



Client : Donegal County Council

Project : E2324 – Lifford Common

Drainage Strategy



PREPARED BY	CHECKED BY	APPROVED BY	ISSUE	DATE
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Contents

1	Introduction	4
2	Site Location, Description and Proposed Development	5
3	Proposed Storm Water Drainage Strategy	7
4	Proposed Foul Water Drainage Strategy	10
5	Conclusion	11
	Appendices	12
	Appendix A – Existing Site Topographical Survey	13
	Appendix B – Proposed Site Layout	14
	Appendix C – Proposed Storm Design - Un-Restricted Runoff Calculations	15
	Appendix D – Proposed Drainage Layout	16
	Appendix E – Proposed Storm Design - Restricted Runoff Calculations	17

1 Introduction

1.1 Report Brief and Scope

The proposed Multi-Use Park 10-acre green field site at The Common, Lifford, Co. Donegal in the Stranorlar Municipal District includes proposals for the construction of approximately 720m of access road and shared footways/cycleways throughout to facilitate access to potential future developments within adjoining lands.

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

The development will further consist of:

- Wastewater pumping station and associated pipe networks to service potential future developments.
- Stormwater drainage facilitating potential future connections.
- Services and utilities to service potential future developments.
- Future linkages that will facilitate access to adjoining lands to enable potential future development proposals and facilitate future road layout proposals that will increase the overall connectivity to the town centre for both pedestrians and road users.

This drainage strategy report will review the proposed development with regards to drainage infrastructure requirements with the following considerations.

- Site Topography
 - Storm Drainage design
 - Foul Drainage Design
 - Potential Future development
-

2 Site Location, Description and Proposed Development

2.1 Site Location and Context

The site is located adjacent to the National Primary Road (N14) and is within the defined settlement framework boundary of Lifford. Lifford is identified as a Layer 2B: Strategic Town due to its special economic function and its proximity to the border with Northern Ireland and the associated cross border context.

The wider area is identified as an 'Opportunity Site' as set out in the County Development Plan 2018-2024 and the proposed site area as identified is contained within this zone. The proposed road network will facilitate the future development of the opportunity site.

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

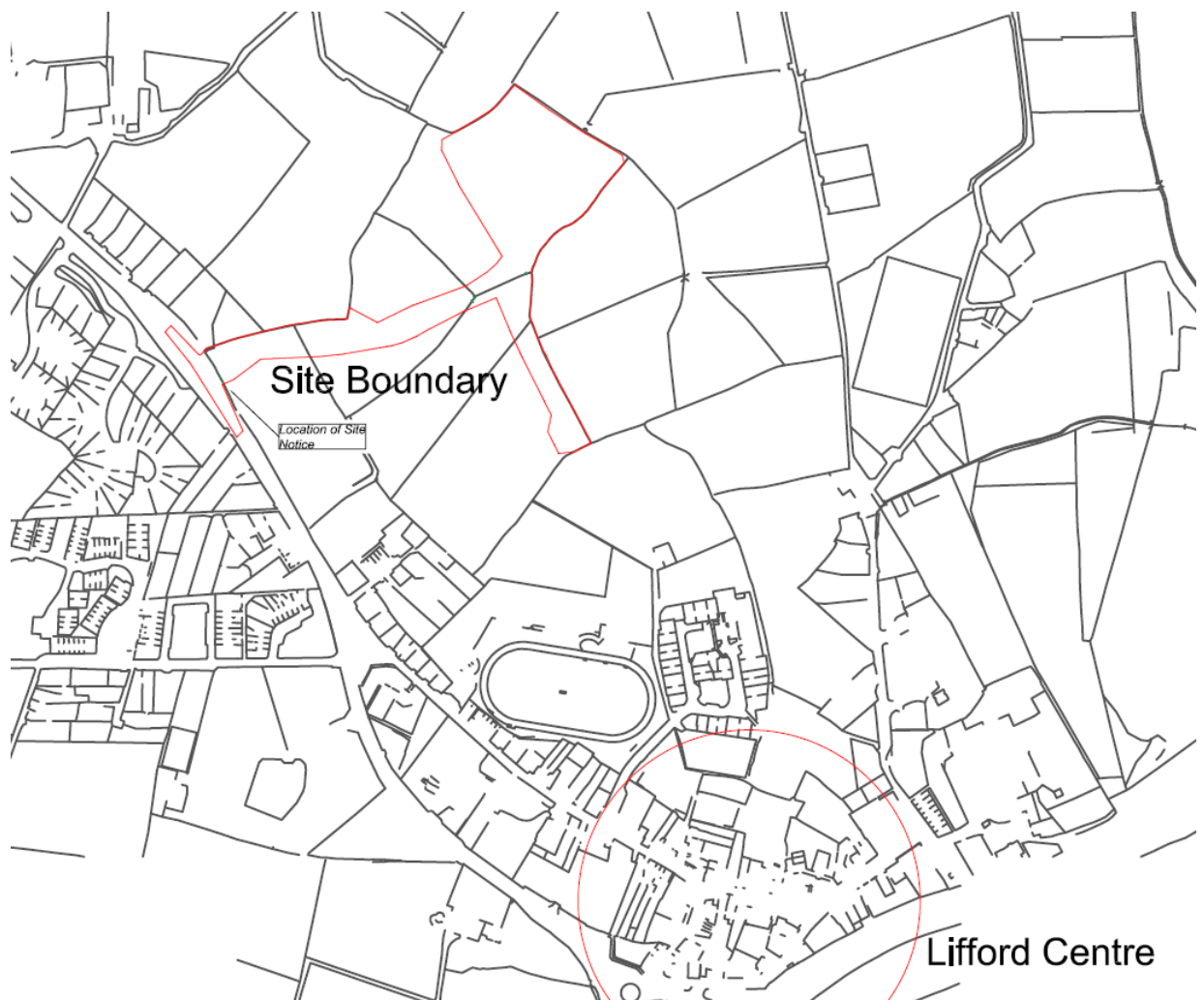


Figure 1 – Site Location and Boundary

2.2 Existing Site Description

The site is of 'Greenfield' nature, irregular in shape and extends to approximately 10 Acres. The N14 forms the boundary to the West and agricultural fields form the boundaries to the other sides. The site generally falls from West to East from approximately 28.0m AOD at the N14 to approximately 2.0m AOD on the Eastern most Boundary. Beyond the site boundary are established residential developments to the west and northwest, a petrol station (Applegreen) to the South and to the East and North is agricultural fields.

The Existing Topographical Survey has been presented as Appendix A.

2.3 Proposed Site Development Plans

The development proposals include the following:

- Right Hand Turn Lane from the N14.
- Approximately 720m of access roads with shared footways/cycleways.
- 2 sports pitches (105m x 70m and 60m x 40m).
- Car park for pitches.
- Wastewater pumping station.

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

2.4 Potential Future development Plans

In addition to this proposed development Donegal County Council have identified adjoining sites that may require connections if these developments progress. These sites may include residential and light industrial units. It is further noted all proposals for these potential developments will be subject to their own separate planning applications.

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.

3.2 Pre-Development Runoff

The existing site is entirely of 'Greenfield' nature. As such the discharge figure for the development has been limited to the existing 'greenfield' run-off rate of 3.5l/s/ha (litres/second/hectare). This figure has been outlined in the FRA (Flood Risk Assessment) completed by McCloy Consulting as part of the planning application.

3.3 Post-Development Runoff

The proposed site development consists of a combination of hardstanding (vehicular pavements, car park, footpaths, pumping station access) and soft landscaping areas (pitches, embankments) and subsequently will result in an increase of impermeable surfacing.

Table 6-3 of the Urban Storm Drainage Critical Manual (Volume 1 January 2016) presents the percentage 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.

The storm sewer network has been modelled and the unrestricted discharge figures for the 1 in 2, 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 un-restricted calculations is provided in Appendix C for the site.

Return Period	Redevelopment Discharge Q (l/s) (Unrestricted)
1 in 2 +20%	214.0
1 in 30 +20%	327.6
1 in 100 +20%	344.8

Table 1: Post development discharge - 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 will be required.

3.5 Proposed Site Storm Drainage and discharge

It is proposed to maintain the existing pre-development 'Greenfield' run-off rate of 3.5l/s/ha as outlined in the FRA so that run-off rate and overall volume are not exceeded over the lifespan of the development. This equates to 32l/s with the developed site of approximately 9.14Ha.

In order to achieve the restricted 'Greenfield' run-off rate an attenuation tank and discharge flow control limiting the storm water discharge from the development are included within the drainage design. The attenuation tank and flow control are situated immediately prior to the discharge location adjacent to the proposed sports pitches.

In addition to this proposed development Donegal County Council have identified adjoining sites that may require connections if these developments progress. The proposed surface water drainage therefore has been designed to include an allowance for these potential future connections. Each connection has been given an allowance for their respective 'Greenfield' run-off rate for each individual plot which will be subject to their own drainage design & associated planning application. Please see Table 2 below for illustration of these figures.

Future Site	Area (ha)	Discharge allowance (@3.5 l/s/ha)
1	2.0	7.0
2	2.7	9.5
3	2.0	7.0
4	2.4	8.4

Table 2: Storm water discharge allowance for potential future developments

A proposed storm network has been developed with consideration of the site proposals, the existing 'Greenfield' run-off rate and the potential future developments. The proposed storm sewers will collect the storm water via road gullies and land drains and convey the flows through a dedicated gravity storm sewer following the falls of the proposed road network (where achievable) discharging the collected flows to the watercourse to the Northeast of the site. The proposed drainage layout is provided in Appendix D.

The storm sewer network has been modelled and the restricted discharge figures for the 1 in 2, 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 an attenuation volume of 680 cubic metres required, with associated flow control restricting the discharge to 32l/s. A copy of the post development calculation inclusive of restricted flow / attenuation is provided in Appendix E.

Return Period	Redevelopment Discharge Q (l/s) (Restricted)
1 in 2 +20%	22.4
1 in 30 +20%	31.7
1 in 100 +20%	31.9

Table 3: Post development discharge – Restricted

3.6 Surface Water (Pluvial) Flood Risk

The proposed scheme design 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 2 year storm;
- 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 sewer does not have any foul connections at this time and has been designed for the potential future development sites noted above.

The proposed foul drainage includes connections at each potential future development site which will convey flows through a gravity pipe network to the proposed foul pumping station. From the pumping station a pumping / rising man is proposed with potential connection to existing Irish Water Infrastructure (subject to Irish Water Approvals).

The Foul design includes an allowance for each potential development site which has been calculated using Irish Water 'Wastewater Code of Practice'. This code gives anticipated flows based on site areas and anticipated development type. Note these land uses are predicted at this time as each will be subject to dedicated separate planning applications. Please see Table 4 below for the figures that have been predicted.

Future Site	Development type	Area (ha)	Foul discharge allowance (l/s)
1	Residential	2.0	1.35
2	Light Industrial	2.7	1.82
3	Light Industrial	2.0	1.35
4	Light Industrial	2.4	1.62
Changing room	Sports	1.7	1.15

Table 4 - Foul Water discharge allowance for potential future development

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

5 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 National Primary Road (N14) and is within the defined settlement framework boundary of Lifford.

The site is of 'Greenfield' nature, irregular in shape and extends to approximately 10 Acres. The N14 forms the boundary to the West and agricultural fields form the boundaries to the other sides. The site generally falls from West to East from approximately 28.0m AOD at the N14 to approximately 2.0m AOD on the Eastern most Boundary. Beyond the site boundary are established residential developments to the west and northwest, a petrol station (Applegreen) to the South and to the East and North is agricultural fields. With consideration of this a detailed FRA has been completed by McCloy Consulting & issued along with this planning application.

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

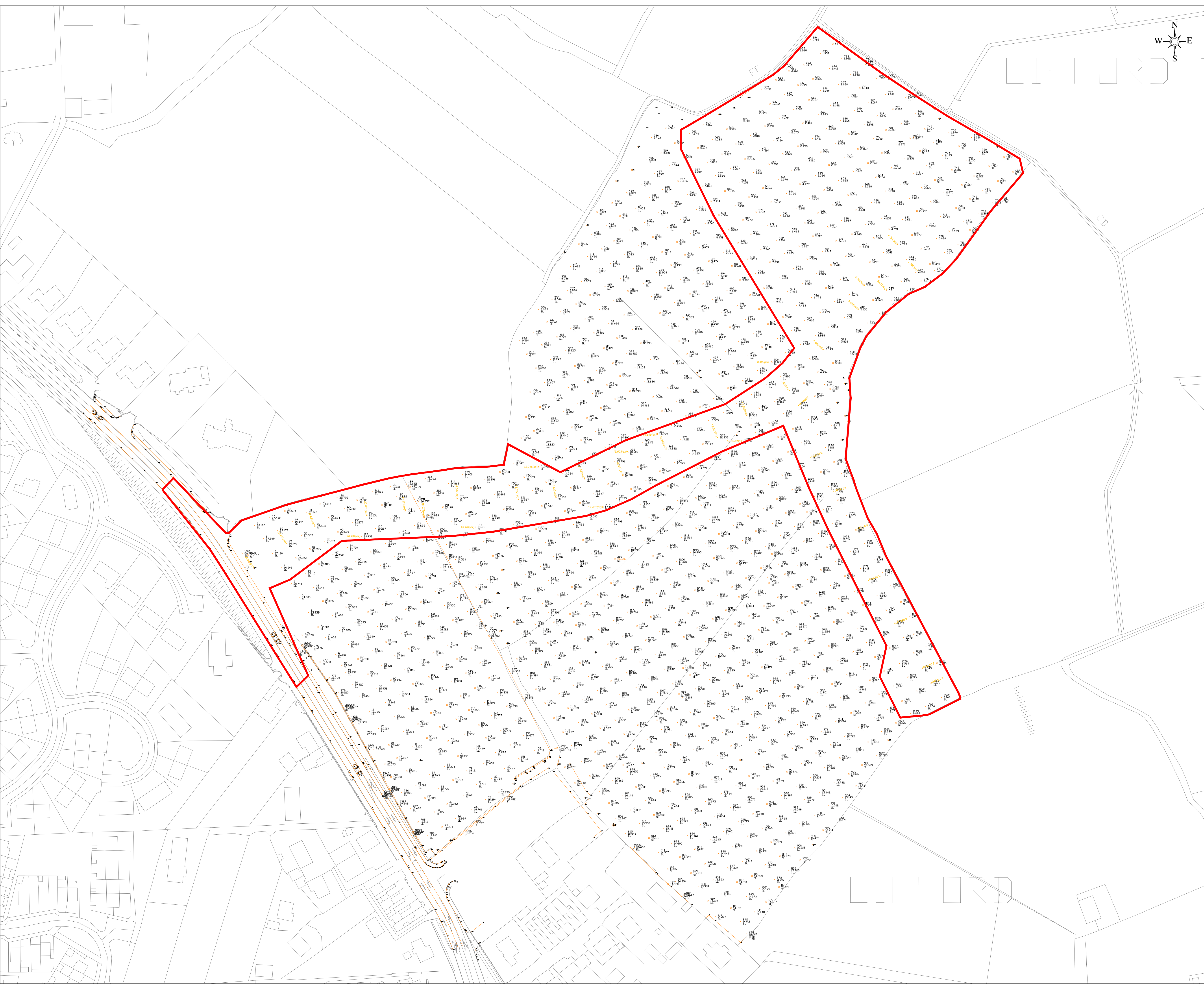
With consideration of the drainage strategy and the surface water mitigation measures for the scheme illustrated above, flood risk from pluvial flooding will be managed at the development and will not increase the runoff elsewhere. Proposed levels have been developed to ensure that no properties will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

In addition, foul sewerage is proposed to discharge to Irish Water infrastructure if potential future developments occupy the site. These will be further illustrated in separate dedicated planning applications as necessary.

A copy of the Proposed Drainage Layout is provided in Appendix D.

Appendices

Appendix A – Existing Site Topographical Survey

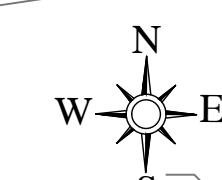


- NOTES**
1. All measurements shown are in metres, and all levels are to ordnance datum unless otherwise indicated
 2. All Coordinates are to Irish Grid, unless otherwise noted.
 3. This drawing should be read in conjunction with all relevant drawings (Architectural and Engineering).
 4. This drawing is provided to illustrate the existing levels for the site. Topographical Survey Was provided by Donegal County Council.
 5. It is the contractors responsibility to verify levels and advise if any discrepancies occur.

- LEGEND**
- Site Boundary
 - × Existing Levels

Rev	Issue Date	Description	App
Status PRELIMINARY			
Client Donegal County Council			
Project The Common, Lifford Multi-Use Development			
Drawing Existing Site Layout & Levels			
Scale 1:1000 @ A1			
Contact Details		1c Montgomery House 478 Castlereagh Road Belfast, BT5 6BQ	T: 028 9040 2000 E: admin@mcadamdesign.co.uk www.mcadamdesign.co.uk
Drawn	ER	Checked	PA
Date	2022-05-26	Date	2022-05-26
Project - Organisation - Zone - Level - Type - Role - Number - Revision		Date	
LIF - MCA - ST1-00 - DR - C - 1020 - P1		2022-05-26	
Project Number		Status code & Description	
E2324		S2 - For Information	
All dimensions are in metres. Figured dimensions to be taken in preference to scale dimensions. Dimensions to be checked on site. © 2021 McAdam Design Ltd.			

Appendix B – Proposed Site Layout



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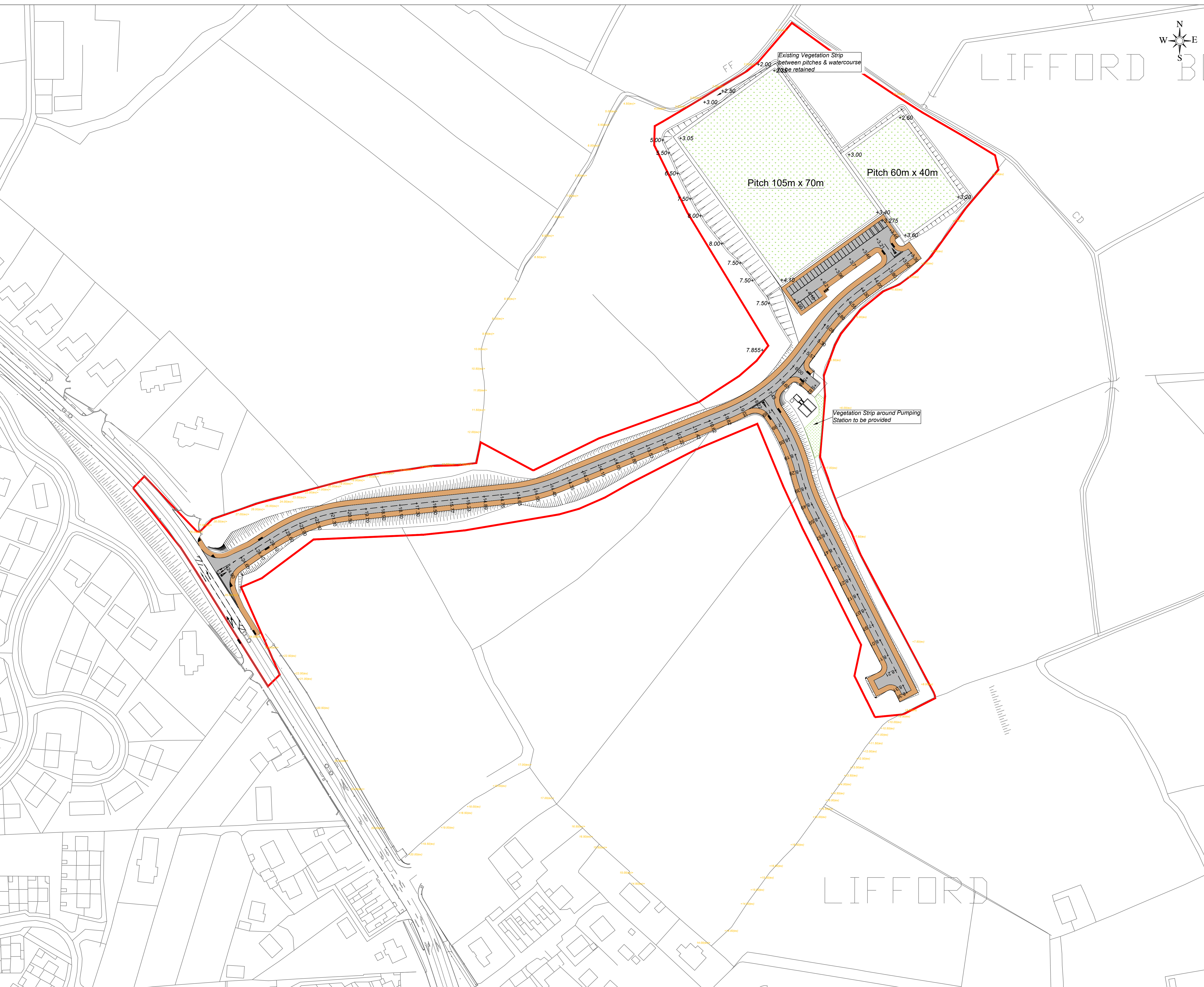
- NOTES:
- All levels and dimensions are in meters unless stated otherwise.
 - The mapping illustrated on this drawing is the proposed site layout which will be subject to change following design development.
 - This drawing should be read in conjunction with all relevant drawings (Architectural and Engineering).
 - The landscaping proposals illustrated on this drawing are indicative only.
 - All levels shown are for illustration purposes only and will require refinement at detailed design.

LEGEND

- +4.10 Proposed Level
- +3.00 Existing Level / Contour
- +18.00
- Proposed Vehicular Pavements
- Proposed Footpaths
- Proposed Grass Soccer Pitches
- Site Boundary

Site Plan Notes:

- Right hand turn lane
Design traffic to be determined.
Assumed lane widths as existing with central hatched area used for right turn pocket.
- Roads within development - Design speed 50 kph
Widths indicated at 6.0m wide (3.0m lanes).
Footway/verge indicated at 3.0m.
Junction radii with N14 10m.
Junction within development 6.0m.
Horizontal radii 105m.
Vertical 'K' factor 5 used.
Embankments to access roads 1 in 3.
- Development sites
Embankments indicated at 1 in 3.
- Site 5
Site 5 is extensively within the flood plain as illustrated within the Flood Risk Assessment.



P9	13/04/2022	Amendments Following Stage 1 RSA	PA
P8	30/03/2022	Background Mapping Amended	PMcM
P7	28/02/2022	Site Layout Amendments	PA
P6	20/02/2022	Building Amendment	PA
P5	09/02/2022	Red Line Boundary Amended	PA
P4	01/02/2022	Minor Layout Amendments	PA
P3	06/12/2021	Levels Building Amended	PA
P2	23/11/2021	Road Dimensions Altered	PA
Rev	Issue Date	Description	App

Status	PRELIMINARY
Client	Donegal County Council
Project	The Common, Lifford Multi-Use Development
Drawing	Proposed Site Layout
Scale	1:1000 @ A1



Contact Details: 1c Montgomery House, 478 Castlereagh Road, Belfast, BT5 6BQ. T: 028 9040 2000, E: admin@mcadamdesign.co.uk, www.mcadamdesign.co.uk

Drawn	DWW	Checked	PA	Approved	PA
Date	2021-09-21	Date	2021-09-21	Date	2021-09-21


Project	- Organisation - Zone - Level - Type - Role - Number - Revision
LIF	- MCA - ST1-00 - DR - C - 1003 - P9

Project Number	Status code & Description
E2324	S2 - For Information

All dimensions are in metres. Figured dimensions to be taken in preference to scale dimensions. Dimensions to be checked on site. © 2021 McAdam Design Ltd.

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

McAdam Design		Page 0
1C Montgomery House Castlereagh Business Park 478 Castlereagh Rd, Belfast,...	Lifford Common Storm Drainage Design Un-Restricted	
Date 01/03/2022 File 2022-03-01 Lifford Stor...	Designed by P Alcorn Checked by P Alcorn	
Innovyze	Network 2018.1.1	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for 2022-03-01 STORM.SWS

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	17.500	Add Flow / Climate Change (%)	10
Ratio R	0.350	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 2022-03-01 STORM.SWS





Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.447	4-8	1.223	8-12	0.228

Total Area Contributing (ha) = 1.897

Total Pipe Volume (m³) = 83.362


Network Design Table for 2022-03-01 STORM.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	42.277	1.646	25.7	0.092	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.001	45.610	3.615	12.6	0.063	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.002	53.418	4.093	13.1	0.063	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.000	18.945	0.126	150.4	0.050	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	5.35	23.404	0.092	0.0	0.0	1.2	1.99	35.3	13.7
1.001	50.00	5.62	21.758	0.155	0.0	0.0	2.1	2.85	50.4	23.1
1.002	50.00	5.86	18.143	0.218	0.0	0.0	3.0	3.64	144.8	32.5
2.000	50.00	5.30	12.000	0.050	0.0	0.0	0.7	1.06	42.3	7.4


McAdam Design		Page 1
1C Montgomery House Castlereagh Business Park 478 Castlereagh Rd, Belfast,...	Lifford Common Storm Drainage Design Un-Restricted	
Date 01/03/2022 File 2022-03-01 Lifford Stor...	Designed by P Alcorn Checked by P Alcorn	
Innovyze	Network 2018.1.1	

Network Design Table for 2022-03-01 STORM.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	47.990	0.320	150.0	0.060	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.004	51.386	0.343	149.8	0.080	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.005	60.010	2.492	24.1	0.071	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.006	30.251	2.451	12.3	0.033	0.00	0.0	0.600	o	300	Pipe/Conduit	
3.000	15.934	0.607	26.3	0.070	5.00	0.0	0.600	o	225	Pipe/Conduit	
4.000	20.662	0.130	158.9	0.038	5.00	0.0	0.600	o	225	Pipe/Conduit	
4.001	52.926	0.399	132.6	0.062	0.00	0.0	0.600	o	225	Pipe/Conduit	
5.000	15.404	1.154	13.3	0.050	5.00	0.0	0.600	o	225	Pipe/Conduit	
4.002	47.277	0.290	163.0	0.058	0.00	0.0	0.600	o	300	Pipe/Conduit	
4.003	56.388	0.346	163.0	0.067	0.00	0.0	0.600	o	300	Pipe/Conduit	
4.004	24.334	0.149	163.0	0.024	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.007	30.956	1.490	20.8	0.040	0.00	0.0	0.600	o	300	Pipe/Conduit	
6.000	16.464	0.199	82.7	0.050	5.00	0.0	0.600	o	150	Pipe/Conduit	
7.000	12.631	1.604	7.9	0.060	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)
1.003	50.00	6.49	11.799	0.328	0.0	0.0	4.4	1.28	90.6	48.9
1.004	50.00	7.16	11.404	0.408	0.0	0.0	5.5	1.28	90.6	60.8
1.005	49.97	7.47	11.061	0.479	0.0	0.0	6.5	3.22	227.4	71.3
1.006	49.61	7.58	8.569	0.512	0.0	0.0	6.9	4.50	318.0	75.7
3.000	50.00	5.10	6.950	0.070	0.0	0.0	0.9	2.56	101.9	10.4
4.000	50.00	5.33	6.875	0.038	0.0	0.0	0.5	1.03	41.1	5.7
4.001	50.00	6.11	6.745	0.100	0.0	0.0	1.4	1.13	45.1	14.9
5.000	50.00	5.07	7.575	0.050	0.0	0.0	0.7	3.60	143.2	7.4
4.002	50.00	6.75	6.271	0.208	0.0	0.0	2.8	1.23	86.9	31.0
4.003	49.81	7.52	5.981	0.275	0.0	0.0	3.7	1.23	86.9	40.8
4.004	48.80	7.85	5.635	0.299	0.0	0.0	4.0	1.23	86.9	43.5
1.007	48.36	8.00	5.411	0.921	0.0	0.0	12.1	3.46	244.9	132.7
6.000	50.00	5.25	4.470	0.050	0.0	0.0	0.7	1.11	19.5	7.4
7.000	50.00	5.04	5.800	0.060	0.0	0.0	0.8	4.69	186.6	8.9

McAdam Design		Page 2
1C Montgomery House Castlereagh Business Park 478 Castlereagh Rd, Belfast,...	Lifford Common Storm Drainage Design Un-Restricted	
Date 01/03/2022 File 2022-03-01 Lifford Stor...	Designed by P Alcorn Checked by P Alcorn	
Innovyze	Network 2018.1.1	

Network Design Table for 2022-03-01 STORM.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
1.008	48.326	1.265	38.2	0.059	0.00	0.0	0.600	o	375	Pipe/Conduit		
8.000	17.579	0.172	102.2	0.065	5.00	0.0	0.600	o	150	Pipe/Conduit		
1.009	32.088	0.800	40.1	0.059	0.00	0.0	0.600	o	450	Pipe/Conduit		
1.010	15.102	0.175	86.3	0.016	0.00	0.0	0.600	o	450	Pipe/Conduit		
9.000	40.281	0.836	48.2	0.078	5.00	0.0	0.600	o	225	Pipe/Conduit		
1.011	10.500	0.121	86.8	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit		
1.012	86.077	0.172	500.4	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit		
1.013	28.186	0.056	503.3	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit		
10.000	52.500	0.489	107.4	0.202	5.00	0.0	0.600	o	300	Pipe/Conduit		
11.000	60.000	0.562	106.8	0.141	5.00	0.0	0.600	o	225	Pipe/Conduit		
11.001	45.889	0.306	150.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit		
10.001	57.632	0.366	157.5	0.202	0.00	0.0	0.600	o	300	Pipe/Conduit		
1.014	24.753	0.158	156.7	0.044	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)
1.008	47.57	8.27	3.921	1.090	0.0	0.0	14.0	2.94	324.7	154.5
8.000	50.00	5.29	3.202	0.065	0.0	0.0	0.9	0.99	17.6	9.7
1.009	47.11	8.44	2.656	1.214	0.0	0.0	15.5	3.22	511.8	170.4
1.010	46.80	8.55	1.781	1.230	0.0	0.0	15.6	2.19	348.2	171.5
9.000	50.00	5.36	2.742	0.078	0.0	0.0	1.1	1.89	75.1	11.6
1.011	46.58	8.63	1.606	1.308	0.0	0.0	16.5	2.18	347.3	181.5
1.012	42.74	10.22	1.485	1.308	0.0	0.0	16.5	0.90	143.5	181.5
1.013	41.64	10.74	1.313	1.308	0.0	0.0	16.5	0.90	143.0	181.5
10.000	50.00	5.58	2.061	0.202	0.0	0.0	2.7	1.52	107.2	30.1
11.000	50.00	5.79	2.515	0.141	0.0	0.0	1.9	1.26	50.3	21.0
11.001	50.00	6.51	1.953	0.141	0.0	0.0	1.9	1.07	42.4	21.0
10.001	50.00	7.28	1.572	0.545	0.0	0.0	7.4	1.25	88.4	81.2
1.014	41.06	11.03	1.206	1.897	0.0	0.0	21.1	1.45	159.6	232.0




Manhole Schedules for 2022-03-01 STORM.SWS

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
1-1/1	24.754	1.350	Open Manhole	1200	1.000	23.404	150				
1-1/2	23.108	1.350	Open Manhole	1200	1.001	21.758	150	1.000	21.758	150	
1-1/3	19.493	1.350	Open Manhole	1200	1.002	18.143	225	1.001	18.143	150	
1-2/1	13.500	1.500	Open Manhole	1200	2.000	12.000	225				
1-1/4	15.400	3.601	Open Manhole	1200	1.003	11.799	300	1.002	14.050	225	2176
								2.000	11.874	225	
1-1/5	14.474	3.070	Open Manhole	1200	1.004	11.404	300	1.003	11.479	300	75
1-1/6	13.937	2.876	Open Manhole	1200	1.005	11.061	300	1.004	11.061	300	
1-1/7	10.144	1.575	Open Manhole	1200	1.006	8.569	300	1.005	8.569	300	
1-3/1	8.300	1.350	Open Manhole	1200	3.000	6.950	225				
1-4/1	8.300	1.425	Open Manhole	1200	4.000	6.875	225				
1-4/2	8.170	1.425	Open Manhole	1200	4.001	6.745	225	4.000	6.745	225	
1-5/1	9.000	1.425	Open Manhole	1200	5.000	7.575	225				
1-4/3	8.167	1.896	Open Manhole	1200	4.002	6.271	300	4.001	6.346	225	
								5.000	6.421	225	75
1-4/4	8.551	2.570	Open Manhole	1200	4.003	5.981	300	4.002	5.981	300	
1-4/5	7.983	2.348	Open Manhole	1200	4.004	5.635	300	4.003	5.635	300	
1-1/8	7.693	2.282	Open Manhole	1200	1.007	5.411	300	1.006	6.118	300	707
								3.000	6.343	225	857
								4.004	5.486	300	75
1-6/1	5.820	1.350	Open Manhole	1200	6.000	4.470	150				
1-7/1	7.150	1.350	Open Manhole	1200	7.000	5.800	225				
1-1/9	5.621	1.700	Open Manhole	1350	1.008	3.921	375	1.007	3.921	300	
								6.000	4.271	150	125
								7.000	4.196	225	125
1-8/1	4.502	1.300	Open Manhole	1200	8.000	3.202	150				
1-1/10	4.356	1.700	Open Manhole	1350	1.009	2.656	450	1.008	2.656	375	
								8.000	3.030	150	74
1-1/11	3.556	1.775	Open Manhole	1350	1.010	1.781	450	1.009	1.856	450	75
1-9/1	4.092	1.350	Open Manhole	1200	9.000	2.742	225				
1-1/12	3.250	1.644	Open Manhole	1350	1.011	1.606	450	1.010	1.606	450	
								9.000	1.906	225	75
1-1/13	3.377	1.892	Open Manhole	1350	1.012	1.485	450	1.011	1.485	450	
DUMMY	2.673	1.360	Open Manhole	1350	1.013	1.313	450	1.012	1.313	450	
1-10/1	3.389	1.328	Open Manhole	1200	10.000	2.061	300				
1-11/1	3.190	0.675	Open Manhole	1200	11.000	2.515	225				
1-11/2	2.628	0.675	Open Manhole	1200	11.001	1.953	225	11.000	1.953	225	
1-10/2	2.900	1.328	Open Manhole	1200	10.001	1.572	300	10.000	1.572	300	

McAdam Design		Page 4
1C Montgomery House Castlereagh Business Park 478 Castlereagh Rd, Belfast,...	Lifford Common Storm Drainage Design Un-Restricted	
Date 01/03/2022 File 2022-03-01 Lifford Stor...	Designed by P Alcorn Checked by P Alcorn	
Innovyze	Network 2018.1.1	

Manhole Schedules for 2022-03-01 STORM.SWS

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
1-1/14	2.500	1.294	Open Manhole	1350	1.014	1.206	375	11.001	1.647	225	126
								1.013	1.257	450	
								10.001	1.206	300	
16	2.200	1.152	Open Manhole	0		OUTFALL		1.014	1.048	375	

McAdam Design		Page 5
1C Montgomery House Castlereagh Business Park 478 Castlereagh Rd, Belfast,...	Lifford Common Storm Drainage Design Un-Restricted	
Date 01/03/2022 File 2022-03-01 Lifford Stor...	Designed by P Alcorn Checked by P Alcorn	
Innovyze	Network 2018.1.1	


PIPELINE SCHEDULES for 2022-03-01 STORM.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	1-1/1	24.754	23.404	1.200	Open Manhole	1200
1.001	o	150	1-1/2	23.108	21.758	1.200	Open Manhole	1200
1.002	o	225	1-1/3	19.493	18.143	1.125	Open Manhole	1200
2.000	o	225	1-2/1	13.500	12.000	1.275	Open Manhole	1200
1.003	o	300	1-1/4	15.400	11.799	3.301	Open Manhole	1200
1.004	o	300	1-1/5	14.474	11.404	2.770	Open Manhole	1200
1.005	o	300	1-1/6	13.937	11.061	2.576	Open Manhole	1200
1.006	o	300	1-1/7	10.144	8.569	1.275	Open Manhole	1200
3.000	o	225	1-3/1	8.300	6.950	1.125	Open Manhole	1200
4.000	o	225	1-4/1	8.300	6.875	1.200	Open Manhole	1200
4.001	o	225	1-4/2	8.170	6.745	1.200	Open Manhole	1200
5.000	o	225	1-5/1	9.000	7.575	1.200	Open Manhole	1200
4.002	o	300	1-4/3	8.167	6.271	1.596	Open Manhole	1200
4.003	o	300	1-4/4	8.551	5.981	2.270	Open Manhole	1200
4.004	o	300	1-4/5	7.983	5.635	2.048	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	42.277	25.7	1-1/2	23.108	21.758	1.200	Open Manhole	1200
1.001	45.610	12.6	1-1/3	19.493	18.143	1.200	Open Manhole	1200
1.002	53.418	13.1	1-1/4	15.400	14.050	1.125	Open Manhole	1200
2.000	18.945	150.4	1-1/4	15.400	11.874	3.301	Open Manhole	1200
1.003	47.990	150.0	1-1/5	14.474	11.479	2.695	Open Manhole	1200
1.004	51.386	149.8	1-1/6	13.937	11.061	2.576	Open Manhole	1200
1.005	60.010	24.1	1-1/7	10.144	8.569	1.275	Open Manhole	1200
1.006	30.251	12.3	1-1/8	7.693	6.118	1.275	Open Manhole	1200
3.000	15.934	26.3	1-1/8	7.693	6.343	1.125	Open Manhole	1200
4.000	20.662	158.9	1-4/2	8.170	6.745	1.200	Open Manhole	1200
4.001	52.926	132.6	1-4/3	8.167	6.346	1.596	Open Manhole	1200
5.000	15.404	13.3	1-4/3	8.167	6.421	1.521	Open Manhole	1200
4.002	47.277	163.0	1-4/4	8.551	5.981	2.270	Open Manhole	1200
4.003	56.388	163.0	1-4/5	7.983	5.635	2.048	Open Manhole	1200
4.004	24.334	163.0	1-1/8	7.693	5.486	1.907	Open Manhole	1200

McAdam Design		Page 6
1C Montgomery House Castlereagh Business Park 478 Castlereagh Rd, Belfast,...	Lifford Common Storm Drainage Design Un-Restricted	
Date 01/03/2022 File 2022-03-01 Lifford Stor...	Designed by P Alcorn Checked by P Alcorn	
Innovyze	Network 2018.1.1	


PIPELINE SCHEDULES for 2022-03-01 STORM.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)
1.007	o	300	1-1/8	7.693	5.411	1.982	Open Manhole	1200
6.000	o	150	1-6/1	5.820	4.470	1.200	Open Manhole	1200
7.000	o	225	1-7/1	7.150	5.800	1.125	Open Manhole	1200
1.008	o	375	1-1/9	5.621	3.921	1.325	Open Manhole	1350
8.000	o	150	1-8/1	4.502	3.202	1.150	Open Manhole	1200
1.009	o	450	1-1/10	4.356	2.656	1.250	Open Manhole	1350
1.010	o	450	1-1/11	3.556	1.781	1.325	Open Manhole	1350
9.000	o	225	1-9/1	4.092	2.742	1.125	Open Manhole	1200
1.011	o	450	1-1/12	3.250	1.606	1.194	Open Manhole	1350
1.012	o	450	1-1/13	3.377	1.485	1.442	Open Manhole	1350
1.013	o	450	DUMMY	2.673	1.313	0.910	Open Manhole	1350
10.000	o	300	1-10/1	3.389	2.061	1.028	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)
1.007	30.956	20.8	1-1/9	5.621	3.921	1.400	Open Manhole	1350
6.000	16.464	82.7	1-1/9	5.621	4.271	1.200	Open Manhole	1350
7.000	12.631	7.9	1-1/9	5.621	4.196	1.200	Open Manhole	1350
1.008	48.326	38.2	1-1/10	4.356	2.656	1.325	Open Manhole	1350
8.000	17.579	102.2	1-1/10	4.356	3.030	1.176	Open Manhole	1350
1.009	32.088	40.1	1-1/11	3.556	1.856	1.250	Open Manhole	1350
1.010	15.102	86.3	1-1/12	3.250	1.606	1.194	Open Manhole	1350
9.000	40.281	48.2	1-1/12	3.250	1.906	1.119	Open Manhole	1350
1.011	10.500	86.8	1-1/13	3.377	1.485	1.442	Open Manhole	1350
1.012	86.077	500.4	DUMMY	2.673	1.313	0.910	Open Manhole	1350
1.013	28.186	503.3	1-1/14	2.500	1.257	0.793	Open Manhole	1350
10.000	52.500	107.4	1-10/2	2.900	1.572	1.028	Open Manhole	1200

McAdam Design		Page 7
1C Montgomery House Castlereagh Business Park 478 Castlereagh Rd, Belfast,...	Lifford Common Storm Drainage Design Un-Restricted	
Date 01/03/2022 File 2022-03-01 Lifford Stor...	Designed by P Alcorn Checked by P Alcorn	
Innovyze	Network 2018.1.1	

PIPELINE SCHEDULES for 2022-03-01 STORM.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)
11.000	o	225	1-11/1	3.190	2.515	0.450	Open Manhole	1200
11.001	o	225	1-11/2	2.628	1.953	0.450	Open Manhole	1200
10.001	o	300	1-10/2	2.900	1.572	1.028	Open Manhole	1200
1.014	o	375	1-1/14	2.500	1.206	0.919	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)
11.000	60.000	106.8	1-11/2	2.628	1.953	0.450	Open Manhole	1200
11.001	45.889	150.0	1-10/2	2.900	1.647	1.028	Open Manhole	1200
10.001	57.632	157.5	1-1/14	2.500	1.206	0.994	Open Manhole	1350
1.014	24.753	156.7	16	2.200	1.048	0.777	Open Manhole	0

Free Flowing Outfall Details for 2022-03-01 STORM.SWS


Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.014	16	2.200	1.048	0.000	0	0

Simulation Criteria for 2022-03-01 STORM.SWS

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1
Number of Input Hydrographs	0	Number of Storage Structures	0
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	Region	Scotland and Ireland
Return Period (years)	2	M5-60 (mm)	17.500

McAdam Design		Page 8
1C Montgomery House Castlereagh Business Park 478 Castlereagh Rd, Belfast,...	Lifford Common Storm Drainage Design Un-Restricted	
Date 01/03/2022	Designed by P Alcorn	
File 2022-03-01 Lifford Stor...	Checked by P Alcorn	
Innovyze	Network 2018.1.1	

Synthetic Rainfall Details

Ratio R 0.350 Cv (Winter) 0.840
 Profile Type Summer Storm Duration (mins) 30
 Cv (Summer) 0.750

McAdam Design		Page 9
1C Montgomery House Castlereagh Business Park 478 Castlereagh Rd, Belfast,...	Lifford Common Storm Drainage Design Un-Restricted	
Date 01/03/2022 File 2022-03-01 Lifford Stor...	Designed by P Alcorn Checked by P Alcorn	
Innovyze	Network 2018.1.1	

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for 2022-03-01 STORM.SWS

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coefficient	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	0
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	0.350
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	17.500	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
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)	2, 30, 100
Climate Change (%)	20, 20, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1-1/1	15 Winter	2	+20%	100/15 Summer				23.480
1.001	1-1/2	15 Winter	2	+20%	30/15 Summer				21.838
1.002	1-1/3	15 Winter	2	+20%					18.222
2.000	1-2/1	15 Winter	2	+20%	30/15 Summer				12.076
1.003	1-1/4	15 Winter	2	+20%	30/15 Summer				11.977
1.004	1-1/5	15 Winter	2	+20%	30/15 Summer				11.606
1.005	1-1/6	15 Winter	2	+20%					11.184
1.006	1-1/7	15 Winter	2	+20%					8.676
3.000	1-3/1	15 Winter	2	+20%	100/15 Winter				7.007
4.000	1-4/1	15 Winter	2	+20%	100/15 Summer				6.942
4.001	1-4/2	15 Winter	2	+20%	100/15 Summer				6.843
5.000	1-5/1	15 Winter	2	+20%					7.615
4.002	1-4/3	15 Winter	2	+20%	100/15 Summer				6.407
4.003	1-4/4	15 Winter	2	+20%	30/15 Summer				6.138
4.004	1-4/5	15 Winter	2	+20%	30/15 Summer				5.803
1.007	1-1/8	15 Winter	2	+20%	30/15 Summer				5.586
6.000	1-6/1	15 Winter	2	+20%	30/15 Winter				4.547

McAdam Design		Page 10
1C Montgomery House Castlereagh Business Park 478 Castlereagh Rd, Belfast,...	Lifford Common Storm Drainage Design Un-Restricted	
Date 01/03/2022 File 2022-03-01 Lifford Stor...	Designed by P Alcorn Checked by P Alcorn	
Innovyze	Network 2018.1.1	

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for 2022-03-01 STORM.SWS


PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1-1/1	-0.074	0.000	0.49	16.9	OK	
1.001	1-1/2	-0.070	0.000	0.55	26.9	OK	
1.002	1-1/3	-0.146	0.000	0.27	36.9	OK	
2.000	1-2/1	-0.149	0.000	0.24	9.2	OK	
1.003	1-1/4	-0.122	0.000	0.64	54.7	OK	
1.004	1-1/5	-0.098	0.000	0.77	65.8	OK	
1.005	1-1/6	-0.177	0.000	0.35	75.5	OK	
1.006	1-1/7	-0.193	0.000	0.28	79.9	OK	
3.000	1-3/1	-0.168	0.000	0.14	13.1	OK	
4.000	1-4/1	-0.158	0.000	0.19	7.0	OK	
4.001	1-4/2	-0.127	0.000	0.38	16.4	OK	
5.000	1-5/1	-0.185	0.000	0.07	9.3	OK	
4.002	1-4/3	-0.164	0.000	0.41	33.6	OK	
4.003	1-4/4	-0.143	0.000	0.52	42.9	OK	
4.004	1-4/5	-0.132	0.000	0.59	45.9	OK	
1.007	1-1/8	-0.125	0.000	0.63	140.8	OK	
6.000	1-6/1	-0.073	0.000	0.51	9.3	OK	

McAdam Design		Page 11
1C Montgomery House Castlereagh Business Park 478 Castlereagh Rd, Belfast,...	Lifford Common Storm Drainage Design Un-Restricted	
Date 01/03/2022 File 2022-03-01 Lifford Stor...	Designed by P Alcorn Checked by P Alcorn	
Innovyze	Network 2018.1.1	

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for 2022-03-01 STORM.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
7.000	1-7/1	15 Winter	2	+20%				
1.008	1-1/9	15 Winter	2	+20%	30/15 Summer			
8.000	1-8/1	15 Winter	2	+20%	30/15 Summer			
1.009	1-1/10	15 Winter	2	+20%	30/15 Summer			
1.010	1-1/11	15 Winter	2	+20%	2/15 Summer	100/15 Summer		
9.000	1-9/1	15 Winter	2	+20%	30/15 Summer			
1.011	1-1/12	15 Winter	2	+20%	2/15 Summer	30/15 Summer		
1.012	1-1/13	15 Winter	2	+20%	2/15 Summer			
1.013	DUMMY	15 Winter	2	+20%	2/15 Summer			
10.000	1-10/1	15 Winter	2	+20%	30/15 Summer			
11.000	1-11/1	15 Winter	2	+20%	30/15 Summer			
11.001	1-11/2	15 Winter	2	+20%	30/15 Summer	30/15 Summer		
10.001	1-10/2	15 Winter	2	+20%	2/15 Winter	100/15 Summer		
1.014	1-1/14	15 Winter	2	+20%	2/15 Summer			

PN	US/MH Name	Water			Surcharged		Flooded		Pipe		Level Exceeded
		Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status			
7.000	1-7/1	5.839	-0.186	0.000	0.07		11.2	OK			
1.008	1-1/9	4.121	-0.175	0.000	0.55		165.6	OK			
8.000	1-8/1	3.299	-0.053	0.000	0.73		12.0	OK			
1.009	1-1/10	2.858	-0.248	0.000	0.42		184.3	OK			
1.010	1-1/11	2.347	0.116	0.000	0.77		180.8	SURCHARGED		4	
9.000	1-9/1	2.811	-0.156	0.000	0.20		14.4	OK			
1.011	1-1/12	2.213	0.157	0.000	0.97		189.5	SURCHARGED		10	
1.012	1-1/13	2.104	0.169	0.000	1.27		172.2	SURCHARGED			
1.013	DUMMY	1.890	0.127	0.000	1.33		162.2	SURCHARGED			
10.000	1-10/1	2.188	-0.173	0.000	0.37		37.0	OK			
11.000	1-11/1	2.634	-0.106	0.000	0.52		25.5	OK			
11.001	1-11/2	2.083	-0.095	0.000	0.61		24.8	OK		10	
10.001	1-10/2	1.922	0.050	0.000	0.93		78.2	SURCHARGED		2	
1.014	1-1/14	1.791	0.210	0.000	1.55		214.0	SURCHARGED			

McAdam Design		Page 12
1C Montgomery House Castlereagh Business Park 478 Castlereagh Rd, Belfast,...	Lifford Common Storm Drainage Design Un-Restricted	
Date 01/03/2022 File 2022-03-01 Lifford Stor...	Designed by P Alcorn Checked by P Alcorn	
Innovyze	Network 2018.1.1	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for 2022-03-01 STORM.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 Coefficient 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 0
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 0.350
Region Scotland and Ireland Cv (Summer) 0.750
M5-60 (mm) 17.500 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status ON
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) 2, 30, 100
Climate Change (%) 20, 20, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1-1/1	15 Winter	30	+20%	100/15	Summer			23.519
1.001	1-1/2	15 Winter	30	+20%	30/15	Summer			22.066
1.002	1-1/3	15 Winter	30	+20%					18.259
2.000	1-2/1	15 Winter	30	+20%	30/15	Summer			12.510
1.003	1-1/4	15 Winter	30	+20%	30/15	Summer			12.483
1.004	1-1/5	15 Winter	30	+20%	30/15	Summer			12.042
1.005	1-1/6	15 Winter	30	+20%					11.234
1.006	1-1/7	15 Winter	30	+20%					8.719
3.000	1-3/1	15 Winter	30	+20%	100/15	Winter			7.029
4.000	1-4/1	15 Winter	30	+20%	100/15	Summer			6.967
4.001	1-4/2	15 Winter	30	+20%	100/15	Summer			6.902
5.000	1-5/1	15 Winter	30	+20%					7.630
4.002	1-4/3	15 Winter	30	+20%	100/15	Summer			6.547
4.003	1-4/4	15 Winter	30	+20%	30/15	Summer			6.460
4.004	1-4/5	15 Winter	30	+20%	30/15	Summer			6.266
1.007	1-1/8	15 Winter	30	+20%	30/15	Summer			6.172
6.000	1-6/1	15 Winter	30	+20%	30/15	Winter			4.756

McAdam Design		Page 13
1C Montgomery House Castlereagh Business Park 478 Castlereagh Rd, Belfast,...	Lifford Common Storm Drainage Design Un-Restricted	
Date 01/03/2022 File 2022-03-01 Lifford Stor...	Designed by P Alcorn Checked by P Alcorn	
Innovyze	Network 2018.1.1	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for 2022-03-01 STORM.SWS


PN	US/MH Name	Surcharged Flooded		Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m ³)					
1.000	1-1/1	-0.035	0.000	0.91		31.2	OK	
1.001	1-1/2	0.158	0.000	1.02		50.0	SURCHARGED	
1.002	1-1/3	-0.109	0.000	0.52		72.5	OK	
2.000	1-2/1	0.285	0.000	0.45		17.1	SURCHARGED	
1.003	1-1/4	0.384	0.000	1.19		101.2	SURCHARGED	
1.004	1-1/5	0.338	0.000	1.38		117.6	SURCHARGED	
1.005	1-1/6	-0.127	0.000	0.62		133.6	OK	
1.006	1-1/7	-0.150	0.000	0.49		141.2	OK	
3.000	1-3/1	-0.146	0.000	0.27		24.2	OK	
4.000	1-4/1	-0.133	0.000	0.34		12.9	OK	
4.001	1-4/2	-0.068	0.000	0.79		34.3	OK	
5.000	1-5/1	-0.170	0.000	0.14		17.3	OK	
4.002	1-4/3	-0.024	0.000	0.85		69.4	OK	
4.003	1-4/4	0.179	0.000	0.96		79.2	SURCHARGED	
4.004	1-4/5	0.331	0.000	1.10		85.0	SURCHARGED	
1.007	1-1/8	0.461	0.000	1.01		224.7	SURCHARGED	
6.000	1-6/1	0.136	0.000	0.95		17.2	SURCHARGED	

McAdam Design		Page 14
1C Montgomery House Castlereagh Business Park 478 Castlereagh Rd, Belfast,...	Lifford Common Storm Drainage Design Un-Restricted	
Date 01/03/2022 File 2022-03-01 Lifford Stor...	Designed by P Alcorn Checked by P Alcorn	
Innovyze	Network 2018.1.1	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for 2022-03-01 STORM.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
7.000	1-7/1	15 Winter	30	+20%				
1.008	1-1/9	15 Winter	30	+20%	30/15 Summer			
8.000	1-8/1	15 Winter	30	+20%	30/15 Summer			
1.009	1-1/10	15 Winter	30	+20%	30/15 Summer			
1.010	1-1/11	15 Winter	30	+20%	2/15 Summer	100/15 Summer		
9.000	1-9/1	15 Winter	30	+20%	30/15 Summer			
1.011	1-1/12	15 Winter	30	+20%	2/15 Summer	30/15 Summer		
1.012	1-1/13	15 Winter	30	+20%	2/15 Summer			
1.013	DUMMY	15 Winter	30	+20%	2/15 Summer			
10.000	1-10/1	15 Winter	30	+20%	30/15 Summer			
11.000	1-11/1	15 Winter	30	+20%	30/15 Summer			
11.001	1-11/2	15 Winter	30	+20%	30/15 Summer	30/15 Summer		
10.001	1-10/2	15 Winter	30	+20%	2/15 Winter	100/15 Summer		
1.014	1-1/14	15 Winter	30	+20%	2/15 Summer			

PN	US/MH Name	Water			Surcharged		Flooded		Pipe		Level Exceeded
		Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status			
7.000	1-7/1	5.854	-0.171	0.000	0.13		20.7	OK			
1.008	1-1/9	4.694	0.398	0.000	0.91		272.1	SURCHARGED			
8.000	1-8/1	3.896	0.544	0.000	1.23		20.1	SURCHARGED			
1.009	1-1/10	3.798	0.692	0.000	0.62		277.1	SURCHARGED			
1.010	1-1/11	3.493	1.262	0.000	1.16		273.9	FLOOD RISK		4	
9.000	1-9/1	3.330	0.363	0.000	0.37		26.5	SURCHARGED			
1.011	1-1/12	3.258	1.202	8.191	1.39		272.0	FLOOD		10	
1.012	1-1/13	3.071	1.136	0.000	1.85		250.9	SURCHARGED			
1.013	DUMMY	2.525	0.762	0.000	2.05		250.0	FLOOD RISK			
10.000	1-10/1	2.850	0.489	0.000	0.55		56.0	SURCHARGED			
11.000	1-11/1	2.954	0.214	0.000	0.82		40.1	FLOOD RISK			
11.001	1-11/2	2.636	0.458	7.647	1.04		41.9	FLOOD		10	
10.001	1-10/2	2.711	0.839	0.000	1.36		114.0	FLOOD RISK		2	
1.014	1-1/14	2.308	0.727	0.000	2.38		327.6	FLOOD RISK			

McAdam Design		Page 15
1C Montgomery House Castlereagh Business Park 478 Castlereagh Rd, Belfast,...	Lifford Common Storm Drainage Design Un-Restricted	
Date 01/03/2022 File 2022-03-01 Lifford Stor...	Designed by P Alcorn Checked by P Alcorn	
Innovyze	Network 2018.1.1	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2022-03-01 STORM.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 Coefficient 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 0
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 0.350
Region Scotland and Ireland Cv (Summer) 0.750
M5-60 (mm) 17.500 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status ON
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) 2, 30, 100
Climate Change (%) 20, 20, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1-1/1	15 Winter	100	+20%	100/15	Summer			24.056
1.001	1-1/2	15 Winter	100	+20%	30/15	Summer			22.591
1.002	1-1/3	15 Winter	100	+20%					18.268
2.000	1-2/1	15 Winter	100	+20%	30/15	Summer			13.073
1.003	1-1/4	15 Winter	100	+20%	30/15	Summer			13.026
1.004	1-1/5	15 Winter	100	+20%	30/15	Summer			12.384
1.005	1-1/6	15 Winter	100	+20%					11.264
1.006	1-1/7	15 Winter	100	+20%					8.743
3.000	1-3/1	15 Winter	100	+20%	100/15	Winter			7.371
4.000	1-4/1	15 Winter	100	+20%	100/15	Summer			7.818
4.001	1-4/2	15 Winter	100	+20%	100/15	Summer			7.797
5.000	1-5/1	15 Winter	100	+20%					7.731
4.002	1-4/3	15 Winter	100	+20%	100/15	Summer			7.698
4.003	1-4/4	15 Winter	100	+20%	30/15	Summer			7.601
4.004	1-4/5	15 Winter	100	+20%	30/15	Summer			7.436
1.007	1-1/8	15 Winter	100	+20%	30/15	Summer			7.338
6.000	1-6/1	15 Winter	100	+20%	30/15	Winter			5.411

McAdam Design		Page 16
1C Montgomery House Castlereagh Business Park 478 Castlereagh Rd, Belfast,...	Lifford Common Storm Drainage Design Un-Restricted	
Date 01/03/2022 File 2022-03-01 Lifford Stor...	Designed by P Alcorn Checked by P Alcorn	
Innovyze	Network 2018.1.1	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2022-03-01 STORM.SWS

PN	US/MH Name	Surcharged Flooded		Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m³)					
1.000	1-1/1	0.502	0.000	0.96		32.7	SURCHARGED	
1.001	1-1/2	0.683	0.000	1.09		53.3	SURCHARGED	
1.002	1-1/3	-0.100	0.000	0.59		81.8	OK	
2.000	1-2/1	0.848	0.000	0.59		22.6	SURCHARGED	
1.003	1-1/4	0.927	0.000	1.39		118.0	SURCHARGED	
1.004	1-1/5	0.680	0.000	1.69		144.8	SURCHARGED	
1.005	1-1/6	-0.097	0.000	0.78		167.9	OK	
1.006	1-1/7	-0.126	0.000	0.62		178.6	OK	
3.000	1-3/1	0.196	0.000	0.35		31.5	SURCHARGED	
4.000	1-4/1	0.718	0.000	0.42		15.9	SURCHARGED	
4.001	1-4/2	0.827	0.000	0.92		40.0	SURCHARGED	
5.000	1-5/1	-0.069	0.000	0.18		22.5	OK	
4.002	1-4/3	1.127	0.000	0.89		72.9	SURCHARGED	
4.003	1-4/4	1.320	0.000	0.92		75.6	SURCHARGED	
4.004	1-4/5	1.501	0.000	1.22		94.7	SURCHARGED	
1.007	1-1/8	1.627	0.000	1.17		260.2	SURCHARGED	
6.000	1-6/1	0.791	0.000	1.02		18.6	SURCHARGED	

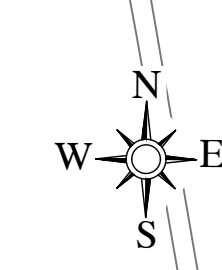
McAdam Design		Page 17
1C Montgomery House Castlereagh Business Park 478 Castlereagh Rd, Belfast,...	Lifford Common Storm Drainage Design Un-Restricted	
Date 01/03/2022 File 2022-03-01 Lifford Stor...	Designed by P Alcorn Checked by P Alcorn	
Innovyze	Network 2018.1.1	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2022-03-01 STORM.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
7.000	1-7/1	15 Winter	100	+20%				
1.008	1-1/9	15 Winter	100	+20%	30/15 Summer			
8.000	1-8/1	15 Winter	100	+20%	30/15 Summer			
1.009	1-1/10	15 Winter	100	+20%	30/15 Summer			
1.010	1-1/11	15 Winter	100	+20%	2/15 Summer	100/15 Summer		
9.000	1-9/1	15 Winter	100	+20%	30/15 Summer			
1.011	1-1/12	30 Winter	100	+20%	2/15 Summer	30/15 Summer		
1.012	1-1/13	15 Winter	100	+20%	2/15 Summer			
1.013	DUMMY	15 Winter	100	+20%	2/15 Summer			
10.000	1-10/1	15 Winter	100	+20%	30/15 Summer			
11.000	1-11/1	15 Winter	100	+20%	30/15 Summer			
11.001	1-11/2	30 Winter	100	+20%	30/15 Summer	30/15 Summer		
10.001	1-10/2	15 Winter	100	+20%	2/15 Winter	100/15 Summer		
1.014	1-1/14	15 Winter	100	+20%	2/15 Summer			

PN	US/MH Name	Water Surcharged Flooded			Pipe		Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)		
7.000	1-7/1	5.862	-0.163	0.000	0.17	27.0	OK	
1.008	1-1/9	5.301	1.005	0.000	1.01	301.2	SURCHARGED	
8.000	1-8/1	4.280	0.928	0.000	1.32	21.6	FLOOD RISK	
1.009	1-1/10	4.018	0.912	0.000	0.75	332.8	SURCHARGED	
1.010	1-1/11	3.561	1.330	5.436	1.30	306.8	FLOOD	4
9.000	1-9/1	3.430	0.463	0.000	0.43	30.8	SURCHARGED	
1.011	1-1/12	3.288	1.232	38.463	1.29	253.0	FLOOD	10
1.012	1-1/13	3.101	1.166	0.000	1.89	255.7	FLOOD RISK	
1.013	DUMMY	2.612	0.849	0.000	2.09	255.2	FLOOD RISK	
10.000	1-10/1	3.231	0.870	0.000	0.77	77.6	FLOOD RISK	
11.000	1-11/1	3.186	0.446	0.000	0.98	47.5	FLOOD RISK	
11.001	1-11/2	2.654	0.476	25.803	1.38	55.8	FLOOD	10
10.001	1-10/2	2.901	1.029	1.358	1.48	124.2	FLOOD	2
1.014	1-1/14	2.407	0.826	0.000	2.50	344.8	FLOOD RISK	

Appendix D – Proposed Drainage Layout



- Notes:**
- 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.
 - 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.
 - All storm & foul drainage designed in accordance with BS EN 752: 2008 drain and sewer systems outside buildings & The Building Regulations 2010, HM Government, Approved Document H (latest version).
 - Drainage works to be carried out in accordance with Civil Engineering Specification for the Water Industry 6th Edition; published by WRC plc 2004.
 - Manholes to be constructed from precast concrete rings (unless otherwise stated / approved) to BS EN 1917:2002 & BS 5911-3:2002 with a D400 heavy duty cover for driveway/carpark and S125 for remaining surface (in accordance with BS EN 124:1994).
 - Pipes to be uPVC to BS EN 1401-1:1998 for sizes Ø100 & Ø150mm. Pipes to be uPVC to WIS 4-35-01, for sizes Ø225 & Ø300mm.
 - Pipes for storm drainage to be Polypipe Rigidrain (or similar approved).
 - All measurements shown are in meters, and all levels are to ordnance datum unless otherwise indicated.
 - All Coordinates are to Irish Grid, unless otherwise noted.
 - 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.
 - 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.
 - 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.
 - 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 "flexcell" (or similar approved) 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 ground. The minimum thickness of the concrete surround should be 150mm or the diameter of the pipe whichever is the greater.
 - Compressible boards to be laid between crossing pipes where cover between pipes limited.
 - Existing sewers to be maintained and kept in service at all times.
 - This drawing should be read in conjunction with proposed drainage schedule drawings, construction details drawings and all other relevant drawings.
 - All drainage channels and outfalls to be constructed in accordance with manufactures specifications.
 - All details/ dimensions to be checked by the contractor. Any discrepancies to be reported to the engineer immediately.
 - Invert levels of catchpit chambers shown denote approximate invert levels of the lowest pipe and do not include for catchpit sump depth.

LEGEND

- SW → SW — PROPOSED STORM SEWER
- FW → FW — PROPOSED FOUL SEWER
- P — PROPOSED PITCH DRAINAGE
- C — PROPOSED CHANNEL DRAINAGE
- SW — PROPOSED PERFORATED FILTER / LAND DRAIN
- SW — PROPOSED INFILTRATION TRENCH
- SW — PROPOSED CHANNEL DRAINAGE OUTFALL
- Fxxx PROPOSED FOUL MANHOLE
- Sxxx PROPOSED STORM MANHOLE
- 600mm Dia CATCHPIT CHAMBERS (LAND DRAINAGE) - 1.2m Deep
- FOUM PROPOSED FOUL SEWER RISING MAIN / INSPECTION CHAMBER
- PROPOSED TRAPPED GULLY
- ATTENUATION TANK / PETROL INTERCEPTOR / SOAKAWAY (REFER TO NOTES)
- PERMEABLE PAVEMENT

P3	13/04/2022	Amendments Following Stage 1 RSA	PA
P2	31/03/2022	Minor Car Park Layout Amendment	PA
Rev	Issue Date	Description	App

Status	PRELIMINARY
Client	Donegal County Council
Project	The Common, Lifford Multi-Use Development
Drawing	Proposed Drainage Overview
Scale	1:1000 @ A1

McAdam
ENHANCING LOCAL COMMUNITIES

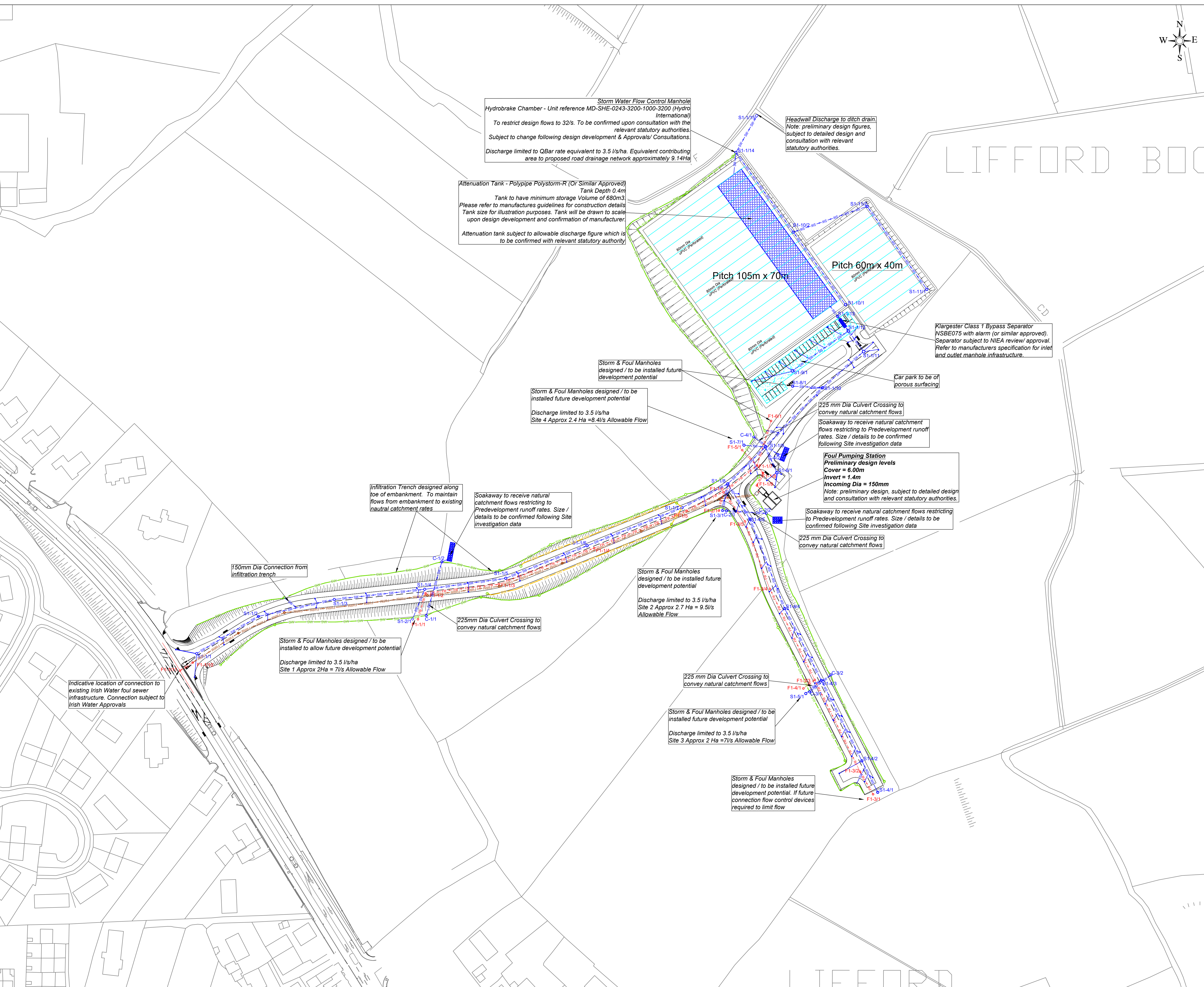
Contact Details: 1c Montgomery House, 478 Castlereagh Road, Belfast, BT5 6BQ. T: 028 9040 2000. E: admin@mcadamdesign.co.uk, www.mcadamdesign.co.uk

Drawn	DWW	Checked	PA	Approved	PA
Date	2022-03-01	Date	2022-03-01	Date	2022-03-01

Project - Organisation - Zone - Level - Type - Role - Number - Revision
LIF - MCA - ST1-00 - DR - C - 2000 - P3

Project Number: E2324
Status code & Description: S2 - For Information

All dimensions are in metres. Figured dimensions to be taken in preference to scale dimensions. Dimensions to be checked on site. © 2021 McAdam Design Ltd.



Storm Water Flow Control Manhole
Hydrobrake Chamber - Unit reference MD-SHE-0243-3200-1000-3200 (Hydro International)
To restrict design flows to 32/s. To be confirmed upon consultation with the relevant statutory authorities.
Subject to change following design development & Approvals/ Consultations.
Discharge limited to QBar rate equivalent to 3.5 l/s/ha. Equivalent contributing area to proposed road drainage network approximately 9.14Ha

Headwall Discharge to ditch drain
Note: preliminary design figures, subject to detailed design and consultation with relevant statutory authorities.

Attenuation Tank - Polypipe Polystorm-R (Or Similar Approved)
Tank Depth 0.4m
Tank to have minimum storage Volume of 680m³.
Please refer to manufacturer's guidelines for construction details.
Tank size for illustration purposes. Tank will be drawn to scale upon design development and confirmation of manufacturer.
Attenuation tank subject to allowable discharge figure which is to be confirmed with relevant statutory authority

Largest Class 1 Bypass Separator
NSBE075 with alarm (or similar approved).
Separator subject to NIEA review/ approval.
Refer to manufacturer's specification for inlet and outlet manhole infrastructure.

Storm & Foul Manholes designed / to be installed future development potential

Storm & Foul Manholes designed / to be installed future development potential
Discharge limited to 3.5 l/s/ha
Site 4 Approx 2.4 Ha = 8.4l/s Allowable Flow

225 mm Dia Culvert Crossing to convey natural catchment flows
Soakaway to receive natural catchment flows restricting to Predevelopment runoff rates. Size / details to be confirmed following Site investigation data

Foul Pumping Station
Preliminary design levels
Cover = 6.00m
Invert = 1.4m
Incoming Dia = 150mm
Note: preliminary design, subject to detailed design and consultation with relevant statutory authorities.

Soakaway to receive natural catchment flows restricting to Predevelopment runoff rates. Size / details to be confirmed following Site investigation data

Infiltration Trench designed along toe of embankment. To maintain flows from embankment to existing natural catchment rates

Soakaway to receive natural catchment flows restricting to Predevelopment runoff rates. Size / details to be confirmed following Site investigation data

150mm Dia Connection from infiltration trench

Storm & Foul Manholes designed / to be installed to allow future development potential
Discharge limited to 3.5 l/s/ha
Site 1 Approx 2Ha = 7l/s Allowable Flow


Indicative location of connection to existing Irish Water foul sewer infrastructure. Connection subject to Irish Water Approvals

Storm & Foul Manholes designed / to be installed future development potential
Discharge limited to 3.5 l/s/ha
Site 2 Approx 2.7 Ha = 9.5l/s Allowable Flow

225 mm Dia Culvert Crossing to convey natural catchment flows
Storm & Foul Manholes designed / to be installed future development potential
Discharge limited to 3.5 l/s/ha
Site 3 Approx 2 Ha = 7l/s Allowable Flow

Storm & Foul Manholes designed / to be installed future development potential. If future connection flow control devices required to limit flow

Appendix E – Proposed Storm Design - Restricted Runoff Calculations

McAdam Design		Page 0
1C Montgomery House Castlereagh Business Park 478 Castlereagh Rd, Belfast,...	Lifford Common Storm Drainage Design	
Date 01/03/2022 File 2022-03-01 Lifford Stor...	Designed by P Alcorn Checked by P Alcorn	
Innovyze	Network 2018.1.1	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for 2022-03-01 STORM.SWS

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	17.500	Add Flow / Climate Change (%)	10
Ratio R	0.350	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 2022-03-01 STORM.SWS





Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.447	4-8	1.217	8-12	0.223

Total Area Contributing (ha) = 1.887

Total Pipe Volume (m³) = 83.362


Network Design Table for 2022-03-01 STORM.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	42.277	1.646	25.7	0.092	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.001	45.610	3.615	12.6	0.063	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.002	53.418	4.093	13.1	0.063	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.000	18.945	0.126	150.4	0.040	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	5.35	23.404	0.092	0.0	0.0	1.2	1.99	35.3	13.7
1.001	50.00	5.62	21.758	0.155	0.0	0.0	2.1	2.85	50.4	23.1
1.002	50.00	5.86	18.143	0.218	0.0	0.0	3.0	3.64	144.8	32.5
2.000	50.00	5.30	12.000	0.040	0.0	0.0	0.5	1.06	42.3	6.0


McAdam Design		Page 1
1C Montgomery House Castlereagh Business Park 478 Castlereagh Rd, Belfast,...	Lifford Common Storm Drainage Design	
Date 01/03/2022 File 2022-03-01 Lifford Stor...	Designed by P Alcorn Checked by P Alcorn	
Innovyze	Network 2018.1.1	

Network Design Table for 2022-03-01 STORM.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	47.990	0.320	150.0	0.060	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.004	51.386	0.343	149.8	0.080	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.005	60.010	2.492	24.1	0.071	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.006	30.251	2.451	12.3	0.033	0.00	0.0	0.600	o	300	Pipe/Conduit	
3.000	15.934	0.607	26.3	0.070	5.00	0.0	0.600	o	225	Pipe/Conduit	
4.000	20.662	0.130	158.9	0.038	5.00	0.0	0.600	o	225	Pipe/Conduit	
4.001	52.926	0.399	132.6	0.062	0.00	0.0	0.600	o	225	Pipe/Conduit	
5.000	15.404	1.154	13.3	0.050	5.00	0.0	0.600	o	225	Pipe/Conduit	
4.002	47.277	0.290	163.0	0.058	0.00	0.0	0.600	o	300	Pipe/Conduit	
4.003	56.388	0.346	163.0	0.067	0.00	0.0	0.600	o	300	Pipe/Conduit	
4.004	24.334	0.149	163.0	0.024	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.007	30.956	1.490	20.8	0.040	0.00	0.0	0.600	o	300	Pipe/Conduit	
6.000	16.464	0.199	82.7	0.050	5.00	0.0	0.600	o	150	Pipe/Conduit	
7.000	12.631	1.604	7.9	0.060	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)
1.003	50.00	6.49	11.799	0.318	0.0	0.0	4.3	1.28	90.6	47.4
1.004	50.00	7.16	11.404	0.398	0.0	0.0	5.4	1.28	90.6	59.3
1.005	49.97	7.47	11.061	0.469	0.0	0.0	6.3	3.22	227.4	69.8
1.006	49.61	7.58	8.569	0.502	0.0	0.0	6.7	4.50	318.0	74.2
3.000	50.00	5.10	6.950	0.070	0.0	0.0	0.9	2.56	101.9	10.4
4.000	50.00	5.33	6.875	0.038	0.0	0.0	0.5	1.03	41.1	5.7
4.001	50.00	6.11	6.745	0.100	0.0	0.0	1.4	1.13	45.1	14.9
5.000	50.00	5.07	7.575	0.050	0.0	0.0	0.7	3.60	143.2	7.4
4.002	50.00	6.75	6.271	0.208	0.0	0.0	2.8	1.23	86.9	31.0
4.003	49.81	7.52	5.981	0.275	0.0	0.0	3.7	1.23	86.9	40.8
4.004	48.80	7.85	5.635	0.299	0.0	0.0	4.0	1.23	86.9	43.5
1.007	48.36	8.00	5.411	0.911	0.0	0.0	11.9	3.46	244.9	131.2
6.000	50.00	5.25	4.470	0.050	0.0	0.0	0.7	1.11	19.5	7.4
7.000	50.00	5.04	5.800	0.060	0.0	0.0	0.8	4.69	186.6	8.9

McAdam Design		Page 2
1C Montgomery House Castlereagh Business Park 478 Castlereagh Rd, Belfast,...	Lifford Common Storm Drainage Design	
Date 01/03/2022 File 2022-03-01 Lifford Stor...	Designed by P Alcorn Checked by P Alcorn	
Innovyze	Network 2018.1.1	

Network Design Table for 2022-03-01 STORM.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
1.008	48.326	1.265	38.2	0.059	0.00	0.0	0.600	o	375	Pipe/Conduit	
8.000	17.579	0.172	102.2	0.065	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.009	32.088	0.800	40.1	0.059	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.010	15.102	0.175	86.3	0.016	0.00	0.0	0.600	o	450	Pipe/Conduit	
9.000	40.281	0.836	48.2	0.078	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.011	10.500	0.121	86.8	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.012	86.077	0.172	500.4	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.013	28.186	0.056	503.3	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
10.000	52.500	0.489	107.4	0.202	5.00	0.0	0.600	o	300	Pipe/Conduit	
11.000	60.000	0.562	106.8	0.141	5.00	0.0	0.600	o	225	Pipe/Conduit	
11.001	45.889	0.306	150.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
10.001	57.632	0.366	157.5	0.202	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.014	24.753	0.158	156.7	0.044	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)
1.008	47.57	8.27	3.921	1.080	0.0	0.0	13.9	2.94	324.7	153.1
8.000	50.00	5.29	3.202	0.065	0.0	0.0	0.9	0.99	17.6	9.7
1.009	47.11	8.44	2.656	1.204	0.0	0.0	15.4	3.22	511.8	169.0
1.010	46.80	8.55	1.781	1.220	0.0	0.0	15.5	2.19	348.2	170.1
9.000	50.00	5.36	2.742	0.078	0.0	0.0	1.1	1.89	75.1	11.6
1.011	46.58	8.63	1.606	1.298	0.0	0.0	16.4	2.18	347.3	180.1
1.012	42.74	10.22	1.485	1.298	0.0	0.0	16.4	0.90	143.5	180.1
1.013	41.64	10.74	1.313	1.298	0.0	0.0	16.4	0.90	143.0	180.1
10.000	50.00	5.58	2.061	0.202	0.0	0.0	2.7	1.52	107.2	30.1
11.000	50.00	5.79	2.515	0.141	0.0	0.0	1.9	1.26	50.3	21.0
11.001	50.00	6.51	1.953	0.141	0.0	0.0	1.9	1.07	42.4	21.0
10.001	50.00	7.28	1.572	0.545	0.0	0.0	7.4	1.25	88.4	81.2
1.014	41.06	11.03	1.206	1.887	0.0	0.0	21.0	1.45	159.6	230.8



Manhole Schedules for 2022-03-01 STORM.SWS


MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
1-1/1	24.754	1.350	Open Manhole	1200	1.000	23.404	150				
1-1/2	23.108	1.350	Open Manhole	1200	1.001	21.758	150	1.000	21.758	150	
1-1/3	19.493	1.350	Open Manhole	1200	1.002	18.143	225	1.001	18.143	150	
1-2/1	13.500	1.500	Open Manhole	1200	2.000	12.000	225				
1-1/4	15.400	3.601	Open Manhole	1200	1.003	11.799	300	1.002	14.050	225	2176
								2.000	11.874	225	
1-1/5	14.474	3.070	Open Manhole	1200	1.004	11.404	300	1.003	11.479	300	75
1-1/6	13.937	2.876	Open Manhole	1200	1.005	11.061	300	1.004	11.061	300	
1-1/7	10.144	1.575	Open Manhole	1200	1.006	8.569	300	1.005	8.569	300	
1-3/1	8.300	1.350	Open Manhole	1200	3.000	6.950	225				
1-4/1	8.300	1.425	Open Manhole	1200	4.000	6.875	225				
1-4/2	8.170	1.425	Open Manhole	1200	4.001	6.745	225	4.000	6.745	225	
1-5/1	9.000	1.425	Open Manhole	1200	5.000	7.575	225				
1-4/3	8.167	1.896	Open Manhole	1200	4.002	6.271	300	4.001	6.346	225	
								5.000	6.421	225	75
1-4/4	8.551	2.570	Open Manhole	1200	4.003	5.981	300	4.002	5.981	300	
1-4/5	7.983	2.348	Open Manhole	1200	4.004	5.635	300	4.003	5.635	300	
1-1/8	7.693	2.282	Open Manhole	1200	1.007	5.411	300	1.006	6.118	300	707
								3.000	6.343	225	857
								4.004	5.486	300	75
1-6/1	5.820	1.350	Open Manhole	1200	6.000	4.470	150				
1-7/1	7.150	1.350	Open Manhole	1200	7.000	5.800	225				
1-1/9	5.621	1.700	Open Manhole	1350	1.008	3.921	375	1.007	3.921	300	
								6.000	4.271	150	125
								7.000	4.196	225	125
1-8/1	4.502	1.300	Open Manhole	1200	8.000	3.202	150				
1-1/10	4.356	1.700	Open Manhole	1350	1.009	2.656	450	1.008	2.656	375	
								8.000	3.030	150	74
1-1/11	3.556	1.775	Open Manhole	1350	1.010	1.781	450	1.009	1.856	450	75
1-9/1	4.092	1.350	Open Manhole	1200	9.000	2.742	225				
1-1/12	3.250	1.644	Open Manhole	1350	1.011	1.606	450	1.010	1.606	450	
								9.000	1.906	225	75
1-1/13	3.377	1.892	Open Manhole	1350	1.012	1.485	450	1.011	1.485	450	
DUMMY	2.673	1.360	Open Manhole	1350	1.013	1.313	450	1.012	1.313	450	
1-10/1	3.389	1.328	Open Manhole	1200	10.000	2.061	300				
1-11/1	3.190	0.675	Open Manhole	1200	11.000	2.515	225				
1-11/2	2.628	0.675	Open Manhole	1200	11.001	1.953	225	11.000	1.953	225	
1-10/2	2.900	1.328	Open Manhole	1200	10.001	1.572	300	10.000	1.572	300	

McAdam Design		Page 4
1C Montgomery House Castlereagh Business Park 478 Castlereagh Rd, Belfast,...		Lifford Common Storm Drainage Design
Date 01/03/2022 File 2022-03-01 Lifford Stor...		Designed by P Alcorn Checked by P Alcorn
Innovyze		Network 2018.1.1



Manhole Schedules for 2022-03-01 STORM.SWS

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out			Pipes In			Backdrop (mm)
					PN	Invert Level (m)	Diameter (mm)	PN	Invert Level (m)	Diameter (mm)	
1-1/14	2.500	1.294	Open Manhole	1350	1.014	1.206	375	11.001	1.647	225	126
16	2.200	1.152	Open Manhole	0		OUTFALL		10.001	1.206	300	
								1.014	1.048	375	

McAdam Design		Page 5
1C Montgomery House Castlereagh Business Park 478 Castlereagh Rd, Belfast,...	Lifford Common Storm Drainage Design	
Date 01/03/2022 File 2022-03-01 Lifford Stor...	Designed by P Alcorn Checked by P Alcorn	
Innovyze	Network 2018.1.1	


PIPELINE SCHEDULES for 2022-03-01 STORM.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	1-1/1	24.754	23.404	1.200	Open Manhole	1200
1.001	o	150	1-1/2	23.108	21.758	1.200	Open Manhole	1200
1.002	o	225	1-1/3	19.493	18.143	1.125	Open Manhole	1200
2.000	o	225	1-2/1	13.500	12.000	1.275	Open Manhole	1200
1.003	o	300	1-1/4	15.400	11.799	3.301	Open Manhole	1200
1.004	o	300	1-1/5	14.474	11.404	2.770	Open Manhole	1200
1.005	o	300	1-1/6	13.937	11.061	2.576	Open Manhole	1200
1.006	o	300	1-1/7	10.144	8.569	1.275	Open Manhole	1200
3.000	o	225	1-3/1	8.300	6.950	1.125	Open Manhole	1200
4.000	o	225	1-4/1	8.300	6.875	1.200	Open Manhole	1200
4.001	o	225	1-4/2	8.170	6.745	1.200	Open Manhole	1200
5.000	o	225	1-5/1	9.000	7.575	1.200	Open Manhole	1200
4.002	o	300	1-4/3	8.167	6.271	1.596	Open Manhole	1200
4.003	o	300	1-4/4	8.551	5.981	2.270	Open Manhole	1200
4.004	o	300	1-4/5	7.983	5.635	2.048	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	42.277	25.7	1-1/2	23.108	21.758	1.200	Open Manhole	1200
1.001	45.610	12.6	1-1/3	19.493	18.143	1.200	Open Manhole	1200
1.002	53.418	13.1	1-1/4	15.400	14.050	1.125	Open Manhole	1200
2.000	18.945	150.4	1-1/4	15.400	11.874	3.301	Open Manhole	1200
1.003	47.990	150.0	1-1/5	14.474	11.479	2.695	Open Manhole	1200
1.004	51.386	149.8	1-1/6	13.937	11.061	2.576	Open Manhole	1200
1.005	60.010	24.1	1-1/7	10.144	8.569	1.275	Open Manhole	1200
1.006	30.251	12.3	1-1/8	7.693	6.118	1.275	Open Manhole	1200
3.000	15.934	26.3	1-1/8	7.693	6.343	1.125	Open Manhole	1200
4.000	20.662	158.9	1-4/2	8.170	6.745	1.200	Open Manhole	1200
4.001	52.926	132.6	1-4/3	8.167	6.346	1.596	Open Manhole	1200
5.000	15.404	13.3	1-4/3	8.167	6.421	1.521	Open Manhole	1200
4.002	47.277	163.0	1-4/4	8.551	5.981	2.270	Open Manhole	1200
4.003	56.388	163.0	1-4/5	7.983	5.635	2.048	Open Manhole	1200
4.004	24.334	163.0	1-1/8	7.693	5.486	1.907	Open Manhole	1200

McAdam Design		Page 6
1C Montgomery House Castlereagh Business Park 478 Castlereagh Rd, Belfast,...	Lifford Common Storm Drainage Design	
Date 01/03/2022 File 2022-03-01 Lifford Stor...	Designed by P Alcorn Checked by P Alcorn	
Innovyze	Network 2018.1.1	


PIPELINE SCHEDULES for 2022-03-01 STORM.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)
1.007	o	300	1-1/8	7.693	5.411	1.982	Open Manhole	1200
6.000	o	150	1-6/1	5.820	4.470	1.200	Open Manhole	1200
7.000	o	225	1-7/1	7.150	5.800	1.125	Open Manhole	1200
1.008	o	375	1-1/9	5.621	3.921	1.325	Open Manhole	1350
8.000	o	150	1-8/1	4.502	3.202	1.150	Open Manhole	1200
1.009	o	450	1-1/10	4.356	2.656	1.250	Open Manhole	1350
1.010	o	450	1-1/11	3.556	1.781	1.325	Open Manhole	1350
9.000	o	225	1-9/1	4.092	2.742	1.125	Open Manhole	1200
1.011	o	450	1-1/12	3.250	1.606	1.194	Open Manhole	1350
1.012	o	450	1-1/13	3.377	1.485	1.442	Open Manhole	1350
1.013	o	450	DUMMY	2.673	1.313	0.910	Open Manhole	1350
10.000	o	300	1-10/1	3.389	2.061	1.028	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)
1.007	30.956	20.8	1-1/9	5.621	3.921	1.400	Open Manhole	1350
6.000	16.464	82.7	1-1/9	5.621	4.271	1.200	Open Manhole	1350
7.000	12.631	7.9	1-1/9	5.621	4.196	1.200	Open Manhole	1350
1.008	48.326	38.2	1-1/10	4.356	2.656	1.325	Open Manhole	1350
8.000	17.579	102.2	1-1/10	4.356	3.030	1.176	Open Manhole	1350
1.009	32.088	40.1	1-1/11	3.556	1.856	1.250	Open Manhole	1350
1.010	15.102	86.3	1-1/12	3.250	1.606	1.194	Open Manhole	1350
9.000	40.281	48.2	1-1/12	3.250	1.906	1.119	Open Manhole	1350
1.011	10.500	86.8	1-1/13	3.377	1.485	1.442	Open Manhole	1350
1.012	86.077	500.4	DUMMY	2.673	1.313	0.910	Open Manhole	1350
1.013	28.186	503.3	1-1/14	2.500	1.257	0.793	Open Manhole	1350
10.000	52.500	107.4	1-10/2	2.900	1.572	1.028	Open Manhole	1200

McAdam Design		Page 7
1C Montgomery House Castlereagh Business Park 478 Castlereagh Rd, Belfast,...	Lifford Common Storm Drainage Design	
Date 01/03/2022 File 2022-03-01 Lifford Stor...	Designed by P Alcorn Checked by P Alcorn	
Innovyze	Network 2018.1.1	

PIPELINE SCHEDULES for 2022-03-01 STORM.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)
11.000	o	225	1-11/1	3.190	2.515	0.450	Open Manhole	1200
11.001	o	225	1-11/2	2.628	1.953	0.450	Open Manhole	1200
10.001	o	300	1-10/2	2.900	1.572	1.028	Open Manhole	1200
1.014	o	375	1-1/14	2.500	1.206	0.919	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)
11.000	60.000	106.8	1-11/2	2.628	1.953	0.450	Open Manhole	1200
11.001	45.889	150.0	1-10/2	2.900	1.647	1.028	Open Manhole	1200
10.001	57.632	157.5	1-1/14	2.500	1.206	0.994	Open Manhole	1350
1.014	24.753	156.7	16	2.200	1.048	0.777	Open Manhole	0

Free Flowing Outfall Details for 2022-03-01 STORM.SWS

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
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1.014	16	2.200	1.048	0.000	0	0
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Simulation Criteria for 2022-03-01 STORM.SWS

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1
Number of Input Hydrographs	0	Number of 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	Region	Scotland and Ireland
Return Period (years)	2	M5-60 (mm)	17.500

McAdam Design		Page 8
1C Montgomery House Castlereagh Business Park 478 Castlereagh Rd, Belfast,...	Lifford Common Storm Drainage Design	
Date 01/03/2022	Designed by P Alcorn	
File 2022-03-01 Lifford Stor...	Checked by P Alcorn	
Innovyze	Network 2018.1.1	

Synthetic Rainfall Details

Ratio R 0.350 Cv (Winter) 0.840
 Profile Type Summer Storm Duration (mins) 30
 Cv (Summer) 0.750

McAdam Design		Page 9
1C Montgomery House Castlereagh Business Park 478 Castlereagh Rd, Belfast,...	Lifford Common Storm Drainage Design	
Date 01/03/2022 File 2022-03-01 Lifford Stor...	Designed by P Alcorn Checked by P Alcorn	
Innovyze	Network 2018.1.1	

Online Controls for 2022-03-01 STORM.SWS


Hydro-Brake® Optimum Manhole: 1-1/14, DS/PN: 1.014, Volume (m³): 10.1

Unit Reference	MD-SHE-0243-3200-1000-3200
Design Head (m)	1.000
Design Flow (l/s)	32.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	243
Invert Level (m)	1.206
Minimum Outlet Pipe Diameter (mm)	300
Suggested Manhole Diameter (mm)	1800

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	32.0
Flush-Flo™	0.387	32.0
Kick-Flo®	0.751	27.9
Mean Flow over Head Range	-	26.4

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	8.0	1.200	34.9	3.000	54.3	7.000	82.0
0.200	24.8	1.400	37.6	3.500	58.5	7.500	84.8
0.300	31.6	1.600	40.1	4.000	62.4	8.000	87.5
0.400	32.0	1.800	42.4	4.500	66.1	8.500	90.1
0.500	31.6	2.000	44.6	5.000	69.6	9.000	92.7
0.600	30.8	2.200	46.8	5.500	72.9	9.500	95.1
0.800	28.8	2.400	48.8	6.000	76.0		
1.000	32.0	2.600	50.7	6.500	79.1		


McAdam Design		Page 10
1C Montgomery House Castlereagh Business Park 478 Castlereagh Rd, Belfast,...	Lifford Common Storm Drainage Design	
Date 01/03/2022	Designed by P Alcorn	
File 2022-03-01 Lifford Stor...	Checked by P Alcorn	
Innovyze	Network 2018.1.1	

Storage Structures for 2022-03-01 STORM.SWS

Cellular Storage Manhole: 1-1/14, DS/PN: 1.014

Invert Level (m) 1.206 Safety Factor 2.0
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
 Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	1700.0	0.0	0.401	0.0	0.0
0.400	1700.0	0.0			

McAdam Design		Page 11
1C Montgomery House Castlereagh Business Park 478 Castlereagh Rd, Belfast,...	Lifford Common Storm Drainage Design	
Date 01/03/2022 File 2022-03-01 Lifford Stor...	Designed by P Alcorn Checked by P Alcorn	
Innovyze	Network 2018.1.1	

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for 2022-03-01 STORM.SWS

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coefficient	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	0.350
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	17.500	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
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)	2, 30, 100
Climate Change (%)	20, 20, 20

US/MH PN	Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1-1/1	15 Winter	2	+20%	100/15 Summer				23.480
1.001	1-1/2	15 Winter	2	+20%	30/15 Summer				21.838
1.002	1-1/3	15 Winter	2	+20%					18.222
2.000	1-2/1	15 Winter	2	+20%	30/15 Summer				12.068
1.003	1-1/4	15 Winter	2	+20%	30/15 Summer				11.973
1.004	1-1/5	15 Winter	2	+20%	30/15 Summer				11.602
1.005	1-1/6	15 Winter	2	+20%					11.182
1.006	1-1/7	15 Winter	2	+20%					8.675
3.000	1-3/1	15 Winter	2	+20%	100/15 Winter				7.007
4.000	1-4/1	15 Winter	2	+20%	100/15 Summer				6.942
4.001	1-4/2	15 Winter	2	+20%	100/15 Summer				6.843
5.000	1-5/1	15 Winter	2	+20%					7.615
4.002	1-4/3	15 Winter	2	+20%	100/15 Summer				6.407
4.003	1-4/4	15 Winter	2	+20%	30/15 Summer				6.138
4.004	1-4/5	15 Winter	2	+20%	30/15 Summer				5.803
1.007	1-1/8	15 Winter	2	+20%	30/15 Summer				5.584
6.000	1-6/1	15 Winter	2	+20%	100/15 Summer				4.547

McAdam Design		Page 12
1C Montgomery House Castlereagh Business Park 478 Castlereagh Rd, Belfast,...	Lifford Common Storm Drainage Design	
Date 01/03/2022 File 2022-03-01 Lifford Stor...	Designed by P Alcorn Checked by P Alcorn	
Innovyze	Network 2018.1.1	

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for 2022-03-01 STORM.SWS


PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1-1/1	-0.074	0.000	0.49	16.9	OK	
1.001	1-1/2	-0.070	0.000	0.55	26.9	OK	
1.002	1-1/3	-0.146	0.000	0.27	36.9	OK	
2.000	1-2/1	-0.157	0.000	0.19	7.4	OK	
1.003	1-1/4	-0.126	0.000	0.62	52.8	OK	
1.004	1-1/5	-0.102	0.000	0.75	64.0	OK	
1.005	1-1/6	-0.179	0.000	0.34	73.7	OK	
1.006	1-1/7	-0.194	0.000	0.27	78.1	OK	
3.000	1-3/1	-0.168	0.000	0.14	13.1	OK	
4.000	1-4/1	-0.158	0.000	0.19	7.0	OK	
4.001	1-4/2	-0.127	0.000	0.38	16.4	OK	
5.000	1-5/1	-0.185	0.000	0.07	9.3	OK	
4.002	1-4/3	-0.164	0.000	0.41	33.6	OK	
4.003	1-4/4	-0.143	0.000	0.52	42.9	OK	
4.004	1-4/5	-0.132	0.000	0.59	45.9	OK	
1.007	1-1/8	-0.127	0.000	0.62	139.0	OK	
6.000	1-6/1	-0.073	0.000	0.51	9.3	OK	

McAdam Design		Page 13
1C Montgomery House Castlereagh Business Park 478 Castlereagh Rd, Belfast,...	Lifford Common Storm Drainage Design	
Date 01/03/2022 File 2022-03-01 Lifford Stor...	Designed by P Alcorn Checked by P Alcorn	
Innovyze	Network 2018.1.1	

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for 2022-03-01 STORM.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
7.000	1-7/1	15 Winter	2	+20%				
1.008	1-1/9	15 Winter	2	+20%	30/15 Summer			
8.000	1-8/1	15 Winter	2	+20%	30/15 Summer			
1.009	1-1/10	15 Winter	2	+20%	30/15 Summer			
1.010	1-1/11	15 Winter	2	+20%	2/15 Summer	100/15 Winter		
9.000	1-9/1	15 Winter	2	+20%	30/15 Summer			
1.011	1-1/12	15 Winter	2	+20%	2/15 Summer	100/15 Summer		
1.012	1-1/13	15 Winter	2	+20%	2/15 Summer			
1.013	DUMMY	15 Winter	2	+20%	2/15 Summer			
10.000	1-10/1	15 Winter	2	+20%	30/15 Summer			
11.000	1-11/1	15 Winter	2	+20%	30/15 Summer			
11.001	1-11/2	15 Winter	2	+20%	30/15 Summer	100/15 Summer		
10.001	1-10/2	15 Winter	2	+20%	30/15 Summer			
1.014	1-1/14	360 Winter	2	+20%	100/120 Winter			

PN	US/MH Name	Water			Flooded		Pipe		Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m³)	Flow / Cap. (l/s)	Overflow Flow (l/s)				
7.000	1-7/1	5.839	-0.186	0.000	0.07	11.2	OK			
1.008	1-1/9	4.120	-0.176	0.000	0.55	164.0	OK			
8.000	1-8/1	3.299	-0.053	0.000	0.73	12.0	OK			
1.009	1-1/10	2.857	-0.249	0.000	0.41	182.8	OK			
1.010	1-1/11	2.334	0.103	0.000	0.76	179.6	SURCHARGED	2		
9.000	1-9/1	2.811	-0.156	0.000	0.20	14.4	OK			
1.011	1-1/12	2.194	0.138	0.000	0.96	188.8	SURCHARGED	4		
1.012	1-1/13	2.078	0.143	0.000	1.27	172.2	SURCHARGED			
1.013	DUMMY	1.795	0.032	0.000	1.40	171.0	SURCHARGED			
10.000	1-10/1	2.188	-0.173	0.000	0.37	37.0	OK			
11.000	1-11/1	2.634	-0.106	0.000	0.52	25.5	OK			
11.001	1-11/2	2.083	-0.095	0.000	0.61	24.8	OK	4		
10.001	1-10/2	1.864	-0.008	0.000	1.00	83.9	OK			
1.014	1-1/14	1.392	-0.189	0.000	0.16	22.4	OK			

McAdam Design		Page 14
1C Montgomery House Castlereagh Business Park 478 Castlereagh Rd, Belfast,...	Lifford Common Storm Drainage Design	
Date 01/03/2022 File 2022-03-01 Lifford Stor...	Designed by P Alcorn Checked by P Alcorn	
Innovyze	Network 2018.1.1	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for 2022-03-01 STORM.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 Coefficient 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 0.350
Region Scotland and Ireland Cv (Summer) 0.750
M5-60 (mm) 17.500 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status ON
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) 2, 30, 100
Climate Change (%) 20, 20, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1-1/1	15 Winter	30	+20%	100/15	Summer			23.519
1.001	1-1/2	15 Winter	30	+20%	30/15	Summer			22.066
1.002	1-1/3	15 Winter	30	+20%					18.259
2.000	1-2/1	15 Winter	30	+20%	30/15	Summer			12.449
1.003	1-1/4	15 Winter	30	+20%	30/15	Summer			12.426
1.004	1-1/5	15 Winter	30	+20%	30/15	Summer			12.001
1.005	1-1/6	15 Winter	30	+20%					11.232
1.006	1-1/7	15 Winter	30	+20%					8.717
3.000	1-3/1	15 Winter	30	+20%	100/15	Winter			7.029
4.000	1-4/1	15 Winter	30	+20%	100/15	Summer			6.967
4.001	1-4/2	15 Winter	30	+20%	100/15	Summer			6.902
5.000	1-5/1	15 Winter	30	+20%					7.630
4.002	1-4/3	15 Winter	30	+20%	100/15	Summer			6.505
4.003	1-4/4	15 Winter	30	+20%	30/15	Summer			6.401
4.004	1-4/5	15 Winter	30	+20%	30/15	Summer			6.193
1.007	1-1/8	15 Winter	30	+20%	30/15	Summer			6.101
6.000	1-6/1	15 Winter	30	+20%	100/15	Summer			4.614

McAdam Design		Page 15
1C Montgomery House Castlereagh Business Park 478 Castlereagh Rd, Belfast,...	Lifford Common Storm Drainage Design	
Date 01/03/2022 File 2022-03-01 Lifford Stor...	Designed by P Alcorn Checked by P Alcorn	
Innovyze	Network 2018.1.1	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for 2022-03-01 STORM.SWS


PN	US/MH Name	Surcharged Flooded		Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m ³)					
1.000	1-1/1	-0.035	0.000	0.91		31.2	OK	
1.001	1-1/2	0.158	0.000	1.02		50.0	SURCHARGED	
1.002	1-1/3	-0.109	0.000	0.52		72.5	OK	
2.000	1-2/1	0.224	0.000	0.37		14.1	SURCHARGED	
1.003	1-1/4	0.327	0.000	1.16		98.7	SURCHARGED	
1.004	1-1/5	0.297	0.000	1.35		115.1	SURCHARGED	
1.005	1-1/6	-0.129	0.000	0.61		131.1	OK	
1.006	1-1/7	-0.152	0.000	0.48		138.9	OK	
3.000	1-3/1	-0.146	0.000	0.27		24.2	OK	
4.000	1-4/1	-0.133	0.000	0.34		12.9	OK	
4.001	1-4/2	-0.068	0.000	0.79		34.3	OK	
5.000	1-5/1	-0.170	0.000	0.14		17.3	OK	
4.002	1-4/3	-0.066	0.000	0.85		69.4	OK	
4.003	1-4/4	0.120	0.000	0.96		79.4	SURCHARGED	
4.004	1-4/5	0.258	0.000	1.10		85.0	SURCHARGED	
1.007	1-1/8	0.390	0.000	1.01		225.7	SURCHARGED	
6.000	1-6/1	-0.006	0.000	0.95		17.2	OK	

McAdam Design		Page 16
1C Montgomery House Castlereagh Business Park 478 Castlereagh Rd, Belfast,...	Lifford Common Storm Drainage Design	
Date 01/03/2022 File 2022-03-01 Lifford Stor...	Designed by P Alcorn Checked by P Alcorn	
Innovyze	Network 2018.1.1	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for 2022-03-01 STORM.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
7.000	1-7/1	15 Winter	30	+20%				
1.008	1-1/9	15 Winter	30	+20%	30/15 Summer			
8.000	1-8/1	15 Winter	30	+20%	30/15 Summer			
1.009	1-1/10	15 Winter	30	+20%	30/15 Summer			
1.010	1-1/11	15 Winter	30	+20%	2/15 Summer	100/15 Winter		
9.000	1-9/1	15 Winter	30	+20%	30/15 Summer			
1.011	1-1/12	15 Winter	30	+20%	2/15 Summer	100/15 Summer		
1.012	1-1/13	15 Winter	30	+20%	2/15 Summer			
1.013	DUMMY	15 Winter	30	+20%	2/15 Summer			
10.000	1-10/1	15 Winter	30	+20%	30/15 Summer			
11.000	1-11/1	15 Winter	30	+20%	30/15 Summer			
11.001	1-11/2	15 Winter	30	+20%	30/15 Summer	100/15 Summer		
10.001	1-10/2	15 Winter	30	+20%	30/15 Summer			
1.014	1-1/14	240 Winter	30	+20%	100/120 Winter			

PN	US/MH Name	Water Surcharged Flooded			Pipe		Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)		
7.000	1-7/1	5.854	-0.171	0.000	0.13	20.7	OK	
1.008	1-1/9	4.548	0.252	0.000	0.91	271.9	SURCHARGED	
8.000	1-8/1	3.723	0.371	0.000	1.23	20.1	SURCHARGED	
1.009	1-1/10	3.623	0.517	0.000	0.63	280.1	SURCHARGED	
1.010	1-1/11	3.309	1.078	0.000	1.19	280.6	FLOOD RISK	2
9.000	1-9/1	3.103	0.136	0.000	0.37	26.5	SURCHARGED	
1.011	1-1/12	3.061	1.005	0.000	1.51	295.4	FLOOD RISK	4
1.012	1-1/13	2.787	0.852	0.000	2.11	286.1	SURCHARGED	
1.013	DUMMY	1.994	0.231	0.000	2.35	286.3	SURCHARGED	
10.000	1-10/1	2.648	0.287	0.000	0.58	58.7	SURCHARGED	
11.000	1-11/1	2.937	0.197	0.000	0.83	40.5	FLOOD RISK	
11.001	1-11/2	2.624	0.446	0.000	1.04	41.9	FLOOD RISK	4
10.001	1-10/2	2.482	0.610	0.000	1.61	134.9	SURCHARGED	
1.014	1-1/14	1.521	-0.060	0.000	0.23	31.7	OK	

McAdam Design		Page 17
1C Montgomery House Castlereagh Business Park 478 Castlereagh Rd, Belfast,...	Lifford Common Storm Drainage Design	
Date 01/03/2022	Designed by P Alcorn	
File 2022-03-01 Lifford Stor...	Checked by P Alcorn	
Innovyze	Network 2018.1.1	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2022-03-01 STORM.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 Coefficient 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 0.350
Region Scotland and Ireland Cv (Summer) 0.750
M5-60 (mm) 17.500 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status ON
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) 2, 30, 100
Climate Change (%) 20, 20, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1-1/1	15 Winter	100	+20%	100/15	Summer			24.056
1.001	1-1/2	15 Winter	100	+20%	30/15	Summer			22.591
1.002	1-1/3	15 Winter	100	+20%					18.268
2.000	1-2/1	15 Winter	100	+20%	30/15	Summer			12.980
1.003	1-1/4	15 Winter	100	+20%	30/15	Summer			12.948
1.004	1-1/5	15 Winter	100	+20%	30/15	Summer			12.345
1.005	1-1/6	15 Winter	100	+20%					11.262
1.006	1-1/7	15 Winter	100	+20%					8.741
3.000	1-3/1	15 Winter	100	+20%	100/15	Winter			7.304
4.000	1-4/1	15 Winter	100	+20%	100/15	Summer			7.771
4.001	1-4/2	15 Winter	100	+20%	100/15	Summer			7.750
5.000	1-5/1	15 Winter	100	+20%					7.683
4.002	1-4/3	15 Winter	100	+20%	100/15	Summer			7.649
4.003	1-4/4	15 Winter	100	+20%	30/15	Summer			7.550
4.004	1-4/5	15 Winter	100	+20%	30/15	Summer			7.377
1.007	1-1/8	15 Winter	100	+20%	30/15	Summer			7.275
6.000	1-6/1	15 Winter	100	+20%	100/15	Summer			5.376

McAdam Design		Page 18
1C Montgomery House Castlereagh Business Park 478 Castlereagh Rd, Belfast,...	Lifford Common Storm Drainage Design	
Date 01/03/2022 File 2022-03-01 Lifford Stor...	Designed by P Alcorn Checked by P Alcorn	
Innovyze	Network 2018.1.1	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2022-03-01 STORM.SWS

PN	US/MH Name	Surcharged Flooded		Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m³)					
1.000	1-1/1	0.502	0.000	0.96		32.7	SURCHARGED	
1.001	1-1/2	0.683	0.000	1.09		53.3	SURCHARGED	
1.002	1-1/3	-0.100	0.000	0.59		81.8	OK	
2.000	1-2/1	0.755	0.000	0.50		18.9	SURCHARGED	
1.003	1-1/4	0.849	0.000	1.35		114.7	SURCHARGED	
1.004	1-1/5	0.641	0.000	1.66		141.9	SURCHARGED	
1.005	1-1/6	-0.099	0.000	0.76		165.0	OK	
1.006	1-1/7	-0.128	0.000	0.61		175.9	OK	
3.000	1-3/1	0.129	0.000	0.35		31.5	SURCHARGED	
4.000	1-4/1	0.671	0.000	0.42		15.9	SURCHARGED	
4.001	1-4/2	0.780	0.000	0.92		40.0	SURCHARGED	
5.000	1-5/1	-0.117	0.000	0.18		22.5	OK	
4.002	1-4/3	1.078	0.000	0.90		73.2	SURCHARGED	
4.003	1-4/4	1.269	0.000	0.92		76.0	SURCHARGED	
4.004	1-4/5	1.442	0.000	1.23		94.9	SURCHARGED	
1.007	1-1/8	1.564	0.000	1.16		258.7	SURCHARGED	
6.000	1-6/1	0.756	0.000	1.02		18.6	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2022-03-01 STORM.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
7.000	1-7/1	15 Winter	100	+20%				
1.008	1-1/9	15 Winter	100	+20%	30/15 Summer			
8.000	1-8/1	15 Winter	100	+20%	30/15 Summer			
1.009	1-1/10	15 Winter	100	+20%	30/15 Summer			
1.010	1-1/11	15 Winter	100	+20%	2/15 Summer	100/15 Winter		
9.000	1-9/1	15 Winter	100	+20%	30/15 Summer			
1.011	1-1/12	15 Winter	100	+20%	2/15 Summer	100/15 Summer		
1.012	1-1/13	15 Winter	100	+20%	2/15 Summer			
1.013	DUMMY	240 Winter	100	+20%	2/15 Summer			
10.000	1-10/1	15 Winter	100	+20%	30/15 Summer			
11.000	1-11/1	15 Winter	100	+20%	30/15 Summer			
11.001	1-11/2	15 Winter	100	+20%	30/15 Summer	100/15 Summer		
10.001	1-10/2	15 Winter	100	+20%	30/15 Summer			
1.014	1-1/14	240 Winter	100	+20%	100/120 Winter			

PN	US/MH Name	Water			Surcharged		Flooded		Pipe		Level Exceeded
		Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status			
7.000	1-7/1	5.862	-0.163	0.000	0.17		27.0	OK			
1.008	1-1/9	5.264	0.968	0.000	1.00		298.0	SURCHARGED			
8.000	1-8/1	4.228	0.876	0.000	1.32		21.6	FLOOD RISK			
1.009	1-1/10	4.012	0.906	0.000	0.74		328.3	SURCHARGED			
1.010	1-1/11	3.559	1.328	2.893	1.32		311.6	FLOOD		2	
9.000	1-9/1	3.374	0.407	0.000	0.43		30.8	SURCHARGED			
1.011	1-1/12	3.254	1.198	4.474	1.62		318.4	FLOOD		4	
1.012	1-1/13	2.951	1.016	0.000	2.29		310.2	SURCHARGED			
1.013	DUMMY	2.160	0.397	0.000	0.93		113.4	SURCHARGED			
10.000	1-10/1	3.053	0.692	0.000	0.83		84.1	SURCHARGED			
11.000	1-11/1	3.186	0.446	0.000	0.98		47.6	FLOOD RISK			
11.001	1-11/2	2.639	0.461	10.549	1.51		60.9	FLOOD		4	
10.001	1-10/2	2.733	0.861	0.000	1.80		150.6	FLOOD RISK			
1.014	1-1/14	2.151	0.570	0.000	0.23		31.9	SURCHARGED			



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