sports Campus
Drawing	Proposed Drainage Layout - Sheet 5
Scale	1:500 @ A1

McAdam ENHANCING LOCAL COMMUNITIES

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Drawn	JG	Checked	PA	Approved	PA
Date	23/02/2024	Date	23/02/2024	Date	23/02/2024

Project	Organisation	Zone	Level	Type	Role	Number	Revision
CRSP	MCA	00	00	DR	C	2005	P4

Project Number	Status code & Description
A2156	S4

indicated at this stage

INFILTRATION TRENCH

INFILTRATION TRENCH

150 cas parking spaces

INFILTRATION TRENCH

SUDS PERMEABLE SURFACING

Roof from stand to connect to land drainage

Internal Pop Ups / drainage connections / rainwater downpipes not illustrated

Porous surfacing sub base beneath pitch allowing for storage & infiltration

Grass pitch lateral drains at 8m centres

S5-5/3 Flow control Manhole - Hydrobrake Chamber
Unit Ref: MD-SHE-0146-1000-1000-1000 (Hydro International)
Design head - 1.0m
Design Flow Q - 10l/s

INFILTRATION TRENCH

Storm Water Discharge to Cavan River to be limited to Equivalent Greenfield Runoff Rates for entire site. See Proposed Drainage Assessment for flow calculations for all networks. All flows maintained within the below Greenfield Runoff Rates
Contributing Site Area - 25 Ha
QBar - 189.22l/s
1 in 1 Year - 160.83l/s
1 in 30 Year - 312.21l/s
1 in 100 Year - 368.97l/s

Soakaway to receive flows from pitch land drainage restricted flows to natural catchment Greenfield Runoff Rates. Soakaway to allow for overflow to Cavan River in accordance with restrictions.

Perforated pipe to extent minimum 5m into stone soakaway allowing for effective dispersal of water. Perforated pipe to be surrounded in Permeable membrane to prevent ingress of sediment

Precast Concrete Headwall and discharge to Cavan River

INFILTRATION TRENCH

S3-1/9 Flow control Manhole - Hydrobrake Chamber
Unit Ref: MD-SHE-0199-2000-1000-2000 (Hydro International)
Design head - 1.0m
Design Flow Q - 20 l/s

Attenuation Tank (Polystorm Extra (PSM3) or Similar Approved).
Tank specification to allow for proposed installation depth (See manhole schedule & Proposed levels) as well as proposed storage volume & tank depth.
Tank Depth 1.05m (5 layers of 0.21m creates)
Tank to have minimum storage Volume of 1140m3.
Please refer to manufactures guidelines for construction details.
Tank to be wrapped in an impermeable membrane

Precast Concrete Headwall and discharge to Cavan River

S1-1/19 Flow control Manhole - Hydrobrake Chamber
Unit Ref: MD-SHE-0441-1300-1000-1300 (Hydro International)
Design head - 1.0m
Design Flow Q - 130l/s

Existing watercourse / ditch discharge location / flows to be maintained

Klargester Class 1 Bypass Separator NSBE020 with alarm (or similar approved). Refer to manufacturers specification for inlet and outlet manhole infrastructure. Contractor to allow for all necessary Structural Concrete Bedding / surround / Cover Slab as necessary for specific loading conditions

Soakaway to receive flows from pitch land drainage restricted flows to natural catchment Greenfield Runoff Rates. Soakaway to allow for overflow to Cavan River in accordance with restrictions.

Perforated pipe to extent minimum 5m into stone soakaway allowing for effective dispersal of water. Perforated pipe to be surrounded in Permeable membrane to prevent ingress of sediment

Foul gravity connection to existing private pumping station.

Sports Ground

effni Park

Notes:

1. This drawing should be read in relation to the subject of the title. All other details illustrated on the drawing (e.g. The proposed layout) are indicative only and are subject to change. For updated details of the proposed layout and finished levels see Proposed Layout & Levels drawings.
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P2	25/02/2024	Minor Amendments	PA

Status: FOR PLANNING

Client: Cavan County Council

Project: Cavan Regional Sports Campus

Drawing: Proposed Drainage Layout - Sheet 5

Scale: 1:500 @ A1

McAdam ENHANCING LOCAL COMMUNITIES

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Drawn	Checked	Approved
JG	PA	PA
Date 23/02/2024	Date 23/02/2024	Date 23/02/2024

Project - Organisation - Zone - Level - Type - Role - Number - Revision
CRSP - MCA - 00 - 00 - DR - C - 2006 - P4

Project Number: A2156

Status code & Description: S4

Appendix E – Proposed Storm Design – Un-Restricted Runoff Calculations

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for 2024-02-22 STORM NETWORK 1.SWS

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	16.900	Add Flow / Climate Change (%)	0
Ratio R	0.328	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	0.000
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	0.75
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for 2024-02-22 STORM NETWORK 1.SWS

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	2.375	4-8	3.876	8-12	0.350

Total Area Contributing (ha) = 6.601

Total Pipe Volume (m³) = 215.659

Network Design Table for 2024-02-22 STORM NETWORK 1.SWS

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	55.899	0.543	102.9	0.088	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.001	30.175	0.403	74.9	0.118	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.000	51.511	0.500	103.0	0.126	5.00	0.0	0.600	o	225	Pipe/Conduit	
2.001	87.382	0.637	137.2	0.214	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.94	74.386	0.088	0.0	0.0	0.0	0.99	17.5	11.9
1.001	50.00	6.27	73.768	0.206	0.0	0.0	0.0	1.51	60.2	27.9
2.000	50.00	5.67	74.150	0.126	0.0	0.0	0.0	1.29	51.2	17.1
2.001	48.34	6.97	73.575	0.340	0.0	0.0	0.0	1.11	44.3«	44.5

Network Design Table for 2024-02-22 STORM NETWORK 1.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
3.000	84.381	0.563	149.9	0.345	5.00	0.0	0.600	o	300	Pipe/Conduit	
3.001	53.312	0.355	150.2	0.075	0.00	0.0	0.600	o	300	Pipe/Conduit	
3.002	44.032	0.294	149.8	0.106	0.00	0.0	0.600	o	300	Pipe/Conduit	
2.002	14.415	0.096	150.2	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
2.003	26.678	0.178	149.9	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.002	35.038	0.234	149.7	0.201	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.003	24.148	1.072	22.5	0.045	0.00	0.0	0.600	o	375	Pipe/Conduit	
4.000	48.000	0.473	101.5	0.404	5.00	0.0	0.600	o	300	Pipe/Conduit	
4.001	55.632	2.325	23.9	0.404	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.004	21.464	1.012	21.2	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.005	21.358	0.719	29.7	0.011	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.006	6.629	0.044	150.7	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
5.000	37.474	0.364	103.0	0.035	5.00	0.0	0.600	o	150	Pipe/Conduit	
5.001	37.527	0.250	150.1	0.033	0.00	0.0	0.600	o	225	Pipe/Conduit	
5.002	29.684	0.198	149.9	0.013	0.00	0.0	0.600	o	225	Pipe/Conduit	
5.003	29.327	0.196	149.6	0.221	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
3.000	50.00	6.10	74.075	0.345	0.0	0.0	0.0	1.28	90.6	46.7
3.001	48.92	6.79	73.512	0.420	0.0	0.0	0.0	1.28	90.5	55.6
3.002	47.16	7.36	73.157	0.526	0.0	0.0	0.0	1.28	90.7	67.2
2.002	46.69	7.53	72.788	0.866	0.0	0.0	0.0	1.48	163.1	109.5
2.003	45.84	7.83	72.692	0.866	0.0	0.0	0.0	1.48	163.2	109.5
1.002	44.79	8.22	72.514	1.273	0.0	0.0	0.0	1.48	163.3	154.4
1.003	44.52	8.33	72.280	1.318	0.0	0.0	0.0	3.83	423.2	158.9
4.000	50.00	5.51	74.081	0.404	0.0	0.0	0.0	1.56	110.3	54.7
4.001	50.00	5.80	73.608	0.808	0.0	0.0	0.0	3.23	228.1	109.4
1.004	44.29	8.42	71.208	2.126	0.0	0.0	0.0	3.95	436.2	255.0
1.005	44.02	8.52	70.121	2.137	0.0	0.0	0.0	3.34	368.4	255.0
1.006	43.86	8.59	69.327	2.137	0.0	0.0	0.0	1.65	263.1	255.0
5.000	50.00	5.63	69.659	0.035	0.0	0.0	0.0	0.99	17.5	4.7
5.001	50.00	6.22	69.220	0.068	0.0	0.0	0.0	1.06	42.3	9.2
5.002	49.27	6.68	68.970	0.081	0.0	0.0	0.0	1.07	42.4	10.8
5.003	47.83	7.14	68.772	0.302	0.0	0.0	0.0	1.07	42.4	39.1

Network Design Table for 2024-02-22 STORM NETWORK 1.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.007	29.032	0.194	149.6	0.260	0.00	0.0	0.600	o	525	Pipe/Conduit	
1.008	29.979	0.200	149.9	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
1.009	5.748	0.038	151.3	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
1.010	38.132	0.254	150.1	0.059	0.00	0.0	0.600	o	525	Pipe/Conduit	
1.011	19.446	0.130	149.6	0.044	0.00	0.0	0.600	o	525	Pipe/Conduit	
6.000	37.116	0.247	150.3	0.229	5.00	0.0	0.600	o	300	Pipe/Conduit	
6.001	37.117	0.247	150.3	0.229	0.00	0.0	0.600	o	300	Pipe/Conduit	
6.002	6.300	0.042	150.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
6.003	29.971	0.200	149.9	0.284	0.00	0.0	0.600	o	375	Pipe/Conduit	
6.004	19.972	0.133	150.2	0.100	0.00	0.0	0.600	o	375	Pipe/Conduit	
6.005	24.665	0.164	150.4	0.100	0.00	0.0	0.600	o	375	Pipe/Conduit	
6.006	5.721	0.038	150.6	0.100	0.00	0.0	0.600	o	375	Pipe/Conduit	
6.007	11.904	0.079	150.7	0.060	0.00	0.0	0.600	o	375	Pipe/Conduit	
6.008	26.071	0.174	149.8	0.040	0.00	0.0	0.600	o	375	Pipe/Conduit	
6.009	26.072	0.174	149.8	0.044	0.00	0.0	0.600	o	375	Pipe/Conduit	
7.000	18.858	0.126	149.7	0.124	5.00	0.0	0.600	o	225	Pipe/Conduit	
6.010	20.606	0.317	65.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.007	43.21	8.86	68.276	2.699	0.0	0.0	0.0	1.83	395.9	315.9
1.008	42.57	9.13	68.082	2.699	0.0	0.0	0.0	1.83	395.6	315.9
1.009	42.45	9.18	67.882	2.699	0.0	0.0	0.0	1.82	393.8	315.9
1.010	41.68	9.53	67.844	2.758	0.0	0.0	0.0	1.83	395.3	315.9
1.011	41.29	9.71	67.590	2.802	0.0	0.0	0.0	1.83	396.0	315.9
6.000	50.00	5.48	69.575	0.229	0.0	0.0	0.0	1.28	90.5	31.0
6.001	50.00	5.97	69.253	0.458	0.0	0.0	0.0	1.28	90.5	62.0
6.002	50.00	6.05	69.006	0.458	0.0	0.0	0.0	1.28	90.6	62.0
6.003	50.00	6.39	68.889	0.742	0.0	0.0	0.0	1.48	163.2	100.5
6.004	49.50	6.61	68.689	0.842	0.0	0.0	0.0	1.48	163.1	112.9
6.005	48.60	6.89	68.556	0.942	0.0	0.0	0.0	1.48	162.9	124.0
6.006	48.40	6.96	68.392	1.042	0.0	0.0	0.0	1.47	162.8	136.6
6.007	47.98	7.09	68.354	1.102	0.0	0.0	0.0	1.47	162.8	143.2
6.008	47.10	7.38	68.275	1.142	0.0	0.0	0.0	1.48	163.2	145.7
6.009	46.26	7.68	68.101	1.186	0.0	0.0	0.0	1.48	163.2	148.6
7.000	50.00	5.29	69.575	0.124	0.0	0.0	0.0	1.07	42.4	16.8
6.010	45.83	7.83	67.927	1.310	0.0	0.0	0.0	2.25	248.6	162.6

Network Design Table for 2024-02-22 STORM NETWORK 1.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.012	5.035	0.034	148.1	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
8.000	31.472	0.306	102.8	0.056	5.00	0.0	0.600	o	150	Pipe/Conduit	
8.001	43.103	0.287	150.2	0.071	0.00	0.0	0.600	o	225	Pipe/Conduit	
8.002	27.464	0.183	150.0	0.041	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.013	11.942	0.080	149.3	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
9.000	67.508	0.675	100.0	0.766	5.00	0.0	0.600	o	375	Pipe/Conduit	
9.001	66.070	1.032	64.0	0.524	0.00	0.0	0.600	o	375	Pipe/Conduit	
9.002	4.258	0.268	15.9	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.014	29.652	0.476	62.3	0.055	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.015	56.811	2.727	20.8	0.051	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.016	18.481	2.718	6.8	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.017	34.921	0.116	301.0	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	
10.000	30.005	0.291	103.1	0.065	5.00	0.0	0.600	o	225	Pipe/Conduit	
10.001	55.355	0.369	150.0	0.071	0.00	0.0	0.600	o	225	Pipe/Conduit	
10.002	13.756	0.092	149.5	0.025	0.00	0.0	0.600	o	225	Pipe/Conduit	
10.003	19.047	0.127	150.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.012	41.21	9.75	67.385	4.112	0.0	0.0	0.0	2.00	565.2	458.9
8.000	50.00	5.53	69.830	0.056	0.0	0.0	0.0	0.99	17.5	7.6
8.001	50.00	6.20	69.449	0.127	0.0	0.0	0.0	1.06	42.3	17.2
8.002	49.43	6.63	69.162	0.168	0.0	0.0	0.0	1.07	42.4	22.5
1.013	40.99	9.85	67.351	4.280	0.0	0.0	0.0	1.99	562.9	475.2
9.000	50.00	5.62	70.481	0.766	0.0	0.0	0.0	1.81	200.1	103.7
9.001	50.00	6.11	69.731	1.290	0.0	0.0	0.0	2.27	250.5	174.7
9.002	50.00	6.12	68.699	1.290	0.0	0.0	0.0	4.57	504.2	174.7
1.014	40.66	10.01	67.271	5.625	0.0	0.0	0.0	3.09	873.4	619.4
1.015	40.30	10.19	66.795	5.676	0.0	0.0	0.0	5.35	1513.0	619.5
1.016	40.24	10.22	64.068	5.676	0.0	0.0	0.0	9.38	2651.2	619.5
1.017	39.60	10.54	61.125	5.676	0.0	0.0	0.0	1.80	1145.5	619.5
10.000	50.00	5.39	64.434	0.065	0.0	0.0	0.0	1.29	51.2	8.8
10.001	50.00	6.25	64.068	0.136	0.0	0.0	0.0	1.07	42.4	18.4
10.002	49.98	6.47	63.699	0.161	0.0	0.0	0.0	1.07	42.4	21.8
10.003	49.00	6.77	63.607	0.161	0.0	0.0	0.0	1.07	42.4	21.8

Network Design Table for 2024-02-22 STORM NETWORK 1.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
11.000	39.165	0.396	98.9	0.151	5.00	0.0	0.600	o	225	Pipe/Conduit	
10.004	16.000	0.107	149.5	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
12.000	15.717	0.153	102.7	0.018	5.00	0.0	0.600	o	150	Pipe/Conduit	
12.001	6.253	0.042	148.9	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
12.002	10.221	0.068	150.3	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
12.003	13.656	0.152	89.8	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
12.004	29.705	0.198	150.0	0.032	0.00	0.0	0.600	o	225	Pipe/Conduit	
12.005	13.626	0.091	149.7	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
12.006	12.951	0.086	150.6	0.036	0.00	0.0	0.600	o	225	Pipe/Conduit	
12.007	36.971	0.931	39.7	0.044	0.00	0.0	0.600	o	225	Pipe/Conduit	
12.008	36.971	0.915	40.4	0.047	0.00	0.0	0.600	o	225	Pipe/Conduit	
12.009	35.175	0.613	57.4	0.048	0.00	0.0	0.600	o	225	Pipe/Conduit	
12.010	39.164	0.450	87.0	0.212	0.00	0.0	0.600	o	375	Pipe/Conduit	
10.005	16.000	0.271	59.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
13.000	39.154	0.395	99.1	0.100	5.00	0.0	0.600	o	225	Pipe/Conduit	
10.006	16.000	0.400	40.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
11.000	50.00	5.50	64.298	0.151	0.0	0.0	0.0	1.31	52.3	20.4
10.004	48.21	7.02	63.480	0.312	0.0	0.0	0.0	1.07	42.4	40.7
12.000	50.00	5.26	67.222	0.018	0.0	0.0	0.0	0.99	17.5	2.4
12.001	50.00	5.36	66.994	0.018	0.0	0.0	0.0	1.07	42.5	2.4
12.002	50.00	5.52	66.952	0.018	0.0	0.0	0.0	1.06	42.3	2.4
12.003	50.00	5.69	66.884	0.018	0.0	0.0	0.0	1.38	54.9	2.4
12.004	50.00	6.15	66.732	0.050	0.0	0.0	0.0	1.07	42.4	6.8
12.005	50.00	6.36	66.534	0.050	0.0	0.0	0.0	1.07	42.4	6.8
12.006	49.65	6.57	66.443	0.086	0.0	0.0	0.0	1.06	42.3	11.6
12.007	48.69	6.86	66.357	0.130	0.0	0.0	0.0	2.08	82.8	17.1
12.008	47.76	7.16	65.426	0.177	0.0	0.0	0.0	2.06	82.1	22.9
12.009	46.76	7.50	64.511	0.225	0.0	0.0	0.0	1.73	68.8	28.5
12.010	45.82	7.84	63.823	0.437	0.0	0.0	0.0	1.94	214.6	54.2
10.005	45.46	7.97	63.298	0.749	0.0	0.0	0.0	2.05	144.9	92.2
13.000	50.00	5.50	63.572	0.100	0.0	0.0	0.0	1.31	52.2	13.5
10.006	45.18	8.07	63.027	0.849	0.0	0.0	0.0	2.49	176.2	103.9

Network Design Table for 2024-02-22 STORM NETWORK 1.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
14.000	39.165	0.396	98.9	0.076	5.00	0.0	0.600	o	150	Pipe/Conduit	
10.007	5.738	0.053	108.3	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
10.008	50.783	0.493	103.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.018	15.679	0.152	103.2	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
14.000	50.00	5.65	63.173	0.076	0.0	0.0	0.0	1.01	17.9	10.3
10.007	45.03	8.13	62.552	0.925	0.0	0.0	0.0	1.74	192.3	112.8
10.008	43.83	8.60	62.499	0.925	0.0	0.0	0.0	1.79	197.2	112.8
1.018	39.44	10.63	61.009	6.601	0.0	0.0	0.0	3.09	1962.7	705.0

Manhole Schedules for 2024-02-22 STORM NETWORK 1.SWS

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)
1-1/01	75.736	1.350	Open Manhole	1200	1.000	74.386	150				
1-1/02	75.750	1.982	Open Manhole	1200	1.001	73.768	225	1.000	73.843	150	
1-2/01	75.500	1.350	Open Manhole	1200	2.000	74.150	225				
1-2/02	75.500	1.925	Open Manhole	1200	2.001	73.575	225	2.000	73.650	225	75
1-3/01	75.500	1.425	Open Manhole	1200	3.000	74.075	300				
1-3/02	75.500	1.988	Open Manhole	1200	3.001	73.512	300	3.000	73.512	300	
1-3/03	75.475	2.318	Open Manhole	1200	3.002	73.157	300	3.001	73.157	300	
1-2/03	75.500	2.712	Open Manhole	1350	2.002	72.788	375	2.001	72.938	225	
								3.002	72.863	300	
1-2/04	75.500	2.808	Open Manhole	1350	2.003	72.692	375	2.002	72.692	375	
1-1/03	74.790	2.276	Open Manhole	1350	1.002	72.514	375	1.001	73.365	225	701
								2.003	72.514	375	
1-1/04	73.924	1.644	Open Manhole	1350	1.003	72.280	375	1.002	72.280	375	
1-4/01	75.581	1.500	Open Manhole	1200	4.000	74.081	300				
1-4/02	75.108	1.500	Open Manhole	1200	4.001	73.608	300	4.000	73.608	300	
1-1/05	72.783	1.575	Open Manhole	1350	1.004	71.208	375	1.003	71.208	375	
								4.001	71.283	300	
1-1/06	71.771	1.650	Open Manhole	1350	1.005	70.121	375	1.004	70.196	375	75
1-1/07	71.052	1.725	Open Manhole	1350	1.006	69.327	450	1.005	69.402	375	
1-5/01	71.009	1.350	Open Manhole	1200	5.000	69.659	150				
1-5/02	71.026	1.806	Open Manhole	1200	5.001	69.220	225	5.000	69.295	150	
1-5/03	71.055	2.085	Open Manhole	1200	5.002	68.970	225	5.001	68.970	225	
1-5/04	71.025	2.253	Open Manhole	1200	5.003	68.772	225	5.002	68.772	225	
1-1/08	71.035	2.759	Open Manhole	1500	1.007	68.276	525	1.006	69.283	450	932
								5.003	68.576	225	
1-1/09	70.920	2.838	Open Manhole	1500	1.008	68.082	525	1.007	68.082	525	
1-1/10	70.992	3.110	Open Manhole	1500	1.009	67.882	525	1.008	67.882	525	
1-1/11	70.897	3.053	Open Manhole	1500	1.010	67.844	525	1.009	67.844	525	
1-1/12	70.611	3.021	Open Manhole	1500	1.011	67.590	525	1.010	67.590	525	
1-6/01	71.000	1.425	Open Manhole	1200	6.000	69.575	300				
1-6/02	71.000	1.747	Open Manhole	1200	6.001	69.253	300	6.000	69.328	300	75
1-6/03	71.000	1.994	Open Manhole	1200	6.002	69.006	300	6.001	69.006	300	
1-6/04	71.000	2.111	Open Manhole	1350	6.003	68.889	375	6.002	68.964	300	
1-6/05	71.000	2.311	Open Manhole	1350	6.004	68.689	375	6.003	68.689	375	
1-6/06	71.000	2.444	Open Manhole	1350	6.005	68.556	375	6.004	68.556	375	
1-6/07	71.000	2.608	Open Manhole	1350	6.006	68.392	375	6.005	68.392	375	
1-6/08	71.000	2.646	Open Manhole	1350	6.007	68.354	375	6.006	68.354	375	
1-6/09	70.971	2.696	Open Manhole	1350	6.008	68.275	375	6.007	68.275	375	

Manhole Schedules for 2024-02-22 STORM NETWORK 1.SWS

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)
1-6/10	70.961	2.860	Open Manhole	1350	6.009	68.101	375	6.008	68.101	375	
1-7/01	71.000	1.425	Open Manhole	1200	7.000	69.575	225				
1-6/11	70.948	3.021	Open Manhole	1350	6.010	67.927	375	6.009	67.927	375	
								7.000	69.449	225	1372
1-1/13	70.669	3.284	Open Manhole	1500	1.012	67.385	600	1.011	67.460	525	
								6.010	67.610	375	
1-8/01	71.180	1.350	Open Manhole	1200	8.000	69.830	150				
1-8/02	70.956	1.507	Open Manhole	1200	8.001	69.449	225	8.000	69.524	150	
1-8/03	70.825	1.663	Open Manhole	1200	8.002	69.162	225	8.001	69.162	225	
1-1/14	70.407	3.056	Open Manhole	1500	1.013	67.351	600	1.012	67.351	600	
								8.002	68.979	225	1251
1-9/01	71.981	1.500	Open Manhole	1350	9.000	70.481	375				
1-9/02	71.306	1.575	Open Manhole	1350	9.001	69.731	375	9.000	69.806	375	75
1-9/03	70.274	1.575	Open Manhole	1350	9.002	68.699	375	9.001	68.699	375	
1-1/15	70.006	2.735	Open Manhole	1500	1.014	67.271	600	1.013	67.271	600	
								9.002	68.431	375	935
1-1/16	68.595	1.800	Open Manhole	1500	1.015	66.795	600	1.014	66.795	600	
1-1/17	65.868	1.800	Open Manhole	1500	1.016	64.068	600	1.015	64.068	600	
1-1/18	63.000	1.875	Open Manhole	1800	1.017	61.125	900	1.016	61.350	600	
1-10/01	65.784	1.350	Open Manhole	1200	10.000	64.434	225				
1-10/02	65.793	1.725	Open Manhole	1200	10.001	64.068	225	10.000	64.143	225	75
1-10/03	65.880	2.181	Open Manhole	1200	10.002	63.699	225	10.001	63.699	225	
1-10/04	65.677	2.070	Open Manhole	1200	10.003	63.607	225	10.002	63.607	225	
1-11/01	65.723	1.425	Open Manhole	1200	11.000	64.298	225				
1-10/05	65.327	1.847	Open Manhole	1200	10.004	63.480	225	10.003	63.480	225	
								11.000	63.902	225	422
1-12/01	68.572	1.350	Open Manhole	1200	12.000	67.222	150				
1-12/02	68.465	1.471	Open Manhole	1200	12.001	66.994	225	12.000	67.069	150	
1-12/03	68.535	1.583	Open Manhole	1200	12.002	66.952	225	12.001	66.952	225	
1-12/04	68.435	1.551	Open Manhole	1200	12.003	66.884	225	12.002	66.884	225	
1-12/05	68.157	1.425	Open Manhole	1200	12.004	66.732	225	12.003	66.732	225	
1-12/06	68.414	1.880	Open Manhole	1200	12.005	66.534	225	12.004	66.534	225	
1-12/07	68.220	1.777	Open Manhole	1200	12.006	66.443	225	12.005	66.443	225	
1-12/08	67.818	1.461	Open Manhole	1200	12.007	66.357	225	12.006	66.357	225	
1-12/09	66.851	1.425	Open Manhole	1200	12.008	65.426	225	12.007	65.426	225	
1-12/10	65.936	1.425	Open Manhole	1200	12.009	64.511	225	12.008	64.511	225	
1-12/11	65.323	1.500	Open Manhole	1350	12.010	63.823	375	12.009	63.898	225	
1-10/06	64.927	1.629	Open Manhole	1350	10.005	63.298	300	10.004	63.373	225	

Manhole Schedules for 2024-02-22 STORM NETWORK 1.SWS

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)
								12.010	63.373	375	150
1-13/01	64.922	1.350	Open Manhole	1200	13.000	63.572	225				
1-10/07	64.527	1.500	Open Manhole	1200	10.006	63.027	300	10.005	63.027	300	
								13.000	63.177	225	75
1-14/01	64.523	1.350	Open Manhole	1200	14.000	63.173	150				
1-10/08	64.127	1.575	Open Manhole	1350	10.007	62.552	375	10.006	62.627	300	
								14.000	62.777	150	
1-10/09	64.074	1.575	Open Manhole	1350	10.008	62.499	375	10.007	62.499	375	
1-1/19	63.000	1.991	Open Manhole	1800	1.018	61.009	900	1.017	61.009	900	
								10.008	62.006	375	472
HW01	63.000	2.143	Open Manhole	0		OUTFALL		1.018	60.857	900	

PIPELINE SCHEDULES for 2024-02-22 STORM NETWORK 1.SWS

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	150	1-1/01	75.736	74.386	1.200	Open Manhole	1200
1.001	o	225	1-1/02	75.750	73.768	1.757	Open Manhole	1200
2.000	o	225	1-2/01	75.500	74.150	1.125	Open Manhole	1200
2.001	o	225	1-2/02	75.500	73.575	1.700	Open Manhole	1200
3.000	o	300	1-3/01	75.500	74.075	1.125	Open Manhole	1200
3.001	o	300	1-3/02	75.500	73.512	1.688	Open Manhole	1200
3.002	o	300	1-3/03	75.475	73.157	2.018	Open Manhole	1200
2.002	o	375	1-2/03	75.500	72.788	2.337	Open Manhole	1350
2.003	o	375	1-2/04	75.500	72.692	2.433	Open Manhole	1350
1.002	o	375	1-1/03	74.790	72.514	1.901	Open Manhole	1350
1.003	o	375	1-1/04	73.924	72.280	1.269	Open Manhole	1350
4.000	o	300	1-4/01	75.581	74.081	1.200	Open Manhole	1200
4.001	o	300	1-4/02	75.108	73.608	1.200	Open Manhole	1200
1.004	o	375	1-1/05	72.783	71.208	1.200	Open Manhole	1350
1.005	o	375	1-1/06	71.771	70.121	1.275	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	55.899	102.9	1-1/02	75.750	73.843	1.757	Open Manhole	1200
1.001	30.175	74.9	1-1/03	74.790	73.365	1.200	Open Manhole	1350
2.000	51.511	103.0	1-2/02	75.500	73.650	1.625	Open Manhole	1200
2.001	87.382	137.2	1-2/03	75.500	72.938	2.337	Open Manhole	1350
3.000	84.381	149.9	1-3/02	75.500	73.512	1.688	Open Manhole	1200
3.001	53.312	150.2	1-3/03	75.475	73.157	2.018	Open Manhole	1200
3.002	44.032	149.8	1-2/03	75.500	72.863	2.337	Open Manhole	1350
2.002	14.415	150.2	1-2/04	75.500	72.692	2.433	Open Manhole	1350
2.003	26.678	149.9	1-1/03	74.790	72.514	1.901	Open Manhole	1350
1.002	35.038	149.7	1-1/04	73.924	72.280	1.269	Open Manhole	1350
1.003	24.148	22.5	1-1/05	72.783	71.208	1.200	Open Manhole	1350
4.000	48.000	101.5	1-4/02	75.108	73.608	1.200	Open Manhole	1200
4.001	55.632	23.9	1-1/05	72.783	71.283	1.200	Open Manhole	1350
1.004	21.464	21.2	1-1/06	71.771	70.196	1.200	Open Manhole	1350
1.005	21.358	29.7	1-1/07	71.052	69.402	1.275	Open Manhole	1350

PIPELINE SCHEDULES for 2024-02-22 STORM NETWORK 1.SWS

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)
1.006	o	450	1-1/07	71.052	69.327	1.275	Open Manhole	1350
5.000	o	150	1-5/01	71.009	69.659	1.200	Open Manhole	1200
5.001	o	225	1-5/02	71.026	69.220	1.581	Open Manhole	1200
5.002	o	225	1-5/03	71.055	68.970	1.860	Open Manhole	1200
5.003	o	225	1-5/04	71.025	68.772	2.028	Open Manhole	1200
1.007	o	525	1-1/08	71.035	68.276	2.234	Open Manhole	1500
1.008	o	525	1-1/09	70.920	68.082	2.313	Open Manhole	1500
1.009	o	525	1-1/10	70.992	67.882	2.585	Open Manhole	1500
1.010	o	525	1-1/11	70.897	67.844	2.528	Open Manhole	1500
1.011	o	525	1-1/12	70.611	67.590	2.496	Open Manhole	1500
6.000	o	300	1-6/01	71.000	69.575	1.125	Open Manhole	1200
6.001	o	300	1-6/02	71.000	69.253	1.447	Open Manhole	1200
6.002	o	300	1-6/03	71.000	69.006	1.694	Open Manhole	1200
6.003	o	375	1-6/04	71.000	68.889	1.736	Open Manhole	1350
6.004	o	375	1-6/05	71.000	68.689	1.936	Open Manhole	1350
6.005	o	375	1-6/06	71.000	68.556	2.069	Open Manhole	1350
6.006	o	375	1-6/07	71.000	68.392	2.233	Open Manhole	1350
6.007	o	375	1-6/08	71.000	68.354	2.271	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)
1.006	6.629	150.7	1-1/08	71.035	69.283	1.302	Open Manhole	1500
5.000	37.474	103.0	1-5/02	71.026	69.295	1.581	Open Manhole	1200
5.001	37.527	150.1	1-5/03	71.055	68.970	1.860	Open Manhole	1200
5.002	29.684	149.9	1-5/04	71.025	68.772	2.028	Open Manhole	1200
5.003	29.327	149.6	1-1/08	71.035	68.576	2.234	Open Manhole	1500
1.007	29.032	149.6	1-1/09	70.920	68.082	2.313	Open Manhole	1500
1.008	29.979	149.9	1-1/10	70.992	67.882	2.585	Open Manhole	1500
1.009	5.748	151.3	1-1/11	70.897	67.844	2.528	Open Manhole	1500
1.010	38.132	150.1	1-1/12	70.611	67.590	2.496	Open Manhole	1500
1.011	19.446	149.6	1-1/13	70.669	67.460	2.684	Open Manhole	1500
6.000	37.116	150.3	1-6/02	71.000	69.328	1.372	Open Manhole	1200
6.001	37.117	150.3	1-6/03	71.000	69.006	1.694	Open Manhole	1200
6.002	6.300	150.0	1-6/04	71.000	68.964	1.736	Open Manhole	1350
6.003	29.971	149.9	1-6/05	71.000	68.689	1.936	Open Manhole	1350
6.004	19.972	150.2	1-6/06	71.000	68.556	2.069	Open Manhole	1350
6.005	24.665	150.4	1-6/07	71.000	68.392	2.233	Open Manhole	1350
6.006	5.721	150.6	1-6/08	71.000	68.354	2.271	Open Manhole	1350
6.007	11.904	150.7	1-6/09	70.971	68.275	2.321	Open Manhole	1350

PIPELINE SCHEDULES for 2024-02-22 STORM NETWORK 1.SWS

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)
6.008	o	375	1-6/09	70.971	68.275	2.321	Open Manhole	1350
6.009	o	375	1-6/10	70.961	68.101	2.485	Open Manhole	1350
7.000	o	225	1-7/01	71.000	69.575	1.200	Open Manhole	1200
6.010	o	375	1-6/11	70.948	67.927	2.646	Open Manhole	1350
1.012	o	600	1-1/13	70.669	67.385	2.684	Open Manhole	1500
8.000	o	150	1-8/01	71.180	69.830	1.200	Open Manhole	1200
8.001	o	225	1-8/02	70.956	69.449	1.282	Open Manhole	1200
8.002	o	225	1-8/03	70.825	69.162	1.438	Open Manhole	1200
1.013	o	600	1-1/14	70.407	67.351	2.456	Open Manhole	1500
9.000	o	375	1-9/01	71.981	70.481	1.125	Open Manhole	1350
9.001	o	375	1-9/02	71.306	69.731	1.200	Open Manhole	1350
9.002	o	375	1-9/03	70.274	68.699	1.200	Open Manhole	1350
1.014	o	600	1-1/15	70.006	67.271	2.135	Open Manhole	1500
1.015	o	600	1-1/16	68.595	66.795	1.200	Open Manhole	1500

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)
6.008	26.071	149.8	1-6/10	70.961	68.101	2.485	Open Manhole	1350
6.009	26.072	149.8	1-6/11	70.948	67.927	2.646	Open Manhole	1350
7.000	18.858	149.7	1-6/11	70.948	69.449	1.274	Open Manhole	1350
6.010	20.606	65.0	1-1/13	70.669	67.610	2.684	Open Manhole	1500
1.012	5.035	148.1	1-1/14	70.407	67.351	2.456	Open Manhole	1500
8.000	31.472	102.8	1-8/02	70.956	69.524	1.282	Open Manhole	1200
8.001	43.103	150.2	1-8/03	70.825	69.162	1.438	Open Manhole	1200
8.002	27.464	150.0	1-1/14	70.407	68.979	1.203	Open Manhole	1500
1.013	11.942	149.3	1-1/15	70.006	67.271	2.135	Open Manhole	1500
9.000	67.508	100.0	1-9/02	71.306	69.806	1.125	Open Manhole	1350
9.001	66.070	64.0	1-9/03	70.274	68.699	1.200	Open Manhole	1350
9.002	4.258	15.9	1-1/15	70.006	68.431	1.200	Open Manhole	1500
1.014	29.652	62.3	1-1/16	68.595	66.795	1.200	Open Manhole	1500
1.015	56.811	20.8	1-1/17	65.868	64.068	1.200	Open Manhole	1500

PIPELINE SCHEDULES for 2024-02-22 STORM NETWORK 1.SWS

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)
1.016	o	600	1-1/17	65.868	64.068	1.200	Open Manhole	1500
1.017	o	900	1-1/18	63.000	61.125	0.975	Open Manhole	1800
10.000	o	225	1-10/01	65.784	64.434	1.125	Open Manhole	1200
10.001	o	225	1-10/02	65.793	64.068	1.500	Open Manhole	1200
10.002	o	225	1-10/03	65.880	63.699	1.956	Open Manhole	1200
10.003	o	225	1-10/04	65.677	63.607	1.845	Open Manhole	1200
11.000	o	225	1-11/01	65.723	64.298	1.200	Open Manhole	1200
10.004	o	225	1-10/05	65.327	63.480	1.622	Open Manhole	1200
12.000	o	150	1-12/01	68.572	67.222	1.200	Open Manhole	1200
12.001	o	225	1-12/02	68.465	66.994	1.246	Open Manhole	1200
12.002	o	225	1-12/03	68.535	66.952	1.358	Open Manhole	1200
12.003	o	225	1-12/04	68.435	66.884	1.326	Open Manhole	1200
12.004	o	225	1-12/05	68.157	66.732	1.200	Open Manhole	1200
12.005	o	225	1-12/06	68.414	66.534	1.655	Open Manhole	1200
12.006	o	225	1-12/07	68.220	66.443	1.552	Open Manhole	1200
12.007	o	225	1-12/08	67.818	66.357	1.236	Open Manhole	1200
12.008	o	225	1-12/09	66.851	65.426	1.200	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)
1.016	18.481	6.8	1-1/18	63.000	61.350	1.050	Open Manhole	1800
1.017	34.921	301.0	1-1/19	63.000	61.009	1.091	Open Manhole	1800
10.000	30.005	103.1	1-10/02	65.793	64.143	1.425	Open Manhole	1200
10.001	55.355	150.0	1-10/03	65.880	63.699	1.956	Open Manhole	1200
10.002	13.756	149.5	1-10/04	65.677	63.607	1.845	Open Manhole	1200
10.003	19.047	150.0	1-10/05	65.327	63.480	1.622	Open Manhole	1200
11.000	39.165	98.9	1-10/05	65.327	63.902	1.200	Open Manhole	1200
10.004	16.000	149.5	1-10/06	64.927	63.373	1.329	Open Manhole	1350
12.000	15.717	102.7	1-12/02	68.465	67.069	1.246	Open Manhole	1200
12.001	6.253	148.9	1-12/03	68.535	66.952	1.358	Open Manhole	1200
12.002	10.221	150.3	1-12/04	68.435	66.884	1.326	Open Manhole	1200
12.003	13.656	89.8	1-12/05	68.157	66.732	1.200	Open Manhole	1200
12.004	29.705	150.0	1-12/06	68.414	66.534	1.655	Open Manhole	1200
12.005	13.626	149.7	1-12/07	68.220	66.443	1.552	Open Manhole	1200
12.006	12.951	150.6	1-12/08	67.818	66.357	1.236	Open Manhole	1200
12.007	36.971	39.7	1-12/09	66.851	65.426	1.200	Open Manhole	1200
12.008	36.971	40.4	1-12/10	65.936	64.511	1.200	Open Manhole	1200

PIPELINE SCHEDULES for 2024-02-22 STORM NETWORK 1.SWS

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)
12.009	o	225	1-12/10	65.936	64.511	1.200	Open Manhole	1200
12.010	o	375	1-12/11	65.323	63.823	1.125	Open Manhole	1350
10.005	o	300	1-10/06	64.927	63.298	1.329	Open Manhole	1350
13.000	o	225	1-13/01	64.922	63.572	1.125	Open Manhole	1200
10.006	o	300	1-10/07	64.527	63.027	1.200	Open Manhole	1200
14.000	o	150	1-14/01	64.523	63.173	1.200	Open Manhole	1200
10.007	o	375	1-10/08	64.127	62.552	1.200	Open Manhole	1350
10.008	o	375	1-10/09	64.074	62.499	1.200	Open Manhole	1350
1.018	o	900	1-1/19	63.000	61.009	1.091	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)
12.009	35.175	57.4	1-12/11	65.323	63.898	1.200	Open Manhole	1350
12.010	39.164	87.0	1-10/06	64.927	63.373	1.179	Open Manhole	1350
10.005	16.000	59.0	1-10/07	64.527	63.027	1.200	Open Manhole	1200
13.000	39.154	99.1	1-10/07	64.527	63.177	1.125	Open Manhole	1200
10.006	16.000	40.0	1-10/08	64.127	62.627	1.200	Open Manhole	1350
14.000	39.165	98.9	1-10/08	64.127	62.777	1.200	Open Manhole	1350
10.007	5.738	108.3	1-10/09	64.074	62.499	1.200	Open Manhole	1350
10.008	50.783	103.0	1-1/19	63.000	62.006	0.619	Open Manhole	1800
1.018	15.679	103.2	HW01	63.000	60.857	1.243	Open Manhole	0

Free Flowing Outfall Details for 2024-02-22 STORM NETWORK 1.SWS

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.018	HW01	63.000	60.857	60.700	0	0

Simulation Criteria for 2024-02-22 STORM NETWORK 1.SWS

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	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 Storage Structures	11
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	16.900	Storm Duration (mins)	30
Ratio R	0.328		

Storage Structures for 2024-02-22 STORM NETWORK 1.SWS

Porous Car Park Manhole: 1-2/01, DS/PN: 2.000

Infiltration Coefficient Base (m/hr)	0.10000	Width (m)	40.0
Membrane Percolation (mm/hr)	1000	Length (m)	80.0
Max Percolation (l/s)	888.9	Slope (1:X)	500.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	74.900	Membrane Depth (mm)	0

Porous Car Park Manhole: 1-2/02, DS/PN: 2.001

Infiltration Coefficient Base (m/hr)	0.10000	Width (m)	86.0
Membrane Percolation (mm/hr)	1000	Length (m)	83.0
Max Percolation (l/s)	1982.8	Slope (1:X)	500.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	74.900	Membrane Depth (mm)	0

Porous Car Park Manhole: 1-3/01, DS/PN: 3.000

Infiltration Coefficient Base (m/hr)	0.10000	Width (m)	85.0
Membrane Percolation (mm/hr)	1000	Length (m)	20.0
Max Percolation (l/s)	472.2	Slope (1:X)	500.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	74.900	Membrane Depth (mm)	0

Porous Car Park Manhole: 1-2/03, DS/PN: 2.002

Infiltration Coefficient Base (m/hr)	0.10000	Width (m)	42.0
Membrane Percolation (mm/hr)	1000	Length (m)	85.0
Max Percolation (l/s)	991.7	Slope (1:X)	500.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	74.900	Membrane Depth (mm)	0

Porous Car Park Manhole: 1-4/01, DS/PN: 4.000

Infiltration Coefficient Base (m/hr)	0.10000	Width (m)	64.0
Membrane Percolation (mm/hr)	1000	Length (m)	100.0
Max Percolation (l/s)	1777.8	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	74.981	Membrane Depth (mm)	0

Cellular Storage Manhole: 1-1/05, DS/PN: 1.004

Invert Level (m)	71.208	Infiltration Coefficient Side (m/hr)	0.10000
Infiltration Coefficient Base (m/hr)	0.10000	Safety Factor	2.0

Cellular Storage Manhole: 1-1/05, DS/PN: 1.004

Porosity 0.95

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	500.0	0.0	1.001	0.0	0.0
1.000	500.0	0.0			

Infiltration Trench Manhole: 1-6/01, DS/PN: 6.000

Infiltration Coefficient Base (m/hr)	0.10000	Trench Width (m)	2.0
Infiltration Coefficient Side (m/hr)	0.10000	Trench Length (m)	70.0
Safety Factor	2.0	Slope (1:X)	500.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	69.000	Cap Infiltration Depth (m)	0.000

Cellular Storage Manhole: 1-1/14, DS/PN: 1.013

Invert Level (m)	67.351	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Side (m/hr)	0.00000		

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	450.0	0.0	1.001	0.0	0.0
1.000	450.0	0.0			

Porous Car Park Manhole: 1-9/01, DS/PN: 9.000

Infiltration Coefficient Base (m/hr)	0.10000	Width (m)	65.0
Membrane Percolation (mm/hr)	1000	Length (m)	75.0
Max Percolation (l/s)	1354.2	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	71.381	Membrane Depth (mm)	0

Porous Car Park Manhole: 1-9/02, DS/PN: 9.001

Infiltration Coefficient Base (m/hr)	0.10000	Width (m)	65.0
Membrane Percolation (mm/hr)	1000	Length (m)	75.0
Max Percolation (l/s)	1354.2	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	70.706	Membrane Depth (mm)	0

Cellular Storage Manhole: 1-1/19, DS/PN: 1.018

Invert Level (m)	61.009	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Side (m/hr)	0.00000		

Cellular Storage Manhole: 1-1/19, DS/PN: 1.018

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	1200.0	0.0	1.001	0.0	0.0
1.000	1200.0	0.0			

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 1.SWS

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	11
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.328
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	16.800	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	20, 20, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1-1/01	15 Winter	1	+20%	30/15 Summer				74.484
1.001	1-1/02	15 Winter	1	+20%	30/15 Summer				73.877
2.000	1-2/01	240 Winter	1	+20%	100/30 Summer				74.187
2.001	1-2/02	480 Winter	1	+20%	30/60 Winter				73.626
3.000	1-3/01	15 Winter	1	+20%	30/15 Summer				74.239
3.001	1-3/02	15 Winter	1	+20%	30/15 Summer				73.678
3.002	1-3/03	15 Winter	1	+20%	30/15 Summer				73.340
2.002	1-2/03	15 Winter	1	+20%	30/15 Summer				72.970
2.003	1-2/04	15 Winter	1	+20%	30/15 Summer				72.856
1.002	1-1/03	30 Winter	1	+20%	30/15 Summer				72.734
1.003	1-1/04	30 Winter	1	+20%					72.412
4.000	1-4/01	60 Winter	1	+20%	30/15 Winter				74.180
4.001	1-4/02	15 Winter	1	+20%	100/15 Summer				73.706
1.004	1-1/05	60 Winter	1	+20%					71.335
1.005	1-1/06	60 Winter	1	+20%	30/30 Winter				70.260
1.006	1-1/07	60 Winter	1	+20%	30/15 Summer				69.571
5.000	1-5/01	15 Winter	1	+20%	30/15 Winter				69.715

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 1.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1-1/01	-0.052	0.000	0.72		12.3	OK	
1.001	1-1/02	-0.116	0.000	0.47		26.6	OK	
2.000	1-2/01	-0.188	0.000	0.07		3.2	OK	
2.001	1-2/02	-0.174	0.000	0.12		5.1	OK	
3.000	1-3/01	-0.136	0.000	0.49		42.7	OK	
3.001	1-3/02	-0.134	0.000	0.57		48.5	OK	
3.002	1-3/03	-0.117	0.000	0.67		56.9	OK	
2.002	1-2/03	-0.193	0.000	0.47		57.4	OK	
2.003	1-2/04	-0.211	0.000	0.40		56.5	OK	
1.002	1-1/03	-0.155	0.000	0.64		94.2	OK	
1.003	1-1/04	-0.243	0.000	0.27		98.0	OK	
4.000	1-4/01	-0.201	0.000	0.22		22.6	OK	
4.001	1-4/02	-0.202	0.000	0.23		49.5	OK	
1.004	1-1/05	-0.248	0.000	0.25		92.3	OK	
1.005	1-1/06	-0.236	0.000	0.30		92.9	OK	
1.006	1-1/07	-0.206	0.000	0.57		92.9	OK	
5.000	1-5/01	-0.094	0.000	0.30		5.1	OK	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 1.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
5.001	1-5/02	15 Winter	1	+20%	30/15 Summer			
5.002	1-5/03	15 Winter	1	+20%	30/15 Summer			
5.003	1-5/04	15 Winter	1	+20%	30/15 Summer			
1.007	1-1/08	60 Winter	1	+20%	30/15 Winter			
1.008	1-1/09	60 Winter	1	+20%	30/15 Summer			
1.009	1-1/10	60 Winter	1	+20%	30/15 Summer			
1.010	1-1/11	60 Winter	1	+20%	30/15 Summer			
1.011	1-1/12	30 Winter	1	+20%	30/15 Summer			
6.000	1-6/01	120 Winter	1	+20%	30/15 Winter			
6.001	1-6/02	15 Winter	1	+20%	30/15 Summer			
6.002	1-6/03	15 Winter	1	+20%	30/15 Summer			
6.003	1-6/04	15 Winter	1	+20%	30/15 Summer			
6.004	1-6/05	15 Winter	1	+20%	30/15 Summer			
6.005	1-6/06	15 Winter	1	+20%	30/15 Summer			
6.006	1-6/07	15 Winter	1	+20%	30/15 Summer			
6.007	1-6/08	15 Winter	1	+20%	30/15 Summer			
6.008	1-6/09	15 Winter	1	+20%	30/15 Summer			
6.009	1-6/10	15 Winter	1	+20%	30/15 Summer			
7.000	1-7/01	15 Winter	1	+20%	100/15 Summer			
6.010	1-6/11	15 Winter	1	+20%	30/15 Summer			
1.012	1-1/13	30 Winter	1	+20%	30/15 Summer			
8.000	1-8/01	15 Winter	1	+20%	30/15 Summer			
8.001	1-8/02	15 Winter	1	+20%	30/15 Summer			
8.002	1-8/03	15 Winter	1	+20%	30/15 Summer			
1.013	1-1/14	60 Winter	1	+20%	30/30 Winter			
9.000	1-9/01	15 Winter	1	+20%	30/15 Summer			
9.001	1-9/02	30 Winter	1	+20%	30/15 Summer			
9.002	1-9/03	30 Winter	1	+20%	30/15 Summer			
1.014	1-1/15	60 Winter	1	+20%	100/30 Winter			
1.015	1-1/16	60 Winter	1	+20%				
1.016	1-1/17	60 Winter	1	+20%				
1.017	1-1/18	60 Winter	1	+20%				
10.000	1-10/01	15 Winter	1	+20%	30/15 Summer			
10.001	1-10/02	15 Winter	1	+20%	30/15 Summer			
10.002	1-10/03	15 Winter	1	+20%	30/15 Summer			
10.003	1-10/04	15 Winter	1	+20%	30/15 Summer			
11.000	1-11/01	15 Winter	1	+20%	30/15 Summer			
10.004	1-10/05	15 Winter	1	+20%	1/15 Winter			
12.000	1-12/01	15 Winter	1	+20%				
12.001	1-12/02	15 Winter	1	+20%				
12.002	1-12/03	15 Winter	1	+20%				
12.003	1-12/04	15 Winter	1	+20%				
12.004	1-12/05	15 Winter	1	+20%				
12.005	1-12/06	15 Winter	1	+20%				
12.006	1-12/07	15 Winter	1	+20%				
12.007	1-12/08	15 Winter	1	+20%				
12.008	1-12/09	15 Winter	1	+20%	100/15 Summer			
12.009	1-12/10	15 Winter	1	+20%	30/15 Summer			

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 1.SWS

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
5.001	1-5/02	69.293	-0.152	0.000	0.22		9.0	OK	
5.002	1-5/03	69.049	-0.146	0.000	0.26		10.4	OK	
5.003	1-5/04	68.943	-0.054	0.000	0.92		36.4	OK	
1.007	1-1/08	68.495	-0.306	0.000	0.36		119.9	OK	
1.008	1-1/09	68.300	-0.307	0.000	0.36		119.7	OK	
1.009	1-1/10	68.160	-0.247	0.000	0.55		119.7	OK	
1.010	1-1/11	68.061	-0.308	0.000	0.36		122.2	OK	
1.011	1-1/12	67.839	-0.276	0.000	0.44		122.5	OK	
6.000	1-6/01	69.509	-0.366	0.000	0.00		0.0	OK	
6.001	1-6/02	69.374	-0.179	0.000	0.34		28.1	OK	
6.002	1-6/03	69.148	-0.158	0.000	0.46		27.9	OK	
6.003	1-6/04	69.061	-0.203	0.000	0.43		61.9	OK	
6.004	1-6/05	68.886	-0.178	0.000	0.54		73.3	OK	
6.005	1-6/06	68.768	-0.163	0.000	0.60		85.1	OK	
6.006	1-6/07	68.676	-0.091	0.000	0.93		96.1	OK	
6.007	1-6/08	68.639	-0.090	0.000	0.93		102.2	OK	
6.008	1-6/09	68.520	-0.130	0.000	0.75		106.3	OK	
6.009	1-6/10	68.351	-0.125	0.000	0.78		110.1	OK	
7.000	1-7/01	69.685	-0.115	0.000	0.46		17.8	OK	
6.010	1-6/11	68.133	-0.169	0.000	0.59		122.7	OK	
1.012	1-1/13	67.782	-0.203	0.000	0.77		217.1	OK	
8.000	1-8/01	69.904	-0.076	0.000	0.48		8.0	OK	
8.001	1-8/02	69.550	-0.124	0.000	0.41		16.4	OK	
8.002	1-8/03	69.280	-0.107	0.000	0.54		21.2	OK	
1.013	1-1/14	67.642	-0.309	0.000	0.48		165.2	OK	
9.000	1-9/01	70.682	-0.174	0.000	0.53		99.8	OK	
9.001	1-9/02	69.934	-0.172	0.000	0.56		131.2	OK	
9.002	1-9/03	68.923	-0.151	0.000	0.65		132.4	OK	
1.014	1-1/15	67.502	-0.369	0.000	0.32		219.6	OK	
1.015	1-1/16	66.958	-0.437	0.000	0.17		222.0	OK	
1.016	1-1/17	64.213	-0.455	0.000	0.13		222.0	OK	
1.017	1-1/18	61.431	-0.594	0.000	0.25		221.8	OK	
10.000	1-10/01	64.502	-0.157	0.000	0.19		9.3	OK	
10.001	1-10/02	64.174	-0.119	0.000	0.43		17.5	OK	
10.002	1-10/03	63.819	-0.105	0.000	0.55		20.4	OK	
10.003	1-10/04	63.747	-0.085	0.000	0.53		20.3	OK	
11.000	1-11/01	64.403	-0.120	0.000	0.44		21.9	OK	
10.004	1-10/05	63.706	0.001	0.000	1.05		39.3	SURCHARGED	
12.000	1-12/01	67.262	-0.110	0.000	0.16		2.6	OK	
12.001	1-12/02	67.039	-0.180	0.000	0.09		2.6	OK	
12.002	1-12/03	66.992	-0.185	0.000	0.07		2.6	OK	
12.003	1-12/04	66.918	-0.191	0.000	0.05		2.6	OK	
12.004	1-12/05	66.793	-0.164	0.000	0.16		6.3	OK	
12.005	1-12/06	66.597	-0.162	0.000	0.17		6.3	OK	
12.006	1-12/07	66.526	-0.142	0.000	0.29		10.4	OK	
12.007	1-12/08	66.425	-0.157	0.000	0.20		15.5	OK	
12.008	1-12/09	65.506	-0.145	0.000	0.27		20.9	OK	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 1.SWS

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
12.009	1-12/10	64.612	-0.124	0.000	0.41		26.5	OK	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 1.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
12.010	1-12/11	15 Winter	1	+20%	30/15 Summer				63.954
10.005	1-10/06	15 Winter	1	+20%	30/15 Summer				63.489
13.000	1-13/01	15 Winter	1	+20%	30/15 Summer				63.656
10.006	1-10/07	15 Winter	1	+20%	30/15 Summer				63.211
14.000	1-14/01	15 Winter	1	+20%	30/15 Summer				63.261
10.007	1-10/08	15 Winter	1	+20%	1/15 Winter				62.952
10.008	1-10/09	15 Winter	1	+20%	30/15 Summer				62.713
1.018	1-1/19	120 Winter	1	+20%					61.264

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
12.010	1-12/11	-0.244	0.000	0.26		50.9	OK	
10.005	1-10/06	-0.109	0.000	0.73		89.9	OK	
13.000	1-13/01	-0.141	0.000	0.29		14.3	OK	
10.006	1-10/07	-0.116	0.000	0.69		103.0	OK	
14.000	1-14/01	-0.062	0.000	0.63		10.9	OK	
10.007	1-10/08	0.025	0.000	1.03		110.0	SURCHARGED	
10.008	1-10/09	-0.161	0.000	0.61		111.4	OK	
1.018	1-1/19	-0.645	0.000	0.18		170.9	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 1.SWS

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	11
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.328
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	16.800	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	20, 20, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1-1/01	15 Winter	30	+20%	30/15 Summer				75.028
1.001	1-1/02	15 Winter	30	+20%	30/15 Summer				74.022
2.000	1-2/01	30 Winter	30	+20%	100/30 Summer				74.271
2.001	1-2/02	60 Winter	30	+20%	30/60 Winter				73.845
3.000	1-3/01	15 Winter	30	+20%	30/15 Summer				74.687
3.001	1-3/02	15 Winter	30	+20%	30/15 Summer				74.146
3.002	1-3/03	15 Winter	30	+20%	30/15 Summer				73.709
2.002	1-2/03	30 Winter	30	+20%	30/15 Summer				73.247
2.003	1-2/04	30 Winter	30	+20%	30/15 Summer				73.134
1.002	1-1/03	15 Winter	30	+20%	30/15 Summer				73.009
1.003	1-1/04	30 Winter	30	+20%					72.472
4.000	1-4/01	15 Winter	30	+20%	30/15 Winter				74.448
4.001	1-4/02	30 Summer	30	+20%	100/15 Summer				73.845
1.004	1-1/05	30 Winter	30	+20%					71.455
1.005	1-1/06	30 Winter	30	+20%	30/30 Winter				70.562
1.006	1-1/07	30 Winter	30	+20%	30/15 Summer				69.965
5.000	1-5/01	15 Winter	30	+20%	30/15 Winter				69.845

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 1.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1-1/01	0.492	0.000	1.35		23.1	SURCHARGED	
1.001	1-1/02	0.029	0.000	1.04		58.3	SURCHARGED	
2.000	1-2/01	-0.104	0.000	0.53		26.1	OK	
2.001	1-2/02	0.045	0.000	0.99		43.0	SURCHARGED	
3.000	1-3/01	0.312	0.000	1.06		92.4	SURCHARGED	
3.001	1-3/02	0.334	0.000	1.10		94.1	SURCHARGED	
3.002	1-3/03	0.252	0.000	1.27		107.3	SURCHARGED	
2.002	1-2/03	0.084	0.000	1.11		134.8	SURCHARGED	
2.003	1-2/04	0.067	0.000	0.95		134.9	SURCHARGED	
1.002	1-1/03	0.120	0.000	1.23		180.7	SURCHARGED	
1.003	1-1/04	-0.183	0.000	0.52		189.2	OK	
4.000	1-4/01	0.067	0.000	1.01		104.4	SURCHARGED	
4.001	1-4/02	-0.063	0.000	0.94		202.4	OK	
1.004	1-1/05	-0.128	0.000	0.77		283.1	OK	
1.005	1-1/06	0.066	0.000	0.91		283.6	SURCHARGED	
1.006	1-1/07	0.188	0.000	1.74		283.7	SURCHARGED	
5.000	1-5/01	0.036	0.000	0.62		10.5	SURCHARGED	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 1.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
5.001	1-5/02	15 Winter	30	+20%	30/15 Summer				69.724
5.002	1-5/03	15 Winter	30	+20%	30/15 Summer				69.678
5.003	1-5/04	15 Winter	30	+20%	30/15 Summer				69.621
1.007	1-1/08	30 Winter	30	+20%	30/15 Winter				69.296
1.008	1-1/09	30 Winter	30	+20%	30/15 Summer				69.084
1.009	1-1/10	30 Winter	30	+20%	30/15 Summer				68.869
1.010	1-1/11	30 Winter	30	+20%	30/15 Summer				68.671
1.011	1-1/12	30 Winter	30	+20%	30/15 Summer				68.408
6.000	1-6/01	15 Winter	30	+20%	30/15 Winter				69.890
6.001	1-6/02	15 Winter	30	+20%	30/15 Summer				69.995
6.002	1-6/03	15 Winter	30	+20%	30/15 Summer				69.978
6.003	1-6/04	15 Winter	30	+20%	30/15 Summer				69.977
6.004	1-6/05	15 Winter	30	+20%	30/15 Summer				69.883
6.005	1-6/06	15 Winter	30	+20%	30/15 Summer				69.782
6.006	1-6/07	15 Winter	30	+20%	30/15 Summer				69.605
6.007	1-6/08	15 Winter	30	+20%	30/15 Summer				69.415
6.008	1-6/09	15 Winter	30	+20%	30/15 Summer				69.192
6.009	1-6/10	15 Winter	30	+20%	30/15 Summer				68.869
7.000	1-7/01	15 Winter	30	+20%	100/15 Summer				69.800
6.010	1-6/11	15 Winter	30	+20%	30/15 Summer				68.515
1.012	1-1/13	30 Winter	30	+20%	30/15 Summer				68.201
8.000	1-8/01	15 Winter	30	+20%	30/15 Summer				70.019
8.001	1-8/02	15 Winter	30	+20%	30/15 Summer				69.712
8.002	1-8/03	15 Winter	30	+20%	30/15 Summer				69.469
1.013	1-1/14	60 Winter	30	+20%	30/30 Winter				67.998
9.000	1-9/01	15 Winter	30	+20%	30/15 Summer				71.382
9.001	1-9/02	15 Winter	30	+20%	30/15 Summer				70.746
9.002	1-9/03	15 Winter	30	+20%	30/15 Summer				69.297
1.014	1-1/15	30 Winter	30	+20%	100/30 Winter				67.707
1.015	1-1/16	30 Winter	30	+20%					67.079
1.016	1-1/17	30 Winter	30	+20%					64.320
1.017	1-1/18	30 Winter	30	+20%					61.681
10.000	1-10/01	15 Winter	30	+20%	30/15 Summer				64.878
10.001	1-10/02	15 Winter	30	+20%	30/15 Summer				64.845
10.002	1-10/03	15 Winter	30	+20%	30/15 Summer				64.711
10.003	1-10/04	15 Winter	30	+20%	30/15 Summer				64.612
11.000	1-11/01	15 Winter	30	+20%	30/15 Summer				64.723
10.004	1-10/05	15 Winter	30	+20%	1/15 Winter				64.525
12.000	1-12/01	15 Winter	30	+20%					67.284
12.001	1-12/02	15 Winter	30	+20%					67.062
12.002	1-12/03	15 Winter	30	+20%					67.013
12.003	1-12/04	15 Winter	30	+20%					66.936
12.004	1-12/05	15 Winter	30	+20%					66.833
12.005	1-12/06	15 Winter	30	+20%					66.638
12.006	1-12/07	15 Winter	30	+20%					66.592
12.007	1-12/08	15 Winter	30	+20%					66.476
12.008	1-12/09	15 Winter	30	+20%	100/15 Summer				65.572
12.009	1-12/10	15 Winter	30	+20%	30/15 Summer				64.927

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 1.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
5.001	1-5/02	0.279	0.000	0.55		22.0	SURCHARGED	
5.002	1-5/03	0.483	0.000	0.70		27.5	SURCHARGED	
5.003	1-5/04	0.624	0.000	2.02		80.0	SURCHARGED	
1.007	1-1/08	0.495	0.000	1.04		342.0	SURCHARGED	
1.008	1-1/09	0.477	0.000	1.03		342.3	SURCHARGED	
1.009	1-1/10	0.462	0.000	1.57		342.4	SURCHARGED	
1.010	1-1/11	0.302	0.000	1.02		347.2	SURCHARGED	
1.011	1-1/12	0.293	0.000	1.27		351.2	SURCHARGED	
6.000	1-6/01	0.015	0.000	0.72		60.1	SURCHARGED	
6.001	1-6/02	0.442	0.000	0.90		75.4	SURCHARGED	
6.002	1-6/03	0.672	0.000	1.27		77.6	SURCHARGED	
6.003	1-6/04	0.713	0.000	0.76		109.6	SURCHARGED	
6.004	1-6/05	0.819	0.000	0.92		126.1	SURCHARGED	
6.005	1-6/06	0.851	0.000	1.06		149.7	SURCHARGED	
6.006	1-6/07	0.838	0.000	1.67		172.9	SURCHARGED	
6.007	1-6/08	0.686	0.000	1.68		184.8	SURCHARGED	
6.008	1-6/09	0.542	0.000	1.35		191.1	SURCHARGED	
6.009	1-6/10	0.393	0.000	1.41		199.9	SURCHARGED	
7.000	1-7/01	0.000	0.000	1.00		38.3	OK	
6.010	1-6/11	0.213	0.000	1.13		236.9	SURCHARGED	
1.012	1-1/13	0.216	0.000	1.88		529.5	SURCHARGED	
8.000	1-8/01	0.039	0.000	1.00		16.8	SURCHARGED	
8.001	1-8/02	0.038	0.000	0.93		37.3	SURCHARGED	
8.002	1-8/03	0.082	0.000	1.22		48.0	SURCHARGED	
1.013	1-1/14	0.047	0.000	1.14		397.0	SURCHARGED	
9.000	1-9/01	0.526	0.000	1.05		198.1	SURCHARGED	
9.001	1-9/02	0.640	0.000	1.18		279.3	SURCHARGED	
9.002	1-9/03	0.223	0.000	1.38		279.3	SURCHARGED	
1.014	1-1/15	-0.164	0.000	0.87		604.9	OK	
1.015	1-1/16	-0.316	0.000	0.45		607.9	OK	
1.016	1-1/17	-0.348	0.000	0.37		609.5	OK	
1.017	1-1/18	-0.344	0.000	0.70		608.9	OK	
10.000	1-10/01	0.219	0.000	0.43		20.6	SURCHARGED	
10.001	1-10/02	0.552	0.000	0.80		32.8	SURCHARGED	
10.002	1-10/03	0.787	0.000	1.00		37.1	SURCHARGED	
10.003	1-10/04	0.780	0.000	1.04		39.7	SURCHARGED	
11.000	1-11/01	0.200	0.000	0.94		46.6	SURCHARGED	
10.004	1-10/05	0.820	0.000	1.73		64.9	SURCHARGED	
12.000	1-12/01	-0.088	0.000	0.36		5.8	OK	
12.001	1-12/02	-0.157	0.000	0.19		5.8	OK	
12.002	1-12/03	-0.164	0.000	0.17		5.8	OK	
12.003	1-12/04	-0.173	0.000	0.12		5.8	OK	
12.004	1-12/05	-0.124	0.000	0.40		15.8	OK	
12.005	1-12/06	-0.121	0.000	0.43		16.0	OK	
12.006	1-12/07	-0.076	0.000	0.75		27.3	OK	
12.007	1-12/08	-0.106	0.000	0.53		41.2	OK	
12.008	1-12/09	-0.079	0.000	0.73		56.4	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 1.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
12.009	1-12/10	0.191	0.000	1.00		64.8	SURCHARGED	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 1.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
12.010	1-12/11	15 Winter	30	+20%	30/15 Summer				64.414
10.005	1-10/06	15 Winter	30	+20%	30/15 Summer				64.260
13.000	1-13/01	15 Winter	30	+20%	30/15 Summer				63.893
10.006	1-10/07	15 Winter	30	+20%	30/15 Summer				63.792
14.000	1-14/01	15 Winter	30	+20%	30/15 Summer				63.694
10.007	1-10/08	15 Winter	30	+20%	1/15 Winter				63.211
10.008	1-10/09	15 Winter	30	+20%	30/15 Summer				62.954
1.018	1-1/19	120 Winter	30	+20%					61.459

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
12.010	1-12/11	0.216	0.000	0.64		125.0	SURCHARGED	
10.005	1-10/06	0.662	0.000	1.30		159.2	SURCHARGED	
13.000	1-13/01	0.096	0.000	0.62		30.7	SURCHARGED	
10.006	1-10/07	0.465	0.000	1.22		182.0	SURCHARGED	
14.000	1-14/01	0.371	0.000	1.16		20.1	SURCHARGED	
10.007	1-10/08	0.284	0.000	1.87		200.0	SURCHARGED	
10.008	1-10/09	0.080	0.000	1.09		199.6	SURCHARGED	
1.018	1-1/19	-0.450	0.000	0.50		477.7	OK	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 1.SWS

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	11
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.328
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	16.800	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	20, 20, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1-1/01	15 Winter	100	+20%	30/15 Summer				75.621
1.001	1-1/02	15 Winter	100	+20%	30/15 Summer				74.228
2.000	1-2/01	30 Winter	100	+20%	100/30 Summer				74.906
2.001	1-2/02	30 Winter	100	+20%	30/60 Winter				74.817
3.000	1-3/01	15 Winter	100	+20%	30/15 Summer				74.932
3.001	1-3/02	15 Winter	100	+20%	30/15 Summer				74.667
3.002	1-3/03	30 Winter	100	+20%	30/15 Summer				74.207
2.002	1-2/03	30 Winter	100	+20%	30/15 Summer				73.692
2.003	1-2/04	30 Winter	100	+20%	30/15 Summer				73.530
1.002	1-1/03	30 Winter	100	+20%	30/15 Summer				73.318
1.003	1-1/04	30 Winter	100	+20%					72.512
4.000	1-4/01	15 Winter	100	+20%	30/15 Winter				74.992
4.001	1-4/02	30 Summer	100	+20%	100/15 Summer				74.306
1.004	1-1/05	30 Winter	100	+20%					71.554
1.005	1-1/06	30 Winter	100	+20%	30/30 Winter				70.845
1.006	1-1/07	30 Winter	100	+20%	30/15 Summer				70.166
5.000	1-5/01	15 Winter	100	+20%	30/15 Winter				70.404

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 1.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1-1/01	1.085	0.000	1.63		27.8	FLOOD RISK	
1.001	1-1/02	0.235	0.000	1.26		70.7	SURCHARGED	
2.000	1-2/01	0.531	0.000	0.84		41.2	SURCHARGED	
2.001	1-2/02	1.017	0.000	1.28		55.2	SURCHARGED	
3.000	1-3/01	0.557	0.000	1.12		98.0	SURCHARGED	
3.001	1-3/02	0.855	0.000	1.17		100.2	SURCHARGED	
3.002	1-3/03	0.750	0.000	1.44		122.2	SURCHARGED	
2.002	1-2/03	0.529	0.000	1.36		164.4	SURCHARGED	
2.003	1-2/04	0.463	0.000	1.17		165.8	SURCHARGED	
1.002	1-1/03	0.429	0.000	1.68		246.7	SURCHARGED	
1.003	1-1/04	-0.143	0.000	0.70		254.7	OK	
4.000	1-4/01	0.611	0.000	1.25		129.3	SURCHARGED	
4.001	1-4/02	0.398	0.000	1.08		233.1	SURCHARGED	
1.004	1-1/05	-0.029	0.000	0.86		318.7	OK	
1.005	1-1/06	0.349	0.000	1.03		319.8	SURCHARGED	
1.006	1-1/07	0.389	0.000	1.97		320.1	SURCHARGED	
5.000	1-5/01	0.595	0.000	0.67		11.3	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 1.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
5.001	1-5/02	30 Winter	100	+20%	30/15 Summer				70.339
5.002	1-5/03	30 Winter	100	+20%	30/15 Summer				70.306
5.003	1-5/04	30 Winter	100	+20%	30/15 Summer				70.274
1.007	1-1/08	30 Winter	100	+20%	30/15 Winter				69.877
1.008	1-1/09	30 Winter	100	+20%	30/15 Summer				69.585
1.009	1-1/10	30 Winter	100	+20%	30/15 Summer				69.287
1.010	1-1/11	60 Winter	100	+20%	30/15 Summer				69.016
1.011	1-1/12	60 Winter	100	+20%	30/15 Summer				68.682
6.000	1-6/01	30 Winter	100	+20%	30/15 Winter				70.404
6.001	1-6/02	15 Winter	100	+20%	30/15 Summer				70.476
6.002	1-6/03	15 Winter	100	+20%	30/15 Summer				70.567
6.003	1-6/04	15 Winter	100	+20%	30/15 Summer				70.613
6.004	1-6/05	15 Winter	100	+20%	30/15 Summer				70.518
6.005	1-6/06	15 Winter	100	+20%	30/15 Summer				70.421
6.006	1-6/07	15 Winter	100	+20%	30/15 Summer				70.230
6.007	1-6/08	15 Winter	100	+20%	30/15 Summer				69.987
6.008	1-6/09	15 Winter	100	+20%	30/15 Summer				69.687
6.009	1-6/10	15 Winter	100	+20%	30/15 Summer				69.270
7.000	1-7/01	15 Winter	100	+20%	100/15 Summer				69.901
6.010	1-6/11	15 Winter	100	+20%	30/15 Summer				68.814
1.012	1-1/13	60 Winter	100	+20%	30/15 Summer				68.420
8.000	1-8/01	15 Winter	100	+20%	30/15 Summer				70.371
8.001	1-8/02	15 Winter	100	+20%	30/15 Summer				69.940
8.002	1-8/03	15 Winter	100	+20%	30/15 Summer				69.593
1.013	1-1/14	60 Winter	100	+20%	30/30 Winter				68.125
9.000	1-9/01	15 Winter	100	+20%	30/15 Summer				71.504
9.001	1-9/02	15 Winter	100	+20%	30/15 Summer				70.828
9.002	1-9/03	15 Winter	100	+20%	30/15 Summer				69.318
1.014	1-1/15	30 Winter	100	+20%	100/30 Winter				67.878
1.015	1-1/16	30 Winter	100	+20%					67.106
1.016	1-1/17	30 Winter	100	+20%					64.343
1.017	1-1/18	30 Winter	100	+20%					61.746
10.000	1-10/01	15 Winter	100	+20%	30/15 Summer				65.611
10.001	1-10/02	15 Winter	100	+20%	30/15 Summer				65.571
10.002	1-10/03	15 Winter	100	+20%	30/15 Summer				65.399
10.003	1-10/04	15 Winter	100	+20%	30/15 Summer				65.294
11.000	1-11/01	15 Winter	100	+20%	30/15 Summer				65.459
10.004	1-10/05	15 Winter	100	+20%	1/15 Winter				65.199
12.000	1-12/01	15 Winter	100	+20%					67.294
12.001	1-12/02	15 Winter	100	+20%					67.071
12.002	1-12/03	15 Winter	100	+20%					67.023
12.003	1-12/04	15 Winter	100	+20%					66.943
12.004	1-12/05	15 Winter	100	+20%					66.851
12.005	1-12/06	15 Winter	100	+20%					66.661
12.006	1-12/07	15 Winter	100	+20%					66.622
12.007	1-12/08	15 Winter	100	+20%					66.497
12.008	1-12/09	15 Winter	100	+20%	100/15 Summer				66.114
12.009	1-12/10	15 Winter	100	+20%	30/15 Summer				65.655

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 1.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
5.001	1-5/02	0.894	0.000	0.37		15.0	SURCHARGED	
5.002	1-5/03	1.111	0.000	0.44		17.5	SURCHARGED	
5.003	1-5/04	1.277	0.000	2.05		81.3	SURCHARGED	
1.007	1-1/08	1.076	0.000	1.23		405.5	SURCHARGED	
1.008	1-1/09	0.978	0.000	1.22		403.8	SURCHARGED	
1.009	1-1/10	0.880	0.000	1.85		403.6	SURCHARGED	
1.010	1-1/11	0.647	0.000	1.18		403.4	SURCHARGED	
1.011	1-1/12	0.567	0.000	1.48		409.5	SURCHARGED	
6.000	1-6/01	0.529	0.000	0.91		76.4	SURCHARGED	
6.001	1-6/02	0.923	0.000	1.02		85.7	SURCHARGED	
6.002	1-6/03	1.261	0.000	1.45		89.2	SURCHARGED	
6.003	1-6/04	1.349	0.000	0.79		114.4	SURCHARGED	
6.004	1-6/05	1.454	0.000	1.02		139.2	SURCHARGED	
6.005	1-6/06	1.490	0.000	1.17		164.6	SURCHARGED	
6.006	1-6/07	1.463	0.000	1.89		195.6	SURCHARGED	
6.007	1-6/08	1.258	0.000	1.92		210.8	SURCHARGED	
6.008	1-6/09	1.037	0.000	1.56		221.3	SURCHARGED	
6.009	1-6/10	0.794	0.000	1.64		232.9	SURCHARGED	
7.000	1-7/01	0.101	0.000	1.35		51.6	SURCHARGED	
6.010	1-6/11	0.512	0.000	1.33		279.3	SURCHARGED	
1.012	1-1/13	0.435	0.000	2.15		605.1	SURCHARGED	
8.000	1-8/01	0.391	0.000	1.19		20.1	SURCHARGED	
8.001	1-8/02	0.266	0.000	1.09		43.8	SURCHARGED	
8.002	1-8/03	0.206	0.000	1.46		57.5	SURCHARGED	
1.013	1-1/14	0.174	0.000	1.54		533.9	SURCHARGED	
9.000	1-9/01	0.648	0.000	1.12		210.9	SURCHARGED	
9.001	1-9/02	0.722	0.000	1.21		285.2	SURCHARGED	
9.002	1-9/03	0.244	0.000	1.41		285.1	SURCHARGED	
1.014	1-1/15	0.007	0.000	1.03		710.5	SURCHARGED	
1.015	1-1/16	-0.289	0.000	0.53		713.8	OK	
1.016	1-1/17	-0.325	0.000	0.43		713.3	OK	
1.017	1-1/18	-0.279	0.000	0.82		712.5	OK	
10.000	1-10/01	0.952	0.000	0.49		23.2	FLOOD RISK	
10.001	1-10/02	1.278	0.000	0.84		34.2	FLOOD RISK	
10.002	1-10/03	1.475	0.000	1.00		37.0	SURCHARGED	
10.003	1-10/04	1.462	0.000	1.05		40.2	SURCHARGED	
11.000	1-11/01	0.936	0.000	1.01		50.1	FLOOD RISK	
10.004	1-10/05	1.494	0.000	1.93		72.5	FLOOD RISK	
12.000	1-12/01	-0.078	0.000	0.46		7.5	OK	
12.001	1-12/02	-0.148	0.000	0.25		7.5	OK	
12.002	1-12/03	-0.154	0.000	0.21		7.6	OK	
12.003	1-12/04	-0.166	0.000	0.16		7.6	OK	
12.004	1-12/05	-0.106	0.000	0.52		20.7	OK	
12.005	1-12/06	-0.098	0.000	0.57		21.0	OK	
12.006	1-12/07	-0.046	0.000	0.97		35.3	OK	
12.007	1-12/08	-0.085	0.000	0.68		53.3	OK	
12.008	1-12/09	0.463	0.000	0.81		63.1	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 1.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
12.009	1-12/10	0.919	0.000	1.05		68.2	FLOOD RISK	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 1.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
12.010	1-12/11	15 Winter	100	+20%	30/15 Summer				65.011
10.005	1-10/06	15 Winter	100	+20%	30/15 Summer				64.847
13.000	1-13/01	15 Winter	100	+20%	30/15 Summer				64.394
10.006	1-10/07	15 Winter	100	+20%	30/15 Summer				64.251
14.000	1-14/01	15 Winter	100	+20%	30/15 Summer				64.175
10.007	1-10/08	15 Winter	100	+20%	1/15 Winter				63.486
10.008	1-10/09	15 Winter	100	+20%	30/15 Summer				63.146
1.018	1-1/19	60 Winter	100	+20%					61.558

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
12.010	1-12/11	0.813	0.000	0.70		135.9	SURCHARGED	
10.005	1-10/06	1.249	0.000	1.47		179.7	FLOOD RISK	
13.000	1-13/01	0.597	0.000	0.69		34.0	SURCHARGED	
10.006	1-10/07	0.924	0.000	1.39		207.5	FLOOD RISK	
14.000	1-14/01	0.852	0.000	1.34		23.2	SURCHARGED	
10.007	1-10/08	0.559	0.000	2.14		229.9	SURCHARGED	
10.008	1-10/09	0.272	0.000	1.26		229.8	SURCHARGED	
1.018	1-1/19	-0.351	0.000	0.69		656.6	OK	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for 2024-02-22 STORM NETWORK 2.SWS

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	16.800	Add Flow / Climate Change (%)	0
Ratio R	0.328	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	0.000
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	0.75
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for 2024-02-22 STORM NETWORK 2.SWS

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.346	4-8	0.203

Total Area Contributing (ha) = 0.549

Total Pipe Volume (m³) = 11.280

Network Design Table for 2024-02-22 STORM NETWORK 2.SWS

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	20.478	1.024	20.0	0.123	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	16.602	0.166	100.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.000	20.479	1.024	20.0	0.092	5.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.12	66.068	0.123	0.0	0.0	0.0	2.94	116.9	16.7
1.001	50.00	5.33	65.044	0.123	0.0	0.0	0.0	1.31	52.0	16.7
2.000	50.00	5.12	65.902	0.092	0.0	0.0	0.0	2.94	116.9	12.5

Network Design Table for 2024-02-22 STORM NETWORK 2.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.002	15.713	0.294	53.4	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
3.000	20.479	0.512	40.0	0.058	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.003	16.552	0.110	150.5	0.040	0.00	0.0	0.600	o	225	Pipe/Conduit	
4.000	20.479	0.512	40.0	0.055	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.004	16.772	0.112	149.8	0.063	0.00	0.0	0.600	o	300	Pipe/Conduit	
5.000	13.385	0.334	40.1	0.040	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.005	15.921	0.106	150.2	0.050	0.00	0.0	0.600	o	300	Pipe/Conduit	
6.000	13.441	0.336	40.0	0.028	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.006	11.914	0.079	150.8	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.007	6.647	0.044	151.1	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.008	5.278	0.035	150.8	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.009	14.386	1.200	12.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.002	50.00	5.47	64.803	0.215	0.0	0.0	0.0	1.79	71.3	29.1
3.000	50.00	5.16	65.745	0.058	0.0	0.0	0.0	2.07	82.5	7.9
1.003	50.00	5.73	64.509	0.313	0.0	0.0	0.0	1.06	42.3«	42.4
4.000	50.00	5.16	65.579	0.055	0.0	0.0	0.0	2.07	82.5	7.4
1.004	50.00	5.95	64.324	0.431	0.0	0.0	0.0	1.28	90.7	58.4
5.000	50.00	5.11	65.234	0.040	0.0	0.0	0.0	2.07	82.4	5.4
1.005	50.00	6.16	64.212	0.521	0.0	0.0	0.0	1.28	90.5	70.5
6.000	50.00	5.11	65.075	0.028	0.0	0.0	0.0	2.07	82.5	3.8
1.006	50.00	6.31	64.106	0.549	0.0	0.0	0.0	1.28	90.3	74.3
1.007	49.92	6.40	64.027	0.549	0.0	0.0	0.0	1.28	90.3	74.3
1.008	49.69	6.47	63.983	0.549	0.0	0.0	0.0	1.28	90.3	74.3
1.009	49.51	6.52	63.948	0.549	0.0	0.0	0.0	4.57	322.7	74.3

Manhole Schedules for 2024-02-22 STORM NETWORK 2.SWS

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)
2-1/01	67.418	1.350	Open Manhole	1200	1.000	66.068	225				
2-1/02	66.906	1.862	Open Manhole	1200	1.001	65.044	225	1.000	65.044	225	
2-2/01	67.252	1.350	Open Manhole	1200	2.000	65.902	225				
2-1/03	66.740	1.937	Open Manhole	1200	1.002	64.803	225	1.001	64.878	225	75
								2.000	64.878	225	75
2-3/01	67.095	1.350	Open Manhole	1200	3.000	65.745	225				
2-1/04	66.583	2.074	Open Manhole	1200	1.003	64.509	225	1.002	64.509	225	
								3.000	65.233	225	724
2-4/01	66.929	1.350	Open Manhole	1200	4.000	65.579	225				
2-1/05	66.417	2.093	Open Manhole	1200	1.004	64.324	300	1.003	64.399	225	
								4.000	65.067	225	668
2-5/01	66.584	1.350	Open Manhole	1200	5.000	65.234	225				
2-1/06	66.250	2.038	Open Manhole	1200	1.005	64.212	300	1.004	64.212	300	
								5.000	64.900	225	613
2-6/01	66.425	1.350	Open Manhole	1200	6.000	65.075	225				
2-1/07	66.089	1.983	Open Manhole	1200	1.006	64.106	300	1.005	64.106	300	
								6.000	64.739	225	558
2-1/08	65.768	1.741	Open Manhole	1200	1.007	64.027	300	1.006	64.027	300	
2-1/09	65.599	1.616	Open Manhole	1200	1.008	63.983	300	1.007	63.983	300	
2-1/10	65.465	1.517	Open Manhole	1200	1.009	63.948	300	1.008	63.948	300	
HW02	63.500	0.752	Open Manhole	0		OUTFALL		1.009	62.748	300	

PIPELINE SCHEDULES for 2024-02-22 STORM NETWORK 2.SWS

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	2-1/01	67.418	66.068	1.125	Open Manhole	1200
1.001	o	225	2-1/02	66.906	65.044	1.637	Open Manhole	1200
2.000	o	225	2-2/01	67.252	65.902	1.125	Open Manhole	1200
1.002	o	225	2-1/03	66.740	64.803	1.712	Open Manhole	1200
3.000	o	225	2-3/01	67.095	65.745	1.125	Open Manhole	1200
1.003	o	225	2-1/04	66.583	64.509	1.849	Open Manhole	1200
4.000	o	225	2-4/01	66.929	65.579	1.125	Open Manhole	1200
1.004	o	300	2-1/05	66.417	64.324	1.793	Open Manhole	1200
5.000	o	225	2-5/01	66.584	65.234	1.125	Open Manhole	1200
1.005	o	300	2-1/06	66.250	64.212	1.738	Open Manhole	1200
6.000	o	225	2-6/01	66.425	65.075	1.125	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	20.478	20.0	2-1/02	66.906	65.044	1.637	Open Manhole	1200
1.001	16.602	100.0	2-1/03	66.740	64.878	1.637	Open Manhole	1200
2.000	20.479	20.0	2-1/03	66.740	64.878	1.637	Open Manhole	1200
1.002	15.713	53.4	2-1/04	66.583	64.509	1.849	Open Manhole	1200
3.000	20.479	40.0	2-1/04	66.583	65.233	1.125	Open Manhole	1200
1.003	16.552	150.5	2-1/05	66.417	64.399	1.793	Open Manhole	1200
4.000	20.479	40.0	2-1/05	66.417	65.067	1.125	Open Manhole	1200
1.004	16.772	149.8	2-1/06	66.250	64.212	1.738	Open Manhole	1200
5.000	13.385	40.1	2-1/06	66.250	64.900	1.125	Open Manhole	1200
1.005	15.921	150.2	2-1/07	66.089	64.106	1.683	Open Manhole	1200
6.000	13.441	40.0	2-1/07	66.089	64.739	1.125	Open Manhole	1200

PIPELINE SCHEDULES for 2024-02-22 STORM NETWORK 2.SWS

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)
1.006	o	300	2-1/07	66.089	64.106	1.683	Open Manhole	1200
1.007	o	300	2-1/08	65.768	64.027	1.441	Open Manhole	1200
1.008	o	300	2-1/09	65.599	63.983	1.316	Open Manhole	1200
1.009	o	300	2-1/10	65.465	63.948	1.217	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)
1.006	11.914	150.8	2-1/08	65.768	64.027	1.441	Open Manhole	1200
1.007	6.647	151.1	2-1/09	65.599	63.983	1.316	Open Manhole	1200
1.008	5.278	150.8	2-1/10	65.465	63.948	1.217	Open Manhole	1200
1.009	14.386	12.0	HW02	63.500	62.748	0.452	Open Manhole	0

Free Flowing Outfall Details for 2024-02-22 STORM NETWORK 2.SWS

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.009	HW02	63.500	62.748	0.000	0	0

Simulation Criteria for 2024-02-22 STORM NETWORK 2.SWS

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	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 Storage Structures	1
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	16.800	Storm Duration (mins)	30
Ratio R	0.328		

Storage Structures for 2024-02-22 STORM NETWORK 2.SWS

Cellular Storage Manhole: 2-1/10, DS/PN: 1.009

Invert Level (m) 63.948 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	200.0	0.0	0.801	0.0	0.0
0.800	200.0	0.0			

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 2.SWS

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.328
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	16.800	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	20, 20, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	2-1/01	15 Winter	1	+20%	100/15 Summer				66.130
1.001	2-1/02	15 Winter	1	+20%	30/15 Summer				65.142
2.000	2-2/01	15 Winter	1	+20%	30/15 Winter				65.955
1.002	2-1/03	15 Winter	1	+20%	30/15 Summer				64.916
3.000	2-3/01	15 Winter	1	+20%	100/15 Summer				65.795
1.003	2-1/04	15 Winter	1	+20%	1/15 Summer				64.766
4.000	2-4/01	15 Winter	1	+20%	100/15 Winter				65.628
1.004	2-1/05	15 Winter	1	+20%	1/15 Winter				64.666
5.000	2-5/01	15 Winter	1	+20%	100/15 Summer				65.277
1.005	2-1/06	15 Winter	1	+20%	1/15 Summer				64.557
6.000	2-6/01	15 Winter	1	+20%	100/15 Winter				65.110
1.006	2-1/07	15 Winter	1	+20%	1/15 Summer				64.449
1.007	2-1/08	15 Winter	1	+20%	1/15 Summer				64.356
1.008	2-1/09	30 Summer	1	+20%	30/15 Summer				64.240
1.009	2-1/10	30 Winter	1	+20%					64.037

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 2.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	2-1/01	-0.163	0.000	0.17		17.9	OK	
1.001	2-1/02	-0.127	0.000	0.38		17.7	OK	
2.000	2-2/01	-0.172	0.000	0.13		13.4	OK	
1.002	2-1/03	-0.112	0.000	0.49		31.0	OK	
3.000	2-3/01	-0.175	0.000	0.11		8.4	OK	
1.003	2-1/04	0.032	0.000	1.18		44.2	SURCHARGED	
4.000	2-4/01	-0.176	0.000	0.11		8.0	OK	
1.004	2-1/05	0.042	0.000	0.74		57.3	SURCHARGED	
5.000	2-5/01	-0.182	0.000	0.08		5.8	OK	
1.005	2-1/06	0.045	0.000	0.83		63.3	SURCHARGED	
6.000	2-6/01	-0.190	0.000	0.06		4.1	OK	
1.006	2-1/07	0.043	0.000	0.89		63.0	SURCHARGED	
1.007	2-1/08	0.029	0.000	0.98		60.2	SURCHARGED	
1.008	2-1/09	-0.043	0.000	1.00		60.8	OK	
1.009	2-1/10	-0.211	0.000	0.19		51.7	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 2.SWS

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.328
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	16.800	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	20, 20, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	2-1/01	15 Winter	30	+20%	100/15 Summer				66.276
1.001	2-1/02	15 Winter	30	+20%	30/15 Summer				66.191
2.000	2-2/01	15 Winter	30	+20%	30/15 Winter				66.142
1.002	2-1/03	15 Winter	30	+20%	30/15 Summer				66.093
3.000	2-3/01	15 Winter	30	+20%	100/15 Summer				65.929
1.003	2-1/04	15 Winter	30	+20%	1/15 Summer				65.898
4.000	2-4/01	15 Winter	30	+20%	100/15 Winter				65.654
1.004	2-1/05	15 Winter	30	+20%	1/15 Winter				65.481
5.000	2-5/01	15 Winter	30	+20%	100/15 Summer				65.308
1.005	2-1/06	15 Winter	30	+20%	1/15 Summer				65.290
6.000	2-6/01	15 Winter	30	+20%	100/15 Winter				65.128
1.006	2-1/07	15 Winter	30	+20%	1/15 Summer				65.026
1.007	2-1/08	15 Winter	30	+20%	1/15 Summer				64.762
1.008	2-1/09	15 Winter	30	+20%	30/15 Summer				64.498
1.009	2-1/10	15 Winter	30	+20%					64.085

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 2.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	2-1/01	-0.017	0.000	0.38		39.8	OK	
1.001	2-1/02	0.922	0.000	0.68		31.3	SURCHARGED	
2.000	2-2/01	0.015	0.000	0.28		29.8	SURCHARGED	
1.002	2-1/03	1.065	0.000	0.83		52.1	SURCHARGED	
3.000	2-3/01	-0.041	0.000	0.25		18.8	OK	
1.003	2-1/04	1.164	0.000	1.98		74.4	SURCHARGED	
4.000	2-4/01	-0.150	0.000	0.24		17.8	OK	
1.004	2-1/05	0.857	0.000	1.31		100.9	SURCHARGED	
5.000	2-5/01	-0.151	0.000	0.18		12.9	OK	
1.005	2-1/06	0.778	0.000	1.59		122.0	SURCHARGED	
6.000	2-6/01	-0.172	0.000	0.13		9.1	OK	
1.006	2-1/07	0.620	0.000	1.82		128.3	SURCHARGED	
1.007	2-1/08	0.435	0.000	2.09		128.1	SURCHARGED	
1.008	2-1/09	0.215	0.000	2.11		128.5	SURCHARGED	
1.009	2-1/10	-0.163	0.000	0.43		114.6	OK	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 2.SWS

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.328
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	16.800	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	20, 20, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	2-1/01	15 Winter	100	+20%	100/15 Summer				66.904
1.001	2-1/02	15 Winter	100	+20%	30/15 Summer				66.783
2.000	2-2/01	15 Winter	100	+20%	30/15 Winter				66.743
1.002	2-1/03	15 Winter	100	+20%	30/15 Summer				66.676
3.000	2-3/01	15 Winter	100	+20%	100/15 Summer				66.464
1.003	2-1/04	15 Winter	100	+20%	1/15 Summer				66.428
4.000	2-4/01	15 Winter	100	+20%	100/15 Winter				65.928
1.004	2-1/05	15 Winter	100	+20%	1/15 Winter				65.893
5.000	2-5/01	15 Winter	100	+20%	100/15 Summer				65.664
1.005	2-1/06	15 Winter	100	+20%	1/15 Summer				65.643
6.000	2-6/01	15 Winter	100	+20%	100/15 Winter				65.301
1.006	2-1/07	15 Winter	100	+20%	1/15 Summer				65.285
1.007	2-1/08	15 Winter	100	+20%	1/15 Summer				64.932
1.008	2-1/09	15 Winter	100	+20%	30/15 Summer				64.582
1.009	2-1/10	15 Winter	100	+20%					64.099

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 2.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	2-1/01	0.611	0.000	0.43		45.8	SURCHARGED	
1.001	2-1/02	1.514	0.000	0.73		33.7	FLOOD RISK	
2.000	2-2/01	0.616	0.000	0.31		33.0	SURCHARGED	
1.002	2-1/03	1.648	0.000	0.95		59.8	FLOOD RISK	
3.000	2-3/01	0.494	0.000	0.29		21.9	SURCHARGED	
1.003	2-1/04	1.694	0.000	2.25		84.4	FLOOD RISK	
4.000	2-4/01	0.124	0.000	0.28		21.2	SURCHARGED	
1.004	2-1/05	1.269	0.000	1.48		114.3	SURCHARGED	
5.000	2-5/01	0.205	0.000	0.22		15.4	SURCHARGED	
1.005	2-1/06	1.131	0.000	1.83		140.3	SURCHARGED	
6.000	2-6/01	0.001	0.000	0.16		11.5	SURCHARGED	
1.006	2-1/07	0.879	0.000	2.09		147.4	SURCHARGED	
1.007	2-1/08	0.605	0.000	2.41		147.9	SURCHARGED	
1.008	2-1/09	0.299	0.000	2.43		148.0	SURCHARGED	
1.009	2-1/10	-0.149	0.000	0.51		136.2	OK	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for 2024-02-22 STORM NETWORK 3.SWS

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	16.800	Add Flow / Climate Change (%)	0
Ratio R	0.328	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	0.000
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	0.75
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for 2024-02-22 STORM NETWORK 3.SWS

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.478	4-8	0.187

Total Area Contributing (ha) = 0.665

Total Pipe Volume (m³) = 14.872

Network Design Table for 2024-02-22 STORM NETWORK 3.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	25.589	0.793	32.3	0.094	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.001	30.505	1.433	21.3	0.040	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.002	25.820	1.322	19.5	0.040	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.000	19.838	0.764	26.0	0.109	5.00	0.0	0.600	o	225	Pipe/Conduit	
2.001	29.496	1.034	28.5	0.029	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.24	75.404	0.094	0.0	0.0	0.0	1.78	31.4	12.7
1.001	50.00	5.47	74.611	0.134	0.0	0.0	0.0	2.19	38.7	18.1
1.002	50.00	5.62	73.103	0.174	0.0	0.0	0.0	2.97	118.3	23.6
2.000	50.00	5.13	73.579	0.109	0.0	0.0	0.0	2.58	102.5	14.8
2.001	50.00	5.33	72.815	0.138	0.0	0.0	0.0	2.46	97.8	18.7

Network Design Table for 2024-02-22 STORM NETWORK 3.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.003	33.972	1.817	18.7	0.068	0.00	0.0	0.600	o	225	Pipe/Conduit	
3.000	29.168	1.417	20.6	0.124	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.004	37.617	2.976	12.6	0.077	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.005	30.928	1.733	17.8	0.084	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.006	13.306	0.498	26.7	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.007	23.910	0.779	30.7	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.008	12.816	2.013	6.4	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.003	50.00	5.80	71.781	0.380	0.0	0.0	0.0	3.04	120.9	51.5
3.000	50.00	5.17	71.456	0.124	0.0	0.0	0.0	2.90	115.2	16.8
1.004	50.00	5.94	69.889	0.581	0.0	0.0	0.0	4.45	314.2	78.7
1.005	50.00	6.08	66.913	0.665	0.0	0.0	0.0	3.74	264.3	90.0
1.006	50.00	6.15	65.180	0.665	0.0	0.0	0.0	3.05	215.9	90.0
1.007	50.00	6.29	64.682	0.665	0.0	0.0	0.0	2.85	201.3	90.0
1.008	50.00	6.33	63.903	0.665	0.0	0.0	0.0	6.27	443.2	90.0

Manhole Schedules for 2024-02-22 STORM NETWORK 3.SWS

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)
3-1/01	76.754	1.350	Open Manhole	1200	1.000	75.404	150				
3-1/02	75.961	1.350	Open Manhole	1200	1.001	74.611	150	1.000	74.611	150	
3-1/03	74.528	1.425	Open Manhole	1200	1.002	73.103	225	1.001	73.178	150	
3-2/01	74.929	1.350	Open Manhole	1200	2.000	73.579	225				
3-2/02	74.165	1.350	Open Manhole	1200	2.001	72.815	225	2.000	72.815	225	
3-1/04	73.206	1.425	Open Manhole	1200	1.003	71.781	225	1.002	71.781	225	
								2.001	71.781	225	
3-3/01	72.806	1.350	Open Manhole	1200	3.000	71.456	225				
3-1/05	71.389	1.500	Open Manhole	1200	1.004	69.889	300	1.003	69.964	225	
								3.000	70.039	225	75
3-1/06	68.413	1.500	Open Manhole	1200	1.005	66.913	300	1.004	66.913	300	
3-1/07	66.680	1.500	Open Manhole	1200	1.006	65.180	300	1.005	65.180	300	
3-1/08	66.182	1.500	Open Manhole	1200	1.007	64.682	300	1.006	64.682	300	
3-1/09	65.403	1.500	Open Manhole	1200	1.008	63.903	300	1.007	63.903	300	
HW3	63.390	1.500	Open Manhole	0		OUTFALL		1.008	61.890	300	

PIPELINE SCHEDULES for 2024-02-22 STORM NETWORK 3.SWS

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	150	3-1/01	76.754	75.404	1.200	Open Manhole	1200
1.001	o	150	3-1/02	75.961	74.611	1.200	Open Manhole	1200
1.002	o	225	3-1/03	74.528	73.103	1.200	Open Manhole	1200
2.000	o	225	3-2/01	74.929	73.579	1.125	Open Manhole	1200
2.001	o	225	3-2/02	74.165	72.815	1.125	Open Manhole	1200
1.003	o	225	3-1/04	73.206	71.781	1.200	Open Manhole	1200
3.000	o	225	3-3/01	72.806	71.456	1.125	Open Manhole	1200
1.004	o	300	3-1/05	71.389	69.889	1.200	Open Manhole	1200
1.005	o	300	3-1/06	68.413	66.913	1.200	Open Manhole	1200
1.006	o	300	3-1/07	66.680	65.180	1.200	Open Manhole	1200
1.007	o	300	3-1/08	66.182	64.682	1.200	Open Manhole	1200
1.008	o	300	3-1/09	65.403	63.903	1.200	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	25.589	32.3	3-1/02	75.961	74.611	1.200	Open Manhole	1200
1.001	30.505	21.3	3-1/03	74.528	73.178	1.200	Open Manhole	1200
1.002	25.820	19.5	3-1/04	73.206	71.781	1.200	Open Manhole	1200
2.000	19.838	26.0	3-2/02	74.165	72.815	1.125	Open Manhole	1200
2.001	29.496	28.5	3-1/04	73.206	71.781	1.200	Open Manhole	1200
1.003	33.972	18.7	3-1/05	71.389	69.964	1.200	Open Manhole	1200
3.000	29.168	20.6	3-1/05	71.389	70.039	1.125	Open Manhole	1200
1.004	37.617	12.6	3-1/06	68.413	66.913	1.200	Open Manhole	1200
1.005	30.928	17.8	3-1/07	66.680	65.180	1.200	Open Manhole	1200
1.006	13.306	26.7	3-1/08	66.182	64.682	1.200	Open Manhole	1200
1.007	23.910	30.7	3-1/09	65.403	63.903	1.200	Open Manhole	1200
1.008	12.816	6.4	HW3	63.390	61.890	1.200	Open Manhole	0

Free Flowing Outfall Details for 2024-02-22 STORM NETWORK 3.SWS

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.008	HW3	63.390	61.890	0.000	0	0

Simulation Criteria for 2024-02-22 STORM NETWORK 3.SWS

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	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 Storage Structures	1
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	16.800	Storm Duration (mins)	30
Ratio R	0.328		

Storage Structures for 2024-02-22 STORM NETWORK 3.SWS

Cellular Storage Manhole: 3-1/09, DS/PN: 1.008

Invert Level (m) 63.978 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	210.0	0.0	0.801	0.0	0.0
0.800	210.0	0.0			

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 3.SWS

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.328
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	16.800	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	20, 20, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	3-1/01	15 Winter	1	+20%	30/15 Summer				75.476
1.001	3-1/02	15 Winter	1	+20%	30/15 Summer				74.687
1.002	3-1/03	15 Winter	1	+20%					73.174
2.000	3-2/01	15 Winter	1	+20%					73.642
2.001	3-2/02	15 Winter	1	+20%	100/15 Winter				72.886
1.003	3-1/04	15 Winter	1	+20%	30/15 Summer				71.888
3.000	3-3/01	15 Winter	1	+20%					71.518
1.004	3-1/05	15 Winter	1	+20%					69.996
1.005	3-1/06	15 Winter	1	+20%	100/15 Summer				67.040
1.006	3-1/07	15 Winter	1	+20%	30/15 Summer				65.331
1.007	3-1/08	15 Winter	1	+20%	30/15 Summer				64.831
1.008	3-1/09	15 Winter	1	+20%					63.998

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	3-1/01	-0.078	0.000	0.46		13.6	OK	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 3.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.001	3-1/02	-0.074	0.000	0.50		18.4	OK	
1.002	3-1/03	-0.154	0.000	0.21		23.5	OK	
2.000	3-2/01	-0.162	0.000	0.17		15.8	OK	
2.001	3-2/02	-0.154	0.000	0.21		19.2	OK	
1.003	3-1/04	-0.118	0.000	0.45		51.3	OK	
3.000	3-3/01	-0.163	0.000	0.17		18.0	OK	
1.004	3-1/05	-0.193	0.000	0.27		78.6	OK	
1.005	3-1/06	-0.173	0.000	0.37		89.1	OK	
1.006	3-1/07	-0.149	0.000	0.50		89.1	OK	
1.007	3-1/08	-0.151	0.000	0.50		88.9	OK	
1.008	3-1/09	-0.205	0.000	0.22		79.1	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 3.SWS

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.328
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	16.800	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	20, 20, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	3-1/01	15 Winter	30	+20%	30/15 Summer				75.614
1.001	3-1/02	15 Winter	30	+20%	30/15 Summer				74.921
1.002	3-1/03	15 Winter	30	+20%					73.213
2.000	3-2/01	15 Winter	30	+20%					73.676
2.001	3-2/02	15 Winter	30	+20%	100/15 Winter				72.928
1.003	3-1/04	15 Winter	30	+20%	30/15 Summer				72.084
3.000	3-3/01	15 Winter	30	+20%					71.552
1.004	3-1/05	15 Winter	30	+20%					70.062
1.005	3-1/06	15 Winter	30	+20%	100/15 Summer				67.141
1.006	3-1/07	15 Winter	30	+20%	30/15 Summer				65.868
1.007	3-1/08	15 Winter	30	+20%	30/15 Summer				65.210
1.008	3-1/09	15 Winter	30	+20%					64.059

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	3-1/01	0.060	0.000	0.94		28.0	SURCHARGED	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 3.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.001	3-1/02	0.160	0.000	1.05		39.2	SURCHARGED	
1.002	3-1/03	-0.115	0.000	0.48		52.1	OK	
2.000	3-2/01	-0.128	0.000	0.38		35.3	OK	
2.001	3-2/02	-0.112	0.000	0.49		44.9	OK	
1.003	3-1/04	0.078	0.000	1.02		116.4	SURCHARGED	
3.000	3-3/01	-0.129	0.000	0.37		40.1	OK	
1.004	3-1/05	-0.127	0.000	0.62		180.7	OK	
1.005	3-1/06	-0.072	0.000	0.87		208.7	OK	
1.006	3-1/07	0.388	0.000	1.16		205.0	SURCHARGED	
1.007	3-1/08	0.228	0.000	1.14		203.4	SURCHARGED	
1.008	3-1/09	-0.144	0.000	0.53		190.0	OK	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 3.SWS

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.328
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	16.800	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	20, 20, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	3-1/01	15 Winter	100	+20%	30/15 Summer				76.130
1.001	3-1/02	15 Winter	100	+20%	30/15 Summer				75.258
1.002	3-1/03	15 Winter	100	+20%					73.222
2.000	3-2/01	15 Winter	100	+20%					73.692
2.001	3-2/02	15 Winter	100	+20%	100/15 Winter				73.051
1.003	3-1/04	15 Winter	100	+20%	30/15 Summer				72.706
3.000	3-3/01	15 Winter	100	+20%					71.567
1.004	3-1/05	15 Winter	100	+20%					70.084
1.005	3-1/06	15 Winter	100	+20%	100/15 Summer				68.004
1.006	3-1/07	15 Winter	100	+20%	30/15 Summer				66.354
1.007	3-1/08	15 Winter	100	+20%	30/15 Summer				65.504
1.008	3-1/09	15 Winter	100	+20%					64.075

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	3-1/01	0.576	0.000	1.05		31.4	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 3.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.001	3-1/02	0.497	0.000	1.16		43.1	SURCHARGED	
1.002	3-1/03	-0.106	0.000	0.54		58.8	OK	
2.000	3-2/01	-0.112	0.000	0.49		45.8	OK	
2.001	3-2/02	0.011	0.000	0.63		57.3	SURCHARGED	
1.003	3-1/04	0.700	0.000	1.17		133.4	SURCHARGED	
3.000	3-3/01	-0.114	0.000	0.49		52.1	OK	
1.004	3-1/05	-0.105	0.000	0.74		213.6	OK	
1.005	3-1/06	0.791	0.000	0.98		234.9	SURCHARGED	
1.006	3-1/07	0.874	0.000	1.31		232.2	SURCHARGED	
1.007	3-1/08	0.522	0.000	1.29		231.1	SURCHARGED	
1.008	3-1/09	-0.128	0.000	0.63		222.5	OK	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for 2024-02-22 STORM NETWORK 4.SWS

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	16.800	Add Flow / Climate Change (%)	0
Ratio R	0.328	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	0.000
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	0.75
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for 2024-02-22 STORM NETWORK 4.SWS

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.076	4-8	0.044

Total Area Contributing (ha) = 0.120

Total Pipe Volume (m³) = 4.056

Network Design Table for 2024-02-22 STORM NETWORK 4.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	26.273	2.863	9.2	0.072	5.00	0.0	0.600	o	100	Pipe/Conduit	
1.001	37.680	5.000	7.5	0.024	0.00	0.0	0.600	o	100	Pipe/Conduit	
1.002	25.358	0.169	150.0	0.024	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.003	49.954	3.114	16.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.004	14.056	0.094	150.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.17	73.563	0.072	0.0	0.0	0.0	2.57	20.2	9.7
1.001	50.00	5.39	70.700	0.096	0.0	0.0	0.0	2.83	22.3	13.0
1.002	50.00	5.79	65.575	0.120	0.0	0.0	0.0	1.07	42.4	16.2
1.003	50.00	6.04	65.406	0.120	0.0	0.0	0.0	3.28	130.6	16.2
1.004	50.00	6.26	62.291	0.120	0.0	0.0	0.0	1.07	42.4	16.2

Manhole Schedules for 2024-02-22 STORM NETWORK 4.SWS

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)
4-1/01	74.863	1.300	Open Manhole	1200	1.000	73.563	100				
4-1/02	72.000	1.300	Open Manhole	1200	1.001	70.700	100	1.000	70.700	100	
4-1/03	67.000	1.425	Open Manhole	1200	1.002	65.575	225	1.001	65.700	100	
4-1/04	67.000	1.594	Open Manhole	1200	1.003	65.406	225	1.002	65.406	225	
4-1/05	63.800	1.509	Open Manhole	1200	1.004	62.291	225	1.003	62.291	225	
HW4	63.800	1.602	Open Manhole	0		OUTFALL		1.004	62.198	225	

PIPELINE SCHEDULES for 2024-02-22 STORM NETWORK 4.SWS

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	100	4-1/01	74.863	73.563	1.200	Open Manhole	1200
1.001	o	100	4-1/02	72.000	70.700	1.200	Open Manhole	1200
1.002	o	225	4-1/03	67.000	65.575	1.200	Open Manhole	1200
1.003	o	225	4-1/04	67.000	65.406	1.369	Open Manhole	1200
1.004	o	225	4-1/05	63.800	62.291	1.284	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	26.273	9.2	4-1/02	72.000	70.700	1.200	Open Manhole	1200
1.001	37.680	7.5	4-1/03	67.000	65.700	1.200	Open Manhole	1200
1.002	25.358	150.0	4-1/04	67.000	65.406	1.369	Open Manhole	1200
1.003	49.954	16.0	4-1/05	63.800	62.291	1.284	Open Manhole	1200
1.004	14.056	150.0	HW4	63.800	62.198	1.377	Open Manhole	0

Free Flowing Outfall Details for 2024-02-22 STORM NETWORK 4.SWS

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.004	HW4	63.800	62.198	0.000	0	0

Simulation Criteria for 2024-02-22 STORM NETWORK 4.SWS

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	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 Storage Structures	4
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	16.800	Storm Duration (mins)	30
Ratio R	0.328		

Storage Structures for 2024-02-22 STORM NETWORK 4.SWS

Infiltration Trench Manhole: 4-1/01, DS/PN: 1.000

Infiltration Coefficient Base (m/hr)	0.10000	Trench Width (m)	1.0
Infiltration Coefficient Side (m/hr)	0.10000	Trench Length (m)	85.0
Safety Factor	2.0	Slope (1:X)	200.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	73.863	Cap Infiltration Depth (m)	0.000

Infiltration Trench Manhole: 4-1/03, DS/PN: 1.002

Infiltration Coefficient Base (m/hr)	0.10000	Trench Width (m)	1.0
Infiltration Coefficient Side (m/hr)	0.10000	Trench Length (m)	20.0
Safety Factor	2.0	Slope (1:X)	100.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	66.000	Cap Infiltration Depth (m)	0.000

Infiltration Trench Manhole: 4-1/04, DS/PN: 1.003

Infiltration Coefficient Base (m/hr)	0.10000	Trench Width (m)	1.0
Infiltration Coefficient Side (m/hr)	0.10000	Trench Length (m)	50.0
Safety Factor	2.0	Slope (1:X)	100.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	66.000	Cap Infiltration Depth (m)	0.000

Infiltration Trench Manhole: 4-1/05, DS/PN: 1.004

Infiltration Coefficient Base (m/hr)	0.10000	Trench Width (m)	1.0
Infiltration Coefficient Side (m/hr)	0.10000	Trench Length (m)	50.0
Safety Factor	2.0	Slope (1:X)	25.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	62.800	Cap Infiltration Depth (m)	0.000

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 4.SWS

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	4
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.328
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	16.800	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	20, 20, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	4-1/01	15 Winter	1	+20%	30/15 Summer				73.615
1.001	4-1/02	15 Winter	1	+20%	30/15 Summer				70.757
1.002	4-1/03	15 Winter	1	+20%					65.677
1.003	4-1/04	15 Winter	1	+20%					65.460
1.004	4-1/05	15 Winter	1	+20%					62.396

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	4-1/01	-0.048	0.000	0.53		10.5	OK	
1.001	4-1/02	-0.043	0.000	0.61		13.3	OK	
1.002	4-1/03	-0.123	0.000	0.42		16.4	OK	
1.003	4-1/04	-0.171	0.000	0.13		16.3	OK	
1.004	4-1/05	-0.120	0.000	0.44		16.2	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 4.SWS

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	4
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.328
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	16.800	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	20, 20, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	4-1/01	15 Winter	30	+20%	30/15 Summer				73.899
1.001	4-1/02	15 Winter	30	+20%	30/15 Summer				71.360
1.002	4-1/03	15 Winter	30	+20%					65.727
1.003	4-1/04	15 Winter	30	+20%					65.481
1.004	4-1/05	15 Winter	30	+20%					62.449

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	4-1/01	0.236	0.000	0.97		19.0	SURCHARGED	
1.001	4-1/02	0.560	0.000	1.05		23.0	SURCHARGED	
1.002	4-1/03	-0.073	0.000	0.78		30.6	OK	
1.003	4-1/04	-0.150	0.000	0.24		30.5	OK	
1.004	4-1/05	-0.068	0.000	0.83		30.6	OK	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 4.SWS

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	4
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.328
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	16.800	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	20, 20, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	4-1/01	15 Winter	100	+20%	30/15 Summer				74.081
1.001	4-1/02	15 Winter	100	+20%	30/15 Summer				71.715
1.002	4-1/03	15 Winter	100	+20%					65.738
1.003	4-1/04	15 Winter	100	+20%					65.485
1.004	4-1/05	15 Winter	100	+20%					62.460

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	4-1/01	0.418	0.000	0.97		19.0	SURCHARGED	
1.001	4-1/02	0.915	0.000	1.09		23.7	FLOOD RISK	
1.002	4-1/03	-0.062	0.000	0.86		33.6	OK	
1.003	4-1/04	-0.146	0.000	0.27		33.4	OK	
1.004	4-1/05	-0.057	0.000	0.91		33.6	OK	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for 2024-02-22 STORM NETWORK 5.SWS

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	16.800	Add Flow / Climate Change (%)	0
Ratio R	0.328	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	0.000
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	0.75
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for 2024-02-22 STORM NETWORK 5.SWS

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.855	4-8	1.435	8-12	0.515	12-16	0.076

Total Area Contributing (ha) = 2.881

Total Pipe Volume (m³) = 116.354

Network Design Table for 2024-02-22 STORM NETWORK 5.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	48.056	0.467	102.9	0.010	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.001	43.945	0.476	92.3	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
2.000	70.868	0.710	99.8	0.150	5.00	0.0	0.600	o	225	Pipe/Conduit	
2.001	81.131	0.802	101.2	0.149	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.002	47.058	0.457	103.1	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.81	69.030	0.010	0.0	0.0	0.0	0.99	17.5	1.4
1.001	49.55	6.51	68.563	0.010	0.0	0.0	0.0	1.05	18.5	1.4
2.000	50.00	5.90	69.524	0.150	0.0	0.0	0.0	1.31	52.0	20.3
2.001	48.15	6.94	68.814	0.299	0.0	0.0	0.0	1.30	51.7	39.0
1.002	46.34	7.55	68.012	0.309	0.0	0.0	0.0	1.29	51.2	39.0

Network Design Table for 2024-02-22 STORM NETWORK 5.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.003	50.000	0.485	103.1	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.004	26.317	0.062	426.5	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
3.000	68.005	0.668	101.8	0.152	5.00	0.0	0.600	o	225	Pipe/Conduit	
3.001	57.678	0.572	100.8	0.152	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.005	50.000	0.100	500.0	0.152	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.006	50.000	0.108	461.2	0.116	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.007	50.000	0.210	238.2	0.116	0.00	0.0	0.600	o	450	Pipe/Conduit	
4.000	50.000	0.494	101.2	0.072	5.00	0.0	0.600	o	150	Pipe/Conduit	
4.001	49.915	0.480	104.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.008	14.460	0.029	500.0	0.108	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.009	10.475	2.271	4.6	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.010	30.497	0.152	200.6	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.011	48.026	0.242	198.5	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.012	40.281	1.376	29.3	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.013	38.308	0.895	42.8	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.014	32.586	0.065	500.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
5.000	50.000	0.375	133.3	0.568	5.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.003	44.58	8.20	67.555	0.309	0.0	0.0	0.0	1.29	51.2	39.0
1.004	43.14	8.78	66.995	0.309	0.0	0.0	0.0	0.76	53.4	39.0
3.000	50.00	5.87	68.567	0.152	0.0	0.0	0.0	1.30	51.5	20.6
3.001	49.21	6.61	67.899	0.304	0.0	0.0	0.0	1.30	51.8	40.5
1.005	40.82	9.82	66.859	0.765	0.0	0.0	0.0	0.80	88.7	84.6
1.006	39.06	10.70	66.684	0.881	0.0	0.0	0.0	0.94	149.5	93.2
1.007	37.91	11.34	66.575	0.997	0.0	0.0	0.0	1.31	208.8	102.4
4.000	50.00	5.83	67.639	0.072	0.0	0.0	0.0	1.00	17.6	9.7
4.001	48.99	6.68	67.145	0.072	0.0	0.0	0.0	0.99	17.4	9.7
1.008	37.45	11.61	66.365	1.177	0.0	0.0	0.0	0.90	143.5	119.4
1.009	37.41	11.62	66.336	1.177	0.0	0.0	0.0	9.51	1513.2	119.4
1.010	36.82	11.98	64.065	1.177	0.0	0.0	0.0	1.43	227.7	119.4
1.011	35.94	12.53	63.913	1.177	0.0	0.0	0.0	1.44	229.0	119.4
1.012	35.67	12.71	63.671	1.177	0.0	0.0	0.0	3.77	599.4	119.4
1.013	35.36	12.92	62.295	1.177	0.0	0.0	0.0	3.11	495.3	119.4
1.014	34.50	13.52	61.400	1.177	0.0	0.0	0.0	0.90	143.5	119.4
5.000	50.00	5.61	63.693	0.568	0.0	0.0	0.0	1.36	96.1	76.9

Network Design Table for 2024-02-22 STORM NETWORK 5.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
5.001	50.000	0.277	180.5	0.568	0.00	0.0	0.600	o	450	Pipe/Conduit	
5.002	62.596	1.041	60.1	0.568	0.00	0.0	0.600	o	450	Pipe/Conduit	
5.003	27.960	0.056	500.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.015	23.565	0.047	500.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.016	16.374	0.033	500.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
5.001	50.00	6.16	63.168	1.136	0.0	0.0	0.0	1.51	240.2	153.8
5.002	49.38	6.56	62.891	1.704	0.0	0.0	0.0	2.63	417.6	227.9
5.003	48.00	6.99	61.700	1.704	0.0	0.0	0.0	1.08	306.0	227.9
1.015	34.00	13.88	61.185	2.881	0.0	0.0	0.0	1.08	306.0	265.3
1.016	33.66	14.14	61.138	2.881	0.0	0.0	0.0	1.08	306.0	265.3

Manhole Schedules for 2024-02-22 STORM NETWORK 5.SWS

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)
5-1/01	70.330	1.300	Open Manhole	1200	1.000	69.030	150				
5-1/02	69.863	1.300	Open Manhole	1200	1.001	68.563	150	1.000	68.563	150	
5-2/01	70.949	1.425	Open Manhole	1200	2.000	69.524	225				
5-2/02	70.239	1.425	Open Manhole	1200	2.001	68.814	225	2.000	68.814	225	
5-1/03	69.437	1.425	Open Manhole	1200	1.002	68.012	225	1.001	68.087	150	
								2.001	68.012	225	
5-1/04	68.980	1.425	Open Manhole	1200	1.003	67.555	225	1.002	67.555	225	
5-1/05	68.495	1.500	Open Manhole	1200	1.004	66.995	300	1.003	67.070	225	
5-3/01	69.992	1.425	Open Manhole	1200	3.000	68.567	225				
5-3/02	69.324	1.425	Open Manhole	1200	3.001	67.899	225	3.000	67.899	225	
5-1/06	68.752	1.893	Open Manhole	1350	1.005	66.859	375	1.004	66.934	300	
								3.001	67.327	225	318
5-1/07	68.517	1.833	Open Manhole	1350	1.006	66.684	450	1.005	66.759	375	
5-1/08	68.266	1.691	Open Manhole	1350	1.007	66.575	450	1.006	66.575	450	
5-4/01	68.989	1.350	Open Manhole	1200	4.000	67.639	150				
5-4/02	68.495	1.350	Open Manhole	1200	4.001	67.145	150	4.000	67.145	150	
5-1/09	68.015	1.650	Open Manhole	1350	1.008	66.365	450	1.007	66.365	450	
								4.001	66.665	150	
5-1/10	68.247	1.911	Open Manhole	1350	1.009	66.336	450	1.008	66.336	450	
5-1/11	65.715	1.650	Open Manhole	1350	1.010	64.065	450	1.009	64.065	450	
5-1/12	65.563	1.650	Open Manhole	1350	1.011	63.913	450	1.010	63.913	450	
5-1/13	65.321	1.650	Open Manhole	1350	1.012	63.671	450	1.011	63.671	450	
5-1/14	63.945	1.650	Open Manhole	1350	1.013	62.295	450	1.012	62.295	450	
5-1/15	63.050	1.650	Open Manhole	1350	1.014	61.400	450	1.013	61.400	450	
5-5/01	65.193	1.500	Open Manhole	1200	5.000	63.693	300				
5-5/02	64.818	1.650	Open Manhole	1350	5.001	63.168	450	5.000	63.318	300	
5-5/03	64.541	1.650	Open Manhole	1350	5.002	62.891	450	5.001	62.891	450	
5-5/04	63.500	1.800	Open Manhole	1500	5.003	61.700	600	5.002	61.850	450	
5-1/16	63.500	2.315	Open Manhole	1500	1.015	61.185	600	1.014	61.335	450	
								5.003	61.644	600	459
5-1/17	63.000	1.862	Open Manhole	1500	1.016	61.138	600	1.015	61.138	600	
HW5	63.000	1.895	Open Manhole	0		OUTFALL		1.016	61.105	600	

PIPELINE SCHEDULES for 2024-02-22 STORM NETWORK 5.SWS

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	150	5-1/01	70.330	69.030	1.150	Open Manhole	1200
1.001	o	150	5-1/02	69.863	68.563	1.150	Open Manhole	1200
2.000	o	225	5-2/01	70.949	69.524	1.200	Open Manhole	1200
2.001	o	225	5-2/02	70.239	68.814	1.200	Open Manhole	1200
1.002	o	225	5-1/03	69.437	68.012	1.200	Open Manhole	1200
1.003	o	225	5-1/04	68.980	67.555	1.200	Open Manhole	1200
1.004	o	300	5-1/05	68.495	66.995	1.200	Open Manhole	1200
3.000	o	225	5-3/01	69.992	68.567	1.200	Open Manhole	1200
3.001	o	225	5-3/02	69.324	67.899	1.200	Open Manhole	1200
1.005	o	375	5-1/06	68.752	66.859	1.518	Open Manhole	1350
1.006	o	450	5-1/07	68.517	66.684	1.383	Open Manhole	1350
1.007	o	450	5-1/08	68.266	66.575	1.241	Open Manhole	1350
4.000	o	150	5-4/01	68.989	67.639	1.200	Open Manhole	1200
4.001	o	150	5-4/02	68.495	67.145	1.200	Open Manhole	1200
1.008	o	450	5-1/09	68.015	66.365	1.200	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	48.056	102.9	5-1/02	69.863	68.563	1.150	Open Manhole	1200
1.001	43.945	92.3	5-1/03	69.437	68.087	1.200	Open Manhole	1200
2.000	70.868	99.8	5-2/02	70.239	68.814	1.200	Open Manhole	1200
2.001	81.131	101.2	5-1/03	69.437	68.012	1.200	Open Manhole	1200
1.002	47.058	103.1	5-1/04	68.980	67.555	1.200	Open Manhole	1200
1.003	50.000	103.1	5-1/05	68.495	67.070	1.200	Open Manhole	1200
1.004	26.317	426.5	5-1/06	68.752	66.934	1.518	Open Manhole	1350
3.000	68.005	101.8	5-3/02	69.324	67.899	1.200	Open Manhole	1200
3.001	57.678	100.8	5-1/06	68.752	67.327	1.200	Open Manhole	1350
1.005	50.000	500.0	5-1/07	68.517	66.759	1.383	Open Manhole	1350
1.006	50.000	461.2	5-1/08	68.266	66.575	1.241	Open Manhole	1350
1.007	50.000	238.2	5-1/09	68.015	66.365	1.200	Open Manhole	1350
4.000	50.000	101.2	5-4/02	68.495	67.145	1.200	Open Manhole	1200
4.001	49.915	104.0	5-1/09	68.015	66.665	1.200	Open Manhole	1350
1.008	14.460	500.0	5-1/10	68.247	66.336	1.461	Open Manhole	1350

PIPELINE SCHEDULES for 2024-02-22 STORM NETWORK 5.SWS

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)
1.009	o	450	5-1/10	68.247	66.336	1.461	Open Manhole	1350
1.010	o	450	5-1/11	65.715	64.065	1.200	Open Manhole	1350
1.011	o	450	5-1/12	65.563	63.913	1.200	Open Manhole	1350
1.012	o	450	5-1/13	65.321	63.671	1.200	Open Manhole	1350
1.013	o	450	5-1/14	63.945	62.295	1.200	Open Manhole	1350
1.014	o	450	5-1/15	63.050	61.400	1.200	Open Manhole	1350
5.000	o	300	5-5/01	65.193	63.693	1.200	Open Manhole	1200
5.001	o	450	5-5/02	64.818	63.168	1.200	Open Manhole	1350
5.002	o	450	5-5/03	64.541	62.891	1.200	Open Manhole	1350
5.003	o	600	5-5/04	63.500	61.700	1.200	Open Manhole	1500
1.015	o	600	5-1/16	63.500	61.185	1.715	Open Manhole	1500
1.016	o	600	5-1/17	63.000	61.138	1.262	Open Manhole	1500

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)
1.009	10.475	4.6	5-1/11	65.715	64.065	1.200	Open Manhole	1350
1.010	30.497	200.6	5-1/12	65.563	63.913	1.200	Open Manhole	1350
1.011	48.026	198.5	5-1/13	65.321	63.671	1.200	Open Manhole	1350
1.012	40.281	29.3	5-1/14	63.945	62.295	1.200	Open Manhole	1350
1.013	38.308	42.8	5-1/15	63.050	61.400	1.200	Open Manhole	1350
1.014	32.586	500.0	5-1/16	63.500	61.335	1.715	Open Manhole	1500
5.000	50.000	133.3	5-5/02	64.818	63.318	1.200	Open Manhole	1350
5.001	50.000	180.5	5-5/03	64.541	62.891	1.200	Open Manhole	1350
5.002	62.596	60.1	5-5/04	63.500	61.850	1.200	Open Manhole	1500
5.003	27.960	500.0	5-1/16	63.500	61.644	1.256	Open Manhole	1500
1.015	23.565	500.0	5-1/17	63.000	61.138	1.262	Open Manhole	1500
1.016	16.374	500.0	HW5	63.000	61.105	1.295	Open Manhole	0

Free Flowing Outfall Details for 2024-02-22 STORM NETWORK 5.SWS

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.016	HW5	63.000	61.105	0.000	0	0

Simulation Criteria for 2024-02-22 STORM NETWORK 5.SWS

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	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 Storage Structures	13
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	16.800	Storm Duration (mins)	30
Ratio R	0.328		

Storage Structures for 2024-02-22 STORM NETWORK 5.SWS

Porous Car Park Manhole: 5-2/01, DS/PN: 2.000

Infiltration Coefficient Base (m/hr)	0.10000	Width (m)	75.0
Membrane Percolation (mm/hr)	1000	Length (m)	92.0
Max Percolation (l/s)	1916.7	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	70.349	Membrane Depth (mm)	0

Porous Car Park Manhole: 5-2/02, DS/PN: 2.001

Infiltration Coefficient Base (m/hr)	0.10000	Width (m)	75.0
Membrane Percolation (mm/hr)	1000	Length (m)	92.0
Max Percolation (l/s)	1916.7	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	69.639	Membrane Depth (mm)	0

Porous Car Park Manhole: 5-3/01, DS/PN: 3.000

Infiltration Coefficient Base (m/hr)	0.10000	Width (m)	75.0
Membrane Percolation (mm/hr)	1000	Length (m)	92.0
Max Percolation (l/s)	1916.7	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	69.392	Membrane Depth (mm)	0

Porous Car Park Manhole: 5-3/02, DS/PN: 3.001

Infiltration Coefficient Base (m/hr)	0.10000	Width (m)	75.0
Membrane Percolation (mm/hr)	1000	Length (m)	92.0
Max Percolation (l/s)	1916.7	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	68.724	Membrane Depth (mm)	0

Porous Car Park Manhole: 5-1/06, DS/PN: 1.005

Infiltration Coefficient Base (m/hr)	0.10000	Width (m)	50.0
Membrane Percolation (mm/hr)	1000	Length (m)	100.0
Max Percolation (l/s)	1388.9	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	68.152	Membrane Depth (mm)	0

Porous Car Park Manhole: 5-1/07, DS/PN: 1.006

Infiltration Coefficient Base (m/hr)	0.10000	Max Percolation (l/s)	1388.9
Membrane Percolation (mm/hr)	1000	Safety Factor	2.0

Porous Car Park Manhole: 5-1/07, DS/PN: 1.006

Porosity	0.30	Slope (1:X)	100.0
Invert Level (m)	67.917	Depression Storage (mm)	5
Width (m)	50.0	Evaporation (mm/day)	3
Length (m)	100.0	Membrane Depth (mm)	0

Porous Car Park Manhole: 5-1/08, DS/PN: 1.007

Infiltration Coefficient Base (m/hr)	0.10000	Width (m)	50.0
Membrane Percolation (mm/hr)	1000	Length (m)	100.0
Max Percolation (l/s)	1388.9	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	67.666	Membrane Depth (mm)	0

Filter Drain Manhole: 5-1/11, DS/PN: 1.010

Infiltration Coefficient Base (m/hr)	0.10000	Pipe Diameter (m)	0.150
Infiltration Coefficient Side (m/hr)	0.10000	Pipe Depth above Invert (m)	0.300
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	200.0
Invert Level (m)	64.715	Cap Volume Depth (m)	0.000
Trench Width (m)	1.0	Cap Infiltration Depth (m)	0.000
Trench Length (m)	40.0		

Filter Drain Manhole: 5-1/14, DS/PN: 1.013

Infiltration Coefficient Base (m/hr)	0.10000	Pipe Diameter (m)	0.150
Infiltration Coefficient Side (m/hr)	0.10000	Pipe Depth above Invert (m)	0.300
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	200.0
Invert Level (m)	62.945	Cap Volume Depth (m)	0.000
Trench Width (m)	1.0	Cap Infiltration Depth (m)	0.000
Trench Length (m)	50.0		

Filter Drain Manhole: 5-1/15, DS/PN: 1.014

Infiltration Coefficient Base (m/hr)	0.10000	Pipe Diameter (m)	0.150
Infiltration Coefficient Side (m/hr)	0.10000	Pipe Depth above Invert (m)	0.300
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	200.0
Invert Level (m)	62.050	Cap Volume Depth (m)	0.000
Trench Width (m)	1.0	Cap Infiltration Depth (m)	0.000
Trench Length (m)	85.0		

Porous Car Park Manhole: 5-5/01, DS/PN: 5.000

Infiltration Coefficient Base (m/hr)	0.10000	Porosity	0.30
Membrane Percolation (mm/hr)	1000	Invert Level (m)	64.593
Max Percolation (l/s)	1388.9	Width (m)	50.0
Safety Factor	2.0	Length (m)	100.0

Porous Car Park Manhole: 5-5/01, DS/PN: 5.000

Slope (1:X)	100.0	Evaporation (mm/day)	3
Depression Storage (mm)	5	Membrane Depth (mm)	0

Porous Car Park Manhole: 5-5/02, DS/PN: 5.001

Infiltration Coefficient Base (m/hr)	0.10000	Width (m)	50.0
Membrane Percolation (mm/hr)	1000	Length (m)	100.0
Max Percolation (l/s)	1388.9	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	64.218	Membrane Depth (mm)	0

Porous Car Park Manhole: 5-5/03, DS/PN: 5.002

Infiltration Coefficient Base (m/hr)	0.10000	Width (m)	50.0
Membrane Percolation (mm/hr)	1000	Length (m)	100.0
Max Percolation (l/s)	1388.9	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	63.941	Membrane Depth (mm)	0

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 5.SWS

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	13
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.328
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	16.800	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	20, 20, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	5-1/01	15 Winter	1	+20%					69.060
1.001	5-1/02	15 Winter	1	+20%					68.591
2.000	5-2/01	1440 Winter	1	+20%					69.547
2.001	5-2/02	1440 Winter	1	+20%					68.845
1.002	5-1/03	1440 Winter	1	+20%					68.043
1.003	5-1/04	1440 Winter	1	+20%					67.587
1.004	5-1/05	1440 Winter	1	+20%	100/60 Winter				67.038
3.000	5-3/01	1440 Winter	1	+20%					68.590
3.001	5-3/02	1440 Winter	1	+20%					67.930
1.005	5-1/06	1440 Winter	1	+20%					66.923
1.006	5-1/07	1440 Winter	1	+20%					66.747
1.007	5-1/08	1440 Winter	1	+20%					66.632
4.000	5-4/01	15 Winter	1	+20%	30/15 Summer				67.724
4.001	5-4/02	15 Winter	1	+20%	30/15 Summer				67.228
1.008	5-1/09	15 Winter	1	+20%					66.521
1.009	5-1/10	15 Winter	1	+20%					66.384
1.010	5-1/11	15 Winter	1	+20%					64.165

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 5.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	5-1/01	-0.120	0.000	0.08		1.4	OK	
1.001	5-1/02	-0.122	0.000	0.08		1.4	OK	
2.000	5-2/01	-0.202	0.000	0.02		1.1	OK	
2.001	5-2/02	-0.194	0.000	0.04		2.3	OK	
1.002	5-1/03	-0.194	0.000	0.05		2.3	OK	
1.003	5-1/04	-0.194	0.000	0.05		2.3	OK	
1.004	5-1/05	-0.258	0.000	0.05		2.3	OK	
3.000	5-3/01	-0.202	0.000	0.02		1.2	OK	
3.001	5-3/02	-0.194	0.000	0.05		2.3	OK	
1.005	5-1/06	-0.310	0.000	0.07		5.7	OK	
1.006	5-1/07	-0.387	0.000	0.05		6.5	OK	
1.007	5-1/08	-0.393	0.000	0.04		7.4	OK	
4.000	5-4/01	-0.065	0.000	0.59		10.1	OK	
4.001	5-4/02	-0.067	0.000	0.60		10.1	OK	
1.008	5-1/09	-0.294	0.000	0.26		22.0	OK	
1.009	5-1/10	-0.402	0.000	0.03		21.9	OK	
1.010	5-1/11	-0.350	0.000	0.11		22.0	OK	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 5.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.011	5-1/12	15 Winter	1	+20%					64.010
1.012	5-1/13	15 Winter	1	+20%					63.729
1.013	5-1/14	15 Winter	1	+20%					62.359
1.014	5-1/15	30 Winter	1	+20%	30/15 Summer				61.661
5.000	5-5/01	30 Summer	1	+20%	30/15 Summer				63.883
5.001	5-5/02	30 Winter	1	+20%	30/15 Summer				63.405
5.002	5-5/03	30 Winter	1	+20%	30/15 Winter				63.099
5.003	5-5/04	30 Winter	1	+20%	30/15 Summer				62.064
1.015	5-1/16	30 Winter	1	+20%	30/15 Summer				61.642
1.016	5-1/17	30 Winter	1	+20%	30/15 Summer				61.595

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.011	5-1/12	-0.353	0.000	0.10		21.6	OK	
1.012	5-1/13	-0.392	0.000	0.04		21.7	OK	
1.013	5-1/14	-0.386	0.000	0.05		21.7	OK	
1.014	5-1/15	-0.189	0.000	0.15		18.2	OK	
5.000	5-5/01	-0.110	0.000	0.68		61.5	OK	
5.001	5-5/02	-0.213	0.000	0.52		114.5	OK	
5.002	5-5/03	-0.242	0.000	0.43		165.7	OK	
5.003	5-5/04	-0.236	0.000	0.68		166.6	OK	
1.015	5-1/16	-0.143	0.000	0.73		168.4	OK	
1.016	5-1/17	-0.143	0.000	0.93		166.6	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 5.SWS

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	13
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.328
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	16.800	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	20, 20, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	5-1/01	15 Winter	30	+20%					69.074
1.001	5-1/02	15 Winter	30	+20%					68.605
2.000	5-2/01	120 Winter	30	+20%					69.596
2.001	5-2/02	120 Winter	30	+20%					68.914
1.002	5-1/03	120 Winter	30	+20%					68.112
1.003	5-1/04	120 Winter	30	+20%					67.655
1.004	5-1/05	120 Winter	30	+20%	100/60 Winter				67.129
3.000	5-3/01	120 Winter	30	+20%					68.641
3.001	5-3/02	120 Winter	30	+20%					68.002
1.005	5-1/06	180 Winter	30	+20%					67.064
1.006	5-1/07	180 Winter	30	+20%					66.879
1.007	5-1/08	180 Winter	30	+20%					66.755
4.000	5-4/01	15 Winter	30	+20%	30/15 Summer				68.025
4.001	5-4/02	15 Winter	30	+20%	30/15 Summer				67.389
1.008	5-1/09	180 Winter	30	+20%					66.670
1.009	5-1/10	180 Winter	30	+20%					66.420
1.010	5-1/11	180 Winter	30	+20%					64.246

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 5.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	5-1/01	-0.106	0.000	0.18		3.1	OK	
1.001	5-1/02	-0.108	0.000	0.17		3.1	OK	
2.000	5-2/01	-0.153	0.000	0.20		10.3	OK	
2.001	5-2/02	-0.125	0.000	0.39		19.5	OK	
1.002	5-1/03	-0.125	0.000	0.41		20.0	OK	
1.003	5-1/04	-0.125	0.000	0.40		19.8	OK	
1.004	5-1/05	-0.166	0.000	0.41		19.6	OK	
3.000	5-3/01	-0.151	0.000	0.22		10.7	OK	
3.001	5-3/02	-0.122	0.000	0.43		21.3	OK	
1.005	5-1/06	-0.170	0.000	0.57		46.9	OK	
1.006	5-1/07	-0.255	0.000	0.39		53.0	OK	
1.007	5-1/08	-0.271	0.000	0.31		58.1	OK	
4.000	5-4/01	0.236	0.000	1.16		19.9	SURCHARGED	
4.001	5-4/02	0.094	0.000	1.10		18.6	SURCHARGED	
1.008	5-1/09	-0.145	0.000	0.80		67.3	OK	
1.009	5-1/10	-0.366	0.000	0.08		67.3	OK	
1.010	5-1/11	-0.269	0.000	0.34		67.2	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 5.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.011	5-1/12	180 Winter	30	+20%					64.089
1.012	5-1/13	180 Winter	30	+20%					63.777
1.013	5-1/14	180 Winter	30	+20%					62.412
1.014	5-1/15	15 Winter	30	+20%	30/15 Summer				62.035
5.000	5-5/01	15 Winter	30	+20%	30/15 Summer				64.640
5.001	5-5/02	15 Winter	30	+20%	30/15 Summer				63.767
5.002	5-5/03	15 Winter	30	+20%	30/15 Winter				63.367
5.003	5-5/04	15 Winter	30	+20%	30/15 Summer				62.357
1.015	5-1/16	15 Winter	30	+20%	30/15 Summer				62.017
1.016	5-1/17	15 Winter	30	+20%	30/15 Summer				61.846

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.011	5-1/12	-0.274	0.000	0.32		67.1	OK	
1.012	5-1/13	-0.344	0.000	0.13		67.0	OK	
1.013	5-1/14	-0.333	0.000	0.15		67.1	OK	
1.014	5-1/15	0.185	0.000	0.33		40.7	SURCHARGED	
5.000	5-5/01	0.647	0.000	1.53		138.1	SURCHARGED	
5.001	5-5/02	0.149	0.000	1.22		267.2	SURCHARGED	
5.002	5-5/03	0.026	0.000	0.98		378.7	SURCHARGED	
5.003	5-5/04	0.057	0.000	1.53		377.1	SURCHARGED	
1.015	5-1/16	0.233	0.000	1.78		413.1	SURCHARGED	
1.016	5-1/17	0.108	0.000	2.32		413.4	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 5.SWS

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	13
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.328
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	16.800	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	20, 20, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	5-1/01	15 Winter	100	+20%					69.081
1.001	5-1/02	15 Winter	100	+20%					68.611
2.000	5-2/01	60 Winter	100	+20%					69.639
2.001	5-2/02	60 Winter	100	+20%					68.973
1.002	5-1/03	60 Winter	100	+20%					68.170
1.003	5-1/04	60 Winter	100	+20%					67.711
1.004	5-1/05	120 Winter	100	+20%	100/60 Winter				67.300
3.000	5-3/01	60 Winter	100	+20%					68.684
3.001	5-3/02	60 Winter	100	+20%					68.065
1.005	5-1/06	60 Winter	100	+20%					67.234
1.006	5-1/07	120 Winter	100	+20%					66.974
1.007	5-1/08	120 Winter	100	+20%					66.881
4.000	5-4/01	15 Winter	100	+20%	30/15 Summer				68.424
4.001	5-4/02	15 Winter	100	+20%	30/15 Summer				67.567
1.008	5-1/09	180 Winter	100	+20%					66.815
1.009	5-1/10	120 Winter	100	+20%					66.450
1.010	5-1/11	120 Winter	100	+20%					64.324

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 5.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	5-1/01	-0.099	0.000	0.24		4.1	OK	
1.001	5-1/02	-0.102	0.000	0.23		4.1	OK	
2.000	5-2/01	-0.110	0.000	0.43		21.8	OK	
2.001	5-2/02	-0.066	0.000	0.78		39.2	OK	
1.002	5-1/03	-0.067	0.000	0.82		40.0	OK	
1.003	5-1/04	-0.069	0.000	0.80		39.4	OK	
1.004	5-1/05	0.004	0.000	0.76		36.6	SURCHARGED	
3.000	5-3/01	-0.108	0.000	0.45		22.7	OK	
3.001	5-3/02	-0.059	0.000	0.88		43.7	OK	
1.005	5-1/06	0.000	0.000	1.00		82.4	OK	
1.006	5-1/07	-0.160	0.000	0.70		95.3	OK	
1.007	5-1/08	-0.145	0.000	0.56		105.9	OK	
4.000	5-4/01	0.635	0.000	1.37		23.5	SURCHARGED	
4.001	5-4/02	0.272	0.000	1.26		21.4	SURCHARGED	
1.008	5-1/09	0.000	0.000	1.31		110.2	OK	
1.009	5-1/10	-0.336	0.000	0.14		123.1	OK	
1.010	5-1/11	-0.191	0.000	0.63		122.9	OK	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 5.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.011	5-1/12	120 Winter	100	+20%					64.163
1.012	5-1/13	120 Winter	100	+20%					63.817
1.013	5-1/14	120 Winter	100	+20%					62.456
1.014	5-1/15	15 Winter	100	+20%	30/15 Summer				62.158
5.000	5-5/01	15 Winter	100	+20%	30/15 Summer				64.746
5.001	5-5/02	15 Winter	100	+20%	30/15 Summer				64.238
5.002	5-5/03	15 Winter	100	+20%	30/15 Winter				63.806
5.003	5-5/04	15 Winter	100	+20%	30/15 Summer				62.409
1.015	5-1/16	15 Winter	100	+20%	30/15 Summer				62.135
1.016	5-1/17	15 Winter	100	+20%	30/15 Summer				61.904

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.011	5-1/12	-0.200	0.000	0.59		122.5	OK	
1.012	5-1/13	-0.304	0.000	0.23		122.4	OK	
1.013	5-1/14	-0.289	0.000	0.28		122.5	OK	
1.014	5-1/15	0.308	0.000	0.42		52.5	SURCHARGED	
5.000	5-5/01	0.753	0.000	1.56		140.9	SURCHARGED	
5.001	5-5/02	0.620	0.000	1.32		287.0	SURCHARGED	
5.002	5-5/03	0.465	0.000	1.15		443.1	SURCHARGED	
5.003	5-5/04	0.109	0.000	1.79		440.4	SURCHARGED	
1.015	5-1/16	0.350	0.000	2.07		480.1	SURCHARGED	
1.016	5-1/17	0.166	0.000	2.68		477.8	SURCHARGED	

Appendix F – Proposed Storm Design - Restricted Runoff Calculations

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for 2024-02-22 STORM NETWORK 1.SWS

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	16.900	Add Flow / Climate Change (%)	0
Ratio R	0.328	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	0.000
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	0.75
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for 2024-02-22 STORM NETWORK 1.SWS

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	2.375	4-8	3.876	8-12	0.350

Total Area Contributing (ha) = 6.601

Total Pipe Volume (m³) = 215.659

Network Design Table for 2024-02-22 STORM NETWORK 1.SWS

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	55.899	0.543	102.9	0.088	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.001	30.175	0.403	74.9	0.118	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.000	51.511	0.500	103.0	0.126	5.00	0.0	0.600	o	225	Pipe/Conduit	
2.001	87.382	0.637	137.2	0.214	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.94	74.386	0.088	0.0	0.0	0.0	0.99	17.5	11.9
1.001	50.00	6.27	73.768	0.206	0.0	0.0	0.0	1.51	60.2	27.9
2.000	50.00	5.67	74.150	0.126	0.0	0.0	0.0	1.29	51.2	17.1
2.001	48.34	6.97	73.575	0.340	0.0	0.0	0.0	1.11	44.3«	44.5

Network Design Table for 2024-02-22 STORM NETWORK 1.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
3.000	84.381	0.563	149.9	0.345	5.00	0.0	0.600	o	300	Pipe/Conduit	
3.001	53.312	0.355	150.2	0.075	0.00	0.0	0.600	o	300	Pipe/Conduit	
3.002	44.032	0.294	149.8	0.106	0.00	0.0	0.600	o	300	Pipe/Conduit	
2.002	14.415	0.096	150.2	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
2.003	26.678	0.178	149.9	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.002	35.038	0.234	149.7	0.201	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.003	24.148	1.072	22.5	0.045	0.00	0.0	0.600	o	375	Pipe/Conduit	
4.000	48.000	0.473	101.5	0.404	5.00	0.0	0.600	o	300	Pipe/Conduit	
4.001	55.632	2.325	23.9	0.404	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.004	21.464	1.012	21.2	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.005	21.358	0.719	29.7	0.011	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.006	6.629	0.044	150.7	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
5.000	37.474	0.364	103.0	0.035	5.00	0.0	0.600	o	150	Pipe/Conduit	
5.001	37.527	0.250	150.1	0.033	0.00	0.0	0.600	o	225	Pipe/Conduit	
5.002	29.684	0.198	149.9	0.013	0.00	0.0	0.600	o	225	Pipe/Conduit	
5.003	29.327	0.196	149.6	0.221	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
3.000	50.00	6.10	74.075	0.345	0.0	0.0	0.0	1.28	90.6	46.7
3.001	48.92	6.79	73.512	0.420	0.0	0.0	0.0	1.28	90.5	55.6
3.002	47.16	7.36	73.157	0.526	0.0	0.0	0.0	1.28	90.7	67.2
2.002	46.69	7.53	72.788	0.866	0.0	0.0	0.0	1.48	163.1	109.5
2.003	45.84	7.83	72.692	0.866	0.0	0.0	0.0	1.48	163.2	109.5
1.002	44.79	8.22	72.514	1.273	0.0	0.0	0.0	1.48	163.3	154.4
1.003	44.52	8.33	72.280	1.318	0.0	0.0	0.0	3.83	423.2	158.9
4.000	50.00	5.51	74.081	0.404	0.0	0.0	0.0	1.56	110.3	54.7
4.001	50.00	5.80	73.608	0.808	0.0	0.0	0.0	3.23	228.1	109.4
1.004	44.29	8.42	71.208	2.126	0.0	0.0	0.0	3.95	436.2	255.0
1.005	44.02	8.52	70.121	2.137	0.0	0.0	0.0	3.34	368.4	255.0
1.006	43.86	8.59	69.327	2.137	0.0	0.0	0.0	1.65	263.1	255.0
5.000	50.00	5.63	69.659	0.035	0.0	0.0	0.0	0.99	17.5	4.7
5.001	50.00	6.22	69.220	0.068	0.0	0.0	0.0	1.06	42.3	9.2
5.002	49.27	6.68	68.970	0.081	0.0	0.0	0.0	1.07	42.4	10.8
5.003	47.83	7.14	68.772	0.302	0.0	0.0	0.0	1.07	42.4	39.1

Network Design Table for 2024-02-22 STORM NETWORK 1.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.007	29.032	0.194	149.6	0.260	0.00	0.0	0.600	o	525	Pipe/Conduit	
1.008	29.979	0.200	149.9	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
1.009	5.748	0.038	151.3	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
1.010	38.132	0.254	150.1	0.059	0.00	0.0	0.600	o	525	Pipe/Conduit	
1.011	19.446	0.130	149.6	0.044	0.00	0.0	0.600	o	525	Pipe/Conduit	
6.000	37.116	0.247	150.3	0.229	5.00	0.0	0.600	o	300	Pipe/Conduit	
6.001	37.117	0.247	150.3	0.229	0.00	0.0	0.600	o	300	Pipe/Conduit	
6.002	6.300	0.042	150.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
6.003	29.971	0.200	149.9	0.284	0.00	0.0	0.600	o	375	Pipe/Conduit	
6.004	19.972	0.133	150.2	0.100	0.00	0.0	0.600	o	375	Pipe/Conduit	
6.005	24.665	0.164	150.4	0.100	0.00	0.0	0.600	o	375	Pipe/Conduit	
6.006	5.721	0.038	150.6	0.100	0.00	0.0	0.600	o	375	Pipe/Conduit	
6.007	11.904	0.079	150.7	0.060	0.00	0.0	0.600	o	375	Pipe/Conduit	
6.008	26.071	0.174	149.8	0.040	0.00	0.0	0.600	o	375	Pipe/Conduit	
6.009	26.072	0.174	149.8	0.044	0.00	0.0	0.600	o	375	Pipe/Conduit	
7.000	18.858	0.126	149.7	0.124	5.00	0.0	0.600	o	225	Pipe/Conduit	
6.010	20.606	0.317	65.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.007	43.21	8.86	68.276	2.699	0.0	0.0	0.0	1.83	395.9	315.9
1.008	42.57	9.13	68.082	2.699	0.0	0.0	0.0	1.83	395.6	315.9
1.009	42.45	9.18	67.882	2.699	0.0	0.0	0.0	1.82	393.8	315.9
1.010	41.68	9.53	67.844	2.758	0.0	0.0	0.0	1.83	395.3	315.9
1.011	41.29	9.71	67.590	2.802	0.0	0.0	0.0	1.83	396.0	315.9
6.000	50.00	5.48	69.575	0.229	0.0	0.0	0.0	1.28	90.5	31.0
6.001	50.00	5.97	69.253	0.458	0.0	0.0	0.0	1.28	90.5	62.0
6.002	50.00	6.05	69.006	0.458	0.0	0.0	0.0	1.28	90.6	62.0
6.003	50.00	6.39	68.889	0.742	0.0	0.0	0.0	1.48	163.2	100.5
6.004	49.50	6.61	68.689	0.842	0.0	0.0	0.0	1.48	163.1	112.9
6.005	48.60	6.89	68.556	0.942	0.0	0.0	0.0	1.48	162.9	124.0
6.006	48.40	6.96	68.392	1.042	0.0	0.0	0.0	1.47	162.8	136.6
6.007	47.98	7.09	68.354	1.102	0.0	0.0	0.0	1.47	162.8	143.2
6.008	47.10	7.38	68.275	1.142	0.0	0.0	0.0	1.48	163.2	145.7
6.009	46.26	7.68	68.101	1.186	0.0	0.0	0.0	1.48	163.2	148.6
7.000	50.00	5.29	69.575	0.124	0.0	0.0	0.0	1.07	42.4	16.8
6.010	45.83	7.83	67.927	1.310	0.0	0.0	0.0	2.25	248.6	162.6

Network Design Table for 2024-02-22 STORM NETWORK 1.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.012	5.035	0.034	148.1	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
8.000	31.472	0.306	102.8	0.056	5.00	0.0	0.600	o	150	Pipe/Conduit	
8.001	43.103	0.287	150.2	0.071	0.00	0.0	0.600	o	225	Pipe/Conduit	
8.002	27.464	0.183	150.0	0.041	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.013	11.942	0.080	149.3	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
9.000	67.508	0.675	100.0	0.766	5.00	0.0	0.600	o	375	Pipe/Conduit	
9.001	66.070	1.032	64.0	0.524	0.00	0.0	0.600	o	375	Pipe/Conduit	
9.002	4.258	0.268	15.9	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.014	29.652	0.476	62.3	0.055	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.015	56.811	2.727	20.8	0.051	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.016	18.481	2.718	6.8	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.017	34.921	0.116	301.0	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	
10.000	30.005	0.291	103.1	0.065	5.00	0.0	0.600	o	225	Pipe/Conduit	
10.001	55.355	0.369	150.0	0.071	0.00	0.0	0.600	o	225	Pipe/Conduit	
10.002	13.756	0.092	149.5	0.025	0.00	0.0	0.600	o	225	Pipe/Conduit	
10.003	19.047	0.127	150.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.012	41.21	9.75	67.385	4.112	0.0	0.0	0.0	2.00	565.2	458.9
8.000	50.00	5.53	69.830	0.056	0.0	0.0	0.0	0.99	17.5	7.6
8.001	50.00	6.20	69.449	0.127	0.0	0.0	0.0	1.06	42.3	17.2
8.002	49.43	6.63	69.162	0.168	0.0	0.0	0.0	1.07	42.4	22.5
1.013	40.99	9.85	67.351	4.280	0.0	0.0	0.0	1.99	562.9	475.2
9.000	50.00	5.62	70.481	0.766	0.0	0.0	0.0	1.81	200.1	103.7
9.001	50.00	6.11	69.731	1.290	0.0	0.0	0.0	2.27	250.5	174.7
9.002	50.00	6.12	68.699	1.290	0.0	0.0	0.0	4.57	504.2	174.7
1.014	40.66	10.01	67.271	5.625	0.0	0.0	0.0	3.09	873.4	619.4
1.015	40.30	10.19	66.795	5.676	0.0	0.0	0.0	5.35	1513.0	619.5
1.016	40.24	10.22	64.068	5.676	0.0	0.0	0.0	9.38	2651.2	619.5
1.017	39.60	10.54	61.125	5.676	0.0	0.0	0.0	1.80	1145.5	619.5
10.000	50.00	5.39	64.434	0.065	0.0	0.0	0.0	1.29	51.2	8.8
10.001	50.00	6.25	64.068	0.136	0.0	0.0	0.0	1.07	42.4	18.4
10.002	49.98	6.47	63.699	0.161	0.0	0.0	0.0	1.07	42.4	21.8
10.003	49.00	6.77	63.607	0.161	0.0	0.0	0.0	1.07	42.4	21.8

Network Design Table for 2024-02-22 STORM NETWORK 1.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
11.000	39.165	0.396	98.9	0.151	5.00	0.0	0.600	o	225	Pipe/Conduit	
10.004	16.000	0.107	149.5	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
12.000	15.717	0.153	102.7	0.018	5.00	0.0	0.600	o	150	Pipe/Conduit	
12.001	6.253	0.042	148.9	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
12.002	10.221	0.068	150.3	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
12.003	13.656	0.152	89.8	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
12.004	29.705	0.198	150.0	0.032	0.00	0.0	0.600	o	225	Pipe/Conduit	
12.005	13.626	0.091	149.7	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
12.006	12.951	0.086	150.6	0.036	0.00	0.0	0.600	o	225	Pipe/Conduit	
12.007	36.971	0.931	39.7	0.044	0.00	0.0	0.600	o	225	Pipe/Conduit	
12.008	36.971	0.915	40.4	0.047	0.00	0.0	0.600	o	225	Pipe/Conduit	
12.009	35.175	0.613	57.4	0.048	0.00	0.0	0.600	o	225	Pipe/Conduit	
12.010	39.164	0.450	87.0	0.212	0.00	0.0	0.600	o	375	Pipe/Conduit	
10.005	16.000	0.271	59.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
13.000	39.154	0.395	99.1	0.100	5.00	0.0	0.600	o	225	Pipe/Conduit	
10.006	16.000	0.400	40.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
11.000	50.00	5.50	64.298	0.151	0.0	0.0	0.0	1.31	52.3	20.4
10.004	48.21	7.02	63.480	0.312	0.0	0.0	0.0	1.07	42.4	40.7
12.000	50.00	5.26	67.222	0.018	0.0	0.0	0.0	0.99	17.5	2.4
12.001	50.00	5.36	66.994	0.018	0.0	0.0	0.0	1.07	42.5	2.4
12.002	50.00	5.52	66.952	0.018	0.0	0.0	0.0	1.06	42.3	2.4
12.003	50.00	5.69	66.884	0.018	0.0	0.0	0.0	1.38	54.9	2.4
12.004	50.00	6.15	66.732	0.050	0.0	0.0	0.0	1.07	42.4	6.8
12.005	50.00	6.36	66.534	0.050	0.0	0.0	0.0	1.07	42.4	6.8
12.006	49.65	6.57	66.443	0.086	0.0	0.0	0.0	1.06	42.3	11.6
12.007	48.69	6.86	66.357	0.130	0.0	0.0	0.0	2.08	82.8	17.1
12.008	47.76	7.16	65.426	0.177	0.0	0.0	0.0	2.06	82.1	22.9
12.009	46.76	7.50	64.511	0.225	0.0	0.0	0.0	1.73	68.8	28.5
12.010	45.82	7.84	63.823	0.437	0.0	0.0	0.0	1.94	214.6	54.2
10.005	45.46	7.97	63.298	0.749	0.0	0.0	0.0	2.05	144.9	92.2
13.000	50.00	5.50	63.572	0.100	0.0	0.0	0.0	1.31	52.2	13.5
10.006	45.18	8.07	63.027	0.849	0.0	0.0	0.0	2.49	176.2	103.9

Network Design Table for 2024-02-22 STORM NETWORK 1.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
14.000	39.165	0.396	98.9	0.076	5.00	0.0	0.600	o	150	Pipe/Conduit	
10.007	5.738	0.053	108.3	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
10.008	50.783	0.493	103.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.018	15.679	0.152	103.2	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
14.000	50.00	5.65	63.173	0.076	0.0	0.0	0.0	1.01	17.9	10.3
10.007	45.03	8.13	62.552	0.925	0.0	0.0	0.0	1.74	192.3	112.8
10.008	43.83	8.60	62.499	0.925	0.0	0.0	0.0	1.79	197.2	112.8
1.018	39.44	10.63	61.009	6.601	0.0	0.0	0.0	3.09	1962.7	705.0

Manhole Schedules for 2024-02-22 STORM NETWORK 1.SWS

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)
1-1/01	75.736	1.350	Open Manhole	1200	1.000	74.386	150				
1-1/02	75.750	1.982	Open Manhole	1200	1.001	73.768	225	1.000	73.843	150	
1-2/01	75.500	1.350	Open Manhole	1200	2.000	74.150	225				
1-2/02	75.500	1.925	Open Manhole	1200	2.001	73.575	225	2.000	73.650	225	75
1-3/01	75.500	1.425	Open Manhole	1200	3.000	74.075	300				
1-3/02	75.500	1.988	Open Manhole	1200	3.001	73.512	300	3.000	73.512	300	
1-3/03	75.475	2.318	Open Manhole	1200	3.002	73.157	300	3.001	73.157	300	
1-2/03	75.500	2.712	Open Manhole	1350	2.002	72.788	375	2.001	72.938	225	
								3.002	72.863	300	
1-2/04	75.500	2.808	Open Manhole	1350	2.003	72.692	375	2.002	72.692	375	
1-1/03	74.790	2.276	Open Manhole	1350	1.002	72.514	375	1.001	73.365	225	701
								2.003	72.514	375	
1-1/04	73.924	1.644	Open Manhole	1350	1.003	72.280	375	1.002	72.280	375	
1-4/01	75.581	1.500	Open Manhole	1200	4.000	74.081	300				
1-4/02	75.108	1.500	Open Manhole	1200	4.001	73.608	300	4.000	73.608	300	
1-1/05	72.783	1.575	Open Manhole	1350	1.004	71.208	375	1.003	71.208	375	
								4.001	71.283	300	
1-1/06	71.771	1.650	Open Manhole	1350	1.005	70.121	375	1.004	70.196	375	75
1-1/07	71.052	1.725	Open Manhole	1350	1.006	69.327	450	1.005	69.402	375	
1-5/01	71.009	1.350	Open Manhole	1200	5.000	69.659	150				
1-5/02	71.026	1.806	Open Manhole	1200	5.001	69.220	225	5.000	69.295	150	
1-5/03	71.055	2.085	Open Manhole	1200	5.002	68.970	225	5.001	68.970	225	
1-5/04	71.025	2.253	Open Manhole	1200	5.003	68.772	225	5.002	68.772	225	
1-1/08	71.035	2.759	Open Manhole	1500	1.007	68.276	525	1.006	69.283	450	932
								5.003	68.576	225	
1-1/09	70.920	2.838	Open Manhole	1500	1.008	68.082	525	1.007	68.082	525	
1-1/10	70.992	3.110	Open Manhole	1500	1.009	67.882	525	1.008	67.882	525	
1-1/11	70.897	3.053	Open Manhole	1500	1.010	67.844	525	1.009	67.844	525	
1-1/12	70.611	3.021	Open Manhole	1500	1.011	67.590	525	1.010	67.590	525	
1-6/01	71.000	1.425	Open Manhole	1200	6.000	69.575	300				
1-6/02	71.000	1.747	Open Manhole	1200	6.001	69.253	300	6.000	69.328	300	75
1-6/03	71.000	1.994	Open Manhole	1200	6.002	69.006	300	6.001	69.006	300	
1-6/04	71.000	2.111	Open Manhole	1350	6.003	68.889	375	6.002	68.964	300	
1-6/05	71.000	2.311	Open Manhole	1350	6.004	68.689	375	6.003	68.689	375	
1-6/06	71.000	2.444	Open Manhole	1350	6.005	68.556	375	6.004	68.556	375	
1-6/07	71.000	2.608	Open Manhole	1350	6.006	68.392	375	6.005	68.392	375	
1-6/08	71.000	2.646	Open Manhole	1350	6.007	68.354	375	6.006	68.354	375	
1-6/09	70.971	2.696	Open Manhole	1350	6.008	68.275	375	6.007	68.275	375	

Manhole Schedules for 2024-02-22 STORM NETWORK 1.SWS

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)
1-6/10	70.961	2.860	Open Manhole	1350	6.009	68.101	375	6.008	68.101	375	
1-7/01	71.000	1.425	Open Manhole	1200	7.000	69.575	225				
1-6/11	70.948	3.021	Open Manhole	1350	6.010	67.927	375	6.009	67.927	375	
								7.000	69.449	225	1372
1-1/13	70.669	3.284	Open Manhole	1500	1.012	67.385	600	1.011	67.460	525	
								6.010	67.610	375	
1-8/01	71.180	1.350	Open Manhole	1200	8.000	69.830	150				
1-8/02	70.956	1.507	Open Manhole	1200	8.001	69.449	225	8.000	69.524	150	
1-8/03	70.825	1.663	Open Manhole	1200	8.002	69.162	225	8.001	69.162	225	
1-1/14	70.407	3.056	Open Manhole	1500	1.013	67.351	600	1.012	67.351	600	
								8.002	68.979	225	1251
1-9/01	71.981	1.500	Open Manhole	1350	9.000	70.481	375				
1-9/02	71.306	1.575	Open Manhole	1350	9.001	69.731	375	9.000	69.806	375	75
1-9/03	70.274	1.575	Open Manhole	1350	9.002	68.699	375	9.001	68.699	375	
1-1/15	70.006	2.735	Open Manhole	1500	1.014	67.271	600	1.013	67.271	600	
								9.002	68.431	375	935
1-1/16	68.595	1.800	Open Manhole	1500	1.015	66.795	600	1.014	66.795	600	
1-1/17	65.868	1.800	Open Manhole	1500	1.016	64.068	600	1.015	64.068	600	
1-1/18	63.000	1.875	Open Manhole	1800	1.017	61.125	900	1.016	61.350	600	
1-10/01	65.784	1.350	Open Manhole	1200	10.000	64.434	225				
1-10/02	65.793	1.725	Open Manhole	1200	10.001	64.068	225	10.000	64.143	225	75
1-10/03	65.880	2.181	Open Manhole	1200	10.002	63.699	225	10.001	63.699	225	
1-10/04	65.677	2.070	Open Manhole	1200	10.003	63.607	225	10.002	63.607	225	
1-11/01	65.723	1.425	Open Manhole	1200	11.000	64.298	225				
1-10/05	65.327	1.847	Open Manhole	1200	10.004	63.480	225	10.003	63.480	225	
								11.000	63.902	225	422
1-12/01	68.572	1.350	Open Manhole	1200	12.000	67.222	150				
1-12/02	68.465	1.471	Open Manhole	1200	12.001	66.994	225	12.000	67.069	150	
1-12/03	68.535	1.583	Open Manhole	1200	12.002	66.952	225	12.001	66.952	225	
1-12/04	68.435	1.551	Open Manhole	1200	12.003	66.884	225	12.002	66.884	225	
1-12/05	68.157	1.425	Open Manhole	1200	12.004	66.732	225	12.003	66.732	225	
1-12/06	68.414	1.880	Open Manhole	1200	12.005	66.534	225	12.004	66.534	225	
1-12/07	68.220	1.777	Open Manhole	1200	12.006	66.443	225	12.005	66.443	225	
1-12/08	67.818	1.461	Open Manhole	1200	12.007	66.357	225	12.006	66.357	225	
1-12/09	66.851	1.425	Open Manhole	1200	12.008	65.426	225	12.007	65.426	225	
1-12/10	65.936	1.425	Open Manhole	1200	12.009	64.511	225	12.008	64.511	225	
1-12/11	65.323	1.500	Open Manhole	1350	12.010	63.823	375	12.009	63.898	225	
1-10/06	64.927	1.629	Open Manhole	1350	10.005	63.298	300	10.004	63.373	225	

Manhole Schedules for 2024-02-22 STORM NETWORK 1.SWS

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)
								12.010	63.373	375	150
1-13/01	64.922	1.350	Open Manhole	1200	13.000	63.572	225				
1-10/07	64.527	1.500	Open Manhole	1200	10.006	63.027	300	10.005	63.027	300	
								13.000	63.177	225	75
1-14/01	64.523	1.350	Open Manhole	1200	14.000	63.173	150				
1-10/08	64.127	1.575	Open Manhole	1350	10.007	62.552	375	10.006	62.627	300	
								14.000	62.777	150	
1-10/09	64.074	1.575	Open Manhole	1350	10.008	62.499	375	10.007	62.499	375	
1-1/19	63.000	1.991	Open Manhole	1800	1.018	61.009	900	1.017	61.009	900	
								10.008	62.006	375	472
HW01	63.000	2.143	Open Manhole	0		OUTFALL		1.018	60.857	900	

PIPELINE SCHEDULES for 2024-02-22 STORM NETWORK 1.SWS

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	150	1-1/01	75.736	74.386	1.200	Open Manhole	1200
1.001	o	225	1-1/02	75.750	73.768	1.757	Open Manhole	1200
2.000	o	225	1-2/01	75.500	74.150	1.125	Open Manhole	1200
2.001	o	225	1-2/02	75.500	73.575	1.700	Open Manhole	1200
3.000	o	300	1-3/01	75.500	74.075	1.125	Open Manhole	1200
3.001	o	300	1-3/02	75.500	73.512	1.688	Open Manhole	1200
3.002	o	300	1-3/03	75.475	73.157	2.018	Open Manhole	1200
2.002	o	375	1-2/03	75.500	72.788	2.337	Open Manhole	1350
2.003	o	375	1-2/04	75.500	72.692	2.433	Open Manhole	1350
1.002	o	375	1-1/03	74.790	72.514	1.901	Open Manhole	1350
1.003	o	375	1-1/04	73.924	72.280	1.269	Open Manhole	1350
4.000	o	300	1-4/01	75.581	74.081	1.200	Open Manhole	1200
4.001	o	300	1-4/02	75.108	73.608	1.200	Open Manhole	1200
1.004	o	375	1-1/05	72.783	71.208	1.200	Open Manhole	1350
1.005	o	375	1-1/06	71.771	70.121	1.275	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	55.899	102.9	1-1/02	75.750	73.843	1.757	Open Manhole	1200
1.001	30.175	74.9	1-1/03	74.790	73.365	1.200	Open Manhole	1350
2.000	51.511	103.0	1-2/02	75.500	73.650	1.625	Open Manhole	1200
2.001	87.382	137.2	1-2/03	75.500	72.938	2.337	Open Manhole	1350
3.000	84.381	149.9	1-3/02	75.500	73.512	1.688	Open Manhole	1200
3.001	53.312	150.2	1-3/03	75.475	73.157	2.018	Open Manhole	1200
3.002	44.032	149.8	1-2/03	75.500	72.863	2.337	Open Manhole	1350
2.002	14.415	150.2	1-2/04	75.500	72.692	2.433	Open Manhole	1350
2.003	26.678	149.9	1-1/03	74.790	72.514	1.901	Open Manhole	1350
1.002	35.038	149.7	1-1/04	73.924	72.280	1.269	Open Manhole	1350
1.003	24.148	22.5	1-1/05	72.783	71.208	1.200	Open Manhole	1350
4.000	48.000	101.5	1-4/02	75.108	73.608	1.200	Open Manhole	1200
4.001	55.632	23.9	1-1/05	72.783	71.283	1.200	Open Manhole	1350
1.004	21.464	21.2	1-1/06	71.771	70.196	1.200	Open Manhole	1350
1.005	21.358	29.7	1-1/07	71.052	69.402	1.275	Open Manhole	1350

PIPELINE SCHEDULES for 2024-02-22 STORM NETWORK 1.SWS

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)
1.006	o	450	1-1/07	71.052	69.327	1.275	Open Manhole	1350
5.000	o	150	1-5/01	71.009	69.659	1.200	Open Manhole	1200
5.001	o	225	1-5/02	71.026	69.220	1.581	Open Manhole	1200
5.002	o	225	1-5/03	71.055	68.970	1.860	Open Manhole	1200
5.003	o	225	1-5/04	71.025	68.772	2.028	Open Manhole	1200
1.007	o	525	1-1/08	71.035	68.276	2.234	Open Manhole	1500
1.008	o	525	1-1/09	70.920	68.082	2.313	Open Manhole	1500
1.009	o	525	1-1/10	70.992	67.882	2.585	Open Manhole	1500
1.010	o	525	1-1/11	70.897	67.844	2.528	Open Manhole	1500
1.011	o	525	1-1/12	70.611	67.590	2.496	Open Manhole	1500
6.000	o	300	1-6/01	71.000	69.575	1.125	Open Manhole	1200
6.001	o	300	1-6/02	71.000	69.253	1.447	Open Manhole	1200
6.002	o	300	1-6/03	71.000	69.006	1.694	Open Manhole	1200
6.003	o	375	1-6/04	71.000	68.889	1.736	Open Manhole	1350
6.004	o	375	1-6/05	71.000	68.689	1.936	Open Manhole	1350
6.005	o	375	1-6/06	71.000	68.556	2.069	Open Manhole	1350
6.006	o	375	1-6/07	71.000	68.392	2.233	Open Manhole	1350
6.007	o	375	1-6/08	71.000	68.354	2.271	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)
1.006	6.629	150.7	1-1/08	71.035	69.283	1.302	Open Manhole	1500
5.000	37.474	103.0	1-5/02	71.026	69.295	1.581	Open Manhole	1200
5.001	37.527	150.1	1-5/03	71.055	68.970	1.860	Open Manhole	1200
5.002	29.684	149.9	1-5/04	71.025	68.772	2.028	Open Manhole	1200
5.003	29.327	149.6	1-1/08	71.035	68.576	2.234	Open Manhole	1500
1.007	29.032	149.6	1-1/09	70.920	68.082	2.313	Open Manhole	1500
1.008	29.979	149.9	1-1/10	70.992	67.882	2.585	Open Manhole	1500
1.009	5.748	151.3	1-1/11	70.897	67.844	2.528	Open Manhole	1500
1.010	38.132	150.1	1-1/12	70.611	67.590	2.496	Open Manhole	1500
1.011	19.446	149.6	1-1/13	70.669	67.460	2.684	Open Manhole	1500
6.000	37.116	150.3	1-6/02	71.000	69.328	1.372	Open Manhole	1200
6.001	37.117	150.3	1-6/03	71.000	69.006	1.694	Open Manhole	1200
6.002	6.300	150.0	1-6/04	71.000	68.964	1.736	Open Manhole	1350
6.003	29.971	149.9	1-6/05	71.000	68.689	1.936	Open Manhole	1350
6.004	19.972	150.2	1-6/06	71.000	68.556	2.069	Open Manhole	1350
6.005	24.665	150.4	1-6/07	71.000	68.392	2.233	Open Manhole	1350
6.006	5.721	150.6	1-6/08	71.000	68.354	2.271	Open Manhole	1350
6.007	11.904	150.7	1-6/09	70.971	68.275	2.321	Open Manhole	1350

PIPELINE SCHEDULES for 2024-02-22 STORM NETWORK 1.SWS

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)
6.008	o	375	1-6/09	70.971	68.275	2.321	Open Manhole	1350
6.009	o	375	1-6/10	70.961	68.101	2.485	Open Manhole	1350
7.000	o	225	1-7/01	71.000	69.575	1.200	Open Manhole	1200
6.010	o	375	1-6/11	70.948	67.927	2.646	Open Manhole	1350
1.012	o	600	1-1/13	70.669	67.385	2.684	Open Manhole	1500
8.000	o	150	1-8/01	71.180	69.830	1.200	Open Manhole	1200
8.001	o	225	1-8/02	70.956	69.449	1.282	Open Manhole	1200
8.002	o	225	1-8/03	70.825	69.162	1.438	Open Manhole	1200
1.013	o	600	1-1/14	70.407	67.351	2.456	Open Manhole	1500
9.000	o	375	1-9/01	71.981	70.481	1.125	Open Manhole	1350
9.001	o	375	1-9/02	71.306	69.731	1.200	Open Manhole	1350
9.002	o	375	1-9/03	70.274	68.699	1.200	Open Manhole	1350
1.014	o	600	1-1/15	70.006	67.271	2.135	Open Manhole	1500
1.015	o	600	1-1/16	68.595	66.795	1.200	Open Manhole	1500

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)
6.008	26.071	149.8	1-6/10	70.961	68.101	2.485	Open Manhole	1350
6.009	26.072	149.8	1-6/11	70.948	67.927	2.646	Open Manhole	1350
7.000	18.858	149.7	1-6/11	70.948	69.449	1.274	Open Manhole	1350
6.010	20.606	65.0	1-1/13	70.669	67.610	2.684	Open Manhole	1500
1.012	5.035	148.1	1-1/14	70.407	67.351	2.456	Open Manhole	1500
8.000	31.472	102.8	1-8/02	70.956	69.524	1.282	Open Manhole	1200
8.001	43.103	150.2	1-8/03	70.825	69.162	1.438	Open Manhole	1200
8.002	27.464	150.0	1-1/14	70.407	68.979	1.203	Open Manhole	1500
1.013	11.942	149.3	1-1/15	70.006	67.271	2.135	Open Manhole	1500
9.000	67.508	100.0	1-9/02	71.306	69.806	1.125	Open Manhole	1350
9.001	66.070	64.0	1-9/03	70.274	68.699	1.200	Open Manhole	1350
9.002	4.258	15.9	1-1/15	70.006	68.431	1.200	Open Manhole	1500
1.014	29.652	62.3	1-1/16	68.595	66.795	1.200	Open Manhole	1500
1.015	56.811	20.8	1-1/17	65.868	64.068	1.200	Open Manhole	1500

PIPELINE SCHEDULES for 2024-02-22 STORM NETWORK 1.SWS

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)
1.016	o	600	1-1/17	65.868	64.068	1.200	Open Manhole	1500
1.017	o	900	1-1/18	63.000	61.125	0.975	Open Manhole	1800
10.000	o	225	1-10/01	65.784	64.434	1.125	Open Manhole	1200
10.001	o	225	1-10/02	65.793	64.068	1.500	Open Manhole	1200
10.002	o	225	1-10/03	65.880	63.699	1.956	Open Manhole	1200
10.003	o	225	1-10/04	65.677	63.607	1.845	Open Manhole	1200
11.000	o	225	1-11/01	65.723	64.298	1.200	Open Manhole	1200
10.004	o	225	1-10/05	65.327	63.480	1.622	Open Manhole	1200
12.000	o	150	1-12/01	68.572	67.222	1.200	Open Manhole	1200
12.001	o	225	1-12/02	68.465	66.994	1.246	Open Manhole	1200
12.002	o	225	1-12/03	68.535	66.952	1.358	Open Manhole	1200
12.003	o	225	1-12/04	68.435	66.884	1.326	Open Manhole	1200
12.004	o	225	1-12/05	68.157	66.732	1.200	Open Manhole	1200
12.005	o	225	1-12/06	68.414	66.534	1.655	Open Manhole	1200
12.006	o	225	1-12/07	68.220	66.443	1.552	Open Manhole	1200
12.007	o	225	1-12/08	67.818	66.357	1.236	Open Manhole	1200
12.008	o	225	1-12/09	66.851	65.426	1.200	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)
1.016	18.481	6.8	1-1/18	63.000	61.350	1.050	Open Manhole	1800
1.017	34.921	301.0	1-1/19	63.000	61.009	1.091	Open Manhole	1800
10.000	30.005	103.1	1-10/02	65.793	64.143	1.425	Open Manhole	1200
10.001	55.355	150.0	1-10/03	65.880	63.699	1.956	Open Manhole	1200
10.002	13.756	149.5	1-10/04	65.677	63.607	1.845	Open Manhole	1200
10.003	19.047	150.0	1-10/05	65.327	63.480	1.622	Open Manhole	1200
11.000	39.165	98.9	1-10/05	65.327	63.902	1.200	Open Manhole	1200
10.004	16.000	149.5	1-10/06	64.927	63.373	1.329	Open Manhole	1350
12.000	15.717	102.7	1-12/02	68.465	67.069	1.246	Open Manhole	1200
12.001	6.253	148.9	1-12/03	68.535	66.952	1.358	Open Manhole	1200
12.002	10.221	150.3	1-12/04	68.435	66.884	1.326	Open Manhole	1200
12.003	13.656	89.8	1-12/05	68.157	66.732	1.200	Open Manhole	1200
12.004	29.705	150.0	1-12/06	68.414	66.534	1.655	Open Manhole	1200
12.005	13.626	149.7	1-12/07	68.220	66.443	1.552	Open Manhole	1200
12.006	12.951	150.6	1-12/08	67.818	66.357	1.236	Open Manhole	1200
12.007	36.971	39.7	1-12/09	66.851	65.426	1.200	Open Manhole	1200
12.008	36.971	40.4	1-12/10	65.936	64.511	1.200	Open Manhole	1200

PIPELINE SCHEDULES for 2024-02-22 STORM NETWORK 1.SWS

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)
12.009	o	225	1-12/10	65.936	64.511	1.200	Open Manhole	1200
12.010	o	375	1-12/11	65.323	63.823	1.125	Open Manhole	1350
10.005	o	300	1-10/06	64.927	63.298	1.329	Open Manhole	1350
13.000	o	225	1-13/01	64.922	63.572	1.125	Open Manhole	1200
10.006	o	300	1-10/07	64.527	63.027	1.200	Open Manhole	1200
14.000	o	150	1-14/01	64.523	63.173	1.200	Open Manhole	1200
10.007	o	375	1-10/08	64.127	62.552	1.200	Open Manhole	1350
10.008	o	375	1-10/09	64.074	62.499	1.200	Open Manhole	1350
1.018	o	900	1-1/19	63.000	61.009	1.091	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)
12.009	35.175	57.4	1-12/11	65.323	63.898	1.200	Open Manhole	1350
12.010	39.164	87.0	1-10/06	64.927	63.373	1.179	Open Manhole	1350
10.005	16.000	59.0	1-10/07	64.527	63.027	1.200	Open Manhole	1200
13.000	39.154	99.1	1-10/07	64.527	63.177	1.125	Open Manhole	1200
10.006	16.000	40.0	1-10/08	64.127	62.627	1.200	Open Manhole	1350
14.000	39.165	98.9	1-10/08	64.127	62.777	1.200	Open Manhole	1350
10.007	5.738	108.3	1-10/09	64.074	62.499	1.200	Open Manhole	1350
10.008	50.783	103.0	1-1/19	63.000	62.006	0.619	Open Manhole	1800
1.018	15.679	103.2	HW01	63.000	60.857	1.243	Open Manhole	0

Free Flowing Outfall Details for 2024-02-22 STORM NETWORK 1.SWS

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.018	HW01	63.000	60.857	60.700	0	0

Simulation Criteria for 2024-02-22 STORM NETWORK 1.SWS

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	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 Storage Structures	11
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	16.900	Storm Duration (mins)	30
Ratio R	0.328		

Online Controls for 2024-02-22 STORM NETWORK 1.SWS

Hydro-Brake® Optimum Manhole: 1-1/05, DS/PN: 1.004, Volume (m³): 8.6

Unit Reference	MD-SHE-0359-8000-1000-8000
Design Head (m)	1.000
Design Flow (l/s)	80.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	359
Invert Level (m)	71.208
Minimum Outlet Pipe Diameter (mm)	375
Suggested Manhole Diameter (mm)	2100

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	80.0
Flush-Flo™	0.516	80.0
Kick-Flo®	0.827	73.0
Mean Flow over Head Range	-	62.1

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	10.3	1.200	87.4	3.000	136.5	7.000	206.6
0.200	36.1	1.400	94.2	3.500	147.2	7.500	213.7
0.300	67.2	1.600	100.5	4.000	157.1	8.000	220.6
0.400	78.8	1.800	106.4	4.500	166.4	8.500	227.3
0.500	80.0	2.000	112.0	5.000	175.2	9.000	233.7
0.600	79.5	2.200	117.3	5.500	183.6	9.500	240.0
0.800	74.3	2.400	122.4	6.000	191.6		
1.000	80.0	2.600	127.3	6.500	199.2		

Hydro-Brake® Optimum Manhole: 1-1/14, DS/PN: 1.013, Volume (m³): 7.4

Unit Reference	MD-SHE-0395-1000-1000-1000
Design Head (m)	1.000
Design Flow (l/s)	100.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	395
Invert Level (m)	67.351
Minimum Outlet Pipe Diameter (mm)	450
Suggested Manhole Diameter (mm)	Site Specific Design (Contact Hydro International)

Hydro-Brake® Optimum Manhole: 1-1/14, DS/PN: 1.013, Volume (m³): 7.4

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	100.0
Flush-Flo™	0.550	99.9
Kick-Flo®	0.846	92.2
Mean Flow over Head Range	-	76.0

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	10.9	1.200	109.2	3.000	170.7	7.000	258.7
0.200	39.0	1.400	117.7	3.500	184.1	7.500	267.6
0.300	75.0	1.600	125.6	4.000	196.6	8.000	276.2
0.400	97.4	1.800	133.1	4.500	208.2	8.500	284.5
0.500	99.7	2.000	140.1	5.000	219.3	9.000	292.7
0.600	99.7	2.200	146.7	5.500	229.8	9.500	300.5
0.800	94.6	2.400	153.1	6.000	239.8		
1.000	100.0	2.600	159.2	6.500	249.4		

Hydro-Brake® Optimum Manhole: 1-1/19, DS/PN: 1.018, Volume (m³): 31.6

Unit Reference	MD-SHE-0441-1300-1000-1300
Design Head (m)	1.000
Design Flow (l/s)	130.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	441
Invert Level (m)	61.009
Minimum Outlet Pipe Diameter (mm)	500
Suggested Manhole Diameter (mm)	Site Specific Design (Contact Hydro International)

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	130.0
Flush-Flo™	0.594	129.9
Kick-Flo®	0.873	121.7
Mean Flow over Head Range	-	96.2

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	11.7	0.300	83.8	0.500	128.8	0.800	125.5
0.200	42.4	0.400	124.1	0.600	129.9	1.000	130.0

Hydro-Brake® Optimum Manhole: 1-1/19, DS/PN: 1.018, Volume (m³): 31.6

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
1.200	142.0	2.400	199.2	5.000	285.5	8.000	359.7
1.400	153.1	2.600	207.2	5.500	299.1	8.500	370.6
1.600	163.4	3.000	222.2	6.000	312.2	9.000	381.1
1.800	173.1	3.500	239.6	6.500	324.7	9.500	391.4
2.000	182.2	4.000	255.8	7.000	336.8		
2.200	190.9	4.500	271.1	7.500	348.4		

Storage Structures for 2024-02-22 STORM NETWORK 1.SWS

Porous Car Park Manhole: 1-2/01, DS/PN: 2.000

Infiltration Coefficient Base (m/hr)	0.10000	Width (m)	40.0
Membrane Percolation (mm/hr)	1000	Length (m)	80.0
Max Percolation (l/s)	888.9	Slope (1:X)	500.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	74.900	Membrane Depth (mm)	0

Porous Car Park Manhole: 1-2/02, DS/PN: 2.001

Infiltration Coefficient Base (m/hr)	0.10000	Width (m)	86.0
Membrane Percolation (mm/hr)	1000	Length (m)	83.0
Max Percolation (l/s)	1982.8	Slope (1:X)	500.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	74.900	Membrane Depth (mm)	0

Porous Car Park Manhole: 1-3/01, DS/PN: 3.000

Infiltration Coefficient Base (m/hr)	0.10000	Width (m)	85.0
Membrane Percolation (mm/hr)	1000	Length (m)	20.0
Max Percolation (l/s)	472.2	Slope (1:X)	500.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	74.900	Membrane Depth (mm)	0

Porous Car Park Manhole: 1-2/03, DS/PN: 2.002

Infiltration Coefficient Base (m/hr)	0.10000	Width (m)	42.0
Membrane Percolation (mm/hr)	1000	Length (m)	85.0
Max Percolation (l/s)	991.7	Slope (1:X)	500.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	74.900	Membrane Depth (mm)	0

Porous Car Park Manhole: 1-4/01, DS/PN: 4.000

Infiltration Coefficient Base (m/hr)	0.10000	Width (m)	64.0
Membrane Percolation (mm/hr)	1000	Length (m)	100.0
Max Percolation (l/s)	1777.8	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	74.981	Membrane Depth (mm)	0

Cellular Storage Manhole: 1-1/05, DS/PN: 1.004

Invert Level (m)	71.208	Infiltration Coefficient Side (m/hr)	0.10000
Infiltration Coefficient Base (m/hr)	0.10000	Safety Factor	2.0

Cellular Storage Manhole: 1-1/05, DS/PN: 1.004

Porosity 0.95

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	500.0	0.0	1.001	0.0	0.0
1.000	500.0	0.0			

Infiltration Trench Manhole: 1-6/01, DS/PN: 6.000

Infiltration Coefficient Base (m/hr)	0.10000	Trench Width (m)	2.0
Infiltration Coefficient Side (m/hr)	0.10000	Trench Length (m)	70.0
Safety Factor	2.0	Slope (1:X)	500.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	69.000	Cap Infiltration Depth (m)	0.000

Cellular Storage Manhole: 1-1/14, DS/PN: 1.013

Invert Level (m)	67.351	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Side (m/hr)	0.00000		

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	450.0	0.0	1.001	0.0	0.0
1.000	450.0	0.0			

Porous Car Park Manhole: 1-9/01, DS/PN: 9.000

Infiltration Coefficient Base (m/hr)	0.10000	Width (m)	65.0
Membrane Percolation (mm/hr)	1000	Length (m)	75.0
Max Percolation (l/s)	1354.2	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	71.381	Membrane Depth (mm)	0

Porous Car Park Manhole: 1-9/02, DS/PN: 9.001

Infiltration Coefficient Base (m/hr)	0.10000	Width (m)	65.0
Membrane Percolation (mm/hr)	1000	Length (m)	75.0
Max Percolation (l/s)	1354.2	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	70.706	Membrane Depth (mm)	0

Cellular Storage Manhole: 1-1/19, DS/PN: 1.018

Invert Level (m)	61.009	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Side (m/hr)	0.00000		

Cellular Storage Manhole: 1-1/19, DS/PN: 1.018

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	1200.0	0.0	1.001	0.0	0.0
1.000	1200.0	0.0			

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 1.SWS

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	11
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.328
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	16.800	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	20, 20, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1-1/01	15 Winter	1	+20%	30/15 Summer				74.484
1.001	1-1/02	15 Winter	1	+20%	30/15 Summer				73.877
2.000	1-2/01	240 Winter	1	+20%	100/30 Summer				74.187
2.001	1-2/02	480 Winter	1	+20%	30/60 Winter				73.626
3.000	1-3/01	15 Winter	1	+20%	30/15 Summer				74.239
3.001	1-3/02	15 Winter	1	+20%	30/15 Summer				73.678
3.002	1-3/03	15 Winter	1	+20%	30/15 Summer				73.340
2.002	1-2/03	15 Winter	1	+20%	30/15 Summer				72.970
2.003	1-2/04	15 Winter	1	+20%	30/15 Summer				72.856
1.002	1-1/03	30 Winter	1	+20%	30/15 Summer				72.734
1.003	1-1/04	30 Winter	1	+20%					72.412
4.000	1-4/01	60 Winter	1	+20%	30/15 Winter				74.180
4.001	1-4/02	15 Winter	1	+20%	100/15 Summer				73.706
1.004	1-1/05	120 Winter	1	+20%	30/15 Winter				71.445
1.005	1-1/06	120 Winter	1	+20%	100/60 Winter				70.219
1.006	1-1/07	120 Winter	1	+20%	100/60 Summer				69.493
5.000	1-5/01	15 Winter	1	+20%	30/15 Winter				69.715

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 1.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1-1/01	-0.052	0.000	0.72		12.3	OK	
1.001	1-1/02	-0.116	0.000	0.47		26.6	OK	
2.000	1-2/01	-0.188	0.000	0.07		3.2	OK	
2.001	1-2/02	-0.174	0.000	0.12		5.1	OK	
3.000	1-3/01	-0.136	0.000	0.49		42.7	OK	
3.001	1-3/02	-0.134	0.000	0.57		48.5	OK	
3.002	1-3/03	-0.117	0.000	0.67		56.9	OK	
2.002	1-2/03	-0.193	0.000	0.47		57.4	OK	
2.003	1-2/04	-0.211	0.000	0.40		56.5	OK	
1.002	1-1/03	-0.155	0.000	0.64		94.2	OK	
1.003	1-1/04	-0.243	0.000	0.27		98.0	OK	
4.000	1-4/01	-0.201	0.000	0.22		22.6	OK	
4.001	1-4/02	-0.202	0.000	0.23		49.5	OK	
1.004	1-1/05	-0.138	0.000	0.13		47.8	OK	
1.005	1-1/06	-0.277	0.000	0.15		48.1	OK	
1.006	1-1/07	-0.284	0.000	0.30		48.1	OK	
5.000	1-5/01	-0.094	0.000	0.30		5.1	OK	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 1.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
5.001	1-5/02	15 Winter	1	+20%	30/15 Summer			
5.002	1-5/03	15 Winter	1	+20%	30/15 Summer			
5.003	1-5/04	15 Winter	1	+20%	30/15 Summer			
1.007	1-1/08	15 Winter	1	+20%	30/60 Summer			
1.008	1-1/09	15 Winter	1	+20%	30/60 Summer			
1.009	1-1/10	15 Winter	1	+20%	30/30 Winter			
1.010	1-1/11	15 Winter	1	+20%	30/30 Winter			
1.011	1-1/12	15 Winter	1	+20%	30/15 Summer			
6.000	1-6/01	120 Winter	1	+20%	30/15 Winter			
6.001	1-6/02	15 Winter	1	+20%	30/15 Summer			
6.002	1-6/03	15 Winter	1	+20%	30/15 Summer			
6.003	1-6/04	15 Winter	1	+20%	30/15 Summer			
6.004	1-6/05	15 Winter	1	+20%	30/15 Summer			
6.005	1-6/06	15 Winter	1	+20%	30/15 Summer			
6.006	1-6/07	15 Winter	1	+20%	30/15 Summer			
6.007	1-6/08	15 Winter	1	+20%	30/15 Summer			
6.008	1-6/09	15 Winter	1	+20%	30/15 Summer			
6.009	1-6/10	15 Winter	1	+20%	30/15 Summer			
7.000	1-7/01	15 Winter	1	+20%	100/15 Summer			
6.010	1-6/11	15 Winter	1	+20%	30/15 Summer			
1.012	1-1/13	120 Winter	1	+20%	30/15 Summer			
8.000	1-8/01	15 Winter	1	+20%	30/15 Summer			
8.001	1-8/02	15 Winter	1	+20%	30/15 Summer			
8.002	1-8/03	15 Winter	1	+20%	30/15 Summer			
1.013	1-1/14	120 Winter	1	+20%	30/15 Winter			
9.000	1-9/01	15 Winter	1	+20%	30/15 Summer			
9.001	1-9/02	30 Winter	1	+20%	30/15 Summer			
9.002	1-9/03	30 Winter	1	+20%	30/15 Summer			
1.014	1-1/15	30 Winter	1	+20%				
1.015	1-1/16	30 Winter	1	+20%				
1.016	1-1/17	30 Winter	1	+20%				
1.017	1-1/18	240 Winter	1	+20%	100/360 Winter			
10.000	1-10/01	15 Winter	1	+20%	30/15 Summer			
10.001	1-10/02	15 Winter	1	+20%	30/15 Summer			
10.002	1-10/03	15 Winter	1	+20%	30/15 Summer			
10.003	1-10/04	15 Winter	1	+20%	30/15 Summer			
11.000	1-11/01	15 Winter	1	+20%	30/15 Summer			
10.004	1-10/05	15 Winter	1	+20%	1/15 Winter			
12.000	1-12/01	15 Winter	1	+20%				
12.001	1-12/02	15 Winter	1	+20%				
12.002	1-12/03	15 Winter	1	+20%				
12.003	1-12/04	15 Winter	1	+20%				
12.004	1-12/05	15 Winter	1	+20%				
12.005	1-12/06	15 Winter	1	+20%				
12.006	1-12/07	15 Winter	1	+20%				
12.007	1-12/08	15 Winter	1	+20%				
12.008	1-12/09	15 Winter	1	+20%	100/15 Summer			
12.009	1-12/10	15 Winter	1	+20%	30/15 Summer			

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 1.SWS

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
5.001	1-5/02	69.293	-0.152	0.000	0.22		9.0	OK	
5.002	1-5/03	69.049	-0.146	0.000	0.26		10.4	OK	
5.003	1-5/04	68.943	-0.054	0.000	0.92		36.4	OK	
1.007	1-1/08	68.442	-0.359	0.000	0.21		70.8	OK	
1.008	1-1/09	68.246	-0.361	0.000	0.21		70.9	OK	
1.009	1-1/10	68.087	-0.320	0.000	0.32		70.4	OK	
1.010	1-1/11	68.012	-0.357	0.000	0.22		76.6	OK	
1.011	1-1/12	67.807	-0.308	0.000	0.29		79.7	OK	
6.000	1-6/01	69.509	-0.366	0.000	0.00		0.0	OK	
6.001	1-6/02	69.374	-0.179	0.000	0.34		28.1	OK	
6.002	1-6/03	69.148	-0.158	0.000	0.46		27.9	OK	
6.003	1-6/04	69.061	-0.203	0.000	0.43		61.9	OK	
6.004	1-6/05	68.886	-0.178	0.000	0.54		73.3	OK	
6.005	1-6/06	68.768	-0.163	0.000	0.60		85.1	OK	
6.006	1-6/07	68.676	-0.091	0.000	0.93		96.1	OK	
6.007	1-6/08	68.639	-0.090	0.000	0.93		102.2	OK	
6.008	1-6/09	68.520	-0.130	0.000	0.75		106.3	OK	
6.009	1-6/10	68.351	-0.125	0.000	0.78		110.1	OK	
7.000	1-7/01	69.685	-0.115	0.000	0.46		17.8	OK	
6.010	1-6/11	68.133	-0.169	0.000	0.59		122.7	OK	
1.012	1-1/13	67.776	-0.209	0.000	0.41		114.2	OK	
8.000	1-8/01	69.904	-0.076	0.000	0.48		8.0	OK	
8.001	1-8/02	69.550	-0.124	0.000	0.41		16.4	OK	
8.002	1-8/03	69.280	-0.107	0.000	0.54		21.2	OK	
1.013	1-1/14	67.769	-0.182	0.000	0.24		84.2	OK	
9.000	1-9/01	70.682	-0.174	0.000	0.53		99.8	OK	
9.001	1-9/02	69.934	-0.172	0.000	0.56		131.2	OK	
9.002	1-9/03	68.923	-0.151	0.000	0.65		132.4	OK	
1.014	1-1/15	67.457	-0.414	0.000	0.21		144.5	OK	
1.015	1-1/16	66.928	-0.467	0.000	0.11		147.4	OK	
1.016	1-1/17	64.189	-0.479	0.000	0.09		147.9	OK	
1.017	1-1/18	61.375	-0.650	0.000	0.13		110.2	OK	
10.000	1-10/01	64.502	-0.157	0.000	0.19		9.3	OK	
10.001	1-10/02	64.174	-0.119	0.000	0.43		17.5	OK	
10.002	1-10/03	63.819	-0.105	0.000	0.55		20.4	OK	
10.003	1-10/04	63.747	-0.085	0.000	0.53		20.3	OK	
11.000	1-11/01	64.403	-0.120	0.000	0.44		21.9	OK	
10.004	1-10/05	63.706	0.001	0.000	1.05		39.3	SURCHARGED	
12.000	1-12/01	67.262	-0.110	0.000	0.16		2.6	OK	
12.001	1-12/02	67.039	-0.180	0.000	0.09		2.6	OK	
12.002	1-12/03	66.992	-0.185	0.000	0.07		2.6	OK	
12.003	1-12/04	66.918	-0.191	0.000	0.05		2.6	OK	
12.004	1-12/05	66.793	-0.164	0.000	0.16		6.3	OK	
12.005	1-12/06	66.597	-0.162	0.000	0.17		6.3	OK	
12.006	1-12/07	66.526	-0.142	0.000	0.29		10.4	OK	
12.007	1-12/08	66.425	-0.157	0.000	0.20		15.5	OK	
12.008	1-12/09	65.506	-0.145	0.000	0.27		20.9	OK	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 1.SWS

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
12.009	1-12/10	64.612	-0.124	0.000	0.41		26.5	OK	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 1.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
12.010	1-12/11	15 Winter	1	+20%	30/15 Summer			
10.005	1-10/06	15 Winter	1	+20%	30/15 Summer			
13.000	1-13/01	15 Winter	1	+20%	30/15 Summer			
10.006	1-10/07	15 Winter	1	+20%	30/15 Summer			
14.000	1-14/01	15 Winter	1	+20%	30/15 Summer			
10.007	1-10/08	15 Winter	1	+20%	1/15 Winter			
10.008	1-10/09	15 Winter	1	+20%	30/15 Summer			
1.018	1-1/19	240 Winter	1	+20%	100/180 Winter			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
12.010	1-12/11	63.954	-0.244	0.000	0.26		50.9	OK	
10.005	1-10/06	63.489	-0.109	0.000	0.73		89.9	OK	
13.000	1-13/01	63.656	-0.141	0.000	0.29		14.3	OK	
10.006	1-10/07	63.211	-0.116	0.000	0.69		103.0	OK	
14.000	1-14/01	63.261	-0.062	0.000	0.63		10.9	OK	
10.007	1-10/08	62.952	0.025	0.000	1.03		110.0	SURCHARGED	
10.008	1-10/09	62.713	-0.161	0.000	0.61		111.4	OK	
1.018	1-1/19	61.332	-0.577	0.000	0.10		93.8	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 1.SWS

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	11
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.328
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	16.800	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	20, 20, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1-1/01	15 Winter	30	+20%	30/15 Summer				75.028
1.001	1-1/02	15 Winter	30	+20%	30/15 Summer				74.022
2.000	1-2/01	30 Winter	30	+20%	100/30 Summer				74.271
2.001	1-2/02	60 Winter	30	+20%	30/60 Winter				73.845
3.000	1-3/01	15 Winter	30	+20%	30/15 Summer				74.687
3.001	1-3/02	15 Winter	30	+20%	30/15 Summer				74.146
3.002	1-3/03	15 Winter	30	+20%	30/15 Summer				73.709
2.002	1-2/03	30 Winter	30	+20%	30/15 Summer				73.247
2.003	1-2/04	30 Winter	30	+20%	30/15 Summer				73.134
1.002	1-1/03	15 Winter	30	+20%	30/15 Summer				73.009
1.003	1-1/04	30 Winter	30	+20%					72.472
4.000	1-4/01	15 Winter	30	+20%	30/15 Winter				74.448
4.001	1-4/02	30 Summer	30	+20%	100/15 Summer				73.845
1.004	1-1/05	120 Winter	30	+20%	30/15 Winter				71.846
1.005	1-1/06	60 Winter	30	+20%	100/60 Winter				70.250
1.006	1-1/07	240 Winter	30	+20%	100/60 Summer				69.620
5.000	1-5/01	15 Winter	30	+20%	30/15 Winter				69.845

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 1.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1-1/01	0.492	0.000	1.35		23.1	SURCHARGED	
1.001	1-1/02	0.029	0.000	1.04		58.3	SURCHARGED	
2.000	1-2/01	-0.104	0.000	0.53		26.1	OK	
2.001	1-2/02	0.045	0.000	0.99		43.0	SURCHARGED	
3.000	1-3/01	0.312	0.000	1.06		92.4	SURCHARGED	
3.001	1-3/02	0.334	0.000	1.10		94.1	SURCHARGED	
3.002	1-3/03	0.252	0.000	1.27		107.3	SURCHARGED	
2.002	1-2/03	0.084	0.000	1.11		134.8	SURCHARGED	
2.003	1-2/04	0.067	0.000	0.95		134.9	SURCHARGED	
1.002	1-1/03	0.120	0.000	1.23		180.7	SURCHARGED	
1.003	1-1/04	-0.183	0.000	0.52		189.2	OK	
4.000	1-4/01	0.067	0.000	1.01		104.4	SURCHARGED	
4.001	1-4/02	-0.063	0.000	0.94		202.4	OK	
1.004	1-1/05	0.263	0.000	0.22		80.0	SURCHARGED	
1.005	1-1/06	-0.246	0.000	0.26		81.1	OK	
1.006	1-1/07	-0.157	0.000	0.49		80.6	OK	
5.000	1-5/01	0.036	0.000	0.62		10.5	SURCHARGED	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 1.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
5.001	1-5/02	15 Winter	30	+20%	30/15 Summer			
5.002	1-5/03	15 Winter	30	+20%	30/15 Summer			
5.003	1-5/04	15 Winter	30	+20%	30/15 Summer			
1.007	1-1/08	240 Winter	30	+20%	30/60 Summer			
1.008	1-1/09	240 Winter	30	+20%	30/60 Summer			
1.009	1-1/10	240 Winter	30	+20%	30/30 Winter			
1.010	1-1/11	240 Winter	30	+20%	30/30 Winter			
1.011	1-1/12	240 Winter	30	+20%	30/15 Summer			
6.000	1-6/01	15 Winter	30	+20%	30/15 Winter			
6.001	1-6/02	15 Winter	30	+20%	30/15 Summer			
6.002	1-6/03	15 Winter	30	+20%	30/15 Summer			
6.003	1-6/04	15 Winter	30	+20%	30/15 Summer			
6.004	1-6/05	15 Winter	30	+20%	30/15 Summer			
6.005	1-6/06	15 Winter	30	+20%	30/15 Summer			
6.006	1-6/07	15 Winter	30	+20%	30/15 Summer			
6.007	1-6/08	15 Winter	30	+20%	30/15 Summer			
6.008	1-6/09	15 Winter	30	+20%	30/15 Summer			
6.009	1-6/10	180 Winter	30	+20%	30/15 Summer			
7.000	1-7/01	15 Winter	30	+20%	100/15 Summer			
6.010	1-6/11	240 Winter	30	+20%	30/15 Summer			
1.012	1-1/13	240 Winter	30	+20%	30/15 Summer			
8.000	1-8/01	15 Winter	30	+20%	30/15 Summer			
8.001	1-8/02	15 Winter	30	+20%	30/15 Summer			
8.002	1-8/03	15 Winter	30	+20%	30/15 Summer			
1.013	1-1/14	240 Winter	30	+20%	30/15 Winter			
9.000	1-9/01	15 Winter	30	+20%	30/15 Summer			
9.001	1-9/02	15 Winter	30	+20%	30/15 Summer			
9.002	1-9/03	15 Winter	30	+20%	30/15 Summer			
1.014	1-1/15	30 Winter	30	+20%				
1.015	1-1/16	30 Winter	30	+20%				
1.016	1-1/17	30 Winter	30	+20%				
1.017	1-1/18	240 Winter	30	+20%	100/360 Winter			
10.000	1-10/01	15 Winter	30	+20%	30/15 Summer			
10.001	1-10/02	15 Winter	30	+20%	30/15 Summer			
10.002	1-10/03	15 Winter	30	+20%	30/15 Summer			
10.003	1-10/04	15 Winter	30	+20%	30/15 Summer			
11.000	1-11/01	15 Winter	30	+20%	30/15 Summer			
10.004	1-10/05	15 Winter	30	+20%	1/15 Winter			
12.000	1-12/01	15 Winter	30	+20%				
12.001	1-12/02	15 Winter	30	+20%				
12.002	1-12/03	15 Winter	30	+20%				
12.003	1-12/04	15 Winter	30	+20%				
12.004	1-12/05	15 Winter	30	+20%				
12.005	1-12/06	15 Winter	30	+20%				
12.006	1-12/07	15 Winter	30	+20%				
12.007	1-12/08	15 Winter	30	+20%				
12.008	1-12/09	15 Winter	30	+20%	100/15 Summer			
12.009	1-12/10	15 Winter	30	+20%	30/15 Summer			

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 1.SWS

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
5.001	1-5/02	69.724	0.279	0.000	0.55		22.1	SURCHARGED	
5.002	1-5/03	69.678	0.483	0.000	0.74		29.1	SURCHARGED	
5.003	1-5/04	69.621	0.624	0.000	2.03		80.3	SURCHARGED	
1.007	1-1/08	69.605	0.804	0.000	0.35		116.7	SURCHARGED	
1.008	1-1/09	69.458	0.851	0.000	0.35		116.7	SURCHARGED	
1.009	1-1/10	69.311	0.904	0.000	0.53		116.5	SURCHARGED	
1.010	1-1/11	69.299	0.930	0.000	0.35		120.0	SURCHARGED	
1.011	1-1/12	69.147	1.032	0.000	0.44		122.8	SURCHARGED	
6.000	1-6/01	69.885	0.010	0.000	0.74		61.6	SURCHARGED	
6.001	1-6/02	69.995	0.442	0.000	0.92		77.0	SURCHARGED	
6.002	1-6/03	69.972	0.666	0.000	1.27		77.7	SURCHARGED	
6.003	1-6/04	69.971	0.707	0.000	0.76		109.6	SURCHARGED	
6.004	1-6/05	69.875	0.811	0.000	0.93		126.5	SURCHARGED	
6.005	1-6/06	69.770	0.839	0.000	1.07		150.2	SURCHARGED	
6.006	1-6/07	69.590	0.823	0.000	1.68		173.8	SURCHARGED	
6.007	1-6/08	69.399	0.670	0.000	1.69		186.1	SURCHARGED	
6.008	1-6/09	69.180	0.530	0.000	1.35		192.2	SURCHARGED	
6.009	1-6/10	69.080	0.604	0.000	0.65		92.0	SURCHARGED	
7.000	1-7/01	69.800	0.000	0.000	1.00		38.3	OK	
6.010	1-6/11	69.041	0.739	0.000	0.40		83.2	SURCHARGED	
1.012	1-1/13	69.024	1.039	0.000	0.72		201.8	SURCHARGED	
8.000	1-8/01	70.019	0.039	0.000	1.00		16.8	SURCHARGED	
8.001	1-8/02	69.712	0.038	0.000	0.93		37.3	SURCHARGED	
8.002	1-8/03	69.469	0.082	0.000	1.22		48.0	SURCHARGED	
1.013	1-1/14	69.014	1.063	0.000	0.36		123.6	SURCHARGED	
9.000	1-9/01	71.382	0.526	0.000	1.05		198.1	SURCHARGED	
9.001	1-9/02	70.746	0.640	0.000	1.18		279.3	SURCHARGED	
9.002	1-9/03	69.297	0.223	0.000	1.38		279.3	SURCHARGED	
1.014	1-1/15	67.574	-0.297	0.000	0.51		351.3	OK	
1.015	1-1/16	67.004	-0.391	0.000	0.26		355.6	OK	
1.016	1-1/17	64.256	-0.412	0.000	0.22		355.5	OK	
1.017	1-1/18	61.702	-0.323	0.000	0.22		193.5	OK	
10.000	1-10/01	64.878	0.219	0.000	0.43		20.6	SURCHARGED	
10.001	1-10/02	64.845	0.552	0.000	0.80		32.8	SURCHARGED	
10.002	1-10/03	64.711	0.787	0.000	1.00		37.1	SURCHARGED	
10.003	1-10/04	64.612	0.780	0.000	1.04		39.7	SURCHARGED	
11.000	1-11/01	64.723	0.200	0.000	0.94		46.6	SURCHARGED	
10.004	1-10/05	64.525	0.820	0.000	1.73		64.9	SURCHARGED	
12.000	1-12/01	67.284	-0.088	0.000	0.36		5.8	OK	
12.001	1-12/02	67.062	-0.157	0.000	0.19		5.8	OK	
12.002	1-12/03	67.013	-0.164	0.000	0.17		5.8	OK	
12.003	1-12/04	66.936	-0.173	0.000	0.12		5.8	OK	
12.004	1-12/05	66.833	-0.124	0.000	0.40		15.8	OK	
12.005	1-12/06	66.638	-0.121	0.000	0.43		16.0	OK	
12.006	1-12/07	66.592	-0.076	0.000	0.75		27.3	OK	
12.007	1-12/08	66.476	-0.106	0.000	0.53		41.2	OK	
12.008	1-12/09	65.572	-0.079	0.000	0.73		56.4	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 1.SWS

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
12.009	1-12/10	64.927	0.191	0.000	1.00		64.8	SURCHARGED	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 1.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
12.010	1-12/11	15 Winter	30	+20%	30/15 Summer			
10.005	1-10/06	15 Winter	30	+20%	30/15 Summer			
13.000	1-13/01	15 Winter	30	+20%	30/15 Summer			
10.006	1-10/07	15 Winter	30	+20%	30/15 Summer			
14.000	1-14/01	15 Winter	30	+20%	30/15 Summer			
10.007	1-10/08	15 Winter	30	+20%	1/15 Winter			
10.008	1-10/09	15 Winter	30	+20%	30/15 Summer			
1.018	1-1/19	240 Winter	30	+20%	100/180 Winter			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
12.010	1-12/11	64.414	0.216	0.000	0.64		125.0	SURCHARGED	
10.005	1-10/06	64.260	0.662	0.000	1.30		159.2	SURCHARGED	
13.000	1-13/01	63.893	0.096	0.000	0.62		30.7	SURCHARGED	
10.006	1-10/07	63.792	0.465	0.000	1.22		182.0	SURCHARGED	
14.000	1-14/01	63.694	0.371	0.000	1.16		20.1	SURCHARGED	
10.007	1-10/08	63.211	0.284	0.000	1.87		200.0	SURCHARGED	
10.008	1-10/09	62.954	0.080	0.000	1.09		199.6	SURCHARGED	
1.018	1-1/19	61.660	-0.249	0.000	0.14		129.7	OK	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 1.SWS

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	11
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.328
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	16.800	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	20, 20, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1-1/01	15 Winter	100	+20%	30/15 Summer				75.621
1.001	1-1/02	15 Winter	100	+20%	30/15 Summer				74.228
2.000	1-2/01	30 Winter	100	+20%	100/30 Summer				74.906
2.001	1-2/02	30 Winter	100	+20%	30/60 Winter				74.817
3.000	1-3/01	15 Winter	100	+20%	30/15 Summer				74.932
3.001	1-3/02	15 Winter	100	+20%	30/15 Summer				74.667
3.002	1-3/03	30 Winter	100	+20%	30/15 Summer				74.207
2.002	1-2/03	30 Winter	100	+20%	30/15 Summer				73.692
2.003	1-2/04	30 Winter	100	+20%	30/15 Summer				73.530
1.002	1-1/03	30 Winter	100	+20%	30/15 Summer				73.318
1.003	1-1/04	30 Winter	100	+20%					72.512
4.000	1-4/01	15 Winter	100	+20%	30/15 Winter				74.992
4.001	1-4/02	30 Summer	100	+20%	100/15 Summer				74.306
1.004	1-1/05	120 Winter	100	+20%	30/15 Winter				72.165
1.005	1-1/06	120 Winter	100	+20%	100/60 Winter				70.819
1.006	1-1/07	120 Winter	100	+20%	100/60 Summer				70.546
5.000	1-5/01	120 Winter	100	+20%	30/15 Winter				70.508

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 1.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1-1/01	1.085	0.000	1.63		27.8	FLOOD RISK	
1.001	1-1/02	0.235	0.000	1.26		70.7	SURCHARGED	
2.000	1-2/01	0.531	0.000	0.84		41.2	SURCHARGED	
2.001	1-2/02	1.017	0.000	1.28		55.2	SURCHARGED	
3.000	1-3/01	0.557	0.000	1.12		98.0	SURCHARGED	
3.001	1-3/02	0.855	0.000	1.17		100.2	SURCHARGED	
3.002	1-3/03	0.750	0.000	1.44		122.2	SURCHARGED	
2.002	1-2/03	0.529	0.000	1.36		164.4	SURCHARGED	
2.003	1-2/04	0.463	0.000	1.17		165.8	SURCHARGED	
1.002	1-1/03	0.429	0.000	1.68		246.7	SURCHARGED	
1.003	1-1/04	-0.143	0.000	0.70		254.7	OK	
4.000	1-4/01	0.611	0.000	1.25		129.3	SURCHARGED	
4.001	1-4/02	0.398	0.000	1.08		233.1	SURCHARGED	
1.004	1-1/05	0.582	0.000	0.22		80.0	SURCHARGED	
1.005	1-1/06	0.323	0.000	0.26		81.5	SURCHARGED	
1.006	1-1/07	0.769	0.000	0.54		88.1	SURCHARGED	
5.000	1-5/01	0.699	0.000	0.29		5.0	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 1.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
5.001	1-5/02	120 Winter	100	+20%	30/15 Summer			
5.002	1-5/03	120 Winter	100	+20%	30/15 Summer			
5.003	1-5/04	120 Winter	100	+20%	30/15 Summer			
1.007	1-1/08	120 Winter	100	+20%	30/60 Summer			
1.008	1-1/09	120 Winter	100	+20%	30/60 Summer			
1.009	1-1/10	120 Winter	100	+20%	30/30 Winter			
1.010	1-1/11	120 Winter	100	+20%	30/30 Winter			
1.011	1-1/12	120 Winter	100	+20%	30/15 Summer			
6.000	1-6/01	180 Winter	100	+20%	30/15 Winter			
6.001	1-6/02	15 Winter	100	+20%	30/15 Summer			
6.002	1-6/03	15 Winter	100	+20%	30/15 Summer			
6.003	1-6/04	15 Winter	100	+20%	30/15 Summer			
6.004	1-6/05	15 Winter	100	+20%	30/15 Summer			
6.005	1-6/06	15 Winter	100	+20%	30/15 Summer			
6.006	1-6/07	180 Winter	100	+20%	30/15 Summer			
6.007	1-6/08	180 Winter	100	+20%	30/15 Summer			
6.008	1-6/09	180 Winter	100	+20%	30/15 Summer			
6.009	1-6/10	180 Winter	100	+20%	30/15 Summer			
7.000	1-7/01	120 Winter	100	+20%	100/15 Summer			
6.010	1-6/11	120 Winter	100	+20%	30/15 Summer			
1.012	1-1/13	120 Winter	100	+20%	30/15 Summer			
8.000	1-8/01	15 Winter	100	+20%	30/15 Summer			
8.001	1-8/02	15 Winter	100	+20%	30/15 Summer			
8.002	1-8/03	120 Winter	100	+20%	30/15 Summer			
1.013	1-1/14	120 Winter	100	+20%	30/15 Winter			
9.000	1-9/01	15 Winter	100	+20%	30/15 Summer			
9.001	1-9/02	15 Winter	100	+20%	30/15 Summer			
9.002	1-9/03	15 Winter	100	+20%	30/15 Summer			
1.014	1-1/15	30 Winter	100	+20%				
1.015	1-1/16	30 Winter	100	+20%				
1.016	1-1/17	30 Winter	100	+20%				
1.017	1-1/18	360 Winter	100	+20%	100/360 Winter			
10.000	1-10/01	15 Winter	100	+20%	30/15 Summer			
10.001	1-10/02	15 Winter	100	+20%	30/15 Summer			
10.002	1-10/03	15 Winter	100	+20%	30/15 Summer			
10.003	1-10/04	15 Winter	100	+20%	30/15 Summer			
11.000	1-11/01	15 Winter	100	+20%	30/15 Summer			
10.004	1-10/05	15 Winter	100	+20%	1/15 Winter			
12.000	1-12/01	15 Winter	100	+20%				
12.001	1-12/02	15 Winter	100	+20%				
12.002	1-12/03	15 Winter	100	+20%				
12.003	1-12/04	15 Winter	100	+20%				
12.004	1-12/05	15 Winter	100	+20%				
12.005	1-12/06	15 Winter	100	+20%				
12.006	1-12/07	15 Winter	100	+20%				
12.007	1-12/08	15 Winter	100	+20%				
12.008	1-12/09	15 Winter	100	+20%	100/15 Summer			
12.009	1-12/10	15 Winter	100	+20%	30/15 Summer			

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 1.SWS

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
5.001	1-5/02	70.497	1.052	0.000	0.24		9.6	SURCHARGED	
5.002	1-5/03	70.489	1.294	0.000	0.29		11.5	SURCHARGED	
5.003	1-5/04	70.480	1.483	0.000	1.07		42.5	SURCHARGED	
1.007	1-1/08	70.447	1.646	0.000	0.49		160.3	SURCHARGED	
1.008	1-1/09	70.301	1.694	0.000	0.47		155.7	SURCHARGED	
1.009	1-1/10	70.153	1.746	0.000	0.71		154.6	SURCHARGED	
1.010	1-1/11	70.141	1.772	0.000	0.47		161.0	SURCHARGED	
1.011	1-1/12	69.989	1.874	0.000	0.59		162.1	SURCHARGED	
6.000	1-6/01	70.437	0.562	0.000	0.25		21.1	SURCHARGED	
6.001	1-6/02	70.472	0.919	0.000	1.04		87.2	SURCHARGED	
6.002	1-6/03	70.561	1.255	0.000	1.47		90.4	SURCHARGED	
6.003	1-6/04	70.606	1.342	0.000	0.79		114.5	SURCHARGED	
6.004	1-6/05	70.509	1.445	0.000	1.02		139.5	SURCHARGED	
6.005	1-6/06	70.410	1.479	0.000	1.18		165.3	SURCHARGED	
6.006	1-6/07	70.375	1.608	0.000	1.00		103.4	SURCHARGED	
6.007	1-6/08	70.284	1.555	0.000	1.00		109.8	SURCHARGED	
6.008	1-6/09	70.188	1.538	0.000	0.80		114.0	SURCHARGED	
6.009	1-6/10	70.078	1.602	0.000	0.83		118.0	SURCHARGED	
7.000	1-7/01	69.976	0.176	0.000	0.46		17.6	SURCHARGED	
6.010	1-6/11	69.964	1.662	0.000	0.76		158.8	SURCHARGED	
1.012	1-1/13	69.866	1.881	0.000	1.09		305.3	SURCHARGED	
8.000	1-8/01	70.371	0.391	0.000	1.19		20.1	SURCHARGED	
8.001	1-8/02	69.940	0.266	0.000	1.09		43.8	SURCHARGED	
8.002	1-8/03	69.871	0.484	0.000	0.61		23.8	SURCHARGED	
1.013	1-1/14	69.853	1.902	0.000	0.44		151.4	SURCHARGED	
9.000	1-9/01	71.504	0.648	0.000	1.12		210.9	SURCHARGED	
9.001	1-9/02	70.828	0.722	0.000	1.21		285.2	SURCHARGED	
9.002	1-9/03	69.318	0.244	0.000	1.41		285.1	SURCHARGED	
1.014	1-1/15	67.594	-0.277	0.000	0.56		389.8	OK	
1.015	1-1/16	67.017	-0.378	0.000	0.29		395.8	OK	
1.016	1-1/17	64.267	-0.401	0.000	0.24		396.0	OK	
1.017	1-1/18	62.349	0.324	0.000	0.24		208.9	SURCHARGED	
10.000	1-10/01	65.611	0.952	0.000	0.49		23.2	FLOOD RISK	
10.001	1-10/02	65.571	1.278	0.000	0.84		34.2	FLOOD RISK	
10.002	1-10/03	65.399	1.475	0.000	1.00		37.0	SURCHARGED	
10.003	1-10/04	65.294	1.462	0.000	1.05		40.2	SURCHARGED	
11.000	1-11/01	65.459	0.936	0.000	1.01		50.1	FLOOD RISK	
10.004	1-10/05	65.199	1.494	0.000	1.93		72.5	FLOOD RISK	
12.000	1-12/01	67.294	-0.078	0.000	0.46		7.5	OK	
12.001	1-12/02	67.071	-0.148	0.000	0.25		7.5	OK	
12.002	1-12/03	67.023	-0.154	0.000	0.21		7.6	OK	
12.003	1-12/04	66.943	-0.166	0.000	0.16		7.6	OK	
12.004	1-12/05	66.851	-0.106	0.000	0.52		20.7	OK	
12.005	1-12/06	66.661	-0.098	0.000	0.57		21.0	OK	
12.006	1-12/07	66.622	-0.046	0.000	0.97		35.3	OK	
12.007	1-12/08	66.497	-0.085	0.000	0.68		53.3	OK	
12.008	1-12/09	66.114	0.463	0.000	0.81		63.1	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 1.SWS

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
12.009	1-12/10	65.655	0.919	0.000	1.05		68.2	FLOOD RISK	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 1.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
12.010	1-12/11	15 Winter	100	+20%	30/15 Summer			
10.005	1-10/06	15 Winter	100	+20%	30/15 Summer			
13.000	1-13/01	15 Winter	100	+20%	30/15 Summer			
10.006	1-10/07	15 Winter	100	+20%	30/15 Summer			
14.000	1-14/01	15 Winter	100	+20%	30/15 Summer			
10.007	1-10/08	15 Winter	100	+20%	1/15 Winter			
10.008	1-10/09	15 Winter	100	+20%	30/15 Summer			
1.018	1-1/19	360 Winter	100	+20%	100/180 Winter			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
12.010	1-12/11	65.011	0.813	0.000	0.70		135.9	SURCHARGED	
10.005	1-10/06	64.847	1.249	0.000	1.47		179.7	FLOOD RISK	
13.000	1-13/01	64.394	0.597	0.000	0.69		34.0	SURCHARGED	
10.006	1-10/07	64.251	0.924	0.000	1.39		207.5	FLOOD RISK	
14.000	1-14/01	64.175	0.852	0.000	1.34		23.2	SURCHARGED	
10.007	1-10/08	63.486	0.559	0.000	2.14		229.9	SURCHARGED	
10.008	1-10/09	63.146	0.272	0.000	1.26		229.8	SURCHARGED	
1.018	1-1/19	62.337	0.428	0.000	0.16		149.2	SURCHARGED	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for 2024-02-22 STORM NETWORK 2.SWS

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	16.800	Add Flow / Climate Change (%)	0
Ratio R	0.328	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	0.000
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	0.75
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for 2024-02-22 STORM NETWORK 2.SWS

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.346	4-8	0.203

Total Area Contributing (ha) = 0.549

Total Pipe Volume (m³) = 11.280

Network Design Table for 2024-02-22 STORM NETWORK 2.SWS

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	20.478	1.024	20.0	0.123	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	16.602	0.166	100.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.000	20.479	1.024	20.0	0.092	5.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.12	66.068	0.123	0.0	0.0	0.0	2.94	116.9	16.7
1.001	50.00	5.33	65.044	0.123	0.0	0.0	0.0	1.31	52.0	16.7
2.000	50.00	5.12	65.902	0.092	0.0	0.0	0.0	2.94	116.9	12.5

Network Design Table for 2024-02-22 STORM NETWORK 2.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.002	15.713	0.294	53.4	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
3.000	20.479	0.512	40.0	0.058	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.003	16.552	0.110	150.5	0.040	0.00	0.0	0.600	o	225	Pipe/Conduit	
4.000	20.479	0.512	40.0	0.055	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.004	16.772	0.112	149.8	0.063	0.00	0.0	0.600	o	300	Pipe/Conduit	
5.000	13.385	0.334	40.1	0.040	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.005	15.921	0.106	150.2	0.050	0.00	0.0	0.600	o	300	Pipe/Conduit	
6.000	13.441	0.336	40.0	0.028	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.006	11.914	0.079	150.8	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.007	6.647	0.044	151.1	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.008	5.278	0.035	150.8	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.009	14.386	1.200	12.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.002	50.00	5.47	64.803	0.215	0.0	0.0	0.0	1.79	71.3	29.1
3.000	50.00	5.16	65.745	0.058	0.0	0.0	0.0	2.07	82.5	7.9
1.003	50.00	5.73	64.509	0.313	0.0	0.0	0.0	1.06	42.3«	42.4
4.000	50.00	5.16	65.579	0.055	0.0	0.0	0.0	2.07	82.5	7.4
1.004	50.00	5.95	64.324	0.431	0.0	0.0	0.0	1.28	90.7	58.4
5.000	50.00	5.11	65.234	0.040	0.0	0.0	0.0	2.07	82.4	5.4
1.005	50.00	6.16	64.212	0.521	0.0	0.0	0.0	1.28	90.5	70.5
6.000	50.00	5.11	65.075	0.028	0.0	0.0	0.0	2.07	82.5	3.8
1.006	50.00	6.31	64.106	0.549	0.0	0.0	0.0	1.28	90.3	74.3
1.007	49.92	6.40	64.027	0.549	0.0	0.0	0.0	1.28	90.3	74.3
1.008	49.69	6.47	63.983	0.549	0.0	0.0	0.0	1.28	90.3	74.3
1.009	49.51	6.52	63.948	0.549	0.0	0.0	0.0	4.57	322.7	74.3

Manhole Schedules for 2024-02-22 STORM NETWORK 2.SWS

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)
2-1/01	67.418	1.350	Open Manhole	1200	1.000	66.068	225				
2-1/02	66.906	1.862	Open Manhole	1200	1.001	65.044	225	1.000	65.044	225	
2-2/01	67.252	1.350	Open Manhole	1200	2.000	65.902	225				
2-1/03	66.740	1.937	Open Manhole	1200	1.002	64.803	225	1.001	64.878	225	75
								2.000	64.878	225	75
2-3/01	67.095	1.350	Open Manhole	1200	3.000	65.745	225				
2-1/04	66.583	2.074	Open Manhole	1200	1.003	64.509	225	1.002	64.509	225	
								3.000	65.233	225	724
2-4/01	66.929	1.350	Open Manhole	1200	4.000	65.579	225				
2-1/05	66.417	2.093	Open Manhole	1200	1.004	64.324	300	1.003	64.399	225	
								4.000	65.067	225	668
2-5/01	66.584	1.350	Open Manhole	1200	5.000	65.234	225				
2-1/06	66.250	2.038	Open Manhole	1200	1.005	64.212	300	1.004	64.212	300	
								5.000	64.900	225	613
2-6/01	66.425	1.350	Open Manhole	1200	6.000	65.075	225				
2-1/07	66.089	1.983	Open Manhole	1200	1.006	64.106	300	1.005	64.106	300	
								6.000	64.739	225	558
2-1/08	65.768	1.741	Open Manhole	1200	1.007	64.027	300	1.006	64.027	300	
2-1/09	65.599	1.616	Open Manhole	1200	1.008	63.983	300	1.007	63.983	300	
2-1/10	65.465	1.517	Open Manhole	1200	1.009	63.948	300	1.008	63.948	300	
HW02	63.500	0.752	Open Manhole	0		OUTFALL		1.009	62.748	300	

PIPELINE SCHEDULES for 2024-02-22 STORM NETWORK 2.SWS

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	2-1/01	67.418	66.068	1.125	Open Manhole	1200
1.001	o	225	2-1/02	66.906	65.044	1.637	Open Manhole	1200
2.000	o	225	2-2/01	67.252	65.902	1.125	Open Manhole	1200
1.002	o	225	2-1/03	66.740	64.803	1.712	Open Manhole	1200
3.000	o	225	2-3/01	67.095	65.745	1.125	Open Manhole	1200
1.003	o	225	2-1/04	66.583	64.509	1.849	Open Manhole	1200
4.000	o	225	2-4/01	66.929	65.579	1.125	Open Manhole	1200
1.004	o	300	2-1/05	66.417	64.324	1.793	Open Manhole	1200
5.000	o	225	2-5/01	66.584	65.234	1.125	Open Manhole	1200
1.005	o	300	2-1/06	66.250	64.212	1.738	Open Manhole	1200
6.000	o	225	2-6/01	66.425	65.075	1.125	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	20.478	20.0	2-1/02	66.906	65.044	1.637	Open Manhole	1200
1.001	16.602	100.0	2-1/03	66.740	64.878	1.637	Open Manhole	1200
2.000	20.479	20.0	2-1/03	66.740	64.878	1.637	Open Manhole	1200
1.002	15.713	53.4	2-1/04	66.583	64.509	1.849	Open Manhole	1200
3.000	20.479	40.0	2-1/04	66.583	65.233	1.125	Open Manhole	1200
1.003	16.552	150.5	2-1/05	66.417	64.399	1.793	Open Manhole	1200
4.000	20.479	40.0	2-1/05	66.417	65.067	1.125	Open Manhole	1200
1.004	16.772	149.8	2-1/06	66.250	64.212	1.738	Open Manhole	1200
5.000	13.385	40.1	2-1/06	66.250	64.900	1.125	Open Manhole	1200
1.005	15.921	150.2	2-1/07	66.089	64.106	1.683	Open Manhole	1200
6.000	13.441	40.0	2-1/07	66.089	64.739	1.125	Open Manhole	1200

PIPELINE SCHEDULES for 2024-02-22 STORM NETWORK 2.SWS

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)
1.006	o	300	2-1/07	66.089	64.106	1.683	Open Manhole	1200
1.007	o	300	2-1/08	65.768	64.027	1.441	Open Manhole	1200
1.008	o	300	2-1/09	65.599	63.983	1.316	Open Manhole	1200
1.009	o	300	2-1/10	65.465	63.948	1.217	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)
1.006	11.914	150.8	2-1/08	65.768	64.027	1.441	Open Manhole	1200
1.007	6.647	151.1	2-1/09	65.599	63.983	1.316	Open Manhole	1200
1.008	5.278	150.8	2-1/10	65.465	63.948	1.217	Open Manhole	1200
1.009	14.386	12.0	HW02	63.500	62.748	0.452	Open Manhole	0

Free Flowing Outfall Details for 2024-02-22 STORM NETWORK 2.SWS

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.009	HW02	63.500	62.748	0.000	0	0

Simulation Criteria for 2024-02-22 STORM NETWORK 2.SWS

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	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 Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	16.800	Storm Duration (mins)	30
Ratio R	0.328		

Online Controls for 2024-02-22 STORM NETWORK 2.SWS

Hydro-Brake® Optimum Manhole: 2-1/10, DS/PN: 1.009, Volume (m³): 2.0

Unit Reference	MD-SHE-0146-1000-1000-1000
Design Head (m)	1.000
Design Flow (l/s)	10.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	146
Invert Level (m)	63.948
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	10.0
Flush-Flo™	0.306	9.9
Kick-Flo®	0.673	8.3
Mean Flow over Head Range	-	8.6

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.2	1.200	10.9	3.000	16.8	7.000	25.2
0.200	9.6	1.400	11.7	3.500	18.1	7.500	26.1
0.300	9.9	1.600	12.5	4.000	19.3	8.000	26.9
0.400	9.8	1.800	13.2	4.500	20.4	8.500	27.7
0.500	9.6	2.000	13.9	5.000	21.5	9.000	28.5
0.600	9.1	2.200	14.5	5.500	22.5	9.500	29.2
0.800	9.0	2.400	15.1	6.000	23.4		
1.000	10.0	2.600	15.7	6.500	24.4		

Storage Structures for 2024-02-22 STORM NETWORK 2.SWS

Cellular Storage Manhole: 2-1/10, DS/PN: 1.009

Invert Level (m) 63.948 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	200.0	0.0	0.801	0.0	0.0
0.800	200.0	0.0			

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 2.SWS

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.328
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	16.800	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	20, 20, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	2-1/01	15 Winter	1	+20%	100/15 Summer				66.130
1.001	2-1/02	15 Winter	1	+20%	30/15 Summer				65.142
2.000	2-2/01	15 Winter	1	+20%	30/15 Winter				65.955
1.002	2-1/03	15 Winter	1	+20%	30/15 Summer				64.916
3.000	2-3/01	15 Winter	1	+20%	100/15 Summer				65.795
1.003	2-1/04	15 Winter	1	+20%	1/15 Summer				64.766
4.000	2-4/01	15 Winter	1	+20%	100/15 Winter				65.628
1.004	2-1/05	15 Winter	1	+20%	1/15 Winter				64.666
5.000	2-5/01	15 Winter	1	+20%	100/15 Summer				65.277
1.005	2-1/06	15 Winter	1	+20%	1/15 Summer				64.557
6.000	2-6/01	15 Winter	1	+20%	100/15 Winter				65.110
1.006	2-1/07	15 Winter	1	+20%	1/15 Summer				64.449
1.007	2-1/08	15 Winter	1	+20%	1/15 Summer				64.356
1.008	2-1/09	30 Summer	1	+20%	30/15 Summer				64.240
1.009	2-1/10	120 Winter	1	+20%	30/15 Summer				64.190

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 2.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	2-1/01	-0.163	0.000	0.17		17.9	OK	
1.001	2-1/02	-0.127	0.000	0.38		17.7	OK	
2.000	2-2/01	-0.172	0.000	0.13		13.4	OK	
1.002	2-1/03	-0.112	0.000	0.49		31.0	OK	
3.000	2-3/01	-0.175	0.000	0.11		8.4	OK	
1.003	2-1/04	0.032	0.000	1.18		44.2	SURCHARGED	
4.000	2-4/01	-0.176	0.000	0.11		8.0	OK	
1.004	2-1/05	0.042	0.000	0.74		57.3	SURCHARGED	
5.000	2-5/01	-0.182	0.000	0.08		5.8	OK	
1.005	2-1/06	0.045	0.000	0.83		63.3	SURCHARGED	
6.000	2-6/01	-0.190	0.000	0.06		4.1	OK	
1.006	2-1/07	0.043	0.000	0.89		63.0	SURCHARGED	
1.007	2-1/08	0.029	0.000	0.98		60.2	SURCHARGED	
1.008	2-1/09	-0.043	0.000	1.00		60.8	OK	
1.009	2-1/10	-0.058	0.000	0.04		9.8	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 2.SWS

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.328
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	16.800	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	20, 20, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	2-1/01	15 Winter	30	+20%	100/15 Summer				66.276
1.001	2-1/02	15 Winter	30	+20%	30/15 Summer				66.191
2.000	2-2/01	15 Winter	30	+20%	30/15 Winter				66.142
1.002	2-1/03	15 Winter	30	+20%	30/15 Summer				66.093
3.000	2-3/01	15 Winter	30	+20%	100/15 Summer				65.929
1.003	2-1/04	15 Winter	30	+20%	1/15 Summer				65.898
4.000	2-4/01	15 Winter	30	+20%	100/15 Winter				65.654
1.004	2-1/05	15 Winter	30	+20%	1/15 Winter				65.481
5.000	2-5/01	15 Winter	30	+20%	100/15 Summer				65.308
1.005	2-1/06	15 Winter	30	+20%	1/15 Summer				65.290
6.000	2-6/01	15 Winter	30	+20%	100/15 Winter				65.128
1.006	2-1/07	15 Winter	30	+20%	1/15 Summer				65.026
1.007	2-1/08	15 Winter	30	+20%	1/15 Summer				64.762
1.008	2-1/09	120 Winter	30	+20%	30/15 Summer				64.600
1.009	2-1/10	120 Winter	30	+20%	30/15 Summer				64.569

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 2.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	2-1/01	-0.017	0.000	0.38		39.8	OK	
1.001	2-1/02	0.922	0.000	0.68		31.3	SURCHARGED	
2.000	2-2/01	0.015	0.000	0.28		29.8	SURCHARGED	
1.002	2-1/03	1.065	0.000	0.83		52.1	SURCHARGED	
3.000	2-3/01	-0.041	0.000	0.25		18.8	OK	
1.003	2-1/04	1.164	0.000	1.98		74.4	SURCHARGED	
4.000	2-4/01	-0.150	0.000	0.24		17.8	OK	
1.004	2-1/05	0.857	0.000	1.31		100.9	SURCHARGED	
5.000	2-5/01	-0.151	0.000	0.18		12.9	OK	
1.005	2-1/06	0.778	0.000	1.59		122.0	SURCHARGED	
6.000	2-6/01	-0.172	0.000	0.13		9.1	OK	
1.006	2-1/07	0.620	0.000	1.82		128.3	SURCHARGED	
1.007	2-1/08	0.435	0.000	2.09		128.1	SURCHARGED	
1.008	2-1/09	0.317	0.000	1.05		63.7	SURCHARGED	
1.009	2-1/10	0.321	0.000	0.04		9.9	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 2.SWS

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.328
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	16.800	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	20, 20, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	2-1/01	15 Winter	100	+20%	100/15 Summer				66.904
1.001	2-1/02	15 Winter	100	+20%	30/15 Summer				66.783
2.000	2-2/01	15 Winter	100	+20%	30/15 Winter				66.743
1.002	2-1/03	15 Winter	100	+20%	30/15 Summer				66.676
3.000	2-3/01	15 Winter	100	+20%	100/15 Summer				66.464
1.003	2-1/04	15 Winter	100	+20%	1/15 Summer				66.428
4.000	2-4/01	15 Winter	100	+20%	100/15 Winter				65.928
1.004	2-1/05	15 Winter	100	+20%	1/15 Winter				65.893
5.000	2-5/01	15 Winter	100	+20%	100/15 Summer				65.664
1.005	2-1/06	15 Winter	100	+20%	1/15 Summer				65.643
6.000	2-6/01	180 Winter	100	+20%	100/15 Winter				65.308
1.006	2-1/07	180 Winter	100	+20%	1/15 Summer				65.307
1.007	2-1/08	180 Winter	100	+20%	1/15 Summer				65.298
1.008	2-1/09	180 Winter	100	+20%	30/15 Summer				65.292
1.009	2-1/10	180 Winter	100	+20%	30/15 Summer				65.288

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 2.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	2-1/01	0.611	0.000	0.43		45.8	SURCHARGED	
1.001	2-1/02	1.514	0.000	0.73		33.7	FLOOD RISK	
2.000	2-2/01	0.616	0.000	0.31		33.0	SURCHARGED	
1.002	2-1/03	1.648	0.000	0.95		59.8	FLOOD RISK	
3.000	2-3/01	0.494	0.000	0.29		21.9	SURCHARGED	
1.003	2-1/04	1.694	0.000	2.25		84.4	FLOOD RISK	
4.000	2-4/01	0.124	0.000	0.28		21.2	SURCHARGED	
1.004	2-1/05	1.269	0.000	1.48		114.3	SURCHARGED	
5.000	2-5/01	0.205	0.000	0.22		15.4	SURCHARGED	
1.005	2-1/06	1.131	0.000	1.83		140.3	SURCHARGED	
6.000	2-6/01	0.008	0.000	0.04		3.0	SURCHARGED	
1.006	2-1/07	0.901	0.000	0.80		56.3	SURCHARGED	
1.007	2-1/08	0.971	0.000	0.91		56.1	SURCHARGED	
1.008	2-1/09	1.009	0.000	0.92		55.8	SURCHARGED	
1.009	2-1/10	1.040	0.000	0.04		11.5	FLOOD RISK	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for 2024-02-22 STORM NETWORK 3.SWS

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	16.800	Add Flow / Climate Change (%)	0
Ratio R	0.328	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	0.000
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	0.75
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for 2024-02-22 STORM NETWORK 3.SWS

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.478	4-8	0.187

Total Area Contributing (ha) = 0.665

Total Pipe Volume (m³) = 14.872

Network Design Table for 2024-02-22 STORM NETWORK 3.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	25.589	0.793	32.3	0.094	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.001	30.505	1.433	21.3	0.040	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.002	25.820	1.322	19.5	0.040	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.000	19.838	0.764	26.0	0.109	5.00	0.0	0.600	o	225	Pipe/Conduit	
2.001	29.496	1.034	28.5	0.029	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.24	75.404	0.094	0.0	0.0	0.0	1.78	31.4	12.7
1.001	50.00	5.47	74.611	0.134	0.0	0.0	0.0	2.19	38.7	18.1
1.002	50.00	5.62	73.103	0.174	0.0	0.0	0.0	2.97	118.3	23.6
2.000	50.00	5.13	73.579	0.109	0.0	0.0	0.0	2.58	102.5	14.8
2.001	50.00	5.33	72.815	0.138	0.0	0.0	0.0	2.46	97.8	18.7

Network Design Table for 2024-02-22 STORM NETWORK 3.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.003	33.972	1.817	18.7	0.068	0.00	0.0	0.600	o	225	Pipe/Conduit	
3.000	29.168	1.417	20.6	0.124	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.004	37.617	2.976	12.6	0.077	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.005	30.928	1.733	17.8	0.084	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.006	13.306	0.498	26.7	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.007	23.910	0.779	30.7	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.008	12.816	2.013	6.4	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.003	50.00	5.80	71.781	0.380	0.0	0.0	0.0	3.04	120.9	51.5
3.000	50.00	5.17	71.456	0.124	0.0	0.0	0.0	2.90	115.2	16.8
1.004	50.00	5.94	69.889	0.581	0.0	0.0	0.0	4.45	314.2	78.7
1.005	50.00	6.08	66.913	0.665	0.0	0.0	0.0	3.74	264.3	90.0
1.006	50.00	6.15	65.180	0.665	0.0	0.0	0.0	3.05	215.9	90.0
1.007	50.00	6.29	64.682	0.665	0.0	0.0	0.0	2.85	201.3	90.0
1.008	50.00	6.33	63.903	0.665	0.0	0.0	0.0	6.27	443.2	90.0

Manhole Schedules for 2024-02-22 STORM NETWORK 3.SWS

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)
3-1/01	76.754	1.350	Open Manhole	1200	1.000	75.404	150				
3-1/02	75.961	1.350	Open Manhole	1200	1.001	74.611	150	1.000	74.611	150	
3-1/03	74.528	1.425	Open Manhole	1200	1.002	73.103	225	1.001	73.178	150	
3-2/01	74.929	1.350	Open Manhole	1200	2.000	73.579	225				
3-2/02	74.165	1.350	Open Manhole	1200	2.001	72.815	225	2.000	72.815	225	
3-1/04	73.206	1.425	Open Manhole	1200	1.003	71.781	225	1.002	71.781	225	
								2.001	71.781	225	
3-3/01	72.806	1.350	Open Manhole	1200	3.000	71.456	225				
3-1/05	71.389	1.500	Open Manhole	1200	1.004	69.889	300	1.003	69.964	225	
								3.000	70.039	225	75
3-1/06	68.413	1.500	Open Manhole	1200	1.005	66.913	300	1.004	66.913	300	
3-1/07	66.680	1.500	Open Manhole	1200	1.006	65.180	300	1.005	65.180	300	
3-1/08	66.182	1.500	Open Manhole	1200	1.007	64.682	300	1.006	64.682	300	
3-1/09	65.403	1.500	Open Manhole	1200	1.008	63.903	300	1.007	63.903	300	
HW3	63.390	1.500	Open Manhole	0		OUTFALL		1.008	61.890	300	

PIPELINE SCHEDULES for 2024-02-22 STORM NETWORK 3.SWS

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	150	3-1/01	76.754	75.404	1.200	Open Manhole	1200
1.001	o	150	3-1/02	75.961	74.611	1.200	Open Manhole	1200
1.002	o	225	3-1/03	74.528	73.103	1.200	Open Manhole	1200
2.000	o	225	3-2/01	74.929	73.579	1.125	Open Manhole	1200
2.001	o	225	3-2/02	74.165	72.815	1.125	Open Manhole	1200
1.003	o	225	3-1/04	73.206	71.781	1.200	Open Manhole	1200
3.000	o	225	3-3/01	72.806	71.456	1.125	Open Manhole	1200
1.004	o	300	3-1/05	71.389	69.889	1.200	Open Manhole	1200
1.005	o	300	3-1/06	68.413	66.913	1.200	Open Manhole	1200
1.006	o	300	3-1/07	66.680	65.180	1.200	Open Manhole	1200
1.007	o	300	3-1/08	66.182	64.682	1.200	Open Manhole	1200
1.008	o	300	3-1/09	65.403	63.903	1.200	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	25.589	32.3	3-1/02	75.961	74.611	1.200	Open Manhole	1200
1.001	30.505	21.3	3-1/03	74.528	73.178	1.200	Open Manhole	1200
1.002	25.820	19.5	3-1/04	73.206	71.781	1.200	Open Manhole	1200
2.000	19.838	26.0	3-2/02	74.165	72.815	1.125	Open Manhole	1200
2.001	29.496	28.5	3-1/04	73.206	71.781	1.200	Open Manhole	1200
1.003	33.972	18.7	3-1/05	71.389	69.964	1.200	Open Manhole	1200
3.000	29.168	20.6	3-1/05	71.389	70.039	1.125	Open Manhole	1200
1.004	37.617	12.6	3-1/06	68.413	66.913	1.200	Open Manhole	1200
1.005	30.928	17.8	3-1/07	66.680	65.180	1.200	Open Manhole	1200
1.006	13.306	26.7	3-1/08	66.182	64.682	1.200	Open Manhole	1200
1.007	23.910	30.7	3-1/09	65.403	63.903	1.200	Open Manhole	1200
1.008	12.816	6.4	HW3	63.390	61.890	1.200	Open Manhole	0

Free Flowing Outfall Details for 2024-02-22 STORM NETWORK 3.SWS

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.008	HW3	63.390	61.890	0.000	0	0

Simulation Criteria for 2024-02-22 STORM NETWORK 3.SWS

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	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 Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	16.800	Storm Duration (mins)	30
Ratio R	0.328		

Online Controls for 2024-02-22 STORM NETWORK 3.SWS

Hydro-Brake® Optimum Manhole: 3-1/09, DS/PN: 1.008, Volume (m³): 3.3

Unit Reference	MD-SHE-0199-2000-1000-2000
Design Head (m)	1.000
Design Flow (l/s)	20.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	199
Invert Level (m)	63.903
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1500

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	20.0
Flush-Flo™	0.340	20.0
Kick-Flo®	0.721	17.1
Mean Flow over Head Range	-	16.8

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	6.9	1.200	21.8	3.000	33.8	7.000	51.0
0.200	18.7	1.400	23.5	3.500	36.4	7.500	52.7
0.300	19.9	1.600	25.0	4.000	38.9	8.000	54.4
0.400	19.9	1.800	26.5	4.500	41.1	8.500	56.0
0.500	19.5	2.000	27.8	5.000	43.3	9.000	57.6
0.600	19.0	2.200	29.1	5.500	45.3	9.500	59.1
0.800	18.0	2.400	30.4	6.000	47.3		
1.000	20.0	2.600	31.6	6.500	49.2		

Storage Structures for 2024-02-22 STORM NETWORK 3.SWS

Cellular Storage Manhole: 3-1/09, DS/PN: 1.008

Invert Level (m) 63.978 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	210.0	0.0	0.801	0.0	0.0
0.800	210.0	0.0			

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 3.SWS

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.328
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	16.800	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	20, 20, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	3-1/01	15 Winter	1	+20%	30/15 Summer				75.476
1.001	3-1/02	15 Winter	1	+20%	30/15 Summer				74.687
1.002	3-1/03	15 Winter	1	+20%					73.174
2.000	3-2/01	15 Winter	1	+20%					73.642
2.001	3-2/02	15 Winter	1	+20%	100/15 Winter				72.886
1.003	3-1/04	15 Winter	1	+20%	30/15 Summer				71.888
3.000	3-3/01	15 Winter	1	+20%					71.518
1.004	3-1/05	15 Winter	1	+20%					69.996
1.005	3-1/06	15 Winter	1	+20%	100/15 Summer				67.040
1.006	3-1/07	15 Winter	1	+20%	30/15 Summer				65.331
1.007	3-1/08	15 Winter	1	+20%	30/15 Summer				64.831
1.008	3-1/09	60 Winter	1	+20%	30/15 Summer				64.167

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	3-1/01	-0.078	0.000	0.46		13.6	OK	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 3.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.001	3-1/02	-0.074	0.000	0.50		18.4	OK	
1.002	3-1/03	-0.154	0.000	0.21		23.4	OK	
2.000	3-2/01	-0.162	0.000	0.17		15.8	OK	
2.001	3-2/02	-0.154	0.000	0.21		19.2	OK	
1.003	3-1/04	-0.118	0.000	0.45		51.2	OK	
3.000	3-3/01	-0.163	0.000	0.17		18.0	OK	
1.004	3-1/05	-0.193	0.000	0.27		78.5	OK	
1.005	3-1/06	-0.173	0.000	0.37		89.0	OK	
1.006	3-1/07	-0.149	0.000	0.50		89.2	OK	
1.007	3-1/08	-0.151	0.000	0.50		89.0	OK	
1.008	3-1/09	-0.036	0.000	0.06		19.8	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 3.SWS

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.328
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	16.800	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	20, 20, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	3-1/01	15 Winter	30	+20%	30/15 Summer				75.614
1.001	3-1/02	15 Winter	30	+20%	30/15 Summer				74.921
1.002	3-1/03	15 Winter	30	+20%					73.213
2.000	3-2/01	15 Winter	30	+20%					73.676
2.001	3-2/02	15 Winter	30	+20%	100/15 Winter				72.928
1.003	3-1/04	15 Winter	30	+20%	30/15 Summer				72.084
3.000	3-3/01	15 Winter	30	+20%					71.552
1.004	3-1/05	15 Winter	30	+20%					70.062
1.005	3-1/06	15 Winter	30	+20%	100/15 Summer				67.141
1.006	3-1/07	15 Winter	30	+20%	30/15 Summer				65.876
1.007	3-1/08	15 Winter	30	+20%	30/15 Summer				65.224
1.008	3-1/09	60 Winter	30	+20%	30/15 Summer				64.551

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	3-1/01	0.060	0.000	0.94		28.0	SURCHARGED	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 3.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.001	3-1/02	0.160	0.000	1.05		39.2	SURCHARGED	
1.002	3-1/03	-0.115	0.000	0.48		52.1	OK	
2.000	3-2/01	-0.128	0.000	0.38		35.3	OK	
2.001	3-2/02	-0.112	0.000	0.49		44.9	OK	
1.003	3-1/04	0.078	0.000	1.02		116.4	SURCHARGED	
3.000	3-3/01	-0.129	0.000	0.37		40.1	OK	
1.004	3-1/05	-0.127	0.000	0.62		180.7	OK	
1.005	3-1/06	-0.072	0.000	0.87		208.7	OK	
1.006	3-1/07	0.396	0.000	1.16		204.8	SURCHARGED	
1.007	3-1/08	0.242	0.000	1.13		201.6	SURCHARGED	
1.008	3-1/09	0.348	0.000	0.06		20.0	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 3.SWS

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.328
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	16.800	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	20, 20, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	3-1/01	15 Winter	100	+20%	30/15 Summer				76.130
1.001	3-1/02	15 Winter	100	+20%	30/15 Summer				75.258
1.002	3-1/03	15 Winter	100	+20%					73.222
2.000	3-2/01	15 Winter	100	+20%					73.692
2.001	3-2/02	15 Winter	100	+20%	100/15 Winter				73.051
1.003	3-1/04	15 Winter	100	+20%	30/15 Summer				72.706
3.000	3-3/01	15 Winter	100	+20%					71.567
1.004	3-1/05	15 Winter	100	+20%					70.084
1.005	3-1/06	15 Winter	100	+20%	100/15 Summer				68.016
1.006	3-1/07	15 Winter	100	+20%	30/15 Summer				66.420
1.007	3-1/08	15 Winter	100	+20%	30/15 Summer				65.598
1.008	3-1/09	60 Winter	100	+20%	30/15 Summer				65.104

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	3-1/01	0.576	0.000	1.05		31.4	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 3.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.001	3-1/02	0.497	0.000	1.16		43.1	SURCHARGED	
1.002	3-1/03	-0.106	0.000	0.54		58.8	OK	
2.000	3-2/01	-0.112	0.000	0.49		45.8	OK	
2.001	3-2/02	0.011	0.000	0.63		57.3	SURCHARGED	
1.003	3-1/04	0.700	0.000	1.17		133.4	SURCHARGED	
3.000	3-3/01	-0.114	0.000	0.49		52.1	OK	
1.004	3-1/05	-0.105	0.000	0.74		213.6	OK	
1.005	3-1/06	0.803	0.000	0.97		234.4	SURCHARGED	
1.006	3-1/07	0.940	0.000	1.30		229.5	FLOOD RISK	
1.007	3-1/08	0.616	0.000	1.27		227.7	SURCHARGED	
1.008	3-1/09	0.901	0.000	0.06		21.9	FLOOD RISK	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for 2024-02-22 STORM NETWORK 4.SWS

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	16.800	Add Flow / Climate Change (%)	0
Ratio R	0.328	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	0.000
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	0.75
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for 2024-02-22 STORM NETWORK 4.SWS

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.076	4-8	0.044

Total Area Contributing (ha) = 0.120

Total Pipe Volume (m³) = 4.056

Network Design Table for 2024-02-22 STORM NETWORK 4.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	26.273	2.863	9.2	0.072	5.00	0.0	0.600	o	100	Pipe/Conduit	
1.001	37.680	5.000	7.5	0.024	0.00	0.0	0.600	o	100	Pipe/Conduit	
1.002	25.358	0.169	150.0	0.024	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.003	49.954	3.114	16.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.004	14.056	0.094	150.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.17	73.563	0.072	0.0	0.0	0.0	2.57	20.2	9.7
1.001	50.00	5.39	70.700	0.096	0.0	0.0	0.0	2.83	22.3	13.0
1.002	50.00	5.79	65.575	0.120	0.0	0.0	0.0	1.07	42.4	16.2
1.003	50.00	6.04	65.406	0.120	0.0	0.0	0.0	3.28	130.6	16.2
1.004	50.00	6.26	62.291	0.120	0.0	0.0	0.0	1.07	42.4	16.2

Manhole Schedules for 2024-02-22 STORM NETWORK 4.SWS

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)
4-1/01	74.863	1.300	Open Manhole	1200	1.000	73.563	100				
4-1/02	72.000	1.300	Open Manhole	1200	1.001	70.700	100	1.000	70.700	100	
4-1/03	67.000	1.425	Open Manhole	1200	1.002	65.575	225	1.001	65.700	100	
4-1/04	67.000	1.594	Open Manhole	1200	1.003	65.406	225	1.002	65.406	225	
4-1/05	63.800	1.509	Open Manhole	1200	1.004	62.291	225	1.003	62.291	225	
HW4	63.800	1.602	Open Manhole	0		OUTFALL		1.004	62.198	225	

PIPELINE SCHEDULES for 2024-02-22 STORM NETWORK 4.SWS

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	100	4-1/01	74.863	73.563	1.200	Open Manhole	1200
1.001	o	100	4-1/02	72.000	70.700	1.200	Open Manhole	1200
1.002	o	225	4-1/03	67.000	65.575	1.200	Open Manhole	1200
1.003	o	225	4-1/04	67.000	65.406	1.369	Open Manhole	1200
1.004	o	225	4-1/05	63.800	62.291	1.284	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	26.273	9.2	4-1/02	72.000	70.700	1.200	Open Manhole	1200
1.001	37.680	7.5	4-1/03	67.000	65.700	1.200	Open Manhole	1200
1.002	25.358	150.0	4-1/04	67.000	65.406	1.369	Open Manhole	1200
1.003	49.954	16.0	4-1/05	63.800	62.291	1.284	Open Manhole	1200
1.004	14.056	150.0	HW4	63.800	62.198	1.377	Open Manhole	0

Free Flowing Outfall Details for 2024-02-22 STORM NETWORK 4.SWS

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.004	HW4	63.800	62.198	0.000	0	0

Simulation Criteria for 2024-02-22 STORM NETWORK 4.SWS

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	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 Storage Structures	4
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	16.800	Storm Duration (mins)	30
Ratio R	0.328		

Storage Structures for 2024-02-22 STORM NETWORK 4.SWS

Infiltration Trench Manhole: 4-1/01, DS/PN: 1.000

Infiltration Coefficient Base (m/hr)	0.10000	Trench Width (m)	1.0
Infiltration Coefficient Side (m/hr)	0.10000	Trench Length (m)	85.0
Safety Factor	2.0	Slope (1:X)	200.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	73.863	Cap Infiltration Depth (m)	0.000

Infiltration Trench Manhole: 4-1/03, DS/PN: 1.002

Infiltration Coefficient Base (m/hr)	0.10000	Trench Width (m)	1.0
Infiltration Coefficient Side (m/hr)	0.10000	Trench Length (m)	20.0
Safety Factor	2.0	Slope (1:X)	100.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	66.000	Cap Infiltration Depth (m)	0.000

Infiltration Trench Manhole: 4-1/04, DS/PN: 1.003

Infiltration Coefficient Base (m/hr)	0.10000	Trench Width (m)	1.0
Infiltration Coefficient Side (m/hr)	0.10000	Trench Length (m)	50.0
Safety Factor	2.0	Slope (1:X)	100.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	66.000	Cap Infiltration Depth (m)	0.000

Infiltration Trench Manhole: 4-1/05, DS/PN: 1.004

Infiltration Coefficient Base (m/hr)	0.10000	Trench Width (m)	1.0
Infiltration Coefficient Side (m/hr)	0.10000	Trench Length (m)	50.0
Safety Factor	2.0	Slope (1:X)	25.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	62.800	Cap Infiltration Depth (m)	0.000

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 4.SWS

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	4
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.328
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	16.800	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	20, 20, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	4-1/01	15 Winter	1	+20%	30/15 Summer				73.615
1.001	4-1/02	15 Winter	1	+20%	30/15 Summer				70.757
1.002	4-1/03	15 Winter	1	+20%					65.677
1.003	4-1/04	15 Winter	1	+20%					65.460
1.004	4-1/05	15 Winter	1	+20%					62.396

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	4-1/01	-0.048	0.000	0.53		10.5	OK	
1.001	4-1/02	-0.043	0.000	0.61		13.3	OK	
1.002	4-1/03	-0.123	0.000	0.42		16.4	OK	
1.003	4-1/04	-0.171	0.000	0.13		16.3	OK	
1.004	4-1/05	-0.120	0.000	0.44		16.2	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 4.SWS

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	4
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.328
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	16.800	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	20, 20, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	4-1/01	15 Winter	30	+20%	30/15 Summer				73.899
1.001	4-1/02	15 Winter	30	+20%	30/15 Summer				71.360
1.002	4-1/03	15 Winter	30	+20%					65.727
1.003	4-1/04	15 Winter	30	+20%					65.481
1.004	4-1/05	15 Winter	30	+20%					62.449

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	4-1/01	0.236	0.000	0.97		19.0	SURCHARGED	
1.001	4-1/02	0.560	0.000	1.05		23.0	SURCHARGED	
1.002	4-1/03	-0.073	0.000	0.78		30.6	OK	
1.003	4-1/04	-0.150	0.000	0.24		30.5	OK	
1.004	4-1/05	-0.068	0.000	0.83		30.6	OK	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 4.SWS

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	4
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.328
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	16.800	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	20, 20, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	4-1/01	15 Winter	100	+20%	30/15 Summer				74.081
1.001	4-1/02	15 Winter	100	+20%	30/15 Summer				71.715
1.002	4-1/03	15 Winter	100	+20%					65.738
1.003	4-1/04	15 Winter	100	+20%					65.485
1.004	4-1/05	15 Winter	100	+20%					62.460

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	4-1/01	0.418	0.000	0.97		19.0	SURCHARGED	
1.001	4-1/02	0.915	0.000	1.09		23.7	FLOOD RISK	
1.002	4-1/03	-0.062	0.000	0.86		33.6	OK	
1.003	4-1/04	-0.146	0.000	0.27		33.4	OK	
1.004	4-1/05	-0.057	0.000	0.91		33.6	OK	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for 2024-02-22 STORM NETWORK 5.SWS

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	16.800	Add Flow / Climate Change (%)	0
Ratio R	0.328	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	0.000
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	0.75
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for 2024-02-22 STORM NETWORK 5.SWS

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.855	4-8	1.435	8-12	0.515	12-16	0.076

Total Area Contributing (ha) = 2.881

Total Pipe Volume (m³) = 116.354

Network Design Table for 2024-02-22 STORM NETWORK 5.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	48.056	0.467	102.9	0.010	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.001	43.945	0.476	92.3	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
2.000	70.868	0.710	99.8	0.150	5.00	0.0	0.600	o	225	Pipe/Conduit	
2.001	81.131	0.802	101.2	0.149	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.002	47.058	0.457	103.1	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.81	69.030	0.010	0.0	0.0	0.0	0.99	17.5	1.4
1.001	49.55	6.51	68.563	0.010	0.0	0.0	0.0	1.05	18.5	1.4
2.000	50.00	5.90	69.524	0.150	0.0	0.0	0.0	1.31	52.0	20.3
2.001	48.15	6.94	68.814	0.299	0.0	0.0	0.0	1.30	51.7	39.0
1.002	46.34	7.55	68.012	0.309	0.0	0.0	0.0	1.29	51.2	39.0

Network Design Table for 2024-02-22 STORM NETWORK 5.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.003	50.000	0.485	103.1	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.004	26.317	0.062	426.5	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
3.000	68.005	0.668	101.8	0.152	5.00	0.0	0.600	o	225	Pipe/Conduit	
3.001	57.678	0.572	100.8	0.152	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.005	50.000	0.100	500.0	0.152	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.006	50.000	0.108	461.2	0.116	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.007	50.000	0.210	238.2	0.116	0.00	0.0	0.600	o	450	Pipe/Conduit	
4.000	50.000	0.494	101.2	0.072	5.00	0.0	0.600	o	150	Pipe/Conduit	
4.001	49.915	0.480	104.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.008	14.460	0.029	500.0	0.108	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.009	10.475	2.271	4.6	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.010	30.497	0.152	200.6	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.011	48.026	0.242	198.5	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.012	40.281	1.376	29.3	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.013	38.308	0.895	42.8	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.014	32.586	0.065	500.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
5.000	50.000	0.375	133.3	0.568	5.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.003	44.58	8.20	67.555	0.309	0.0	0.0	0.0	1.29	51.2	39.0
1.004	43.14	8.78	66.995	0.309	0.0	0.0	0.0	0.76	53.4	39.0
3.000	50.00	5.87	68.567	0.152	0.0	0.0	0.0	1.30	51.5	20.6
3.001	49.21	6.61	67.899	0.304	0.0	0.0	0.0	1.30	51.8	40.5
1.005	40.82	9.82	66.859	0.765	0.0	0.0	0.0	0.80	88.7	84.6
1.006	39.06	10.70	66.684	0.881	0.0	0.0	0.0	0.94	149.5	93.2
1.007	37.91	11.34	66.575	0.997	0.0	0.0	0.0	1.31	208.8	102.4
4.000	50.00	5.83	67.639	0.072	0.0	0.0	0.0	1.00	17.6	9.7
4.001	48.99	6.68	67.145	0.072	0.0	0.0	0.0	0.99	17.4	9.7
1.008	37.45	11.61	66.365	1.177	0.0	0.0	0.0	0.90	143.5	119.4
1.009	37.41	11.62	66.336	1.177	0.0	0.0	0.0	9.51	1513.2	119.4
1.010	36.82	11.98	64.065	1.177	0.0	0.0	0.0	1.43	227.7	119.4
1.011	35.94	12.53	63.913	1.177	0.0	0.0	0.0	1.44	229.0	119.4
1.012	35.67	12.71	63.671	1.177	0.0	0.0	0.0	3.77	599.4	119.4
1.013	35.36	12.92	62.295	1.177	0.0	0.0	0.0	3.11	495.3	119.4
1.014	34.50	13.52	61.400	1.177	0.0	0.0	0.0	0.90	143.5	119.4
5.000	50.00	5.61	63.693	0.568	0.0	0.0	0.0	1.36	96.1	76.9

Network Design Table for 2024-02-22 STORM NETWORK 5.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
5.001	50.000	0.277	180.5	0.568	0.00	0.0	0.600	o	450	Pipe/Conduit	
5.002	62.596	1.041	60.1	0.568	0.00	0.0	0.600	o	450	Pipe/Conduit	
5.003	27.960	0.056	500.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.015	23.565	0.047	500.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.016	16.374	0.033	500.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
5.001	50.00	6.16	63.168	1.136	0.0	0.0	0.0	1.51	240.2	153.8
5.002	49.38	6.56	62.891	1.704	0.0	0.0	0.0	2.63	417.6	227.9
5.003	48.00	6.99	61.700	1.704	0.0	0.0	0.0	1.08	306.0	227.9
1.015	34.00	13.88	61.185	2.881	0.0	0.0	0.0	1.08	306.0	265.3
1.016	33.66	14.14	61.138	2.881	0.0	0.0	0.0	1.08	306.0	265.3

Manhole Schedules for 2024-02-22 STORM NETWORK 5.SWS

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)
5-1/01	70.330	1.300	Open Manhole	1200	1.000	69.030	150				
5-1/02	69.863	1.300	Open Manhole	1200	1.001	68.563	150	1.000	68.563	150	
5-2/01	70.949	1.425	Open Manhole	1200	2.000	69.524	225				
5-2/02	70.239	1.425	Open Manhole	1200	2.001	68.814	225	2.000	68.814	225	
5-1/03	69.437	1.425	Open Manhole	1200	1.002	68.012	225	1.001	68.087	150	
								2.001	68.012	225	
5-1/04	68.980	1.425	Open Manhole	1200	1.003	67.555	225	1.002	67.555	225	
5-1/05	68.495	1.500	Open Manhole	1200	1.004	66.995	300	1.003	67.070	225	
5-3/01	69.992	1.425	Open Manhole	1200	3.000	68.567	225				
5-3/02	69.324	1.425	Open Manhole	1200	3.001	67.899	225	3.000	67.899	225	
5-1/06	68.752	1.893	Open Manhole	1350	1.005	66.859	375	1.004	66.934	300	
								3.001	67.327	225	318
5-1/07	68.517	1.833	Open Manhole	1350	1.006	66.684	450	1.005	66.759	375	
5-1/08	68.266	1.691	Open Manhole	1350	1.007	66.575	450	1.006	66.575	450	
5-4/01	68.989	1.350	Open Manhole	1200	4.000	67.639	150				
5-4/02	68.495	1.350	Open Manhole	1200	4.001	67.145	150	4.000	67.145	150	
5-1/09	68.015	1.650	Open Manhole	1350	1.008	66.365	450	1.007	66.365	450	
								4.001	66.665	150	
5-1/10	68.247	1.911	Open Manhole	1350	1.009	66.336	450	1.008	66.336	450	
5-1/11	65.715	1.650	Open Manhole	1350	1.010	64.065	450	1.009	64.065	450	
5-1/12	65.563	1.650	Open Manhole	1350	1.011	63.913	450	1.010	63.913	450	
5-1/13	65.321	1.650	Open Manhole	1350	1.012	63.671	450	1.011	63.671	450	
5-1/14	63.945	1.650	Open Manhole	1350	1.013	62.295	450	1.012	62.295	450	
5-1/15	63.050	1.650	Open Manhole	1350	1.014	61.400	450	1.013	61.400	450	
5-5/01	65.193	1.500	Open Manhole	1200	5.000	63.693	300				
5-5/02	64.818	1.650	Open Manhole	1350	5.001	63.168	450	5.000	63.318	300	
5-5/03	64.541	1.650	Open Manhole	1350	5.002	62.891	450	5.001	62.891	450	
5-5/04	63.500	1.800	Open Manhole	1500	5.003	61.700	600	5.002	61.850	450	
5-1/16	63.500	2.315	Open Manhole	1500	1.015	61.185	600	1.014	61.335	450	
								5.003	61.644	600	459
5-1/17	63.000	1.862	Open Manhole	1500	1.016	61.138	600	1.015	61.138	600	
HW5	63.000	1.895	Open Manhole	0		OUTFALL		1.016	61.105	600	

PIPELINE SCHEDULES for 2024-02-22 STORM NETWORK 5.SWS

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	150	5-1/01	70.330	69.030	1.150	Open Manhole	1200
1.001	o	150	5-1/02	69.863	68.563	1.150	Open Manhole	1200
2.000	o	225	5-2/01	70.949	69.524	1.200	Open Manhole	1200
2.001	o	225	5-2/02	70.239	68.814	1.200	Open Manhole	1200
1.002	o	225	5-1/03	69.437	68.012	1.200	Open Manhole	1200
1.003	o	225	5-1/04	68.980	67.555	1.200	Open Manhole	1200
1.004	o	300	5-1/05	68.495	66.995	1.200	Open Manhole	1200
3.000	o	225	5-3/01	69.992	68.567	1.200	Open Manhole	1200
3.001	o	225	5-3/02	69.324	67.899	1.200	Open Manhole	1200
1.005	o	375	5-1/06	68.752	66.859	1.518	Open Manhole	1350
1.006	o	450	5-1/07	68.517	66.684	1.383	Open Manhole	1350
1.007	o	450	5-1/08	68.266	66.575	1.241	Open Manhole	1350
4.000	o	150	5-4/01	68.989	67.639	1.200	Open Manhole	1200
4.001	o	150	5-4/02	68.495	67.145	1.200	Open Manhole	1200
1.008	o	450	5-1/09	68.015	66.365	1.200	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	48.056	102.9	5-1/02	69.863	68.563	1.150	Open Manhole	1200
1.001	43.945	92.3	5-1/03	69.437	68.087	1.200	Open Manhole	1200
2.000	70.868	99.8	5-2/02	70.239	68.814	1.200	Open Manhole	1200
2.001	81.131	101.2	5-1/03	69.437	68.012	1.200	Open Manhole	1200
1.002	47.058	103.1	5-1/04	68.980	67.555	1.200	Open Manhole	1200
1.003	50.000	103.1	5-1/05	68.495	67.070	1.200	Open Manhole	1200
1.004	26.317	426.5	5-1/06	68.752	66.934	1.518	Open Manhole	1350
3.000	68.005	101.8	5-3/02	69.324	67.899	1.200	Open Manhole	1200
3.001	57.678	100.8	5-1/06	68.752	67.327	1.200	Open Manhole	1350
1.005	50.000	500.0	5-1/07	68.517	66.759	1.383	Open Manhole	1350
1.006	50.000	461.2	5-1/08	68.266	66.575	1.241	Open Manhole	1350
1.007	50.000	238.2	5-1/09	68.015	66.365	1.200	Open Manhole	1350
4.000	50.000	101.2	5-4/02	68.495	67.145	1.200	Open Manhole	1200
4.001	49.915	104.0	5-1/09	68.015	66.665	1.200	Open Manhole	1350
1.008	14.460	500.0	5-1/10	68.247	66.336	1.461	Open Manhole	1350

PIPELINE SCHEDULES for 2024-02-22 STORM NETWORK 5.SWS

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)
1.009	o	450	5-1/10	68.247	66.336	1.461	Open Manhole	1350
1.010	o	450	5-1/11	65.715	64.065	1.200	Open Manhole	1350
1.011	o	450	5-1/12	65.563	63.913	1.200	Open Manhole	1350
1.012	o	450	5-1/13	65.321	63.671	1.200	Open Manhole	1350
1.013	o	450	5-1/14	63.945	62.295	1.200	Open Manhole	1350
1.014	o	450	5-1/15	63.050	61.400	1.200	Open Manhole	1350
5.000	o	300	5-5/01	65.193	63.693	1.200	Open Manhole	1200
5.001	o	450	5-5/02	64.818	63.168	1.200	Open Manhole	1350
5.002	o	450	5-5/03	64.541	62.891	1.200	Open Manhole	1350
5.003	o	600	5-5/04	63.500	61.700	1.200	Open Manhole	1500
1.015	o	600	5-1/16	63.500	61.185	1.715	Open Manhole	1500
1.016	o	600	5-1/17	63.000	61.138	1.262	Open Manhole	1500

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)
1.009	10.475	4.6	5-1/11	65.715	64.065	1.200	Open Manhole	1350
1.010	30.497	200.6	5-1/12	65.563	63.913	1.200	Open Manhole	1350
1.011	48.026	198.5	5-1/13	65.321	63.671	1.200	Open Manhole	1350
1.012	40.281	29.3	5-1/14	63.945	62.295	1.200	Open Manhole	1350
1.013	38.308	42.8	5-1/15	63.050	61.400	1.200	Open Manhole	1350
1.014	32.586	500.0	5-1/16	63.500	61.335	1.715	Open Manhole	1500
5.000	50.000	133.3	5-5/02	64.818	63.318	1.200	Open Manhole	1350
5.001	50.000	180.5	5-5/03	64.541	62.891	1.200	Open Manhole	1350
5.002	62.596	60.1	5-5/04	63.500	61.850	1.200	Open Manhole	1500
5.003	27.960	500.0	5-1/16	63.500	61.644	1.256	Open Manhole	1500
1.015	23.565	500.0	5-1/17	63.000	61.138	1.262	Open Manhole	1500
1.016	16.374	500.0	HW5	63.000	61.105	1.295	Open Manhole	0

Free Flowing Outfall Details for 2024-02-22 STORM NETWORK 5.SWS

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.016	HW5	63.000	61.105	0.000	0	0

Simulation Criteria for 2024-02-22 STORM NETWORK 5.SWS

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	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 Storage Structures	13
Number of Online Controls	4	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	16.800	Storm Duration (mins)	30
Ratio R	0.328		

Online Controls for 2024-02-22 STORM NETWORK 5.SWS

Hydro-Brake® Optimum Manhole: 5-1/03, DS/PN: 1.002, Volume (m³): 5.5

Unit Reference	MD-SHE-0199-2000-1000-2000
Design Head (m)	1.000
Design Flow (l/s)	20.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	199
Invert Level (m)	68.012
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1500

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	20.0
Flush-Flo™	0.340	20.0
Kick-Flo®	0.721	17.1
Mean Flow over Head Range	-	16.8

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	6.9	1.200	21.8	3.000	33.8	7.000	51.0
0.200	18.7	1.400	23.5	3.500	36.4	7.500	52.7
0.300	19.9	1.600	25.0	4.000	38.9	8.000	54.4
0.400	19.9	1.800	26.5	4.500	41.1	8.500	56.0
0.500	19.5	2.000	27.8	5.000	43.3	9.000	57.6
0.600	19.0	2.200	29.1	5.500	45.3	9.500	59.1
0.800	18.0	2.400	30.4	6.000	47.3		
1.000	20.0	2.600	31.6	6.500	49.2		

Hydro-Brake® Optimum Manhole: 5-1/06, DS/PN: 1.005, Volume (m³): 6.7

Unit Reference	MD-SHE-0146-1000-1000-1000
Design Head (m)	1.000
Design Flow (l/s)	10.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	146
Invert Level (m)	66.859
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1200

Hydro-Brake® Optimum Manhole: 5-1/06, DS/PN: 1.005, Volume (m³): 6.7

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	10.0
Flush-Flo™	0.306	9.9
Kick-Flo®	0.673	8.3
Mean Flow over Head Range	-	8.6

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.2	1.200	10.9	3.000	16.8	7.000	25.2
0.200	9.6	1.400	11.7	3.500	18.1	7.500	26.1
0.300	9.9	1.600	12.5	4.000	19.3	8.000	26.9
0.400	9.8	1.800	13.2	4.500	20.4	8.500	27.7
0.500	9.6	2.000	13.9	5.000	21.5	9.000	28.5
0.600	9.1	2.200	14.5	5.500	22.5	9.500	29.2
0.800	9.0	2.400	15.1	6.000	23.4		
1.000	10.0	2.600	15.7	6.500	24.4		

Hydro-Brake® Optimum Manhole: 5-1/09, DS/PN: 1.008, Volume (m³): 11.0

Unit Reference	MD-SHE-0146-1000-1000-1000
Design Head (m)	1.000
Design Flow (l/s)	10.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	146
Invert Level (m)	66.365
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	10.0
Flush-Flo™	0.306	9.9
Kick-Flo®	0.673	8.3
Mean Flow over Head Range	-	8.6

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.2	0.300	9.9	0.500	9.6	0.800	9.0
0.200	9.6	0.400	9.8	0.600	9.1	1.000	10.0

Hydro-Brake® Optimum Manhole: 5-1/09, DS/PN: 1.008, Volume (m³): 11.0

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
1.200	10.9	2.400	15.1	5.000	21.5	8.000	26.9
1.400	11.7	2.600	15.7	5.500	22.5	8.500	27.7
1.600	12.5	3.000	16.8	6.000	23.4	9.000	28.5
1.800	13.2	3.500	18.1	6.500	24.4	9.500	29.2
2.000	13.9	4.000	19.3	7.000	25.2		
2.200	14.5	4.500	20.4	7.500	26.1		

Hydro-Brake® Optimum Manhole: 5-5/03, DS/PN: 5.002, Volume (m³): 10.1

Unit Reference	MD-SHE-0146-1000-1000-1000
Design Head (m)	1.000
Design Flow (l/s)	10.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	146
Invert Level (m)	62.891
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	10.0
Flush-Flo™	0.306	9.9
Kick-Flo®	0.673	8.3
Mean Flow over Head Range	-	8.6

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.2	1.200	10.9	3.000	16.8	7.000	25.2
0.200	9.6	1.400	11.7	3.500	18.1	7.500	26.1
0.300	9.9	1.600	12.5	4.000	19.3	8.000	26.9
0.400	9.8	1.800	13.2	4.500	20.4	8.500	27.7
0.500	9.6	2.000	13.9	5.000	21.5	9.000	28.5
0.600	9.1	2.200	14.5	5.500	22.5	9.500	29.2
0.800	9.0	2.400	15.1	6.000	23.4		
1.000	10.0	2.600	15.7	6.500	24.4		

Storage Structures for 2024-02-22 STORM NETWORK 5.SWS

Porous Car Park Manhole: 5-2/01, DS/PN: 2.000

Infiltration Coefficient Base (m/hr)	0.10000	Width (m)	75.0
Membrane Percolation (mm/hr)	1000	Length (m)	92.0
Max Percolation (l/s)	1916.7	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	70.349	Membrane Depth (mm)	0

Porous Car Park Manhole: 5-2/02, DS/PN: 2.001

Infiltration Coefficient Base (m/hr)	0.10000	Width (m)	75.0
Membrane Percolation (mm/hr)	1000	Length (m)	92.0
Max Percolation (l/s)	1916.7	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	69.639	Membrane Depth (mm)	0

Porous Car Park Manhole: 5-3/01, DS/PN: 3.000

Infiltration Coefficient Base (m/hr)	0.10000	Width (m)	75.0
Membrane Percolation (mm/hr)	1000	Length (m)	92.0
Max Percolation (l/s)	1916.7	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	69.392	Membrane Depth (mm)	0

Porous Car Park Manhole: 5-3/02, DS/PN: 3.001

Infiltration Coefficient Base (m/hr)	0.10000	Width (m)	75.0
Membrane Percolation (mm/hr)	1000	Length (m)	92.0
Max Percolation (l/s)	1916.7	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	68.724	Membrane Depth (mm)	0

Porous Car Park Manhole: 5-1/06, DS/PN: 1.005

Infiltration Coefficient Base (m/hr)	0.10000	Width (m)	50.0
Membrane Percolation (mm/hr)	1000	Length (m)	100.0
Max Percolation (l/s)	1388.9	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	68.152	Membrane Depth (mm)	0

Porous Car Park Manhole: 5-1/07, DS/PN: 1.006

Infiltration Coefficient Base (m/hr)	0.10000	Max Percolation (l/s)	1388.9
Membrane Percolation (mm/hr)	1000	Safety Factor	2.0

Porous Car Park Manhole: 5-1/07, DS/PN: 1.006

Porosity	0.30	Slope (1:X)	100.0
Invert Level (m)	67.917	Depression Storage (mm)	5
Width (m)	50.0	Evaporation (mm/day)	3
Length (m)	100.0	Membrane Depth (mm)	0

Porous Car Park Manhole: 5-1/08, DS/PN: 1.007

Infiltration Coefficient Base (m/hr)	0.10000	Width (m)	50.0
Membrane Percolation (mm/hr)	1000	Length (m)	100.0
Max Percolation (l/s)	1388.9	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	67.666	Membrane Depth (mm)	0

Filter Drain Manhole: 5-1/11, DS/PN: 1.010

Infiltration Coefficient Base (m/hr)	0.10000	Pipe Diameter (m)	0.150
Infiltration Coefficient Side (m/hr)	0.10000	Pipe Depth above Invert (m)	0.300
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	200.0
Invert Level (m)	64.715	Cap Volume Depth (m)	0.000
Trench Width (m)	1.0	Cap Infiltration Depth (m)	0.000
Trench Length (m)	40.0		

Filter Drain Manhole: 5-1/14, DS/PN: 1.013

Infiltration Coefficient Base (m/hr)	0.10000	Pipe Diameter (m)	0.150
Infiltration Coefficient Side (m/hr)	0.10000	Pipe Depth above Invert (m)	0.300
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	200.0
Invert Level (m)	62.945	Cap Volume Depth (m)	0.000
Trench Width (m)	1.0	Cap Infiltration Depth (m)	0.000
Trench Length (m)	50.0		

Filter Drain Manhole: 5-1/15, DS/PN: 1.014

Infiltration Coefficient Base (m/hr)	0.10000	Pipe Diameter (m)	0.150
Infiltration Coefficient Side (m/hr)	0.10000	Pipe Depth above Invert (m)	0.300
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	200.0
Invert Level (m)	62.050	Cap Volume Depth (m)	0.000
Trench Width (m)	1.0	Cap Infiltration Depth (m)	0.000
Trench Length (m)	85.0		

Porous Car Park Manhole: 5-5/01, DS/PN: 5.000

Infiltration Coefficient Base (m/hr)	0.10000	Porosity	0.30
Membrane Percolation (mm/hr)	1000	Invert Level (m)	64.593
Max Percolation (l/s)	1388.9	Width (m)	50.0
Safety Factor	2.0	Length (m)	100.0

Porous Car Park Manhole: 5-5/01, DS/PN: 5.000

Slope (1:X)	100.0	Evaporation (mm/day)	3
Depression Storage (mm)	5	Membrane Depth (mm)	0

Porous Car Park Manhole: 5-5/02, DS/PN: 5.001

Infiltration Coefficient Base (m/hr)	0.10000	Width (m)	50.0
Membrane Percolation (mm/hr)	1000	Length (m)	100.0
Max Percolation (l/s)	1388.9	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	64.218	Membrane Depth (mm)	0

Porous Car Park Manhole: 5-5/03, DS/PN: 5.002

Infiltration Coefficient Base (m/hr)	0.10000	Width (m)	50.0
Membrane Percolation (mm/hr)	1000	Length (m)	100.0
Max Percolation (l/s)	1388.9	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	63.941	Membrane Depth (mm)	0

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 5.SWS

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	13
Number of Online Controls	4	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.328
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	16.800	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	20, 20, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	5-1/01	15 Winter	1	+20%	100/120 Winter			
1.001	5-1/02	15 Winter	1	+20%	100/60 Winter			
2.000	5-2/01	1440 Winter	1	+20%				
2.001	5-2/02	1440 Winter	1	+20%	100/60 Winter			
1.002	5-1/03	1440 Winter	1	+20%	30/60 Winter			
1.003	5-1/04	1440 Winter	1	+20%	30/60 Winter			
1.004	5-1/05	1440 Winter	1	+20%	30/60 Winter			
3.000	5-3/01	1440 Winter	1	+20%				
3.001	5-3/02	1440 Winter	1	+20%	30/60 Winter			
1.005	5-1/06	1440 Winter	1	+20%	30/60 Winter			
1.006	5-1/07	1440 Winter	1	+20%	30/60 Winter			
1.007	5-1/08	30 Winter	1	+20%	30/30 Winter			
4.000	5-4/01	15 Winter	1	+20%	30/15 Summer			
4.001	5-4/02	15 Winter	1	+20%	30/15 Summer			
1.008	5-1/09	30 Winter	1	+20%	30/15 Summer			
1.009	5-1/10	30 Summer	1	+20%				
1.010	5-1/11	15 Winter	1	+20%				

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 5.SWS

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	5-1/01	69.060	-0.120	0.000	0.08		1.4	OK	
1.001	5-1/02	68.591	-0.122	0.000	0.08		1.4	OK	
2.000	5-2/01	69.547	-0.202	0.000	0.02		1.1	OK	
2.001	5-2/02	68.845	-0.194	0.000	0.04		2.3	OK	
1.002	5-1/03	68.067	-0.170	0.000	0.05		2.3	OK	
1.003	5-1/04	67.587	-0.194	0.000	0.05		2.3	OK	
1.004	5-1/05	67.038	-0.258	0.000	0.05		2.3	OK	
3.000	5-3/01	68.590	-0.202	0.000	0.02		1.2	OK	
3.001	5-3/02	67.930	-0.194	0.000	0.05		2.3	OK	
1.005	5-1/06	66.964	-0.270	0.000	0.07		5.7	OK	
1.006	5-1/07	66.747	-0.387	0.000	0.05		6.5	OK	
1.007	5-1/08	66.687	-0.339	0.000	0.01		2.2	OK	
4.000	5-4/01	67.724	-0.065	0.000	0.59		10.1	OK	
4.001	5-4/02	67.228	-0.067	0.000	0.60		10.1	OK	
1.008	5-1/09	66.687	-0.128	0.000	0.12		9.9	OK	
1.009	5-1/10	66.361	-0.425	0.000	0.01		9.9	OK	
1.010	5-1/11	64.130	-0.385	0.000	0.05		9.9	OK	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 5.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.011	5-1/12	30 Summer	1	+20%					63.976
1.012	5-1/13	15 Summer	1	+20%					63.711
1.013	5-1/14	15 Winter	1	+20%					62.341
1.014	5-1/15	15 Summer	1	+20%					61.484
5.000	5-5/01	60 Winter	1	+20%	1/15 Winter				64.316
5.001	5-5/02	120 Winter	1	+20%	1/15 Summer				64.276
5.002	5-5/03	180 Winter	1	+20%	1/15 Summer				64.214
5.003	5-5/04	180 Winter	1	+20%					61.782
1.015	5-1/16	60 Winter	1	+20%					61.321
1.016	5-1/17	60 Winter	1	+20%					61.274

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.011	5-1/12	-0.387	0.000	0.05		9.9	OK	
1.012	5-1/13	-0.410	0.000	0.02		9.9	OK	
1.013	5-1/14	-0.404	0.000	0.02		9.9	OK	
1.014	5-1/15	-0.366	0.000	0.08		9.9	OK	
5.000	5-5/01	0.323	0.000	0.50		45.1	SURCHARGED	
5.001	5-5/02	0.658	0.000	0.23		49.4	SURCHARGED	
5.002	5-5/03	0.873	0.000	0.03		11.4	SURCHARGED	
5.003	5-5/04	-0.518	0.000	0.05		11.4	OK	
1.015	5-1/16	-0.464	0.000	0.09		21.0	OK	
1.016	5-1/17	-0.464	0.000	0.12		21.0	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 5.SWS

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	13
Number of Online Controls	4	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.328
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	16.800	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	20, 20, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	5-1/01	15 Winter	30	+20%	100/120 Winter				69.074
1.001	5-1/02	15 Winter	30	+20%	100/60 Winter				68.605
2.000	5-2/01	120 Winter	30	+20%					69.596
2.001	5-2/02	120 Winter	30	+20%	100/60 Winter				68.914
1.002	5-1/03	180 Winter	30	+20%	30/60 Winter				68.536
1.003	5-1/04	240 Winter	30	+20%	30/60 Winter				68.355
1.004	5-1/05	360 Winter	30	+20%	30/60 Winter				68.325
3.000	5-3/01	120 Winter	30	+20%					68.641
3.001	5-3/02	360 Winter	30	+20%	30/60 Winter				68.343
1.005	5-1/06	360 Winter	30	+20%	30/60 Winter				68.314
1.006	5-1/07	360 Winter	30	+20%	30/60 Winter				67.794
1.007	5-1/08	360 Winter	30	+20%	30/30 Winter				67.787
4.000	5-4/01	15 Winter	30	+20%	30/15 Summer				68.029
4.001	5-4/02	360 Winter	30	+20%	30/15 Summer				67.831
1.008	5-1/09	360 Winter	30	+20%	30/15 Summer				67.818
1.009	5-1/10	360 Winter	30	+20%					66.366
1.010	5-1/11	360 Winter	30	+20%					64.136

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 5.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	5-1/01	-0.106	0.000	0.18		3.1	OK	
1.001	5-1/02	-0.108	0.000	0.17		3.1	OK	
2.000	5-2/01	-0.153	0.000	0.20		10.3	OK	
2.001	5-2/02	-0.125	0.000	0.38		19.4	OK	
1.002	5-1/03	0.299	0.000	0.36		17.8	SURCHARGED	
1.003	5-1/04	0.575	0.000	0.30		14.6	SURCHARGED	
1.004	5-1/05	1.029	0.000	0.26		12.6	FLOOD RISK	
3.000	5-3/01	-0.151	0.000	0.22		10.7	OK	
3.001	5-3/02	0.219	0.000	0.30		14.9	SURCHARGED	
1.005	5-1/06	1.081	0.000	0.12		9.9	SURCHARGED	
1.006	5-1/07	0.660	0.000	0.11		14.3	SURCHARGED	
1.007	5-1/08	0.762	0.000	0.07		12.9	SURCHARGED	
4.000	5-4/01	0.240	0.000	1.15		19.7	SURCHARGED	
4.001	5-4/02	0.536	0.000	0.21		3.6	SURCHARGED	
1.008	5-1/09	1.003	0.000	0.14		11.8	FLOOD RISK	
1.009	5-1/10	-0.420	0.000	0.01		11.8	OK	
1.010	5-1/11	-0.379	0.000	0.06		11.8	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 5.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.011	5-1/12	360 Winter	30	+20%					63.982
1.012	5-1/13	360 Winter	30	+20%					63.717
1.013	5-1/14	360 Winter	30	+20%					62.344
1.014	5-1/15	360 Winter	30	+20%					61.492
5.000	5-5/01	30 Winter	30	+20%	1/15 Winter				64.706
5.001	5-5/02	120 Winter	30	+20%	1/15 Summer				64.450
5.002	5-5/03	120 Winter	30	+20%	1/15 Summer				64.434
5.003	5-5/04	120 Winter	30	+20%					61.785
1.015	5-1/16	180 Winter	30	+20%					61.330
1.016	5-1/17	180 Winter	30	+20%					61.283

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.011	5-1/12	-0.381	0.000	0.06		11.7	OK	
1.012	5-1/13	-0.404	0.000	0.02		11.7	OK	
1.013	5-1/14	-0.401	0.000	0.03		11.7	OK	
1.014	5-1/15	-0.358	0.000	0.09		11.7	OK	
5.000	5-5/01	0.713	0.000	0.99		89.5	SURCHARGED	
5.001	5-5/02	0.832	0.000	0.43		92.8	SURCHARGED	
5.002	5-5/03	1.093	0.000	0.03		12.3	FLOOD RISK	
5.003	5-5/04	-0.515	0.000	0.05		12.3	OK	
1.015	5-1/16	-0.455	0.000	0.10		23.9	OK	
1.016	5-1/17	-0.455	0.000	0.13		23.9	OK	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 5.SWS

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	13
Number of Online Controls	4	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.328
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	16.800	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	20, 20, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	5-1/01	120 Winter	100	+20%	100/120 Winter				69.442
1.001	5-1/02	120 Winter	100	+20%	100/60 Winter				69.436
2.000	5-2/01	60 Winter	100	+20%					69.639
2.001	5-2/02	120 Winter	100	+20%	100/60 Winter				69.552
1.002	5-1/03	120 Winter	100	+20%	30/60 Winter				69.432
1.003	5-1/04	180 Winter	100	+20%	30/60 Winter				68.521
1.004	5-1/05	240 Winter	100	+20%	30/60 Winter				68.444
3.000	5-3/01	60 Winter	100	+20%					68.684
3.001	5-3/02	120 Winter	100	+20%	30/60 Winter				68.523
1.005	5-1/06	240 Winter	100	+20%	30/60 Winter				68.426
1.006	5-1/07	180 Winter	100	+20%	30/60 Winter				67.867
1.007	5-1/08	180 Winter	100	+20%	30/30 Winter				67.860
4.000	5-4/01	15 Winter	100	+20%	30/15 Summer				68.468
4.001	5-4/02	30 Winter	100	+20%	30/15 Summer				67.957
1.008	5-1/09	180 Winter	100	+20%	30/15 Summer				67.904
1.009	5-1/10	120 Winter	100	+20%					66.367
1.010	5-1/11	240 Winter	100	+20%					64.137

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 5.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	5-1/01	0.262	0.000	0.08		1.4	SURCHARGED	
1.001	5-1/02	0.723	0.000	0.17		3.1	SURCHARGED	
2.000	5-2/01	-0.110	0.000	0.43		21.8	OK	
2.001	5-2/02	0.513	0.000	0.70		35.3	SURCHARGED	
1.002	5-1/03	1.195	0.000	0.41		19.9	FLOOD RISK	
1.003	5-1/04	0.740	0.000	0.41		19.9	SURCHARGED	
1.004	5-1/05	1.148	0.000	0.41		19.8	FLOOD RISK	
3.000	5-3/01	-0.108	0.000	0.45		22.7	OK	
3.001	5-3/02	0.399	0.000	0.64		32.1	SURCHARGED	
1.005	5-1/06	1.193	0.000	0.12		9.9	SURCHARGED	
1.006	5-1/07	0.734	0.000	0.15		20.3	SURCHARGED	
1.007	5-1/08	0.834	0.000	0.08		14.6	SURCHARGED	
4.000	5-4/01	0.679	0.000	1.33		22.8	SURCHARGED	
4.001	5-4/02	0.662	0.000	0.99		16.9	SURCHARGED	
1.008	5-1/09	1.089	0.000	0.14		12.1	FLOOD RISK	
1.009	5-1/10	-0.419	0.000	0.01		12.1	OK	
1.010	5-1/11	-0.378	0.000	0.06		12.0	OK	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2024-02-22 STORM NETWORK 5.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.011	5-1/12	180 Winter	100	+20%					63.983
1.012	5-1/13	180 Winter	100	+20%					63.717
1.013	5-1/14	180 Winter	100	+20%					62.344
1.014	5-1/15	180 Winter	100	+20%					61.493
5.000	5-5/01	30 Winter	100	+20%	1/15 Winter				64.784
5.001	5-5/02	120 Winter	100	+20%	1/15 Summer				64.530
5.002	5-5/03	120 Winter	100	+20%	1/15 Summer				64.513
5.003	5-5/04	120 Winter	100	+20%					61.787
1.015	5-1/16	180 Winter	100	+20%					61.332
1.016	5-1/17	180 Winter	100	+20%					61.285

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.011	5-1/12	-0.380	0.000	0.06		12.0	OK	
1.012	5-1/13	-0.404	0.000	0.02		12.0	OK	
1.013	5-1/14	-0.401	0.000	0.03		12.0	OK	
1.014	5-1/15	-0.357	0.000	0.10		12.0	OK	
5.000	5-5/01	0.791	0.000	1.03		93.0	SURCHARGED	
5.001	5-5/02	0.912	0.000	0.46		99.7	FLOOD RISK	
5.002	5-5/03	1.172	0.000	0.03		12.5	FLOOD RISK	
5.003	5-5/04	-0.513	0.000	0.05		12.5	OK	
1.015	5-1/16	-0.453	0.000	0.11		24.5	OK	
1.016	5-1/17	-0.453	0.000	0.14		24.5	OK	

Appendix G – Uisce Éireann Pre Connection response

CONFIRMATION OF FEASIBILITY

Jonathan Scott
McAdam Design Ltd.
1C Montgomery House
478 Castlereagh Road
Belfast
Down
BT56BQ
Northern Ireland

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

Uisce Éireann
PO Box 448
South City
Delivery Office
Cork City

www.water.ie

6 March 2024

Our Ref: CDS24001179 Pre-Connection Enquiry
Royal School, College Street, Lurganboy, Cavan

Dear Applicant/Agent,

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

Uisce Éireann has reviewed the pre-connection enquiry in relation to a Water & Wastewater connection for a Business Connection of 1 unit(s) at Royal School, College Street, Lurganboy, Cavan, (the **Development)**.

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

- **Water Connection**
  - **Feasible without infrastructure upgrade by Irish Water**
  - Please note, while flows in excess of your required demand may be achieved in the Uisce Eireann network and could be utilised in the event of a fire, Uisce Eireann cannot guarantee a flow rate to meet your fire flow requirement. To guarantee a flow to meet the Fire Authority requirements you should provide adequate fire storage capacity within your development.

- **Wastewater Connection**
  - **Feasible without infrastructure upgrade by Irish Water**
  - It is noted that one of the two foul sewer connections proposed by the applicant connects to a private 3rd

party pumping station. Connections via third party owned assets can be permitted subject to the following conditions:

- Written agreement should be obtained by the Customer from the 3rd party giving permission to the Customer to connect via 3rd party infrastructure.
- Confirmation shall be provided by the new customer, supported by design calculations (if required), that the 3rd party infrastructure has capacity and is structurally adequate. If UE deems a high level of risk involved, further information should be sought such as condition survey/CCTV survey, etc.
- It should be made clear to all parties that the 3rd party infrastructure remains classified as a service connection and is not assumed by any party to be adopted/taken in charge by Uisce Eireann following the new connection being made, unless it is expressly stated otherwise.
- The Customer shall obtain a Wayleave (in favour of themselves) over the 3rd party infrastructure where possible.

This letter does not constitute an offer, in whole or in part, to provide a connection to any Uisce Éireann infrastructure. Before the Development can be connected to our network(s) you must submit a connection application and be granted and sign a connection agreement with Uisce Éireann.

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

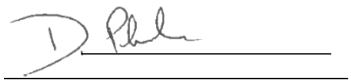
Where can you find more information?

- **Section A -** What is important to know?
- **Section B -** Details of Uisce Éireann's Network(s)

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

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

Yours sincerely,



Dermot Phelan
Connections Delivery Manager

Section A - What is important to know?

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

Appendix H – Sustainable Urban Drainage Infrastructure Operations & Maintenance Plans

- **Geocellular/ Modular Attenuation Tank**

Several Geocellular/ Modular Attenuation Tank System are required to provide the storage requirements for stormwater runoff within the proposed storm networks prior to discharging into the watercourse. The storage volume is provided by the provision of a number of interlocking 'Honeycomb' structures, wrapped in a permeable geomembrane to promote infiltration. Under storm conditions rainwater is forced out of the pipework, into the storage structures. The Geocellular/ Modular Attenuation Tank System has been designed to provide the necessary storage volume and to withstand and provide the essential support to the loads that will be exerted on it by pedestrian and/or vehicular traffic.

- **Maintenance**

Regular inspection and maintenance is required to ensure the effective long-term operation of the ground modular systems. The system should be inspected regularly, preferably during and after heavy rainfall to check effective operation.

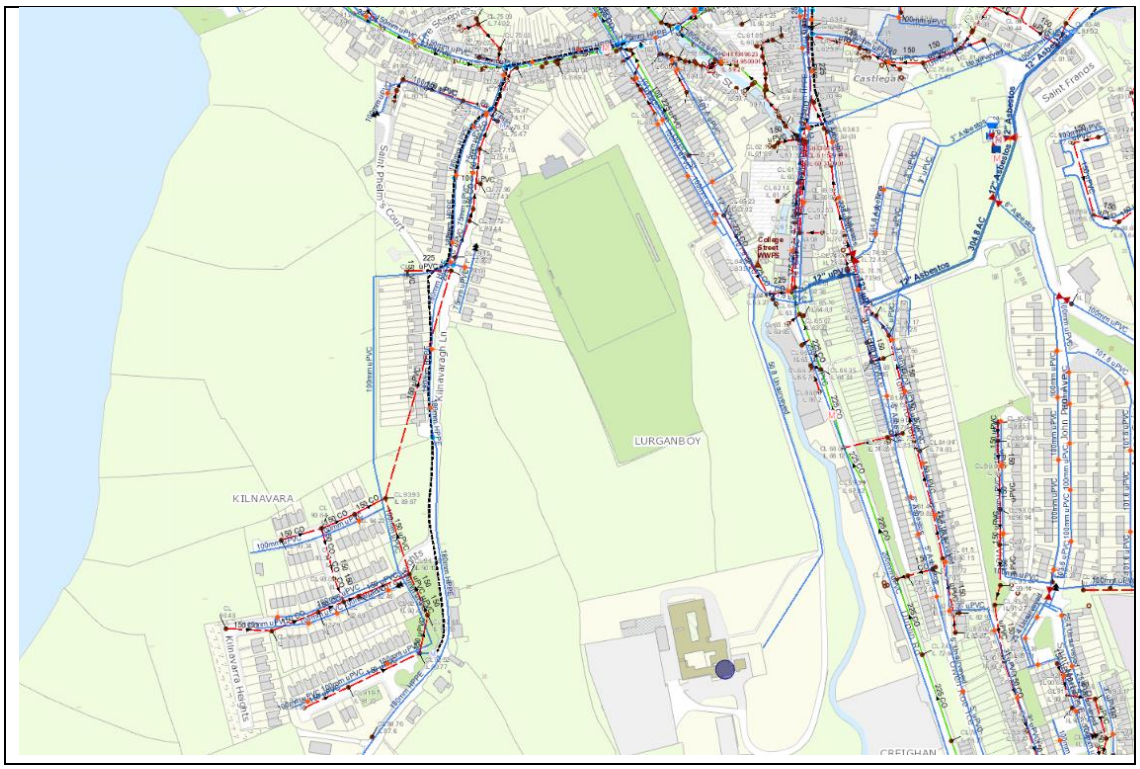
It is important that maintenance plans and schedules should be prepared during the design phase. Specific maintenance needs of the system should be monitored and maintenance schedules adjusted to suit requirements. Please refer to the specific attenuation tank manufacturers guidelines for specific maintenance requirements but as a minimum the proposed maintenance schedule is as follows:

Maintenance schedule	Required action	Recommended Frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then six monthly
	Debris removal from catchment surface (where may cause risks to performance)	Monthly
	Where rainfall infiltrates into blocks from above, check surface of filter for blockage by silt, algae or other matter. Remove and replace surface infiltration medium as necessary.	Monthly (and after large storms)
	Remove sediment from pre-treatment structures	Annually, or as required
Remedial actions	Repair/rehabilitation of inlets, outlet , overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually and after large storms

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

Section B – Details of Uisce Éireann's Network(s)

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



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

Whilst every care has been taken in respect of the information on Uisce Éireann's network(s), Uisce Éireann assumes no responsibility for and gives no guarantees, undertakings or warranties concerning the accuracy, completeness or up to date nature of the information provided, nor does it accept any liability whatsoever arising from or out of any errors or omissions. This information should not be solely relied upon in the event of excavations or any other works being carried out in the vicinity of Uisce Éireann's underground network(s). The onus is on the parties carrying out excavations or any other works to ensure the exact location of Uisce Éireann's underground network(s) is identified prior to excavations or any other works being carried out. Service connection pipes are not generally shown but their presence should be anticipated.

- **Filter Drains / Infiltration Trench**

The proposed filter drains / infiltration Trench are trenches filled with rubble or stone that creates a temporary subsurface storage for stormwater runoff which is ether filtered through the stone media and conveyed downstream via perforated land drain, or else infiltrated into the soil. The filter trench stone can either be laid to surface levels or a layer of permeable topsoil can be added above the filter stone to surface level.

- **Maintenance**

Regular inspection and maintenance is important for the effective operation of trenches as designed.

Adequate access has been provided to the filter drains with maintenance points for inspection and maintenance, including for appropriate equipment and vehicles.

The proposed maintenance schedule is as follows:

Maintenance schedule	Required action	Frequency
Regular maintenance	Litter and debris removal from trench surface, access chambers and pre-treatment devices.	Monthly (or as required).
	Removal and washing of exposed stones on the trench surface.	Annual (bi-annual the first year) or when silt is evident on the surface.
	Trimming of any roots that may be causing blockages.	Annual(semi-annual the first year).
	Remove weeds on the trench surface.	Monthly (at start, then as required)
Occasional maintenance	Removal of sediment from pre-treatment devices.	Six monthly.
	Remove tree roots or trees that grow close to the trench.	As required.
	At locations with high pollution loads, remove surface geotextile and replace, and wash or replace filter media.	Five yearly.
Remedial actions	Clear perforated pipework of blockages.	As required.
	Rehabilitate infiltration or filtration surfaces.	As required.
	Replace geotextiles and clean and replace filter media, if clogging occurs.	As required.
	Excavate trench walls to expose clean soils if infiltration performance reduces to unacceptable levels.	As required.
	Inspect inlets, outlets and inspection points for blockages, clogging, standing water and structural damage.	Monthly.
Monitoring	Inspect pre-treatment systems, inlets, trench surfaces and perforated pipework for silt accumulation. Establish appropriate silt removal frequencies.	Half yearly.

- **Porous / Permeable Pavements**

The porous pavement proposed differs from normal pavement because it allows rainwater to infiltrate into underlying surfaces. The system then temporarily stores the water until it can be discharged into the existing storm sewer system. The porous pavement has also been designed to withstand and provide the essential support to the loads that will be exerted on it by pedestrian and/or vehicular traffic. Several are proposed throughout the scheme and include hardstanding pavements and the proposed natural grass and the artificial / synthetic sports pitches.

The proposed porous pavements are made up of a subgrade, a permeable membrane to promote infiltration, an aggregate sub-base, and then finally the finished pavement surfacing.

The proposed systems target maximising infiltration potential. Where not possible once filtered through the sub-base the flows will be conveyed through pipes and additional infrastructure before being discharged to the river. The flow through the system is controlled by a series of flow control devices.

- **Maintenance**

Before the facility is handed over to the client, it should be inspected for clogging, litter, weeds and water ponding, and if identified these failings should be rectified. Post-handover, the facility should be inspected regularly, preferably during and after heavy rainfall to check effective operation and to identify any areas of ponding. The pavement surface will have to be regularly cleaned of silt and other sediments to preserve their infiltration capability. It is suggested that there should be a minimum of three surface sweepings a year using a brush and suction cleaner for hardstanding areas and artificial / synthetic pitches in accordance with manufacturers recommendations.

The regime should be as follows:

- End of winter/start of spring- to collect winter debris.
- Mid- summer- to collect dust, flower and grass-type deposits.
- After autumn- to collect the leaf fall.

In the scenario that reconstruction of the SUDS is needed you should follow the procedure below;

- Lift surface layer and laying course.
- Remove any geotextile layer.
- Inspect sub-base and remove, wash and replace if required.
- Renew any geotextile layer.
- Renew laying course, jointing material and concrete block paving / asphalt surfacing.

It is important that maintenance plans and schedules should be prepared during the design phase. Specific maintenance needs of the pervious pavement should be monitored and maintenance schedules adjusted to suit requirements. The proposed maintenance schedule is as follows:

Maintenance Schedule	Required Section	Frequency
Regular Maintenance	Brushing and vacuuming.	Three times/year at end of winter, mid- summer, after autumn leaf fall, or as required based on specific observations of clogging or manufacturers recommendations.
Occasion Maintenance	Stabilise and mow contributing and adjacent areas.	As Required.
	Removal of weeds.	As Required.
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm of the level of paving.	As Required.
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users.	As Required.
	Rehabilitation or surface and upper sub-structure.	As required (if infiltration performance is reduced as a result of significant clogging).
Monitoring	Initial Inspection.	Monthly for 3 months after installation.
	Inspect for evidence of poor operation and/or weed growth if required take remedial action.	3 monthly, 48 hours after large storms.
	Inspect silt accumulation rates and establish appropriate brushing frequencies.	Annually.
	Monitor inspection chambers.	Annually.

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