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Our Ref: 949-02-CIV-Planning Condition 15 response

Medieval Quarter Glade of Light
23 March 2021

Response to planning condition 15 – Drainage and flood risk

See below response to planning condition 15 relating to surface water drainage and flood risk for the Medieval Quarter Glade of Light development.

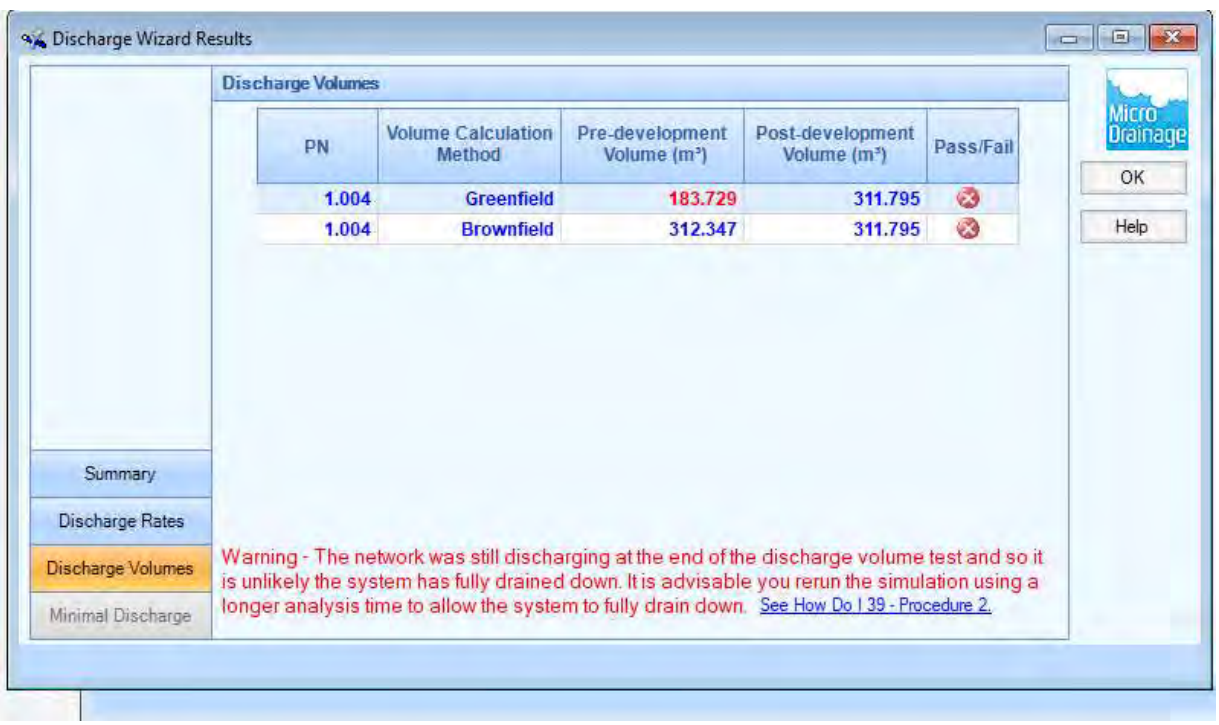
The below table highlights the planning condition comments with Civic Engineers' response alongside.

Planning Condition Comments	**Designer's Response**
No development shall take place until surface water drainage works have been implemented in accordance with Non-Statutory Technical Standards for Sustainable Drainage Systems (March 2015) or any subsequent replacements national standards and details that have been submitted to and approved in writing by the Local Planning Authority.	
In order to avoid/discharge the above drainage condition the following additional information has to be provided: *Details of surface water attenuation that offers a reduction in surface water runoff rate in line with the Manchester Trafford and Salford Strategic Flood Risk Assessment, i.e. at least a 50% reduction in runoff rate compared to the existing rates, as the site is located within Conurbation Core Critical Drainage Area; *Runoff volume in the 1 in 100 year, 6 hours rainfall shall be constrained to a value as close as is reasonable practicable to the greenfield runoff volume for the same event, but never to exceed the runoff volume from the development site prior to redevelopment; *Evidence that the drainage system has been designed (unless an area is designated to hold and/or convey water as part of the design) so that flooding does not occur during a 1 in 100 year rainfall event with allowance for 40% climate change in any part of a building;	See attached calculations for surface water discharge rates and attenuation volumes, these include: 949-02-CIVIC-C-XX-EX-001_P01- Existing SW Drainage - Existing catchment plan and brownfield run-off calculation Proposed drainage network model, with hydrobrake details and restriction to 50% of the existing 1:1 year flow rate See microdrainage snapshot below and description of calculation method for the run-off volume for the 1:100 year 6 hour duration storm event for the proposed development is 3 Greenfield 1:100 year 6 hour duration event Pre-development 1:100 year 6 hour duration event The microdrainage network calculations show the 1:100 year + 40% climate change storm event contained within the drainage network and SuDS features. 949-02-CIV-Micro drainage network output file rev C01

*Details of siltation prevention measures across the drainage network, which should be designed to reduce risk of blockage occurring at the shallow pipe gradients towards the River Irwell outfall. This should include prevention of mobilising green SuDS components substrates into the pipes.	As per the attached SuDS details, drawing 949-02-CIVIC-C-XX-DE-004_P03- Drainage Details Sheet 4, all stone drainage trenches / blankets include a geotextile wrap to mitigate the risk of silts entering the system. The gradients of the pipework near to the outfall are adequate for the pipe size used to achieve an appropriate self-cleansing velocity of 1.0 m/s.
*Assessment of overland flow routes for extreme events that is diverted away from buildings (including basements). Overland flow routes need to be designed to convey the flood water in a safe manner in the event of a blockage or exceedance of the proposed drainage system capacity including inlet structures. A layout with overland flow routes needs to be presented with appreciation of these overland flow routes with regards to the properties on site and adjacent properties off site.	The proposed levels layout and contours, drawing 949-02-CIVIC-C-XX-GA-009_P02 Proposed Levels, indicate that the levels generally fall in a northerly direction towards Chapel Street with crossfalls within Phase 1A specifically routed towards the Glade of Light. The SuDS and piped drainage system are designed to accommodate a 1:100 year + 40% climate change extreme event without any surface flooding within hardstanding areas. In the event of a more extreme event, flood water would be routed along Victoria Street and towards Chapel Street with crossfalls to the hardstanding routed towards the Glade of Light and raingardens situated to the northern end of Phase 1A. Currently, surface water can quickly overwhelm the road gullies at the lowest point and cascade towards Chapel Street. This was witnessed on several occasions on site. The proposals are intended to make a positive impact on this currect situation especially by introducing a significant reduction in the impermeable surfacing.
*Where surface water is connected to Main River, any works within or adjacent to the river that would affect it would require consent from Environment Agency. An email of acceptance of proposed flows and/or new connection will suffice.	The reason for re-using the existing outfall into the River Irwell it to avoid any work that would affect the Main River. The intention is to retain as much of the existing 300dia. outfall as possible to keep works away from the Victoria Street retaining wall.

*Where surface water is connected to the Highway gullies to outfall into River Irwell, agreement in principle from Manchester City Council Highways Department is required. An email of acceptance of proposed flows and/or new connection will suffice.	See attached correspondence from MCC highways and LLFA to date relation to the existing highways drainage. It is understood that as the highways gully is under MCC highway's ownership that the outfall is also under the ownership / management of MCC highways. We await confirmation from the LLFA relating to this.
*Hydraulic calculation of the proposed drainage system;	See attached file 949-02-CIV-Micro drainage network output file rev C01
*Construction details of flow control and SuDS elements. Reason: To promote sustainable development, secure proper drainage and to manage the risk of flooding and pollution. This condition is imposed in light of national policies within the NPPF and NPPG and local policies EN08 and EN14.	See attached specification for the Hydrobrake flow control. Also included are the details for the SuDS elements (drawing 949-02-CIVIC-C-XX-DE-004_P03- Drainage Details Sheet 4).
If there is no clear adoption policy in place to take over the proposed drainage system after construction, we suggest the following construction and maintenance condition to be considered by the LPA:	MCC will take on maintenance responsibilities for the public realm including SuDS features.

Output from discharge volume wizard tool in Microdrainage below (6 hour 1:100 year storm event)



PN	Volume Calculation Method	Pre-development Volume (m³)	Post-development Volume (m³)	Pass/Fail
1.004	Greenfield	183.729	311.795	✗
1.004	Brownfield	312.347	311.795	✗

This shows the predevelopment (brownfield) run-off volume (312.347m^3), greenfield run-off volume (183.729m^3) versus the post development run-off volume (311.795m^3). The overall catchment area for all 3 analysis' was taken as 6250m^2 which represents catchment 1A and 1C.

It should be noted that both Phase 1A and 1C have a significant reduction in hardstanding area with Phase 1A impermeable area equating to 2258m^2. And the Phase 1C impermeable area of circa 2500m^2 (which may be subject to further development). Due to the nature of the surface water drainage system utilising SuDS within the soft landscaping areas, the full catchment has been included within the calculations (6250m^2) which represents a conservative approach to the surface water run-off and discharge volume calculations.

If we re-run the calculations for the actual impermeable catchment through the discharge volume wizard for the same 6 hour 1:100 year storm event but for the 2258m^2 catchment we get a discharge volume of 239m^3 which is a lot closer to the greenfield run-off volume.

The attached documents are provided to support the above responses:

Micro Drainage network calculations

- 949-02-CIV-Micro drainage network output file rev C01

Drainage and Levels Design Drawings

- 949-02-CIVIC-C-XX-EX-001_P01- Existing SW Drainage
- 949-02-CIVIC-C-XX-DE-004_P03- Drainage Details Sheet 4
- 949-02-CIVIC-C-XX-GA-009_P02 Proposed Levels
- SHE-0275-4230-0960-4230_Design_Drawing(OD)
- 949-02-CIVIC-C-XX-DR-002_P06 - Proposed SW Drainage Strategy Phase 1A

Correspondence with MCC, EA and LLFA

Chris Kendrick
For Civic Engineers

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	18.000	Add Flow / Climate Change (%)	0
Ratio R	0.357	Minimum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	20.000
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

« - 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
S1.000	9.695	0.200	48.5	0.304	4.00	0.0	0.600	o	300	Pipe/Conduit	
S1.001	38.394	0.375	102.4	0.015	0.00	0.0	0.600	o	300	Pipe/Conduit	
S2.000	10.800	0.140	77.1	0.020	6.00	0.0	0.600	o	100	Pipe/Conduit	
S2.001	12.689	0.285	44.5	0.011	0.00	0.0	0.600	o	100	Pipe/Conduit	
S3.000	7.382	0.330	22.4	0.015	6.00	0.0	0.600	o	100	Pipe/Conduit	
S4.000	14.083	0.100	140.8	0.015	6.00	0.0	0.600	o	100	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	50.00	4.07	31.500	0.304	0.0	0.0	0.0	2.26	160.0	41.2
S1.001	50.00	4.48	31.274	0.319	0.0	0.0	0.0	1.55	109.8	43.2
S2.000	50.00	6.21	30.840	0.020	0.0	0.0	0.0	0.88	6.9	2.7
S2.001	50.00	6.39	30.700	0.031	0.0	0.0	0.0	1.16	9.1	4.2
S3.000	50.00	6.08	30.895	0.015	0.0	0.0	0.0	1.64	12.9	2.0
S4.000	50.00	6.36	30.925	0.015	0.0	0.0	0.0	0.65	5.1	2.0

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S4.001	4.886	0.060	81.4	0.015	0.00	0.0	0.600	o	100	Pipe/Conduit	
S3.001	6.498	0.050	130.0	0.011	0.00	0.0	0.600	o	100	Pipe/Conduit	
S2.002	2.615	0.025	104.6	0.010	0.00	0.0	0.600	o	100	Pipe/Conduit	
S1.002	17.147	0.086	199.4	0.015	0.00	0.0	0.600	o	300	Pipe/Conduit	
S5.000	15.276	0.550	27.8	0.015	6.00	0.0	0.600	o	100	Pipe/Conduit	
S6.000	13.904	0.570	24.4	0.014	6.00	0.0	0.600	o	100	Pipe/Conduit	
S5.001	6.161	0.750	8.2	0.010	0.00	0.0	0.600	o	100	Pipe/Conduit	
S7.000	16.621	0.680	24.4	0.013	6.00	0.0	0.600	o	100	Pipe/Conduit	
S8.000	14.334	0.100	143.3	0.012	6.00	0.0	0.600	o	100	Pipe/Conduit	
S7.001	5.112	0.370	13.8	0.010	0.00	0.0	0.600	o	100	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)
S4.001	50.00	6.46	30.825	0.030	0.0	0.0	0.0	0.85	6.7	4.1
S3.001	50.00	6.62	30.765	0.056	0.0	0.0	0.0	0.67	5.3«	7.6
S2.002	50.00	6.68	30.280	0.097	0.0	0.0	0.0	0.75	5.9«	13.1
S1.002	50.00	6.94	29.900	0.431	0.0	0.0	0.0	1.11	78.4	58.4
S5.000	50.00	6.17	31.100	0.015	0.0	0.0	0.0	1.47	11.5	2.0
S6.000	50.00	6.15	31.120	0.014	0.0	0.0	0.0	1.57	12.3	1.9
S5.001	50.00	6.21	30.550	0.039	0.0	0.0	0.0	2.71	21.3	5.3
S7.000	50.00	6.18	30.850	0.013	0.0	0.0	0.0	1.57	12.3	1.8
S8.000	50.00	6.37	31.100	0.012	0.0	0.0	0.0	0.64	5.0	1.6
S7.001	50.00	6.41	30.170	0.035	0.0	0.0	0.0	2.09	16.4	4.7

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S5.002	6.725	0.124	54.2	0.010	0.00	0.0	0.600	o	100	Pipe/Conduit	
S9.000	15.380	0.100	153.8	0.014	6.00	0.0	0.600	o	100	Pipe/Conduit	
S5.003	4.075	0.041	99.4	0.010	0.00	0.0	0.600	o	100	Pipe/Conduit	
S1.003	29.319	0.147	200.0	0.010	0.00	0.0	0.600	o	300	Pipe/Conduit	
S10.000	5.000	0.050	100.0	0.015	4.00	0.0	0.600	o	100	Pipe/Conduit	
S10.001	3.725	0.045	82.8	0.005	0.00	0.0	0.600	o	100	Pipe/Conduit	
S11.000	5.000	0.085	58.8	0.025	4.00	0.0	0.600	o	100	Pipe/Conduit	
S11.001	3.425	0.100	34.3	0.005	0.00	0.0	0.600	o	100	Pipe/Conduit	
S12.000	14.493	0.335	43.3	0.016	6.00	0.0	0.600	o	100	Pipe/Conduit	
S13.000	17.393	0.100	173.9	0.010	6.00	0.0	0.600	o	100	Pipe/Conduit	
S12.001	9.902	0.100	99.0	0.000	0.00	0.0	0.600	o	100	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)
S5.002	50.00	6.52	29.650	0.084	0.0	0.0	0.0	1.05	8.2«	11.4
S9.000	50.00	6.42	30.480	0.014	0.0	0.0	0.0	0.62	4.9	1.9
S5.003	50.00	6.61	29.476	0.108	0.0	0.0	0.0	0.77	6.1«	14.6
S1.003	50.00	7.38	28.722	0.549	0.0	0.0	0.0	1.11	78.3	74.3
S10.000	50.00	4.11	28.870	0.015	0.0	0.0	0.0	0.77	6.0	2.0
S10.001	50.00	4.18	28.820	0.020	0.0	0.0	0.0	0.85	6.6	2.7
S11.000	50.00	4.08	28.960	0.025	0.0	0.0	0.0	1.01	7.9	3.4
S11.001	50.00	4.13	28.875	0.030	0.0	0.0	0.0	1.32	10.4	4.1
S12.000	50.00	6.21	29.645	0.016	0.0	0.0	0.0	1.18	9.2	2.2
S13.000	50.00	6.50	29.476	0.010	0.0	0.0	0.0	0.58	4.6	1.4
S12.001	50.00	6.71	29.310	0.026	0.0	0.0	0.0	0.77	6.1	3.5

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.004	8.925	0.052	171.6	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.004	49.85	7.50	28.575	0.625	0.0	0.0	0.0	1.20	84.6	84.4

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)
S1.004	S	30.230	28.523	28.500	0	0

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	0.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	10
Number of Online Controls	9	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	30
Ratio R	0.357		

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Online Controls for Storm

Orifice Manhole: S1, DS/PN: S1.001, Volume (m³): 0.8

Diameter (m) 0.130 Discharge Coefficient 0.600 Invert Level (m) 31.300

Orifice Manhole: SIC3, DS/PN: S2.002, Volume (m³): 0.3

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 30.280

Orifice Manhole: SIC13, DS/PN: S5.001, Volume (m³): 0.4

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 30.550

Orifice Manhole: SIC15, DS/PN: S7.001, Volume (m³): 0.4

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 30.170

Orifice Manhole: SIC8, DS/PN: S5.003, Volume (m³): 0.4

Diameter (m) 0.060 Discharge Coefficient 0.600 Invert Level (m) 29.526

Orifice Manhole: SIC18, DS/PN: S10.001, Volume (m³): 0.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 28.820

Orifice Manhole: SIC17, DS/PN: S11.001, Volume (m³): 0.3

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 28.875

Orifice Manhole: SIC16, DS/PN: S12.001, Volume (m³): 0.4

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 29.310

Hydro-Brake® Optimum Manhole: S4, DS/PN: S1.004, Volume (m³): 6.3

Unit Reference	MD-SHE-0271-4230-1250-4230
Design Head (m)	1.250
Design Flow (l/s)	42.3
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	271
Invert Level (m)	28.575

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Hydro-Brake® Optimum Manhole: S4, DS/PN: S1.004, Volume (m³): 6.3

Minimum Outlet Pipe Diameter (mm) 300
Suggested Manhole Diameter (mm) 1800

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.250	42.3	Kick-Flo®	0.918	36.5
Flush-Flo™	0.452	42.3	Mean Flow over Head Range	-	35.3

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	8.6	1.200	41.5	3.000	64.5	7.000	97.4
0.200	27.9	1.400	44.6	3.500	69.5	7.500	100.7
0.300	41.1	1.600	47.6	4.000	74.2	8.000	104.0
0.400	42.2	1.800	50.4	4.500	78.5	8.500	107.1
0.500	42.2	2.000	53.0	5.000	82.7	9.000	110.1
0.600	41.7	2.200	55.5	5.500	86.6	9.500	113.1
0.800	39.7	2.400	57.9	6.000	90.4		
1.000	38.0	2.600	60.2	6.500	93.9		

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Storage Structures for Storm

Tank or Pond Manhole: S1, DS/PN: S1.001

Invert Level (m) 31.300

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	180.0	0.500	180.0	0.501	0.0

Tank or Pond Manhole: SIC2, DS/PN: S2.001

Invert Level (m) 30.700

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	10.0	0.500	10.0	0.501	0.0

Tank or Pond Manhole: SIC20, DS/PN: S4.001

Invert Level (m) 30.825

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	10.0	0.500	10.0	0.501	0.0

Tank or Pond Manhole: SIC3, DS/PN: S2.002

Invert Level (m) 30.415

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	20.0	0.500	20.0	0.501	0.0

Tank or Pond Manhole: SIC13, DS/PN: S5.001

Invert Level (m) 30.550

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	10.0	0.500	10.0	0.501	0.0

Tank or Pond Manhole: SIC15, DS/PN: S7.001

Invert Level (m) 30.170

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Tank or Pond Manhole: SIC15, DS/PN: S7.001

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	10.0	0.500	10.0	0.501	0.0

Tank or Pond Manhole: SIC8, DS/PN: S5.003

Invert Level (m) 29.526

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	20.0	0.500	20.0	0.501	0.0

Tank or Pond Manhole: SIC18, DS/PN: S10.001

Invert Level (m) 28.820

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	5.0	1.000	5.0	1.001	0.0

Tank or Pond Manhole: SIC17, DS/PN: S11.001

Invert Level (m) 28.960

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	5.0	1.000	5.0	1.001	0.0

Tank or Pond Manhole: SIC16, DS/PN: S12.001

Invert Level (m) 29.310

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	30.0	0.500	30.0	0.501	0.0

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Summary of Critical Results by Maximum Outflow (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 0.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 10
Number of Online Controls 9 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 0.360
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 18.000 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	SPhs1C	15 Summer	100	+40%	100/15 Summer				32.068
S1.001	S1	60 Winter	100	+40%	100/15 Summer				32.232
S2.000	SIC1	15 Winter	100	+40%	100/15 Summer				31.241
S2.001	SIC2	15 Summer	100	+40%	30/15 Winter				31.060
S3.000	SIC1b	15 Winter	100	+40%					30.995
S4.000	SIC19	15 Winter	100	+40%	30/15 Summer				31.508
S4.001	SIC20	15 Winter	100	+40%	30/15 Summer				31.417
S3.001	SIC5	15 Winter	100	+40%	1/15 Winter				31.367
S2.002	SIC3	60 Winter	100	+40%	1/15 Summer	100/30 Summer			31.514
S1.002	S2	60 Winter	100	+40%					30.059
S5.000	SIC11	15 Winter	100	+40%	100/15 Summer				31.952
S6.000	SIC12	15 Winter	100	+40%	100/15 Summer				31.922
S5.001	SIC13	15 Winter	100	+40%	1/15 Summer	100/15 Summer			31.764
S7.000	SIC14	15 Winter	100	+40%	100/15 Summer				31.450
S8.000	SIC13b	15 Winter	100	+40%					31.200
S7.001	SIC15	15 Winter	100	+40%	1/15 Summer	100/15 Winter			31.376

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Summary of Critical Results by Maximum Outflow (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SPhs1C	0.268	0.000	1.55			173.7	SURCHARGED	
S1.001	S1	0.658	0.000	0.29			29.7	FLOOD RISK	
S2.000	SIC1	0.301	0.000	1.50			9.7	SURCHARGED	
S2.001	SIC2	0.260	0.000	0.92			7.9	SURCHARGED	
S3.000	SIC1b	0.000	0.000	0.49			6.3	SURCHARGED*	
S4.000	SIC19	0.483	0.000	1.47			7.1	SURCHARGED	
S4.001	SIC20	0.492	0.000	1.27			7.4	SURCHARGED	
S3.001	SIC5	0.502	0.000	2.95			14.0	SURCHARGED	
S2.002	SIC3	1.134	5.737	1.27			5.6	FLOOD	10
S1.002	S2	-0.141	0.000	0.55			36.7	OK	
S5.000	SIC11	0.752	0.000	0.66			7.2	FLOOD RISK	
S6.000	SIC12	0.702	0.000	0.58			6.8	FLOOD RISK	
S5.001	SIC13	1.114	0.986	0.30			5.7	FLOOD	8
S7.000	SIC14	0.500	0.000	0.54			6.4	SURCHARGED	
S8.000	SIC13b	0.000	0.000	1.14			5.7	SURCHARGED*	
S7.001	SIC15	1.106	0.160	0.37			5.3	FLOOD	9

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Summary of Critical Results by Maximum Outflow (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S5.002	SIC7	30 Winter	100	+40%	30/15 Summer	100/30 Summer		
S9.000	SIC3b	15 Winter	100	+40%				
S5.003	SIC8	60 Winter	100	+40%	1/15 Summer	100/120 Winter		
S1.003	S3	60 Winter	100	+40%	100/30 Summer			
S10.000	SRE	15 Winter	100	+40%	30/15 Summer			
S10.001	SIC18	15 Winter	100	+40%	30/15 Summer			
S11.000	SRE	15 Winter	100	+40%	30/15 Summer			
S11.001	SIC17	15 Winter	100	+40%	1/15 Summer			
S12.000	SIC9	15 Winter	100	+40%				
S13.000	SIC8b	15 Winter	100	+40%				
S12.001	SIC16	60 Winter	100	+40%	30/30 Summer			
S1.004	S4	30 Summer	100	+40%	100/15 Winter			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S5.002	SIC7	31.002	1.252	1.605	1.80			13.4	FLOOD
S9.000	SIC3b	30.580	0.000	0.000	1.38			6.7	SURCHARGED*
S5.003	SIC8	30.994	1.418	0.000	1.67			8.6	FLOOD RISK
S1.003	S3	29.783	0.761	0.000	0.62			43.9	SURCHARGED
S10.000	SRE	29.340	0.370	0.000	1.31			6.9	SURCHARGED
S10.001	SIC18	29.322	0.402	0.000	0.61			3.4	SURCHARGED
S11.000	SRE	29.760	0.700	0.000	1.66			11.4	SURCHARGED
S11.001	SIC17	29.696	0.721	0.000	0.54			4.6	SURCHARGED
S12.000	SIC9	29.719	-0.026	0.000	0.90			7.9	OK
S13.000	SIC8b	29.576	0.000	0.000	1.04			4.7	SURCHARGED*
S12.001	SIC16	29.638	0.228	0.000	0.46			2.6	SURCHARGED
S1.004	S4	29.175	0.300	0.000	0.69			42.2	SURCHARGED

PN	US/MH Name	Level Exceeded
S5.002	SIC7	8
S9.000	SIC3b	
S5.003	SIC8	
S1.003	S3	
S10.000	SRE	
S10.001	SIC18	
S11.000	SRE	
S11.001	SIC17	

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Summary of Critical Results by Maximum Outflow (Rank 1) for Storm

PN	US/MH Name	Level Exceeded
S12.000	SIC9	
S13.000	SIC8b	
S12.001	SIC16	
S1.004	S4	

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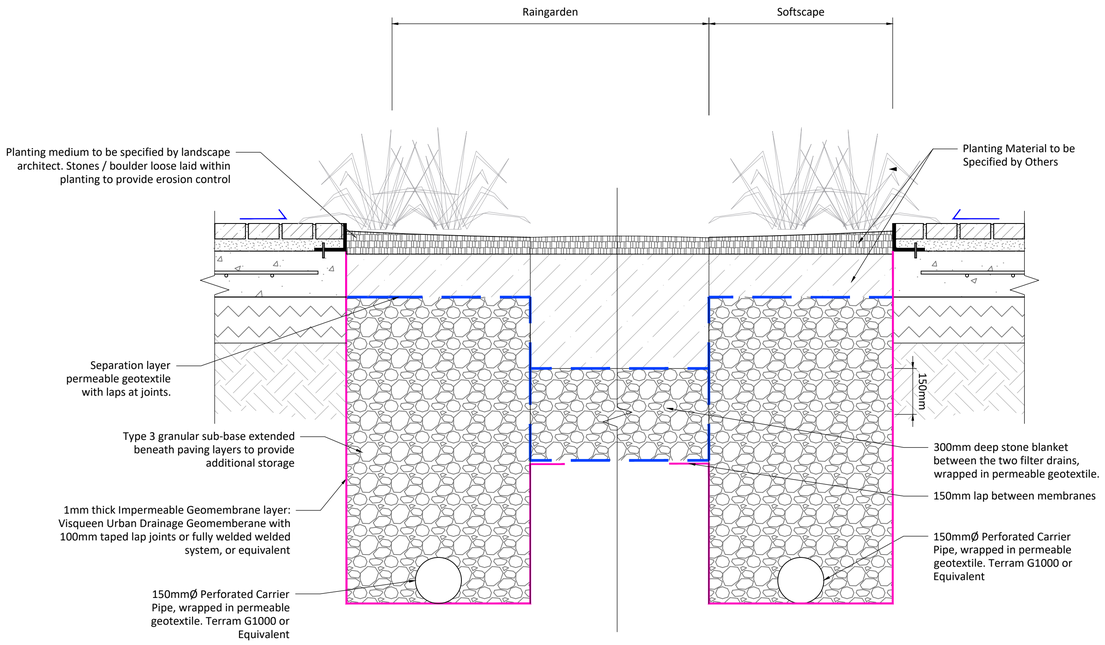
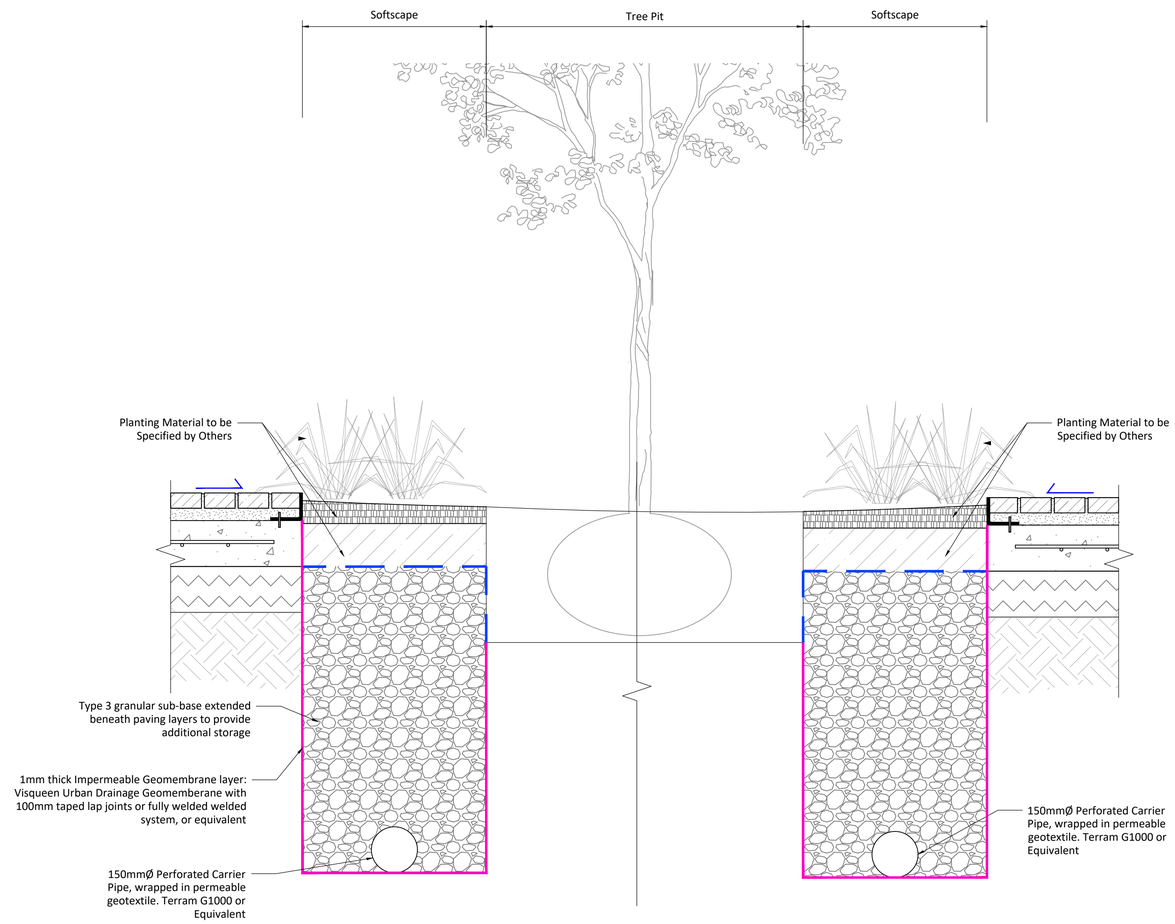


Typical Section through Raingarden

(Scale 1:10@A1)



Typical Section through Tree Pit

(Scale 1:10@A1)

Standard Notes

1. This drawing is to be read in conjunction with all relevant Architect's and Engineer's drawings and the specification.
2. This drawing should not be scaled.
3. All dimensions are to be verified by the contractor on site.
4. All discrepancies should be reported to the C.A. prior to the commencement of the works.

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Notes and Keys

1. General:
   a. All works to be in accordance with the Specification for Highways Works unless stated otherwise.
   b. All drainage should be constructed in accordance with MCHWVol 1, 500 Series.
   c. All covers and gratings shall comply with the requirements of (BS) EN124:1994 and shall be marked with the B.S. kitemark or L.R.Q.A.
   d. All covers to Class D400 & E600 shall provide for the permanent non-rock performance whilst in operation.
   e. The cover or grating shall be capable of supporting without fracture the design load with the design load bearing block placed at ANY position wholly within the perimeter of the cover or grating section(s).
   f. All covers shall be made from Ductile Iron (with no infilling).

Notes and Keys

   g. All gratings shall be made from Ductile Iron.
   h. All gully gratings shall be hinged and shall be captive within the frame.

Notes and Keys

Notes and Keys

Date	Rev	Description	Drawn	Chk
13/12/20	P03	STAGE 4 ISSUE	LGS	CK
14/08/20	P02	STAGE 3 ISSUE	DC	NH
16/07/20	P01	ISSUED FOR INFORMATION	DC	NH

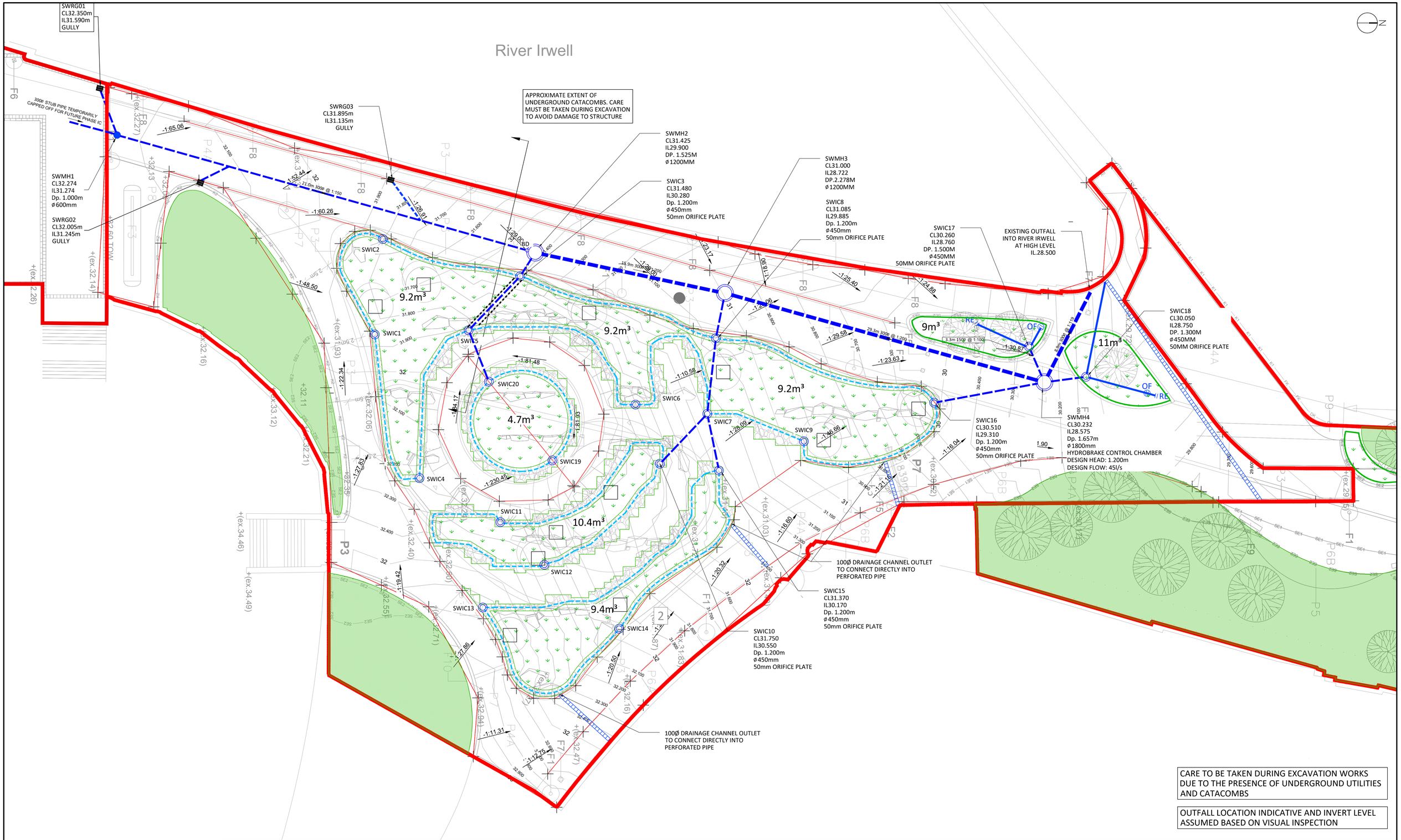
Project
MEDIEVAL QUARTER & GLADE OF LIGHT
MANCHESTER

Title
TYPICAL DRAINAGE DETAILS
SHEET 4

Civic Engineers
MANCHESTER LONDON LEEDS
Carver's Warehouse, 77 Dale Street, Manchester, M1 2HG. Tel: 0161 228 6757
Lloyds Wharf, 3 Mill Street, London SE1 2BD. Tel: 020 7253 2977
Tower Works, Unit 02-01, Globe Road, Leeds, LS11 5QG. Tel: 0113 2025 130
www.civicengineers.com

Status
INFORMATION

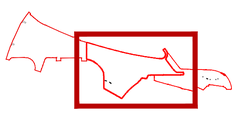
Scale @ A1	Date Created	Drawn	Checked	Project Number	Originator	Discipline	Drawing Number	Revision
1:10	16/07/20	DC	NH	949-02	CIVIC	C	DE-004	P03



CARE TO BE TAKEN DURING EXCAVATION WORKS DUE TO THE PRESENCE OF UNDERGROUND UTILITIES AND CATACOMBS

OUTFALL LOCATION INDICATIVE AND INVERT LEVEL ASSUMED BASED ON VISUAL INSPECTION

Location Plan



Standard Notes

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Notes and Keys

1. PROPOSED GENERAL ARRANGEMENT, SITE BOUNDARY ARE AS PER PLANIT-IE DRAWING 'PL1784-VW-001-23-PLANIT IE WORKING FILE', RECEIVED ON 02/07/2020.

Notes and Keys

- ZONE AND SITE BOUNDARY
- PROPOSED SW DRAINAGE
- PROPOSED 150mm PERFORATED SW DRAIN (LAID AT MIN 1:150 FALLS)
- EXISTING UNITED UTILITIES SEWER
- PROPOSED SURFACE WATER SOLID PIPE
- PROPOSED PERFORATED PIPE (100mmØ)
- PROPOSED SW MANHOLE/IC
- PROPOSED FLOW CONTROL CHAMBER

Notes and Keys

- XX.XX - PROPOSED LEVELS CONTOURS
- PROPOSED 300mm DEEP STONE BLANKET
- PROPOSED LAWN AREA
- PROPOSED GULLY
- ACO CHANNEL (HEEL GUARD GRATING OR SIMILAR)
- RE - PROPOSED RODDING EYE
- OF - PROPOSED OVERFLOW
- PROPOSED IMPERMEABLE MEMBRANE

Date	Rev	Description	Drawn	Chk
14/01/21	P06	STAGE 4 ISSUE - MINOR DRAINAGE AMENDMENTS	LGS	CFK
17/12/20	P05	STAGE 4 ISSUE - IC REFERENCES AMENDED	CFK	CFK
11/12/20	P04	STAGE 4 ISSUE	CFK	CFK
27/11/20	P03	STAGE 4 ISSUE - DRAFT	CFK	CFK
19/11/20	P02	ISSUED FOR INFORMATION	MR	CK
14/08/20	P01	STAGE 3 ISSUE	DC	NH

Project

MEDIEVAL QUARTER & GLADE OF LIGHT MANCHESTER

Title

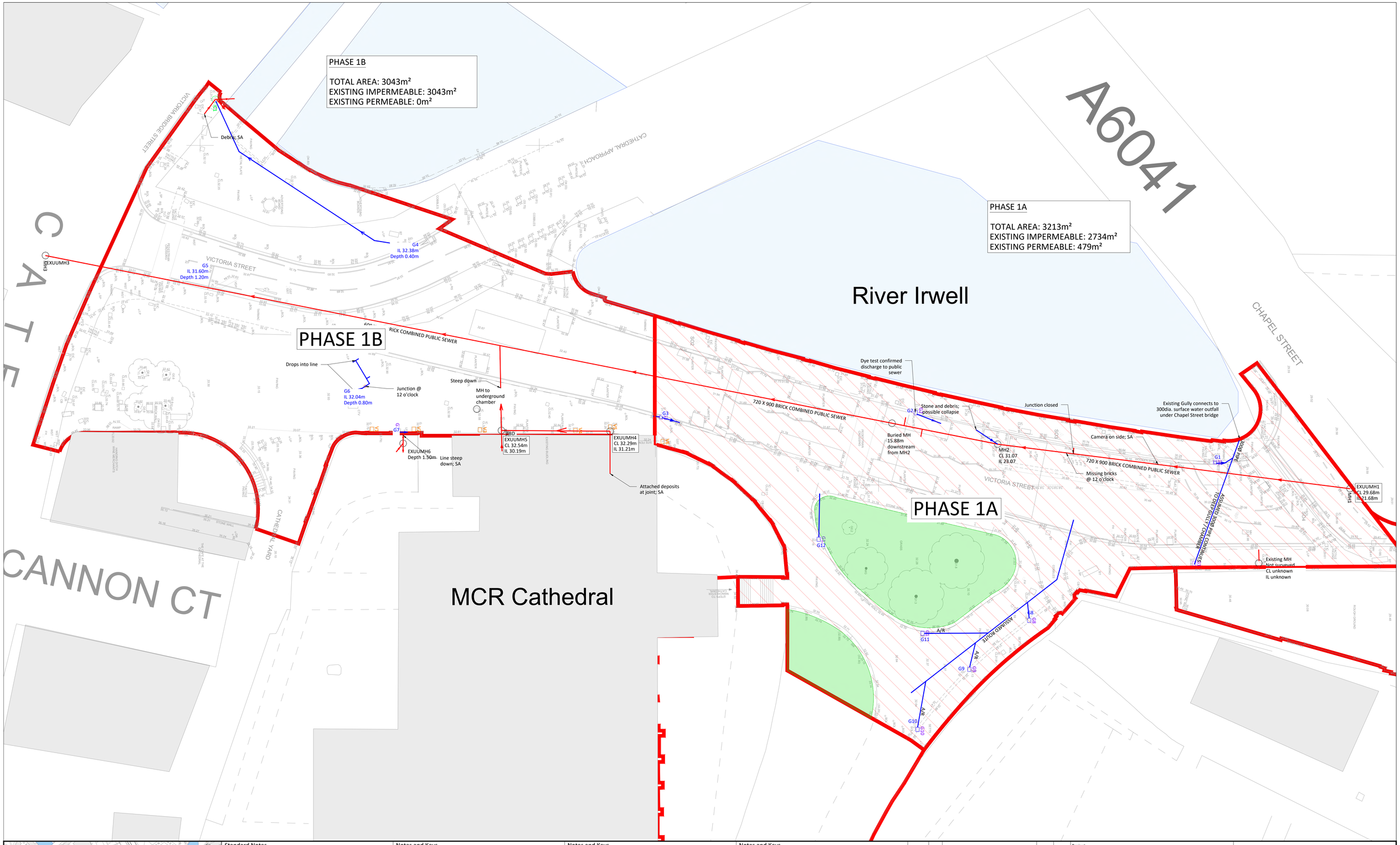
PROPOSED DRAINAGE STRATEGY PHASE 1A

Civic Engineers
MANCHESTER Carver's Warehouse, 77 Dale Street, Manchester, M1 2HG. Tel: 0161 228 6757
LONDON Lloyds Wharf, 3 Mill Street, London SE1 2BD. Tel: 020 7253 2977
LEEDS Tower Works, Unit 02-01, Globe Road, Leeds, LS11 5QG. Tel: 0113 2025 130
www.civicengineers.com

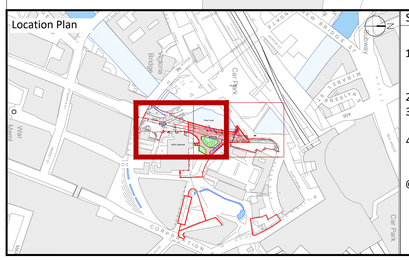
Status

TENDER

Scale @ A1	Date Created	Drawn	Checked	Project Number	Originator	Discipline	Drawing Number	Revision
1:150	14/08/20	DC	NH	949-02	CIVIC	C	DR-002	P06



Location Plan



Standard Notes

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2. This drawing should not be scaled.
3. All dimensions are to be verified by the contractor on site.
4. All discrepancies should be reported to the C.A. prior to the commencement of the works.

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Notes and Keys

1. Topographical survey carried out by Survey Operations in June 2018, received from Galliford Try Infrastructure Limited on 25.06.2018.
2. Existing drainage investigations carried out by General Utilities Northwest Limited in June 2018.
3. Existing drainage features shown in the drawing are based on the topographical survey (by Survey Operations) and the CCTV survey (by General Utilities Northwest Limited).

Notes and Keys

Notes and Keys

Date	Rev	Description	Drawn	Chk
21/03/21	P01	ISSUED FOR INFORMATION	CK	CK

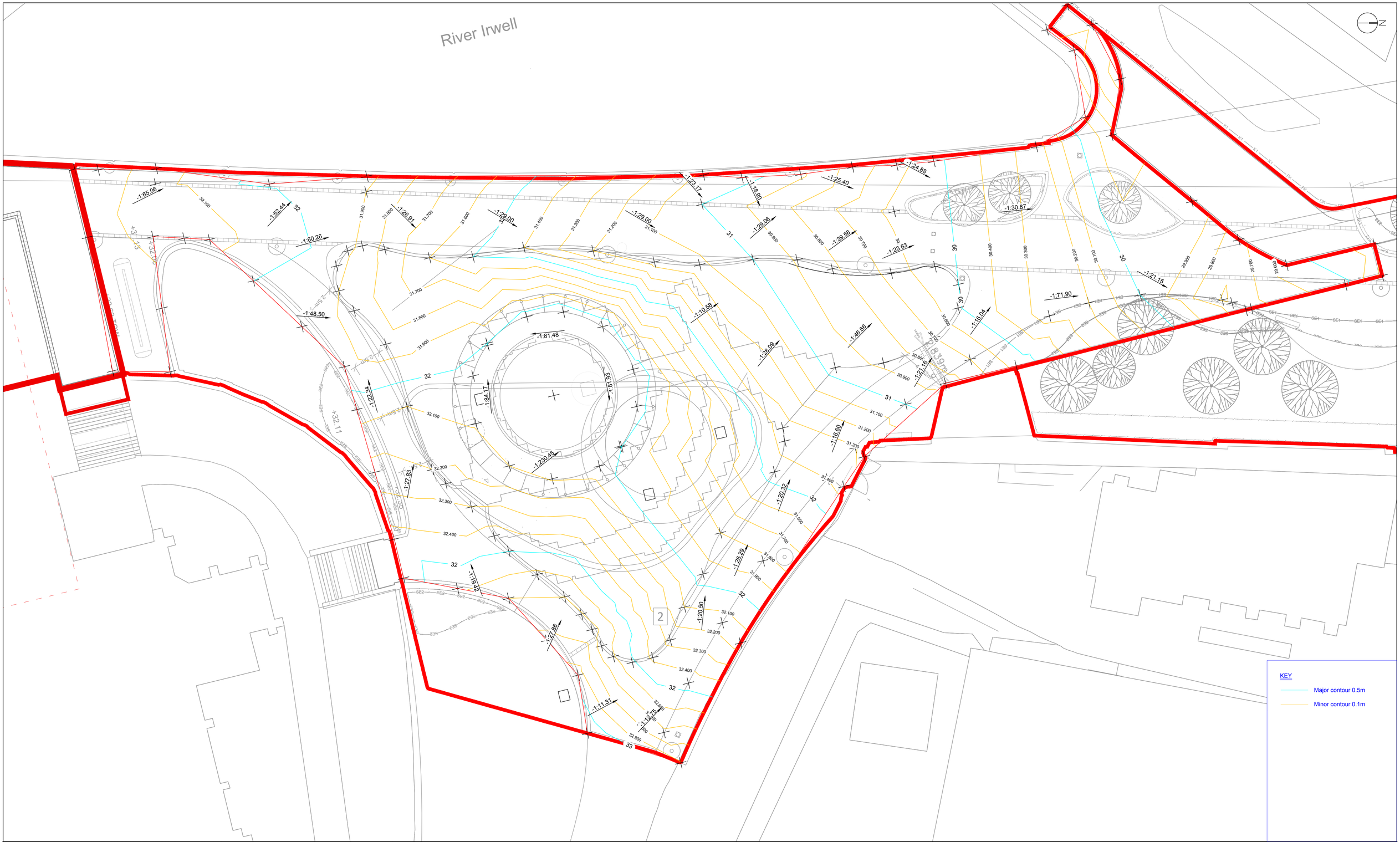
Project
Medieval Quarter
Manchester

Title
Existing Drainage
Phase 1A

Civic Engineers
MANCHESTER Corner's Warehouse, 77 Dale Street, Manchester, M1 2HG, Tel: 0161 228 6751
LONDON Reedi Wharf, 33 Mill Street, London SE1 2AX, Tel: 020 7253 2977
LEEDS Tower Works, Unit D2-01, Globe Road, Leeds, LS11 5QG, Tel: 0113 2035 130
GLASGOW Gretham Chambers, 45 West Nile St, Glasgow, G1 2PT, Tel: 0141 370 1829
www.civicengineers.com

Status
INFORMATION

Scale @ A1	Date Created	Drawn	Checked	Project Number	Originator	Discipline	Drawing Number	Revision
1:250	18/03/21	CK	CK	949-02	CIVIC	C	----	P01



Location Plan

Standard Notes

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4. All discrepancies should be reported to the C.A. prior to the commencement of the works.

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Notes and Keys

1. PROPOSED GENERAL ARRANGEMENT, SITE BOUNDARY ARE AS PER PLANIT-IE DRAWING 'PL1784-VW-001-23-PLANIT IE WORKING FILE', RECEIVED ON 19/11/2020.

Notes and Keys

Notes and Keys

Date	Rev	Description	Drawn	Chk
11/12/20	P02	STAGE 4 ISSUE	LGS	CK
27/11/20	P01	STAGE 4 ISSUE	CK	CK

Project
MEDIEVAL QUARTER & GLADE OF LIGHT
MANCHESTER

Title
PROPOSED FINISHED LEVELS
AND CONTOURS

Scale @ A1	Date Created	Drawn	Checked
1:150	27/11/20	CFK	CFK

Civic Engineers
MANCHESTER Carver's Warehouse, 77 Dale Street, Manchester, M1 2HG. Tel: 0161 228 6757
LONDON Lloyds Wharf, 3 Mill Street, London SE1 2BD. Tel: 020 7253 2977
LEEDS Tower Works, Unit 02-01, Globe Road, Leeds, LS11 5QG. Tel: 0113 2025 130
www.civicengineers.com

Status
INFORMATION

Project Number	Originator	Discipline	Drawing Number	Revision
949-02	CIVIC	C	GA-009	P02

Chris Kendrick

From: GMMC Info Requests <InfoRequests.GMMC@environment-agency.gov.uk>
Sent: 10 November 2020 09:50
To: Chris Kendrick
Subject: GE12845CC Response from the Environment Agency

Dear Chris,

Please see our officer's comments below:

At a planning level matters relation to surface-water drainage are handled primarily by the Lead Local Flood Authority (LLFA). I would advise that the enquirer contacts the LLFA in the first instance as we do not tend to formally comment on surface water drainage proposals unless the development is proposing to utilise infiltration into potentially contaminated ground.

From an environmental permitting aspect, any works within the vicinity of a 'main river' (River Irwell may require a Flood Risk Activity Permit (FRAP) and any existing permit for the outfall noted may need to be varied or a new permit obtained. I'd recommend referring the enquirer to the following pages:

- https://www.gov.uk/guidance/check-if-you-need-an-environmental-permit
- https://www.gov.uk/guidance/flood-risk-activities-environmental-permits

Kind Regards

Claire

Claire Cooke
Customer and Engagement Officer
Greater Manchester, Merseyside and Cheshire
External: 020 302 50048
Email: Inforequests.gmmc@environment-agency.gov.uk

From: Chris Kendrick [mailto:chris.kendrick@civicengineers.com]
Sent: 06 November 2020 07:30
To: GMMC Info Requests <InfoRequests.GMMC@environment-agency.gov.uk>
Subject: Medieval Quarter Glade of Light Public Realm, Manchester

Dear Sir / Madam,

We would like to discuss proposals for the surface water discharge for a public realm development close to Manchester Cathedral. Please see attached site location plan and proposed drainage strategy for the development.

The existing development area comprises existing highway and pedestrianised areas with the majority of the site being impermeable hardstanding with some existing raised lawns containing several trees. The existing highway is known as Victoria Street which has been under a prohibition of traffic order for a number of years and has been used as a pedestrian route from Victoria Train Station into the city centre. The new public realm development will introduce more soft landscaping, which will be utilised for SuDS features located to capture surface water run-off in key areas.

The SuDS features will be in the form of raingardens to provide treatment for surface water run-off, reduction in peak flows through lower time of concentration and storage within the sub-base below. The raingardens also encourage a nominal amount of infiltration into soils which can be taken up by plants which add to the biodiversity of the area. Beneath raingardens will sit a granular sub-base and network of perforated pipes in order to provide positive drainage (due to impracticality of relying on infiltration) towards a main piped system and eventual outfall to the River Irwell.

The proposed surface water discharge will utilise an existing 300dia. surface water outfall into the River Irwell. This provides a number of benefits such as:

- It is an existing outfall so minimal work is required near to the River Irwell retaining wall
- It is conveniently located at the lowest part of the site
- Existing highway gullies connect to this chamber
- It means surface water can be taken out of the public sewer for this area

I would welcome the opportunity to discuss these proposals with you but please get in touch if you need anything further in the meantime.

Kind regards,

Chris Kendrick
Senior Civil Engineer

Tel: 0161 228 6757
Mobile: 07921 299371

Civic Engineers

Manchester / London / Leeds / Glasgow

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Chris Kendrick

From: Chris Kendrick
Sent: 25 February 2021 10:06
To: Rob Byrne
Cc: Adam Liu (Galliford Try)
Subject: RE: Medieval Quarter - Existing Outfall to R.Irwell

Hi Rob,

Sorry to chase again but we're starting on site towards the end of March and we need to confirm use of the existing highway outfall. The confirmation would also form part of planning conditions we need to close out pre-commencement.

If you could get back to me as soon as possible that would be much appreciated.

Kind regards,

From: Chris Kendrick
Sent: 10 February 2021 14:28
To: Rob Byrne <r.byrne2@manchester.gov.uk>
Subject: RE: Medieval Quarter - Existing Outfall to R.Irwell

Hi Rob,

Further to our conversation and the email chain below could you confirm that MCC highways own the existing 300dia. outfall into the River Irwell. I attach a previous email sent to Nick with details of the existing outfall.

As well as confirming ownership could you please confirm agreement, or how to obtain agreement, for re-using this outfall for the proposed surface water drainage. I also attach the current drainage strategy for the development showing re-use of the existing outfall.

Kind regards,

Chris

From: Rob Byrne <r.byrne2@manchester.gov.uk>
Sent: 16 October 2020 07:23
To: Nick O'Keefe <nick.okeefe@manchester.gov.uk>
Cc: Chris Kendrick <chris.kendrick@civicengineers.com>; Paul Gee <p.gee@manchester.gov.uk>; Victor Nwegbu <v.nwegbu@manchester.gov.uk>; Robert Ashcroft <r.ashcroft@manchester.gov.uk>
Subject: Re: Medieval Quarter - Existing Outfall to R.Irwell

Hi Nick,

Can you please contact Chris to discuss his proposal.

Regards,

Rob Byrne

Contract Manager
Highway Services
Neighbourhoods Directorate
Block C
Hooper Street
Manchester
M12 6LA

Mob: 07789 984162
Email: r.byrne2@manchester.gov.uk

Environment on call email: contact@manchester.gov.uk

Web: www.manchester.gov.uk

POSTAL ADDRESS: Highways Service, Growth and Neighbourhoods Directorate, Manchester City Council, PO Box 532, Town Hall, Manchester, M60 2LA

On Thu, 15 Oct 2020 at 15:30, Victor Nwegbu <v.nwegbu@manchester.gov.uk> wrote:

> Hello Rob,
>
> Can you help with this enquiry from Chris Kendrick?
>
> Regards (& keep safe, well and fit!)
>
> ***Victor***
>
> *Victor K. NWEGBU* (Ph.D.)
> *Assistant Engineer (Bridges)*
>
> ***Postal Address:***
> HIGHWAYS, TRANSPORT & ENGINEERING
> *Growth & Neighbourhoods*
> Manchester City Council
> PO Box 532 Town Hall
> Manchester
> M60 2LA
>
> ***Office Location:***

*5th Floor **(5-038)* Bridgewater House
58-60 Whitworth Street
Manchester
M1 6LT

Telephone: 0161 219 6668
Internal: 801 36668
Mobile : 07742 227 406
E-mail: v.nwegbu@manchester.gov.uk
Website: www.manchester.gov.uk

In light of the COVID-19 situation I am currently working from home - please bear with me in responding to your email

---------- Forwarded message ---------
From: **Victor Nwegbu** <v.nwegbu@manchester.gov.uk>
Date: Thu, 15 Oct 2020 at 09:25
Subject: Re: Medieval Quarter - Existing Outfall to R.Irwell
To: Chris Kendrick <chris.kendrick@civicengineers.com>
Cc: p.gee@manchester.gov.uk <p.gee@manchester.gov.uk>, Adam Liu (Galliford Try) <Adam.Liu@gallifordtry.co.uk>

Hello Chris,

I can confirm that MCC Highways owns the retaining wall structure (Victoria Street Retaining Wall) - see attached. However, with respect to the drainage outfall and any permissions to utilise it is outside my scope.

Hi Paul, are you able to direct the inquirer to the right person?

Regards (& keep safe, well and fit!)

Victor

Victor K. NWEGBU (Ph.D.)
Assistant Engineer (Bridges)

Postal Address:
HIGHWAYS, TRANSPORT & ENGINEERING
Growth & Neighbourhoods
Manchester City Council
PO Box 532 Town Hall
Manchester
M60 2LA

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In light of the COVID-19 situation I am currently working from home - please bear with me in responding to your email

On Wed, 14 Oct 2020 at 17:11, Chris Kendrick <chris.kendrick@civicengineers.com> wrote:

Hi Victor,

Thank you for taking my call earlier.

Further to my call see attached mark up of where we identified a 300mm diameter surface water outfall from Victoria Street, through the retaining wall to the east bank of the River Irwell. The outfall is located under the Chapel Street bridge (also see attached photo).

The drainage survey proved that the existing highway gully, noted on the mark up, connects directly into the 300dia. pipe. No other gullies or drains could be proven to this outfall at the time of the survey.

Therefore, we would like to know if you have any records to suggest that this comes under MCC highways ownership? We would ultimately like to determine who we need to obtain permission from in order to utilise this as an outfall for the Medieval Quarter development.

Any assistance you could offer would be greatly appreciated.

Kind regards,

Chris Kendrick

07921 299 371

Chris Kendrick
Senior Civil Engineer

Tel: 0161 228 6757

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Chris Kendrick

From: Chris Kendrick
Sent: 18 March 2021 22:34
To: Flood Risk Management
Cc: Adam Liu (Galliford Try)
Subject: RE: Medieval Quarter - Surface Water Discharge to Existing Highways Outfall
Attachments: GE12845CC Response from the Environment Agency; 949-02-CIVIC-C-XX-EX-001 _P01- Existing SW Drainage.pdf

Hi Laura,

Thanks for the follow up. As requested, I also attach the Environment Agency's response referring us to the LLFA.

In addition, the existing highway is drained by traditional highway gullies. The attached plan shows the existing drainage including the existing 300dia. outfall into the Irwell. Currently there are several gullies which connect to the public sewer and the gullies at the lower end of the catchment discharge to the existing outfall. The proposal involves disconnecting the gullies from the public sewer and instead utilising the existing 300dia. outfall as the means of surface water disposal for the full catchment. I also include a link to the CCTV drainage survey of the existing outfall here showing the survey of the nearest gully outlet opening up into the 300 outfall pipe:

https://we.tl/t-p2w6FmRUNG

By removing surface water from the combined sewer we are complying with step 2 of the hierarchy of surface water disposal. Due to the sensitive nature of the site with existing utilities and underground catacombs associated with the Cathedral, surface water disposal by infiltration is not feasible.

The existing area within the Phase 1A site is 3213m²
The existing area within the Phase 1B site is 3043m²

Due to the gradient of Victoria Street, Phase 1B will eventually drain into the new surface water system provided by Phase 1A, therefore the total brownfield run-off from Phase 1A and 1B has been calculated. The existing 1:1 year run-off is 86.5 l/s which when offering a 50% betterment in accordance with Manchester SFRA, gives a discharge rate of 43.25l/s.

We have made several enquiries to various members of the MCC highways team to determine ownership of the existing outfall. Unfortunately, we have not received a formal response confirming MCC ownership / responsibility for this outfall and acceptance of the discharge rate which we require to close out a planning condition. Therefore, is this something you are able to confirm?

I am happy to discuss further should you wish, I am available most of tomorrow for a telephone call or teams meeting should you wish.

Kind regards,

From: Flood Risk Management <floodriskmanagement@manchester.gov.uk>
Sent: 15 March 2021 16:45
To: Chris Kendrick <chris.kendrick@civicengineers.com>
Subject: RE: Medieval Quarter - Surface Water Discharge to Existing Highways Outfall

Good Afternoon Chris,

I hope you are well,

I have been advised that some discussions were recently held with Highways colleagues regarding the drainage strategy. We remain available to hold additional discussions with you, with regards to our below 2 queries on confirming what the existing network is and the EA consultation for main river outfall.

Kind Regards,
Laura

From: Flood Risk Management <floodriskmanagement@manchester.gov.uk>
Sent: 09 March 2021 11:53
To: Chris Kendrick <chris.kendrick@civicengineers.com>
Subject: RE: Medieval Quarter - Surface Water Discharge to Existing Highways Outfall

Good Morning Chris,

Many thanks for your email regarding planning ref: 128045/VO/2020.

To begin our discussion on proposed rates, could you please discuss how existing rates have been calculated, what existing network the site was determined to drain to, & confirm that this existing network has been modelled in your attached calcs. At the point of formal FRA submission for this App, the existing drainage regime was unclear. We subsequently received the below text from the applicant via email 12 Nov 2020.

"The original CCTV survey was inconclusive and could not determine connections to either the public sewer or directly into the River Irwell. Therefore a further investigation was undertaken on 12th October which proved a highway gully connection to an existing 300 diameter piped outfall to the Irwell. This outfall is at a convenient location for the Phase 1A (and 1C) development as it is at a low point of the site. The only challenge with this outfall is that the invert level is approximately 1m below the nearest ground level (estimated based on observation). If the drainage strategy were of a traditional nature, i.e.: gullies, channels and pipes then connection to this would be a lot simpler to achieve. The difficultly arises with the depth of raingarden sub-bases which are used for storage. A strategy has been developed which introduces a shallower detail to raingarden nearest the outfall in order to utilise the existing Irwell outfall."

As per our comments, as the EA is risk management authority for main rivers, any works within or adjacent to the river that would affect it would require consent from Environment Agency. You have stated that you have approached the EA; and they have no objection or stipulations, and have directed you back to the LLFA. An email of acceptance of proposed flows and/or new connection will suffice to discharge this part of our comments.

We look forward to hearing further from you,

Kind Regards,
Laura

From: Chris Kendrick <chris.kendrick@civicengineers.com>
Sent: 25 February 2021 09:59
To: Flood Risk Management <floodriskmanagement@manchester.gov.uk>
Subject: Medieval Quarter - Surface Water Discharge to Existing Highways Outfall

Dear Sir / Madam,

We have contacted the Environment Agency in relation to discharge of surface water to the River Irwell from a new public realm development. They have advised that Manchester as Lead Local Flood Authority would be responsible for approving surface water in this instance.

Therefore, we would like to obtain the necessary approval for the discharge of surface water for the Phase 1A of the Medieval Quarter public realm development (planning ref: 128045/VO/2020) close to Manchester Cathedral. Please see attached site location plan and proposed drainage strategy for the development.

The existing development area comprises existing highway and pedestrianised areas with the majority of the site being impermeable hardstanding with some existing raised lawns containing several trees. The existing highway is known as Victoria Street which has been under a prohibition of traffic order for a number of years and has been used as a pedestrian route from Victoria Train Station into the city centre. The new public realm development will introduce more soft landscaping, which will be utilised for SuDS features located to capture surface water run-off in key areas.

The SuDS features will be in the form of raingardens to provide treatment for surface water run-off, reduction in peak flows through lower time of concentration and storage within the sub-base below. The raingardens also encourage a nominal amount of infiltration into soils and planting beds. Beneath raingardens will sit a granular sub-base and network of perforated pipes in order to provide positive drainage (due to impracticality of relying on infiltration) towards a main piped system and eventual outfall to the River Irwell.

The proposed surface water discharge will utilise an existing 300dia. surface water outfall into the River Irwell. This provides a number of benefits such as:

- It is an existing outfall so minimal work is required near to the River Irwell retaining wall
- It is conveniently located at the lowest part of the site
- Existing highway gullies connect to this chamber
- It means surface water can be taken out of the public sewer for this area

Phase 1A will be the first section to be installed, with Phase 1C and 1B coming forward at a later date. We have calculated the existing run-off from the phase 1A and 1C areas as 84.5 l/s (based on a 1:1 year 50mm/hr rainfall intensity), which when applying a 50% betterment gives a maximum discharge into the existing outfall of 42.25l/s.

I would welcome the opportunity to discuss these proposals with you but please get in touch if you need anything further in the meantime.

Kind regards,

Chris Kendrick
Senior Civil Engineer

Tel: 0161 228 6757
Mobile: 07921 299371

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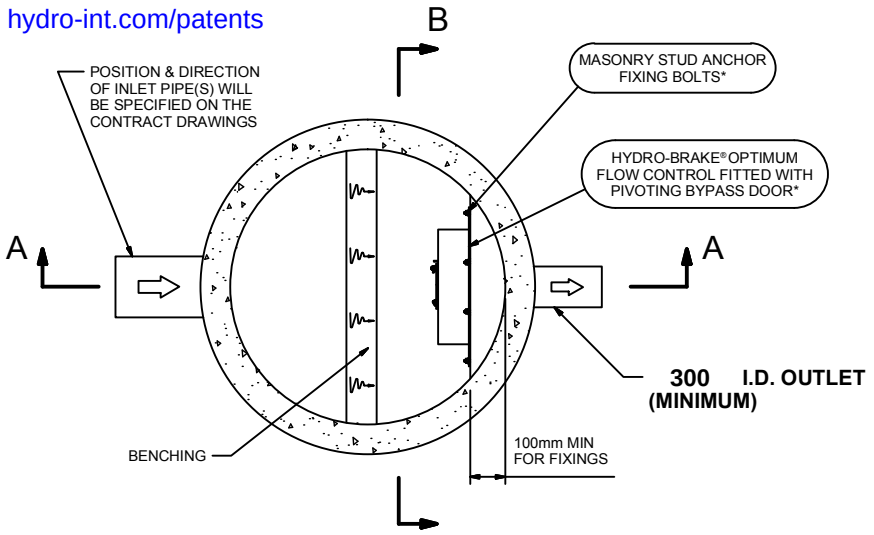
Technical Specification

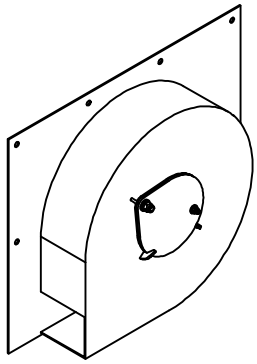
Control Point	Head (m)	Flow (l/s)
Primary Design	0.960	42.300
Flush-Flo™	0.421	42.299
Kick-Flo®	0.750	37.562
Mean Flow		34.111

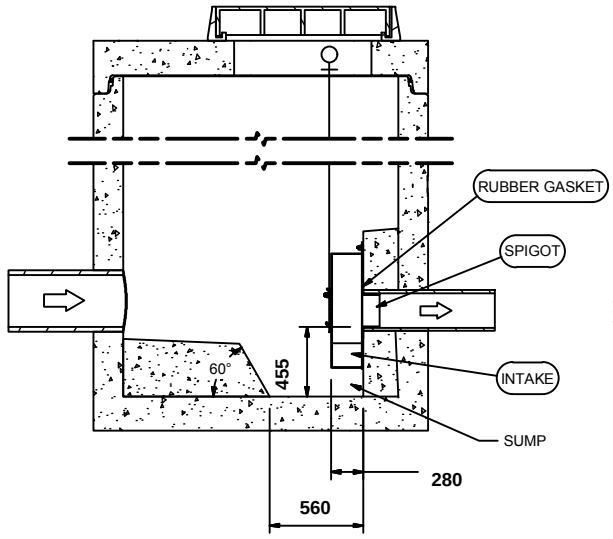
Hydro-Brake® Optimum Flow Control including:

- 3 mm grade 304L stainless steel
- Integral stainless steel pivoting by-pass door allowing clear line of sight through to outlet, c/w stainless steel operating rope
- Beed blasted finish to maximise corrosion resistance
- Stainless steel fixings
- Rubber gasket to seal outlet

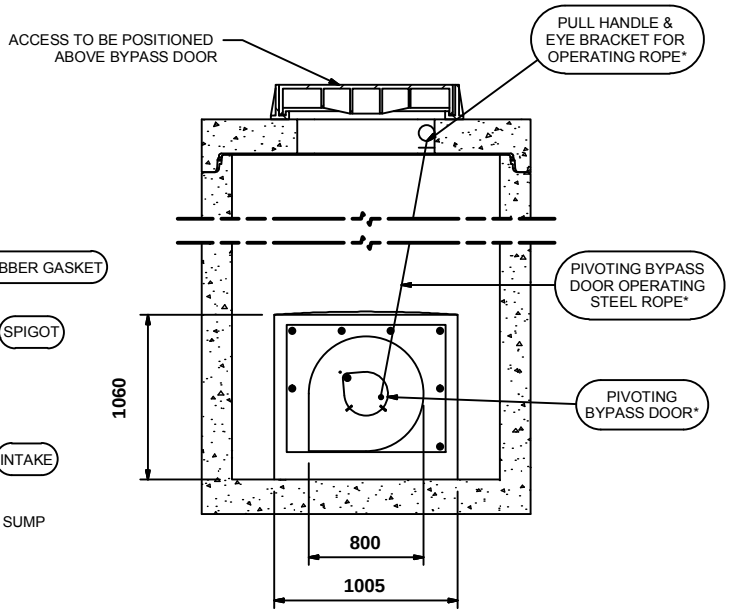
hydro-int.com/patents







SECTION A-A



SECTION B-B

IMPORTANT: LIMIT OF HYDRO INTERNATIONAL SUPPLY
THE DEVICE WILL BE HANDED TO SUIT SITE CONDITIONS
FOR SITE SPECIFIC DETAILS AND MINIMUM CHAMBER SIZE REFER TO HYDRO INTERNATIONAL
ALL CIVIL AND INSTALLATION WORK BY OTHERS
* WHERE SUPPLIED
HYDRO-BRAKE® FLOW CONTROL & HYDRO-BRAKE® OPTIMUM FLOW CONTROL ARE REGISTERED TRADEMARKS FOR FLOW CONTROLS DESIGNED AND MANUFACTURED EXCLUSIVELY BY HYDRO INTERNATIONAL

THIS DESIGN LAYOUT IS FOR ILLUSTRATIVE PURPOSES ONLY. NOT TO SCALE.

DESIGN ADVICE !

The head/flow characteristics of this SHE-0275-4230-0960-4230 Hydro-Brake® Optimum Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.
The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.

DATE	3/16/2021 7:03 AM
SITE	
DESIGNER	Sharon King
REF	

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Hydro-Brake® Optimum

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