Highgate Newton Community Centre

Discharge of Planning Condition no. 9 – Review of Proposed SUDs Drainage Elements

November 2021

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November 2021

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NI Reg No. NI055181

CONTENTS

1.0 PLANNING CONDITION INFORMATION

1.1 Planning approval for the proposed development has been obtained under planning reference 2018/5774/P.

1.2 Planning condition No.9 of the approval states “Prior to commencement of the relevant part of the development (excluding demolition) details of a sustainable urban drainage system shall be submitted to and approved by the local planning authority in writing. SUDS will be implemented prior to the opening of the relevant parts of the development and maintained thereafter”.

2.0 INTRODUCTION TO THE SCHEME

2.1 Doran Consulting Ltd. have been commissioned by Farrans Construction Ltd. (Farrans) to undertake the below ground surface water and foul water drainage design for the proposed new Highgate Newtown Community Centre and Youth Academy development, located at 25 Bertram Street, London, N19 5DQ.

2.2 The development consists of the demolition of existing buildings and construction of:

- Block A – Residential building
- Block B – Offices
- Sports Hall
- Bicycle shed and Stores
- Block C – Reconfiguration of the Existing Gospel Hall
- Block D – Four storey residential building

3.0 DRAINAGE DESIGN STANDARDS & GUIDELINES

3.1 All drainage has been designed and will be developed in accordance with the current British Standards - BS EN 752 ‘Drain and Sewer Systems Outside Buildings’ and BS EN 12056, ‘Gravity Drainage Systems Inside Buildings;’ ‘WRc Sewers for Adoption - 7th Edition, and the requirements stipulated by the local Planning Authority and UK Building Regulations, namely, ‘Approved Document H – Drainage & Waste Disposal’.

3.2 The design of the surface drainage systems has also been developed in accordance with best practice guidelines, such as ‘Drainage of Development Sites - A Guide by HR Wallingford/CIRIA’ and ‘The CIRIA SUDs Manual’.

3.3 The proposed surface water drainage system for the site has been designed with a conservative, responsible, and innovative approach, incorporating best practice and

sustainable drainage techniques, wherever possible, in order to minimise the facility's impact on the local environment.

4.0 FLOOD RISK ASSESSMENT

4.1 A flood risk assessment for the site was carried out by Conisbee in December 2016.

4.2 The report findings conclude that in accordance with the National Planning Policy Framework (NPPF), the site is located within a Flood Zone 1. This is defined as an area having a less than 0.1% probability of flooding from rivers and the sea and therefore, in line with NPPF guidelines, is considered suitable for development. Furthermore, the SFRA and the site-specific flood risk assessment for the development did not identify any potential flood risks that could not be managed.

4.3 Conisbee had indicated that post development flows, generated from a 1 in 100 year plus 30% CC storm event, leaving the site should be limited to 5l/s from two outfall locations.

4.4 Attenuation systems are therefore to be provided on site to provide adequate storage during a design storm event, and discharge rates will be limited using vortex flow control units upstream of the identified site discharge points.

5.0 PROPOSED SURFACE WATER DESIGN STRATEGY

5.1 The proposed development will see the construction of new residential buildings, office buildings, a sports hall, bicycle shed and stores and the reconfiguration of an existing Gospel Hall. It also includes the construction of new hardstanding and landscaped areas.

5.2 Surface water attenuation for the site shall be provided using 3no. underground cellular storage tanks. One tank shall be provided within the main site and two smaller tanks shall be provided, to the back of the Gospel Hall (as shown in Figure 1&2). Flows from the above will be restricted via the use of a Hydrobrake Vortex Flow Control unit. In addition, green roofs have been incorporated into the development on Block A, Block B and Block D, which shall provide source control measure, helping to effectively slow down and delay the rainwater flows from the roofs of each building.

5.3 The design of the proposed surface water drainage system has been undertaken to provide a sustainable solution, reducing the surface water flow leaving the site to a total flow of 10l/s in accordance with Thames Water approval and the approved

Drainage Strategy. This also aligns with the original drainage impact assessment carried out by Conisbee.

5.4 The proposed surface water attenuation systems are shown on the images below, which is an extract from the drainage layout drawing included within Appendix A.

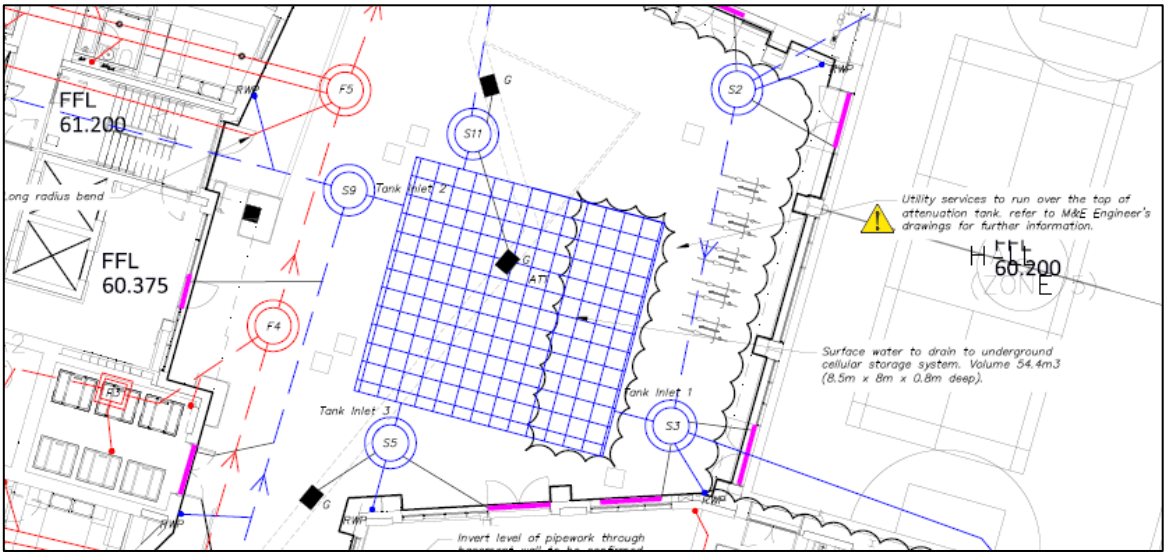


Figure 1: Attenuation Systems Main Site

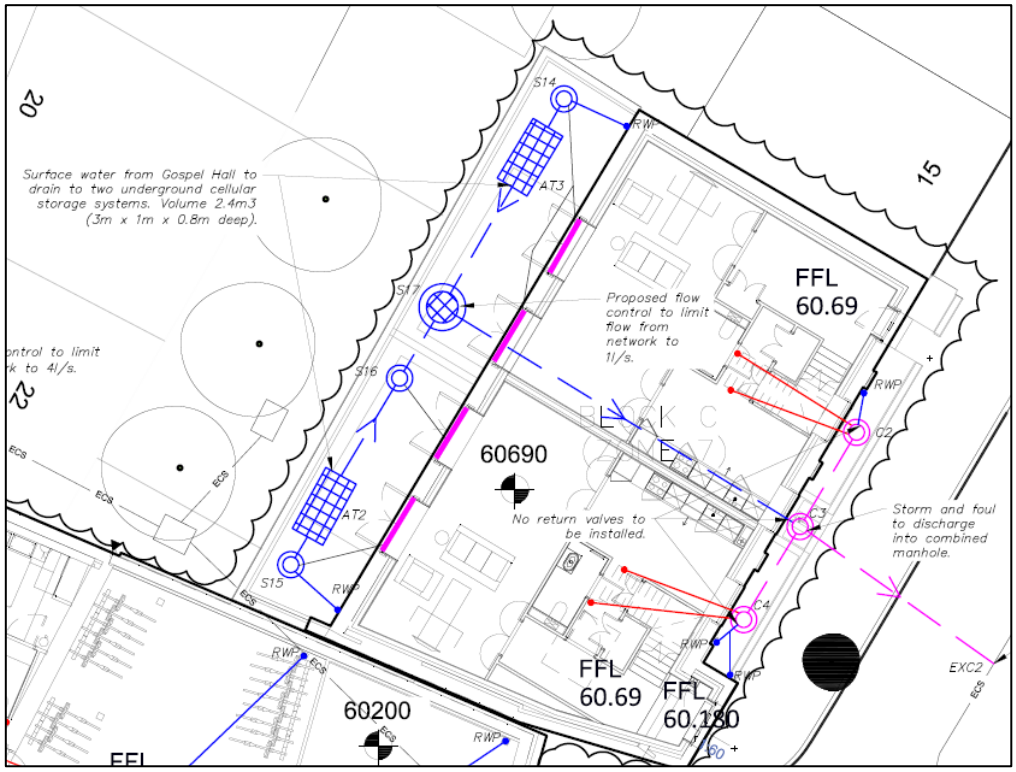


Figure 2: Attenuation Systems Gospel Hall

5.5 The surface water attenuation system has been designed in accordance with current best practice to accommodate the 1 in 100 year storm event (+30% climate change) including the critical storm duration. The effective volume of attenuation to be provided is 55m^3 for the main site and 4.8m^3 for the gospel hall. Calculations are provided in Appendix B.

5.6 The figure below, indicates a typical cellular storage system, proposed for the project. The cellular units shall be surrounded by an impermeable liner and protection fleece. The proposed systems for the main site and the gospel hall have been designed as a 55m^3 (8m by 8.5m by 0.8m deep) and two 2.4m^3 (3m by 1m by 0.8m deep) Polystorm-R Geocellular tanks Systems (or similar approved).

Figure 3: Typical Cellular Storage System

6.0 CONCLUSION

6.1 The proposed surface water drainage system has been designed in strict accordance with the relevant British Standards, Sewers for Adoption guidelines and Building Regulations. It has also considered the local planning policy, Flood Risk Assessment and Drainage Strategies previously proposed for the scheme.

6.2 Surface flows from the proposed development shall be restricted to a total flow of 10l/s in accordance with Thames Water approval, the approved drainage strategy and the original drainage impact assessment carried out by Conisbee (FRA). Flows shall be restricted via the use of vortex flow control units.

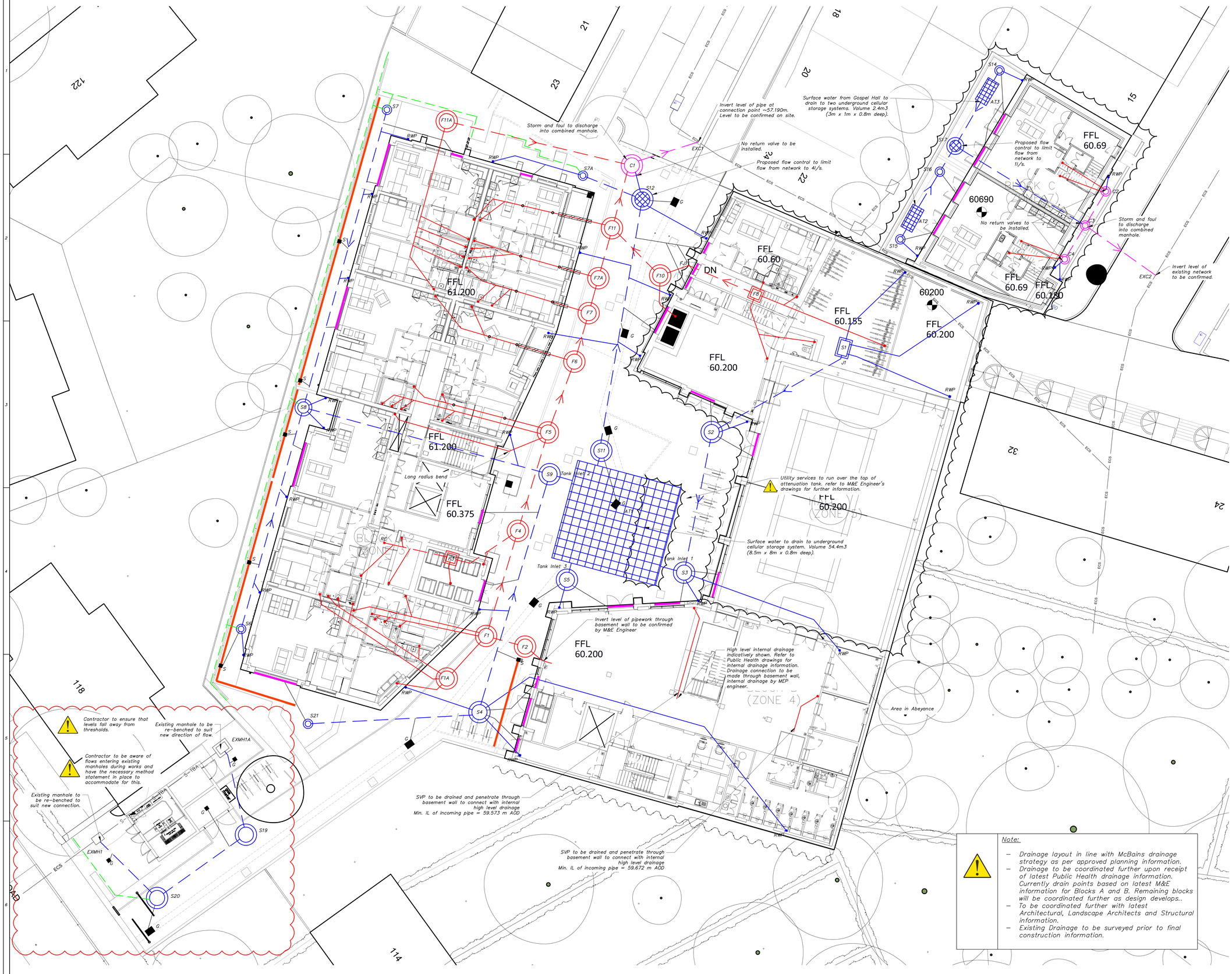
6.3 Surface Water attenuation shall be provided via the use of 3 no. cellular storage tanks (Polypipe Polystorm R system of similar approved). The tanks shall have a respective volume of 55m3, 2.4m3 and 2.4m3.

6.4 Source controls measures, such as green roofs have also been incorporated into the development.

6.5 The information contained within this report has aimed to provide details of the Sustainable drainage systems to be adopted within the new Highgate Newton Community centre development. The design of the systems has been undertaken in line with the planning approved documents, best industry practice and local drainage planning policy; and as such it is considered that planning condition no. 9 can now be discharged.

APPENDICES

APPENDIX A:



Rev.	Date	By	Check	Details	Appr.
P01	05/05/2021	AMCG	PMCG	Preliminary First Issue	IRL
C01	27/05/2021	AMCG	PMCG	Construction Issue	IRL
C02	16/06/2021	AMCG	PMCG	Layout Revised. Note 24 added.	IRL
C03	13/09/2021	BMcC	AMCG	RWP pop ups added & locations amended. Land drainage added.	IRL
C04	14/10/2021	AMCG	AC	Drainage at substation updated	IRL
C05	27/10/2021	AMCG	AC	Drainage at substation updated to suit new location & Farrans comments.	IRL

LEGEND

- Proposed Storm Drainage
- Proposed Foul Drainage
- Proposed Combined Drainage
- Proposed Land Drainage
- Existing Combined Retained
- Existing drainage to be abandoned
- M100D drainage channel
- M150D drainage channel
- Proposed Sump unit
- Proposed Gully unit
- Proposed Foul upstand and connections
- Proposed RWP Connection
- Proposed Cellular Storage
- Steep transition in pipe to accommodate level difference with structural foundations
- Pipe running beneath ground beam to be provided with rocker pipe either side of foundation

NOTES

1. This drawing is to be read in conjunction with all relevant architectural and engineering drawings.
2. All gullies to be trapped. Road gully grills to be heavy duty ductile iron (Load Class D400).
3. Refer to Architect's drawings for exact locations of all rainwater downpipes. Where indicated, rainwater downpipes are to be connected to roddable back inlet bottle gullies or PPICs before connecting to main sewers.
4. Refer to relevant Architect's and M&E Engineering drawings for exact locations of builder's upstands/ SVPs etc.
5. Contractor to ensure that all conditions of storm and foul drainage discharges are met. All discharge arrangements to be confirmed.
6. All pipework with diameter of 300mm or less to be uPVC pipes unless otherwise stated. All pipes with diameter greater than 300mm to be class H concrete.
7. Manhole type to be as noted in schedule. Construction of manholes to be as per details.
8. All pipes with cover exceeding 1.2m in trafficked areas and 0.9m in non-trafficked areas to have class S bedding. All pipes with cover less than 1.2m in trafficked areas and 0.9m in non-trafficked areas to have class Z bedding.
9. Contractor to confirm the location and level of all sewers prior to the commencement of any works. Any discrepancies are to be notified to the engineer immediately.
10. Contractor to confirm the location of all existing services, buried and overhead, prior to the commencement of the works.
11. Pipe diameters to be as per manhole schedule.
12. Drainage channels shall be provided at all door thresholds. Channels to be ACO multidrain M100D or approved similar. All required fixtures and fittings to be specified by drainage channel manufacturer. All gratings to be heelguard galvanised steel, minimum load class of B125. Channels within paved areas to be installed with brick slot feature.
13. Drainage channels not at all door thresholds, to be ACO multidrain M150D or approved similar. All required fixtures and fittings to be specified by drainage channel manufacturer. All gratings to be heelguard galvanised steel, minimum load class of C250. Channels within paved areas to be installed will brick slot feature.
14. All drainage to be constructed in accordance with, 'WRc Sewers for Adoption'
15. All high level inlet pipes to manholes to be backdropped externally as per details.
16. Storm drainage is proposed to be attenuated and discharged at agreed rates to Thames Water infrastructure. Attenuation to be provided cellular storage units. Flows to be throttled via the use of Hydrobrake Vortex Flow Control units. Construction of attenuation and flow control units to be in strict accordance with the manufacturer's guidelines.
17. All setting out shall be in accordance with available Architecture drawings.This drawing shall not be used for setting out purposes.
18. This drawing is not suitable to be scaled from.
19. All internal pipework, indicated as 110mm diameter shall be shall be laid to a minimum fall of 1 in 40 even gradient.
20. All works to comply with current British Standards, Codes of Practice, and Building Regulations. The Contractor shall verify all information on site and report any discrepancies immediately to the Architect/Engineer.
21. All drainage shall be installed and tested to the satisfaction of the Building Control Officer/ Architect/ Consulting Engineer.
22. All builders upstands to be provided with above ground rodding access. Please refer to M&E Engineering drawings for further details.
23. All external foul sewers to be vented in accordance with Building Regulations. Please refer to M&E Engineering drawings for further details.
24. All drain points to have a minimum invert level of 550mm below FFL unless noted otherwise.
25. All external RWP's to discharge into bottle gullies.

Note:

- Drainage layout in line with McBains drainage strategy as per approved planning information.
- Drainage to be coordinated further upon receipt of latest Public Health drainage information. Currently drain points based on latest M&E information for Blocks A and B. Remaining blocks will be coordinated further as design develops..
- To be coordinated further with latest Architectural, Landscape Architects and Structural information.
- Existing Drainage to be surveyed prior to final construction information.

CONSTRUCTION DRAWING

Project Title:

Highgate Newton Community Community Centre

Drawing Title:

Proposed Drainage Layout

Client/Architect:	FARRANS		
Drawn by:	AMCG	Date:	June 2021
Checked by:	PMCG	Scales:	1:100
Approved by:	IRL	Sheet Size:	A0
Dorans Project Number:	202050	Status:	S3

Project Number:	Orig.	Vol.	Level.	Type.	Role	Number.	Revision:
HNCC	DCL	SL	XX	DR	C	0100	C05

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APPENDIX B:

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes DC PIPES Manhole Sizes DC MHs

FSR Rainfall Model - England and Wales

Return Period (years)	5	PIMP (%)	100
M5-60 (mm)	20.000	Add Flow / Climate Change (%)	0
Ratio R	0.447	Minimum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	200	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)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	0.898	0.009	100.0	0.012	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.001	11.755	0.118	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.002	11.357	0.114	100.0	0.018	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.003	1.926	0.016	120.0	0.025	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.004	8.171	0.020	400.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S2.000	13.621	0.150	90.8	0.002	5.00	0.0	0.600	o	150	Pipe/Conduit	
S2.001	19.670	0.194	101.4	0.032	0.00	0.0	0.600	o	150	Pipe/Conduit	
S3.000	18.242	0.182	100.0	0.015	5.00	0.0	0.600	o	150	Pipe/Conduit	
S4.000	26.251	0.263	100.0	0.015	5.00	0.0	0.600	o	150	Pipe/Conduit	
S3.001	20.223	0.208	97.4	0.004	0.00	0.0	0.600	o	150	Pipe/Conduit	
S2.002	1.868	0.012	150.0	0.031	0.00	0.0	0.600	o	225	Pipe/Conduit	
S2.003	1.672	0.004	400.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S5.000	1.369	0.011	120.0	0.005	5.00	0.0	0.600	o	150	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)
S1.000	96.12	5.01	59.155	0.012	0.0	0.0	0.0	1.00	17.8	3.2
S1.001	94.52	5.21	59.146	0.012	0.0	0.0	0.0	1.00	17.8	3.2
S1.002	93.02	5.40	59.028	0.030	0.0	0.0	0.0	1.00	17.8	7.7
S1.003	92.75	5.43	58.050	0.056	0.0	0.0	0.0	0.92	16.2	14.0
S1.004	91.16	5.64	57.959	0.056	0.0	0.0	0.0	0.65	25.8	14.0
S2.000	94.47	5.22	59.120	0.002	0.0	0.0	0.0	1.06	18.6	0.5
S2.001	91.91	5.54	58.970	0.034	0.0	0.0	0.0	1.00	17.6	8.4
S3.000	93.78	5.30	59.250	0.015	0.0	0.0	0.0	1.00	17.8	3.8
S4.000	92.74	5.44	59.250	0.015	0.0	0.0	0.0	1.00	17.8	3.9
S3.001	90.26	5.77	58.987	0.035	0.0	0.0	0.0	1.02	18.0	8.5
S2.002	90.05	5.80	58.208	0.099	0.0	0.0	0.0	1.07	42.4	24.2
S2.003	89.74	5.84	58.196	0.099	0.0	0.0	0.0	0.65	25.8	24.2
S5.000	96.04	5.02	58.211	0.005	0.0	0.0	0.0	0.92	16.2	1.4

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S5.001	5.975	0.015	400.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.005	3.239	0.026	124.6	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.006	20.190	0.165	122.4	0.015	0.00	0.0	0.600	o	300	Pipe/Conduit	
S6.000	5.068	0.100	50.7	0.000	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.007	2.823	0.028	100.8	0.009	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.008	5.584	0.056	100.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S7.000	6.935	0.069	100.5	0.004	5.00	0.0	0.600	o	150	Pipe/Conduit	
S8.000	6.211	0.062	100.0	0.004	5.00	0.0	0.600	o	150	Pipe/Conduit	
S8.001	2.384	0.024	100.0	0.003	0.00	0.0	0.600	o	150	Pipe/Conduit	
S7.001	12.077	0.121	100.0	0.003	0.00	0.0	0.600	o	150	Pipe/Conduit	
S9.000	3.162	0.032	100.0	0.003	5.00	0.0	0.600	o	150	Pipe/Conduit	
S10.000	3.128	0.031	100.0	0.004	5.00	0.0	0.600	o	150	Pipe/Conduit	
S7.002	6.824	0.077	88.1	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S11.000	0.714	0.016	45.0	0.000	5.00	0.0	0.600	o	150	Pipe/Conduit	
S11.001	6.472	0.140	46.3	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S11.002	8.646	0.248	34.9	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S11.003	6.652	0.176	37.8	0.001	0.00	0.0	0.600	o	150	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)
S5.001	94.39	5.23	58.200	0.005	0.0	0.0	0.0	0.50	8.8	1.4
S1.005	89.46	5.88	57.864	0.160	0.0	0.0	0.0	1.41	99.5	38.8
S1.006	87.81	6.11	57.838	0.175	0.0	0.0	0.0	1.42	100.4	41.7
S6.000	95.75	5.06	59.900	0.000	0.0	0.0	0.0	1.42	25.0	0.0
S1.007	87.61	6.14	57.673	0.184	0.0	0.0	0.0	1.57	110.7	43.6
S1.008	87.21	6.20	57.645	0.184	0.0	0.0	0.0	1.57	111.1	43.6
S7.000	95.29	5.12	59.450	0.004	0.0	0.0	0.0	1.00	17.7	1.0
S8.000	95.39	5.10	59.450	0.004	0.0	0.0	0.0	1.00	17.8	1.1
S8.001	95.06	5.14	59.388	0.007	0.0	0.0	0.0	1.00	17.8	1.8
S7.001	93.46	5.34	59.364	0.014	0.0	0.0	0.0	1.00	17.8	3.5
S9.000	95.81	5.05	59.750	0.003	0.0	0.0	0.0	1.00	17.8	0.8
S10.000	95.81	5.05	59.750	0.004	0.0	0.0	0.0	1.00	17.8	1.0
S7.002	92.63	5.45	59.243	0.021	0.0	0.0	0.0	1.07	18.9	5.2
S11.000	96.18	5.01	59.510	0.000	0.0	0.0	0.0	1.50	26.6	0.0
S11.001	95.57	5.08	59.494	0.000	0.0	0.0	0.0	1.48	26.2	0.0
S11.002	94.88	5.16	59.354	0.000	0.0	0.0	0.0	1.71	30.2	0.0
S11.003	94.33	5.23	59.107	0.001	0.0	0.0	0.0	1.64	29.0	0.3

Norwood House
96 -102 Great Victoria Street
BELFAST BT2 7BE

Date 19/11/2021 10:35 | Designed by 541
File Drainage Model - 18.11.21.MDX | Checked by
XP Solutions | Network 2019.1

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S1	60.155	1.000	Open Manhole	1200 x 750	S1.000	59.155	150				
SJ1	60.155	1.009	Junction		S1.001	59.146	150	S1.000	59.146	150	
S2	60.180	1.152	Open Manhole	1200	S1.002	59.028	150	S1.001	59.028	150	
S3	60.180	2.130	Open Manhole	1200	S1.003	58.050	150	S1.002	58.915	150	865
STank Inlet 1	60.200	2.241	Junction		S1.004	57.959	225	S1.003	58.034	150	
S21	60.170	1.050	Open Manhole	450	S2.000	59.120	150				
S4	60.170	1.200	Open Manhole	1200	S2.001	58.970	150	S2.000	58.970	150	
S6	60.350	1.100	Open Manhole	450	S3.000	59.250	150				
S7	60.350	1.100	Open Manhole	450	S4.000	59.250	150				
S8	60.350	1.363	Open Manhole	900	S3.001	58.987	150	S3.000	59.068	150	80
								S4.000	58.987	150	
S9	60.300	2.092	Open Manhole	1200	S2.002	58.208	225	S2.001	58.776	150	493
								S3.001	58.780	150	497
STank Inlet 2	60.200	2.004	Junction		S2.003	58.196	225	S2.002	58.196	225	
S5	60.170	1.959	Open Manhole	1200	S5.000	58.211	150				
STank Inlet 3	60.200	2.000	Junction		S5.001	58.200	150	S5.000	58.200	150	
S10 ATT	60.200	2.336	Open Manhole	1200	S1.005	57.864	300	S1.004	57.939	225	
								S2.003	58.191	225	253
								S5.001	58.185	150	171
S11	60.200	2.362	Open Manhole	1200	S1.006	57.838	300	S1.005	57.838	300	
S7A	61.100	1.200	Open Manhole	450	S6.000	59.900	150				
S12	60.750	3.077	Open Manhole	1200	S1.007	57.673	300	S1.006	57.673	300	
								S6.000	59.800	150	1977
SC1	60.850	3.205	Open Manhole	1200	S1.008	57.645	300	S1.007	57.645	300	
SEGC1	60.515	2.926	Open Manhole	0		OUTFALL		S1.008	57.589	300	
S14	60.650	1.200	Open Manhole	450	S7.000	59.450	150				
S15	60.650	1.200	Open Manhole	450	S8.000	59.450	150				
S16	60.650	1.262	Open Manhole	450	S8.001	59.388	150	S8.000	59.388	150	
S17	60.650	1.286	Open Manhole	900	S7.001	59.364	150	S7.000	59.381	150	17
								S8.001	59.364	150	
SC2	60.650	0.900	Open Manhole	450	S9.000	59.750	150				
SC4	60.650	0.900	Open Manhole	450	S10.000	59.750	150				
SC3	60.650	1.407	Open Manhole	450	S7.002	59.243	150	S7.001	59.243	150	
								S9.000	59.718	150	475
								S10.000	59.719	150	475
SEGC2	60.300	1.134	Open Manhole	0		OUTFALL		S7.002	59.166	150	
SEXMH1A	60.990	1.480	Open Manhole	675 x 900	S11.000	59.510	150				
SJ	60.990	1.496	Junction		S11.001	59.494	150	S11.000	59.494	150	
S19	60.662	1.308	Open Manhole	1200	S11.002	59.354	150	S11.001	59.354	150	
S20	60.570	1.463	Open Manhole	1200	S11.003	59.107	150	S11.002	59.107	150	
SEGMH1	60.800	1.869	Open Manhole	675 x 975		OUTFALL		S11.003	58.931	150	

Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S1	528806.706	186502.720	528806.706	186502.720	Required	
SJ1	528806.466	186501.855			No Entry	
S2	528796.241	186496.054	528796.241	186496.054	Required	
S3	528794.053	186484.910	528794.053	186484.910	Required	
STank Inlet 1	528792.190	186485.400			No Entry	
S21	528764.246	186472.919	528764.246	186472.919	Required	
S4	528777.835	186473.844	528777.835	186473.844	Required	
S6	528758.943	186480.441	528758.943	186480.441	Required	
S7	528770.972	186523.277	528770.972	186523.277	Required	
S8	528763.881	186498.001	528763.881	186498.001	Required	
S9	528783.400	186492.711	528783.400	186492.711	Required	
STank Inlet 2	528785.197	186492.204			No Entry	
S5	528784.770	186484.344	528784.770	186484.344	Required	
STank Inlet 3	528785.122	186485.666			No Entry	
S10 ATT	528786.681	186491.435	528786.681	186491.435	Required	
S11	528787.495	186494.570	528787.495	186494.570	Required	
S7A	528786.040	186516.379	528786.040	186516.379	Required	
S12	528790.745	186514.497	528790.745	186514.497	Required	
SC1	528789.921	186517.197	528789.921	186517.197	Required	

Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SEGC1	528795.186	186519.058			No Entry	
S14	528819.055	186524.723	528819.055	186524.723	Required	
S15	528811.195	186511.329	528811.195	186511.329	Required	
S16	528814.325	186516.693	528814.325	186516.693	Required	
S17	528815.554	186518.736	528815.554	186518.736	Required	
SC2	528827.477	186515.137	528827.477	186515.137	Required	
SC4	528824.227	186509.752	528824.227	186509.752	Required	
SC3	528825.851	186512.425	528825.851	186512.425	Required	
SEGC2	528831.424	186508.487			No Entry	
SEXMH1A	528757.459	186471.016	528757.459	186471.016	Required	
SJ	528757.880	186470.439			No Entry	
S19	528759.325	186464.130	528759.325	186464.130	Required	
S20	528752.284	186459.111	528752.284	186459.111	Required	
SEGMH1	528747.588	186463.822			No Entry	

Norwood House
96 -102 Great Victoria Street
BELFAST BT2 7BE

Date 19/11/2021 10:35 | Designed by 541
File Drainage Model - 18.11.21.MDX | Checked by
XP Solutions | Network 2019.1

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	Classification	Default	95	0.013	0.012	0.012
1.001	-	-	100	0.000	0.000	0.000
1.002	Classification	Default	95	0.015	0.015	0.015
	Classification	Green Roof	40	0.009	0.003	0.018
1.003	Classification	Default	95	0.024	0.023	0.023
	Classification	Green Roof	40	0.005	0.002	0.025
1.004	-	-	100	0.000	0.000	0.000
2.000	Classification	Landscaping/Gravel	30	0.006	0.002	0.002
2.001	Classification	Default	95	0.009	0.008	0.008
	Classification	Green Roof	40	0.013	0.005	0.013
	Classification	Default	95	0.007	0.007	0.020
	Classification	Green Roof	40	0.007	0.003	0.023
	Classification	Default	95	0.009	0.008	0.032
	Classification	Landscaping/Gravel	30	0.002	0.000	0.032
3.000	Classification	Default	95	0.004	0.004	0.004
	Classification	Default	95	0.005	0.005	0.009
	Classification	Green Roof	40	0.014	0.005	0.015
4.000	Classification	Default	95	0.009	0.009	0.009
	Classification	Green Roof	40	0.017	0.007	0.015
3.001	Classification	Default	95	0.005	0.004	0.004
2.002	Classification	Default	95	0.029	0.028	0.028
	Classification	Landscaping/Gravel	30	0.004	0.001	0.029
	Classification	Green Roof	40	0.004	0.001	0.031
2.003	-	-	100	0.000	0.000	0.000
5.000	Classification	Green Roof	40	0.007	0.003	0.003
	User	-	100	0.003	0.003	0.005
5.001	-	-	100	0.000	0.000	0.000
1.005	-	-	100	0.000	0.000	0.000
1.006	Classification	Default	95	0.008	0.008	0.008
	Classification	Green Roof	40	0.018	0.007	0.015
6.000	-	-	100	0.000	0.000	0.000
1.007	Classification	Green Roof	40	0.007	0.003	0.003
	Classification	Default	95	0.006	0.006	0.008
	Classification	Landscaping/Gravel	30	0.001	0.000	0.009
1.008	-	-	100	0.000	0.000	0.000
7.000	Classification	Default	95	0.004	0.004	0.004
8.000	Classification	Default	95	0.004	0.004	0.004
8.001	Classification	Default	95	0.003	0.003	0.003
7.001	Classification	Default	95	0.003	0.003	0.003
9.000	Classification	Default	95	0.003	0.003	0.003
10.000	Classification	Default	95	0.004	0.004	0.004
7.002	-	-	100	0.000	0.000	0.000
11.000	-	-	100	0.000	0.000	0.000
11.001	-	-	100	0.000	0.000	0.000
11.002	-	-	100	0.000	0.000	0.000
11.003	Classification	Landscaping/Gravel	30	0.003	0.001	0.001
				Total	Total	Total
				0.285	0.206	0.206

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.008	SEGC1	60.515	57.589	0.000	0	0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S7.002	SEGC2	60.300	59.166	0.000	0	0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S11.003	SEGMH1	60.800	58.931	0.000	675	975

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 2 Number of Storage Structures 3 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	5	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Storm Duration (mins)	30
Ratio R	0.447		

Online Controls for Storm

Hydro-Brake® Optimum Manhole: S12, DS/PN: S1.007, Volume (m³): 4.9

Unit Reference	MD-SHE-0082-4000-2000-4000
Design Head (m)	2.000
Design Flow (l/s)	4.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	82
Invert Level (m)	57.673
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.000	4.0	Kick-Flo®	0.729	2.5
Flush-Flo™	0.356	3.1	Mean Flow over Head Range	-	3.1

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.4	0.800	2.6	2.000	4.0	4.000	5.5	7.000	7.2
0.200	3.0	1.000	2.9	2.200	4.2	4.500	5.8	7.500	7.4
0.300	3.1	1.200	3.2	2.400	4.3	5.000	6.1	8.000	7.7
0.400	3.1	1.400	3.4	2.600	4.5	5.500	6.4	8.500	7.9
0.500	3.1	1.600	3.6	3.000	4.8	6.000	6.7	9.000	8.1
0.600	2.9	1.800	3.8	3.500	5.2	6.500	6.9	9.500	8.3

Hydro-Brake® Optimum Manhole: S17, DS/PN: S7.001, Volume (m³): 1.0

Unit Reference	MD-SHE-0045-1000-1200-1000
Design Head (m)	1.200
Design Flow (l/s)	1.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	45
Invert Level (m)	59.364
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	1.0	Kick-Flo®	0.398	0.6
Flush-Flo™	0.196	0.7	Mean Flow over Head Range	-	0.8

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.7	0.800	0.8	2.000	1.3	4.000	1.7	7.000	2.2
0.200	0.7	1.000	0.9	2.200	1.3	4.500	1.8	7.500	2.3
0.300	0.7	1.200	1.0	2.400	1.4	5.000	1.9	8.000	2.4
0.400	0.6	1.400	1.1	2.600	1.4	5.500	2.0	8.500	2.4
0.500	0.7	1.600	1.1	3.000	1.5	6.000	2.1	9.000	2.5
0.600	0.7	1.800	1.2	3.500	1.6	6.500	2.2	9.500	2.6

Storage Structures for Storm

Tank or Pond Manhole: S10 ATT, DS/PN: S1.005

Invert Level (m) 57.864

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	68.0	0.800	68.0	0.801	0.0

Tank or Pond Manhole: S14, DS/PN: S7.000

Invert Level (m) 59.450

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	3.0	0.800	3.0	0.801	0.0

Tank or Pond Manhole: S15, DS/PN: S8.000

Invert Level (m) 59.450

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	3.0	0.800	3.0	0.801	0.0

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 2 Number of Storage Structures 3 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	20.000
Region	England and Wales	Ratio R	0.435
Cv (Summer)	0.750		
Cv (Winter)	0.840		

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
S1.000	S1	15 Winter	1	+0%	100/120 Winter				59.196	-0.109
S1.001	SJ1	15 Winter	1	+0%					59.178	-0.118
S1.002	S2	15 Winter	1	+0%	100/15 Summer				59.079	-0.099
S1.003	S3	15 Winter	1	+0%	30/15 Summer				58.138	-0.062
S1.004	STank Inlet 1	15 Winter	1	+0%					58.045	-0.139
S2.000	S21	15 Winter	1	+0%	100/120 Winter				59.131	-0.139
S2.001	S4	15 Winter	1	+0%	100/15 Summer				59.021	-0.099
S3.000	S6	15 Winter	1	+0%	100/120 Winter				59.286	-0.114
S4.000	S7	15 Winter	1	+0%	100/120 Winter				59.286	-0.114
S3.001	S8	15 Winter	1	+0%	100/15 Summer				59.042	-0.095
S2.002	S9	15 Winter	1	+0%	30/15 Summer				58.312	-0.121
S2.003	STank Inlet 2	15 Winter	1	+0%					58.297	-0.123
S5.000	S5	15 Winter	1	+0%	100/15 Summer				58.238	-0.123
S5.001	STank Inlet 3	15 Winter	1	+0%					58.227	-0.123
S1.005	S10 ATT	60 Winter	1	+0%	30/15 Summer				58.015	-0.149
S1.006	S11	60 Winter	1	+0%	30/15 Summer				58.014	-0.124
S6.000	S7A	120 Winter	1	+0%					59.900	-0.150
S1.007	S12	60 Winter	1	+0%	1/15 Winter				58.011	0.038
S1.008	SC1	60 Winter	1	+0%					57.688	-0.257
S7.000	S14	15 Winter	1	+0%	30/15 Summer				59.492	-0.108
S8.000	S15	15 Winter	1	+0%	30/15 Summer				59.492	-0.108
S8.001	S16	15 Winter	1	+0%	30/15 Summer				59.492	-0.046
S7.001	S17	15 Winter	1	+0%	30/15 Summer				59.491	-0.023
S9.000	SC2	15 Winter	1	+0%					59.770	-0.130
S10.000	SC4	15 Winter	1	+0%					59.771	-0.129
S7.002	SC3	15 Winter	1	+0%					59.276	-0.118
S11.000	SEXMH1A	120 Winter	1	+0%					59.510	-0.150
S11.001	SJ	120 Winter	1	+0%					59.494	-0.150
S11.002	S19	120 Winter	1	+0%					59.354	-0.150
S11.003	S20	15 Winter	1	+0%					59.110	-0.147

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	0.000	0.16		1.8	OK	
S1.001	SJ1	0.000	0.10		1.8	OK*	
S1.002	S2	0.000	0.25		3.9	OK	
S1.003	S3	0.000	0.64		7.0	OK	
S1.004	STank Inlet 1	0.000	0.31		7.0	OK*	
S2.000	S21	0.000	0.01		0.3	OK	
S2.001	S4	0.000	0.25		4.1	OK	
S3.000	S6	0.000	0.13		2.1	OK	
S4.000	S7	0.000	0.13		2.2	OK	
S3.001	S8	0.000	0.29		4.9	OK	
S2.002	S9	0.000	0.43		12.7	OK	
S2.003	STank Inlet 2	0.000	0.42		12.7	OK*	
S5.000	S5	0.000	0.07		0.8	OK	
S5.001	STank Inlet 3	0.000	0.08		0.8	OK*	
S1.005	S10 ATT	0.000	0.08		4.6	OK	
S1.006	S11	0.000	0.06		5.2	OK	
S6.000	S7A	0.000	0.00		0.0	OK	
S1.007	S12	0.000	0.05		3.1	SURCHARGED	
S1.008	SC1	0.000	0.05		3.1	OK	
S7.000	S14	0.000	0.02		0.3	OK	
S8.000	S15	0.000	0.02		0.4	OK	
S8.001	S16	0.000	0.04		0.5	OK	
S7.001	S17	0.000	0.04		0.7	OK	
S9.000	SC2	0.000	0.04		0.5	OK	
S10.000	SC4	0.000	0.05		0.5	OK	
S7.002	SC3	0.000	0.10		1.7	OK	
S11.000	SEXMH1A	0.000	0.00		0.0	OK	
S11.001	SJ	0.000	0.00		0.0	OK*	
S11.002	S19	0.000	0.00		0.0	OK	
S11.003	S20	0.000	0.00		0.1	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 2 Number of Storage Structures 3 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	20.000
Region	England and Wales	Ratio R	0.435
Cv (Summer)	0.750		
Cv (Winter)	0.840		

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
S1.000	S1	15 Winter	30	+0%	100/120 Winter				59.221	-0.084
S1.001	SJ1	15 Winter	30	+0%					59.197	-0.099
S1.002	S2	15 Winter	30	+0%	100/15 Summer				59.121	-0.058
S1.003	S3	120 Winter	30	+0%	30/15 Summer				58.357	0.157
S1.004	STank Inlet 1	120 Winter	30	+0%					58.184	0.000
S2.000	S21	15 Winter	30	+0%	100/120 Winter				59.139	-0.131
S2.001	S4	15 Winter	30	+0%	100/15 Summer				59.069	-0.051
S3.000	S6	15 Winter	30	+0%	100/120 Winter				59.308	-0.092
S4.000	S7	15 Winter	30	+0%	100/120 Winter				59.309	-0.091
S3.001	S8	15 Winter	30	+0%	100/15 Summer				59.083	-0.055
S2.002	S9	15 Winter	30	+0%	30/15 Summer				58.547	0.114
S2.003	STank Inlet 2	15 Winter	30	+0%					58.421	0.000
S5.000	S5	120 Winter	30	+0%	100/15 Summer				58.356	-0.005
S5.001	STank Inlet 3	120 Winter	30	+0%					58.350	0.000
S1.005	S10 ATT	120 Winter	30	+0%	30/15 Summer				58.354	0.191
S1.006	S11	120 Winter	30	+0%	30/15 Summer				58.359	0.221
S6.000	S7A	120 Winter	30	+0%					59.900	-0.150
S1.007	S12	60 Winter	30	+0%	1/15 Winter				58.371	0.398
S1.008	SC1	60 Winter	30	+0%					57.688	-0.257
S7.000	S14	30 Winter	30	+0%	30/15 Summer				59.666	0.066
S8.000	S15	30 Winter	30	+0%	30/15 Summer				59.667	0.067
S8.001	S16	30 Winter	30	+0%	30/15 Summer				59.666	0.128
S7.001	S17	30 Winter	30	+0%	30/15 Summer				59.666	0.152
S9.000	SC2	15 Winter	30	+0%					59.782	-0.118
S10.000	SC4	15 Winter	30	+0%					59.784	-0.116
S7.002	SC3	15 Winter	30	+0%					59.288	-0.105
S11.000	SEXMH1A	120 Winter	30	+0%					59.510	-0.150
S11.001	SJ	120 Winter	30	+0%					59.494	-0.150
S11.002	S19	120 Winter	30	+0%					59.354	-0.150
S11.003	S20	15 Winter	30	+0%					59.117	-0.139

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	0.000	0.40		4.3	OK	
S1.001	SJ1	0.000	0.24		4.3	OK*	
S1.002	S2	0.000	0.68		10.9	OK	
S1.003	S3	0.000	0.55		6.0	SURCHARGED	
S1.004	STank Inlet 1	0.000	0.26		5.7	SURCHARGED*	
S2.000	S21	0.000	0.04		0.6	OK	
S2.001	S4	0.000	0.76		12.7	OK	
S3.000	S6	0.000	0.31		5.2	OK	
S4.000	S7	0.000	0.31		5.3	OK	
S3.001	S8	0.000	0.72		12.1	OK	
S2.002	S9	0.000	1.19		34.8	SURCHARGED	
S2.003	STank Inlet 2	0.000	1.19		35.5	SURCHARGED*	
S5.000	S5	0.000	0.05		0.6	OK	
S5.001	STank Inlet 3	0.000	0.06		0.6	SURCHARGED*	
S1.005	S10 ATT	0.000	0.06		3.6	SURCHARGED	
S1.006	S11	0.000	0.05		4.0	SURCHARGED	
S6.000	S7A	0.000	0.00		0.0	OK	
S1.007	S12	0.000	0.05		3.1	SURCHARGED	
S1.008	SC1	0.000	0.05		3.1	OK	
S7.000	S14	0.000	0.02		0.3	SURCHARGED	
S8.000	S15	0.000	0.02		0.3	SURCHARGED	
S8.001	S16	0.000	0.05		0.5	SURCHARGED	
S7.001	S17	0.000	0.05		0.7	SURCHARGED	
S9.000	SC2	0.000	0.10		1.1	OK	
S10.000	SC4	0.000	0.12		1.3	OK	
S7.002	SC3	0.000	0.19		3.1	OK	
S11.000	SEXMH1A	0.000	0.00		0.0	OK	
S11.001	SJ	0.000	0.00		0.0	OK*	
S11.002	S19	0.000	0.00		0.0	OK	
S11.003	S20	0.000	0.01		0.4	OK	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 2 Number of Storage Structures 3 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	20.000
Region	England and Wales	Ratio R	0.435
Cv (Summer)	0.750		
Cv (Winter)	0.840		

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
S1.000	S1	120 Winter	100	+30%	100/120 Winter				59.400	0.095
S1.001	SJ1	120 Winter	100	+30%					59.296	0.000
S1.002	S2	120 Winter	100	+30%	100/15 Summer				59.399	0.221
S1.003	S3	120 Winter	100	+30%	30/15 Summer				59.397	1.197
S1.004	STank Inlet 1	120 Winter	100	+30%					58.184	0.000
S2.000	S21	120 Winter	100	+30%	100/120 Winter				59.400	0.130
S2.001	S4	120 Winter	100	+30%	100/15 Summer				59.400	0.280
S3.000	S6	120 Winter	100	+30%	100/120 Winter				59.402	0.002
S4.000	S7	120 Winter	100	+30%	100/120 Winter				59.402	0.002
S3.001	S8	120 Winter	100	+30%	100/15 Summer				59.400	0.263
S2.002	S9	120 Winter	100	+30%	30/15 Summer				59.396	0.963
S2.003	STank Inlet 2	60 Winter	100	+30%					58.421	0.000
S5.000	S5	120 Winter	100	+30%	100/15 Summer				59.395	1.034
S5.001	STank Inlet 3	60 Winter	100	+30%					58.350	0.000
S1.005	S10 ATT	120 Winter	100	+30%	30/15 Summer				59.395	1.232
S1.006	S11	120 Winter	100	+30%	30/15 Summer				59.394	1.257
S6.000	S7A	120 Winter	100	+30%					59.900	-0.150
S1.007	S12	120 Winter	100	+30%	1/15 Winter				59.391	1.418
S1.008	SC1	120 Winter	100	+30%					57.692	-0.253
S7.000	S14	60 Winter	100	+30%	30/15 Summer				59.944	0.344
S8.000	S15	60 Winter	100	+30%	30/15 Summer				59.945	0.345
S8.001	S16	60 Winter	100	+30%	30/15 Summer				59.944	0.406
S7.001	S17	60 Winter	100	+30%	30/15 Summer				59.944	0.430
S9.000	SC2	15 Winter	100	+30%					59.792	-0.108
S10.000	SC4	15 Winter	100	+30%					59.795	-0.105
S7.002	SC3	15 Winter	100	+30%					59.299	-0.094
S11.000	SEXMH1A	120 Winter	100	+30%					59.510	-0.150
S11.001	SJ	120 Winter	100	+30%					59.494	-0.150
S11.002	S19	120 Winter	100	+30%					59.354	-0.150
S11.003	S20	15 Summer	100	+30%					59.123	-0.134

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	0.000	0.21		2.3	SURCHARGED	
S1.001	SJ1	0.000	0.13		2.3	SURCHARGED*	
S1.002	S2	0.000	0.35		5.6	SURCHARGED	
S1.003	S3	0.000	0.89		9.7	SURCHARGED	
S1.004	STank Inlet 1	0.000	0.42		9.3	SURCHARGED*	
S2.000	S21	0.000	0.02		0.3	SURCHARGED	
S2.001	S4	0.000	0.38		6.2	SURCHARGED	
S3.000	S6	0.000	0.16		2.7	SURCHARGED	
S4.000	S7	0.000	0.17		2.8	SURCHARGED	
S3.001	S8	0.000	0.38		6.4	SURCHARGED	
S2.002	S9	0.000	0.61		17.9	SURCHARGED	
S2.003	STank Inlet 2	0.000	1.00		29.9	SURCHARGED*	
S5.000	S5	0.000	0.08		0.9	SURCHARGED	
S5.001	STank Inlet 3	0.000	0.15		1.5	SURCHARGED*	
S1.005	S10 ATT	0.000	0.08		4.5	SURCHARGED	
S1.006	S11	0.000	0.05		4.3	SURCHARGED	
S6.000	S7A	0.000	0.00		0.0	OK	
S1.007	S12	0.000	0.06		3.7	SURCHARGED	
S1.008	SC1	0.000	0.06		3.7	OK	
S7.000	S14	0.000	0.02		0.3	SURCHARGED	
S8.000	S15	0.000	0.02		0.3	SURCHARGED	
S8.001	S16	0.000	0.05		0.5	SURCHARGED	
S7.001	S17	0.000	0.05		0.7	SURCHARGED	
S9.000	SC2	0.000	0.17		1.9	OK	
S10.000	SC4	0.000	0.20		2.2	OK	
S7.002	SC3	0.000	0.30		4.8	OK	
S11.000	SEXMH1A	0.000	0.00		0.0	OK	
S11.001	SJ	0.000	0.00		0.0	OK*	
S11.002	S19	0.000	0.00		0.0	OK	
S11.003	S20	0.000	0.03		0.6	OK	