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Project 6, MGS

Manchester

Drainage Strategy

1950-MGS-DP2-A180-RP-XX-9005

Rev P06

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Project 6, Manchester Grammar School

For

Manchester Grammar School and OMI Architects

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P01	06-06-2023	DEP	First Issue
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Project 6 – Drainage Strategy

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1. Introduction

This report outlines the SuDS Surface Water Management Strategy for the reconfigured drainage to the Sixth Form Pavilion at Manchester Grammar School,

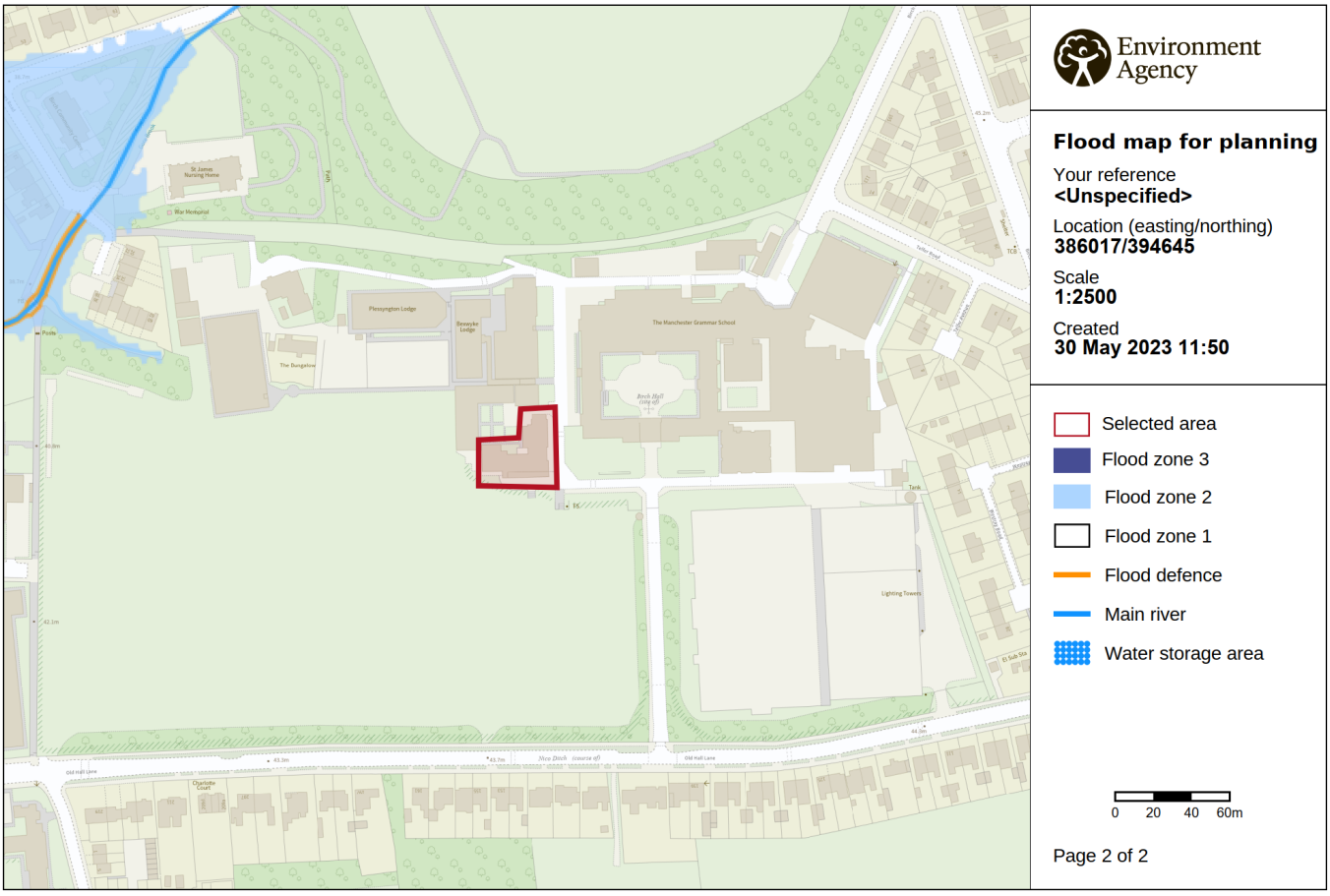
The existing surface water regime consists of:

- Infiltration to soft landscaping areas
- Gullies connected to the combined sewer for hard surfaced areas
- Rainwater from roofs connected to the combined sewer that forms part of the site wide drainage.

The proposed surface water system looks to reduce the current flow to the combined sewer utilising the following:

- Infiltration to soft landscaping areas
- Rainwater from new roofs connected to the combined sewer, utilising a storm water attenuation tank.

The site currently does not sit in an active flood zone.



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Figure 1 - Extract from EA Flood Map

2. Drainage Hierarchy

The National Planning Practice Guidance sets out The Hierarchy of Drainage to promote the use of Sustainable Drainage Systems, by aligning modern drainage systems with natural water processes. The aim of the Hierarchy of Drainage is to drain surface water run-off as sustainable, as reasonably practicable.

The increase in infrastructure and the use of traditional drainage networks (pipes and culverts) are resulting in downstream flooding and a deterioration in water quality of controlled waters, due to foul sewer overflow. Therefore, sustainable drainage systems aim to alleviate these problems by storing or re-using surface water at the source. This decreases the flow rates to watercourses and improves water quality.

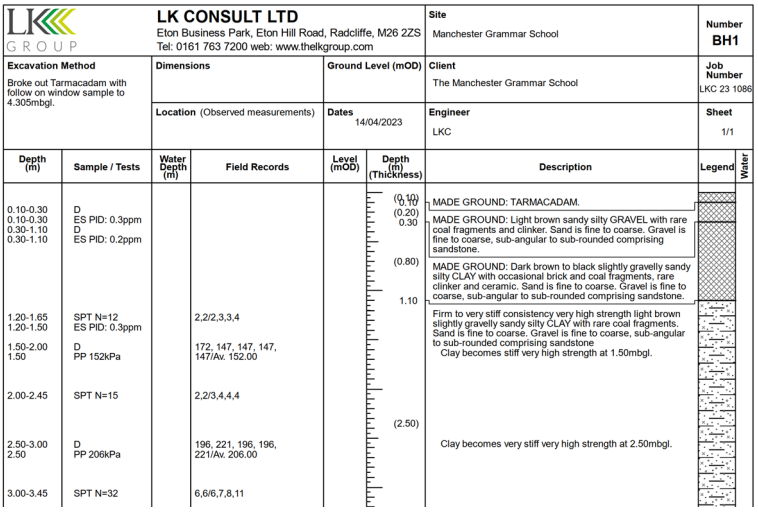
2.1. The Hierarchy of Drainage

As stated in the National Planning Practice Guidance, the aim should be to discharge surface water run-off as high up the drainage hierarchy, as reasonably practicable:

- into the ground (infiltration).
- to a surface water body.
- to a surface water sewer, highway drain, or another drainage system.
- to a combined sewer.

2.1.1. Infiltration

A site investigation has been conducted and the results show that the underlying strata is mainly clay.



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Site Manchester Grammar School			**Number** BH1
Excavation Method Broke out Tarmacadam with follow on window sample to 4.305mbgl.	**Dimensions**	**Ground Level (mOD)**	**Client** The Manchester Grammar School / **Job Number** LKC 23 1086
	Location (Observed measurements)	**Dates** 14/04/2023	**Engineer** LKC / **Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.10)			
0.10-0.30	D				0.10	MADE GROUND: TARMACADAM.		
0.10-0.30	ES PID: 0.3ppm				(0.20)			
0.30-1.10	D				0.30	MADE GROUND: Light brown sandy silty GRAVEL with rare coal fragments and clinker. Sand is fine to coarse. Gravel is fine to coarse, sub-angular to sub-rounded comprising sandstone.		
0.30-1.10	ES PID: 0.2ppm				(0.80)			
						MADE GROUND: Dark brown to black slightly gravelly sandy silty CLAY with occasional brick and coal fragments, rare clinker and ceramic. Sand is fine to coarse. Gravel is fine to coarse, sub-angular to sub-rounded comprising sandstone.		
					1.10			
1.20-1.65	SPT N=12		2,2/2,3,3,4			Firm to very stiff consistency very high strength light brown slightly gravelly sandy silty CLAY with rare coal fragments. Sand is fine to coarse. Gravel is fine to coarse, sub-angular to sub-rounded comprising sandstone		
1.20-1.50	ES PID: 0.3ppm							
1.50-2.00	D		172, 147, 147, 147, 147/Av. 152.00			Clay becomes stiff very high strength at 1.50mbgl.		
1.50	PP 152kPa							
2.00-2.45	SPT N=15		2,2/3,4,4,4					
					(2.50)			
2.50-3.00	D		196, 221, 196, 196, 221/Av. 206.00			Clay becomes very stiff very high strength at 2.50mbgl.		
2.50	PP 206kPa							
3.00-3.45	SPT N=32		6,6/6,7,8,11					

Figure 2 - Borehole Log Extract

The clay layer precludes the use of soak away systems on the site.

2.1.2. Surface Water Body

The nearest surface water body is 250m away on the other side of school buildings and private land and is excluded due to cost and practicality.



Figure 3 - Distance to Water Course

2.1.3. Connection to Surface Water Sewer.

There are no surface water sewers adjacent to the site.

2.1.4. Connection to a combined sewer

The existing drainage to the pavilion is part of a site wide drainage system that includes other buildings on the school site.

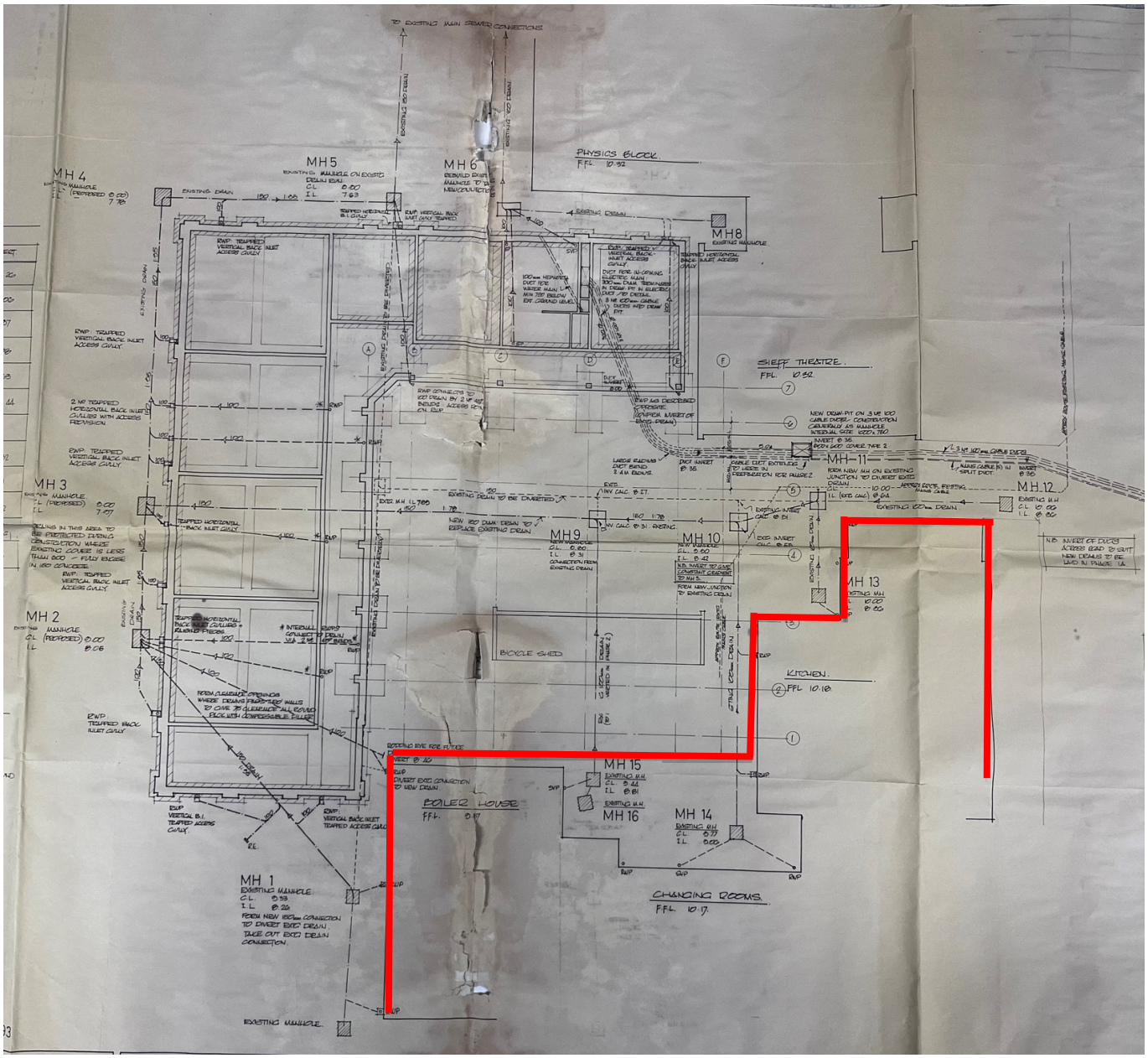


Figure 4 - Existing Drainage Plan - Existing Pavilion highlighted in Red.

2.2. Surface Water Proposal

Following the drainage hierarchy, the proposed surface water drainage is to be connected into the existing private surface water system via two attenuation tanks that will provide storage to restrict the discharge flow to 5l/s. Refer to Appendix A for the drainage calculations.

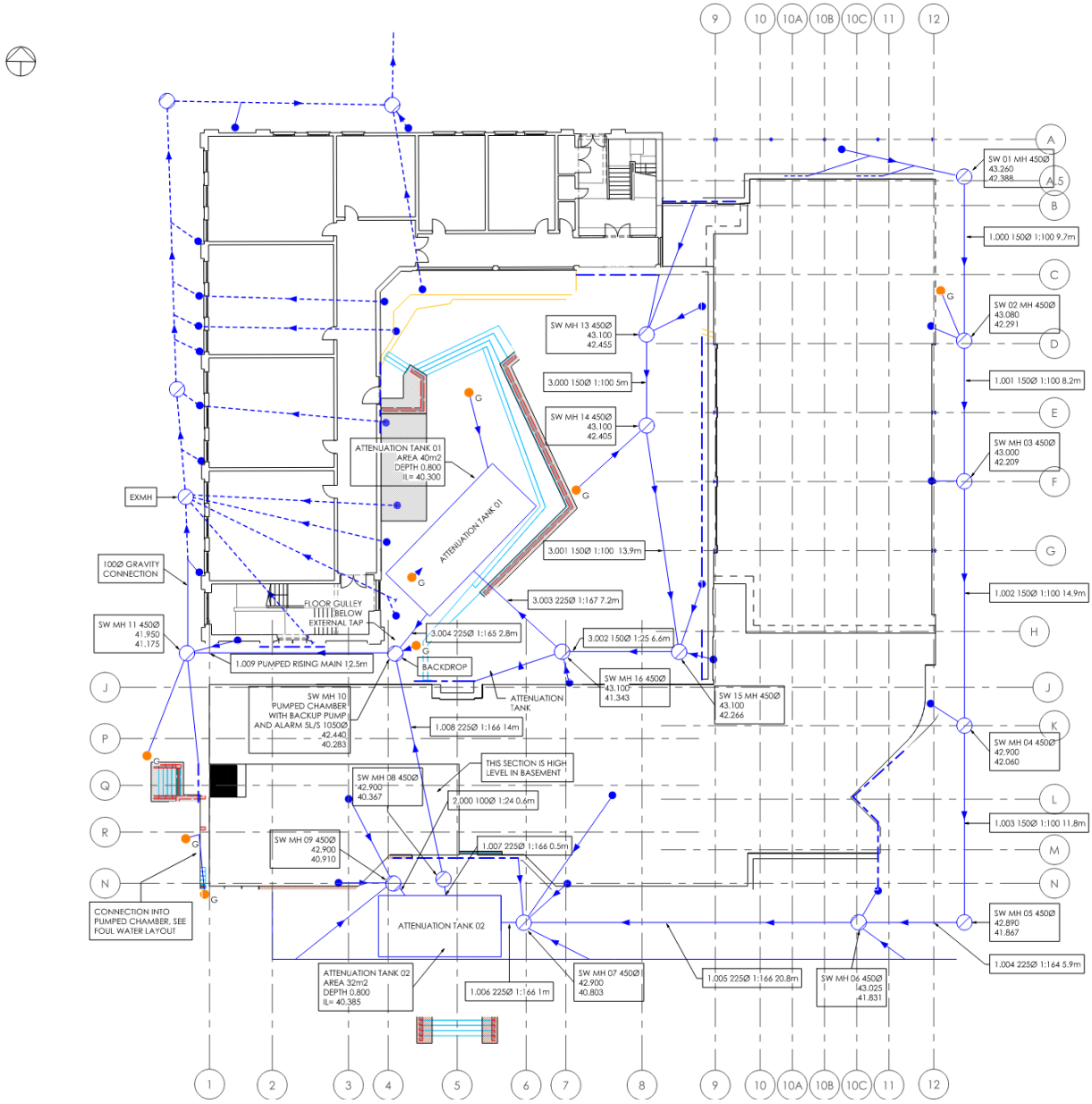


Figure 5 - Proposed Drainage Layout

The proposed drainage sits wholly within a private site and connects to a private network.

3. Appendix A – Drainage Calculations

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Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	1	Maximum Rainfall (mm/hr)	150.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	17.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	0.500
CV	1.000	Include Intermediate Ground	x
Time of Entry (mins)	4.00	Enforce best practice design rules	x

Nodes

	Name	Area (ha)	T of E (mins)	Cover Level (m)	Node Type	Manhole Type	Diameter (mm)	Depth (m)	Notes
✓	SW1	0.006	4.00	43.260	Manhole	Adoptable	450	0.872	
✓	SW2	0.021	4.00	43.080	Manhole	Adoptable	450	0.789	
✓	SW3	0.010	4.00	43.000	Manhole	Adoptable	450	0.791	
✓	SW4	0.009	4.00	42.900	Manhole	Adoptable	450	0.840	
✓	SW5	0.000		42.890	Manhole	Adoptable	450	1.023	
✓	SW6	0.020	4.00	43.025	Manhole	Adoptable	600	1.194	
✓	SW7	0.020	4.00	42.900	Manhole	Adoptable	600	2.097	
✓	TANK 02	0.000		42.900	Manhole	Adoptable	450	2.515	
✓	SW8	0.000		42.900	Manhole	Adoptable	600	2.533	
✓	SW9	0.016	4.00	42.900	Manhole	Adoptable	450	1.925	
✓	SW10	0.002	4.00	42.440	Manhole	Adoptable	1050	2.157	Auto-design is off
✓	SW13	0.017	4.00	43.100	Manhole	Adoptable	450	0.645	
✓	SW14	0.011	4.00	43.100	Manhole	Adoptable	450	0.695	
✓	SW15	0.037	4.00	43.100	Manhole	Adoptable	600	0.834	
✓	TANK 01	0.019	4.00	42.440	Manhole	Adoptable	450	2.140	
✓	SW16	0.022	4.00	43.100	Manhole	Adoptable	600	1.757	
✓	EXISTING			42.440	Manhole	Adoptable	600	1.295	

Links (Input)

Name	US Node	DS Node	Length (m)	ks (mm) / n	Velocity Equation	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	Link Type	T of C (mins)	Ra (mm
1.000	SW1	SW2	9.700	0.600	Colebrook-White	42.388	42.291	0.097	100.0	150	Circular	4.16	
1.001	SW2	SW3	8.200	0.600	Colebrook-White	42.291	42.209	0.082	100.0	150	Circular	4.30	
1.002	SW3	SW4	14.900	0.600	Colebrook-White	42.209	42.060	0.149	100.0	150	Circular	4.54	
1.003	SW4	SW5	11.800	0.600	Colebrook-White	42.060	41.942	0.118	100.0	150	Circular	4.74	
1.004	SW5	SW6	5.900	0.600	Colebrook-White	41.867	41.831	0.036	163.9	225	Circular	4.84	
1.005	SW6	SW7	20.800	0.600	Colebrook-White	41.831	41.706	0.125	166.0	225	Circular	5.18	
1.006	SW7	TANK 02	1.000	0.600	Colebrook-White	40.803	40.785	0.018	55.6	225	Circular	5.19	
2.000	SW9	TANK 02	1.000	0.600	Colebrook-White	40.975	40.875	0.100	10.0	100	Circular	4.01	
1.007	TANK 02	SW8	1.000	0.600	Colebrook-White	40.385	40.367	0.018	55.6	225	Circular	5.20	
1.008	SW8	SW10	14.000	0.600	Colebrook-White	40.367	40.283	0.084	166.7	225	2X225	5.43	
3.000	SW13	SW14	5.000	0.600	Colebrook-White	42.455	42.405	0.050	100.0	150	Circular	4.08	
3.001	SW14	SW15	13.900	0.600	Colebrook-White	42.405	42.266	0.139	100.0	150	Circular	4.31	
3.002	SW15	SW16	6.600	0.600	Colebrook-White	42.266	42.000	0.266	24.8	150	Circular	4.37	
3.003	SW16	TANK 01	7.200	0.600	Colebrook-White	41.343	41.300	0.043	167.4	225	Circular	4.49	
3.004	TANK 01	SW10	2.800	0.600	Colebrook-White	40.300	40.283	0.017	164.7	225	Circular	4.53	
EXIST NG	SW10	EXISTING	5.000	0.600	Colebrook-White	41.175	41.145	0.030	166.7	225	Circular	5.51	

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Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	17.000	Drain Down Time (mins)	240
Ratio-R	0.400	Additional Storage (m³/ha)	20.0
Summer CV	1.000	Check Discharge Rate(s)	x
Winter CV	1.000	Check Discharge Volume	x

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
100	45	0	0

Node SW10 Online Pump Control

Flap Valve	x	Design Depth (m)	1.000	Switch off depth (m)	0.001
Replaces Downstream Link	✓	Design Flow (l/s)	5.0		
Invert Level (m)	40.283	Switch on depth (m)	0.002		

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.001	5.000	2.160	5.000

Node TANK 01 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	40.300
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	120

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	40.0	0.0	1.600	40.0	0.0	1.601	0.0	0.0

Node TANK 02 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	40.385
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	162

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	32.0	0.0	1.200	32.0	0.0	1.201	0.0	0.0

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CAUSEWAY	Flood Risk and Drainage Ltd	File: MANCHESTER GRAMMER Network: Storm Network Christian Vose 11/07/2024	Page 3

Results for 1 year Critical Storm Duration. Lowest mass balance: 96.32%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW1	10	42.412	0.024	1.0	0.0072	0.0000	OK
15 minute summer	SW2	10	42.345	0.054	4.5	0.0376	0.0000	OK
15 minute summer	SW3	10	42.272	0.063	6.2	0.0259	0.0000	OK
15 minute summer	SW4	10	42.132	0.072	7.7	0.0270	0.0000	OK
15 minute summer	SW5	10	41.941	0.074	7.6	0.0117	0.0000	OK
15 minute summer	SW6	10	41.912	0.081	10.9	0.0501	0.0000	OK
15 minute summer	SW7	10	40.889	0.086	13.8	0.0409	0.0000	OK
60 minute summer	TANK 02	43	40.493	0.108	10.2	3.3107	0.0000	OK
60 minute summer	SW8	43	40.493	0.126	8.2	0.0357	0.0000	OK
15 minute summer	SW9	10	41.006	0.031	2.7	0.0100	0.0000	OK
60 minute summer	SW10	44	40.493	0.210	7.6	0.1855	0.0000	OK
15 minute summer	SW13	10	42.499	0.044	2.9	0.0305	0.0000	OK
15 minute summer	SW14	10	42.459	0.054	4.7	0.0256	0.0000	OK
15 minute summer	SW15	10	42.328	0.062	10.9	0.0726	0.0000	OK
60 minute summer	TANK 01	44	40.493	0.193	12.1	7.4015	0.0000	OK
15 minute summer	SW16	10	41.445	0.102	14.6	0.0543	0.0000	OK
15 minute summer	EXISTING	1	41.145	0.000	5.0	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	SW1	1.000	SW2	1.0	0.272	0.056	0.0368	
15 minute summer	SW2	1.001	SW3	4.5	0.705	0.253	0.0523	
15 minute summer	SW3	1.002	SW4	6.2	0.804	0.348	0.1146	
15 minute summer	SW4	1.003	SW5	7.6	0.934	0.425	0.0954	
15 minute summer	SW5	1.004	SW6	7.5	0.618	0.184	0.0713	
15 minute summer	SW6	1.005	SW7	10.6	0.844	0.263	0.2609	
15 minute summer	SW7	1.006	TANK 02	13.7	1.144	0.195	0.0120	
15 minute summer	TANK 02	1.007	SW8	11.9	1.172	0.170	0.0161	
15 minute summer	SW8	1.008	SW10	11.1	0.850	0.138	0.7454	
15 minute summer	SW9	2.000	TANK 02	2.7	1.504	0.140	0.0018	
15 minute summer	SW10	Pump	EXISTING	5.0				13.4
15 minute summer	SW13	3.000	SW14	2.9	0.578	0.163	0.0251	
15 minute summer	SW14	3.001	SW15	4.7	0.749	0.265	0.0873	
15 minute summer	SW15	3.002	SW16	10.9	1.680	0.304	0.0428	
15 minute winter	TANK 01	3.004	SW10	5.1	1.110	0.126	0.0945	
15 minute summer	SW16	3.003	TANK 01	14.6	0.885	0.364	0.1186	

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Results for 30 year Critical Storm Duration. Lowest mass balance: 96.32%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW1	10	42.426	0.038	2.5	0.0113	0.0000	OK
15 minute summer	SW2	10	42.388	0.097	11.1	0.0669	0.0000	OK
15 minute summer	SW3	10	42.324	0.115	15.2	0.0473	0.0000	OK
15 minute summer	SW4	10	42.213	0.153	18.9	0.0571	0.0000	SURCHARGED
15 minute summer	SW5	11	41.996	0.129	17.9	0.0205	0.0000	OK
15 minute summer	SW6	10	41.969	0.138	26.0	0.0852	0.0000	OK
15 minute summer	SW7	10	40.949	0.146	33.7	0.0692	0.0000	OK
60 minute winter	TANK 02	58	40.873	0.488	18.2	14.9251	0.0000	SURCHARGED
60 minute winter	SW8	60	40.873	0.506	7.5	0.1431	0.0000	SURCHARGED
15 minute summer	SW9	10	41.030	0.055	6.6	0.0177	0.0000	OK
60 minute winter	SW10	59	40.873	0.590	6.7	0.5219	0.0000	OK
15 minute summer	SW13	10	42.531	0.076	7.0	0.0521	0.0000	OK
15 minute summer	SW14	10	42.498	0.093	11.5	0.0444	0.0000	OK
15 minute summer	SW15	10	42.380	0.114	26.7	0.1335	0.0000	OK
60 minute winter	TANK 01	59	40.873	0.573	19.0	21.9828	0.0000	SURCHARGED
15 minute summer	SW16	10	41.529	0.186	35.7	0.0992	0.0000	OK
15 minute summer	EXISTING	1	41.145	0.000	5.0	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	SW1	1.000	SW2	2.5	0.326	0.141	0.0753	
15 minute summer	SW2	1.001	SW3	11.1	0.835	0.625	0.1086	
15 minute summer	SW3	1.002	SW4	15.2	0.946	0.854	0.2389	
15 minute summer	SW4	1.003	SW5	17.9	1.093	1.007	0.1952	
15 minute summer	SW5	1.004	SW6	18.1	0.741	0.446	0.1444	
15 minute summer	SW6	1.005	SW7	25.6	1.049	0.636	0.5090	
15 minute summer	SW7	1.006	TANK 02	33.6	1.444	0.480	0.0232	
15 minute summer	TANK 02	1.007	SW8	18.5	1.175	0.264	0.0398	
15 minute summer	SW8	1.008	SW10	13.5	0.833	0.169	1.1136	
15 minute summer	SW9	2.000	TANK 02	6.6	1.801	0.342	0.0037	
15 minute summer	SW10	Pump	EXISTING	5.0				33.8
15 minute summer	SW13	3.000	SW14	7.0	0.684	0.394	0.0511	
15 minute summer	SW14	3.001	SW15	11.5	0.886	0.648	0.1799	
15 minute summer	SW15	3.002	SW16	26.7	2.022	0.744	0.0869	
15 minute winter	TANK 01	3.004	SW10	7.2	1.011	0.178	0.1114	
15 minute summer	SW16	3.003	TANK 01	35.7	1.094	0.891	0.2340	

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Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 96.32%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW1	11	42.861	0.473	4.6	0.1403	0.0000	SURCHARGED
15 minute summer	SW2	11	42.854	0.563	18.2	0.3894	0.0000	FLOOD RISK
15 minute summer	SW3	11	42.756	0.547	23.3	0.2253	0.0000	FLOOD RISK
15 minute summer	SW4	11	42.455	0.395	28.2	0.1475	0.0000	SURCHARGED
15 minute summer	SW5	11	42.066	0.199	28.2	0.0316	0.0000	OK
15 minute summer	SW6	11	42.038	0.207	41.5	0.1280	0.0000	OK
120 minute winter	SW7	116	41.641	0.838	18.1	0.3961	0.0000	SURCHARGED
120 minute winter	TANK 02	116	41.641	1.256	21.1	36.6949	0.0000	SURCHARGED
120 minute winter	SW8	116	41.635	1.268	30.0	0.3587	0.0000	SURCHARGED
120 minute winter	SW9	116	41.643	0.668	3.4	0.2170	0.0000	SURCHARGED
120 minute winter	SW10	116	41.636	1.353	31.8	1.1958	0.0000	SURCHARGED
15 minute summer	SW13	11	42.961	0.506	13.1	0.3474	0.0000	FLOOD RISK
15 minute summer	SW14	11	42.928	0.523	19.3	0.2489	0.0000	FLOOD RISK
15 minute summer	SW15	10	42.723	0.457	45.5	0.5351	0.0000	SURCHARGED
120 minute winter	TANK 01	116	41.635	1.335	22.2	51.1988	0.0000	SURCHARGED
15 minute summer	SW16	10	41.665	0.321	60.8	0.1714	0.0000	SURCHARGED
15 minute summer	EXISTING	1	41.145	0.000	5.0	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	SW1	1.000	SW2	5.0	0.330	0.284	0.1708	
15 minute summer	SW2	1.001	SW3	16.5	0.937	0.929	0.1444	
15 minute summer	SW3	1.002	SW4	22.5	1.281	1.270	0.2623	
15 minute summer	SW4	1.003	SW5	28.2	1.601	1.587	0.2056	
15 minute summer	SW5	1.004	SW6	28.2	0.818	0.697	0.2225	
15 minute summer	SW6	1.005	SW7	41.3	1.161	1.027	0.7334	
15 minute summer	SW7	1.006	TANK 02	55.1	1.643	0.789	0.0398	
15 minute summer	TANK 02	1.007	SW8	18.6	1.258	0.266	0.0398	
120 minute winter	SW8	1.008	SW10	-30.0	0.792	-0.373	1.1136	
15 minute summer	SW9	2.000	TANK 02	12.3	1.969	0.637	0.0078	
15 minute summer	SW10	Pump	EXISTING	5.0				62.2
15 minute summer	SW13	3.000	SW14	11.5	0.723	0.649	0.0880	
15 minute summer	SW14	3.001	SW15	19.4	1.100	1.091	0.2447	
15 minute summer	SW15	3.002	SW16	43.9	2.495	1.224	0.1159	
120 minute winter	TANK 01	3.004	SW10	31.8	0.888	0.786	0.1114	
15 minute summer	SW16	3.003	TANK 01	60.4	1.520	1.507	0.2777	

Flow+ v10.8 Copyright © 1988-2024 Causeway Technologies Ltd

4. Appendix B – Drainage Drawings

Do not scale from this drawing, figured dimensions only should be used. If in doubt ASK.

NOTES:

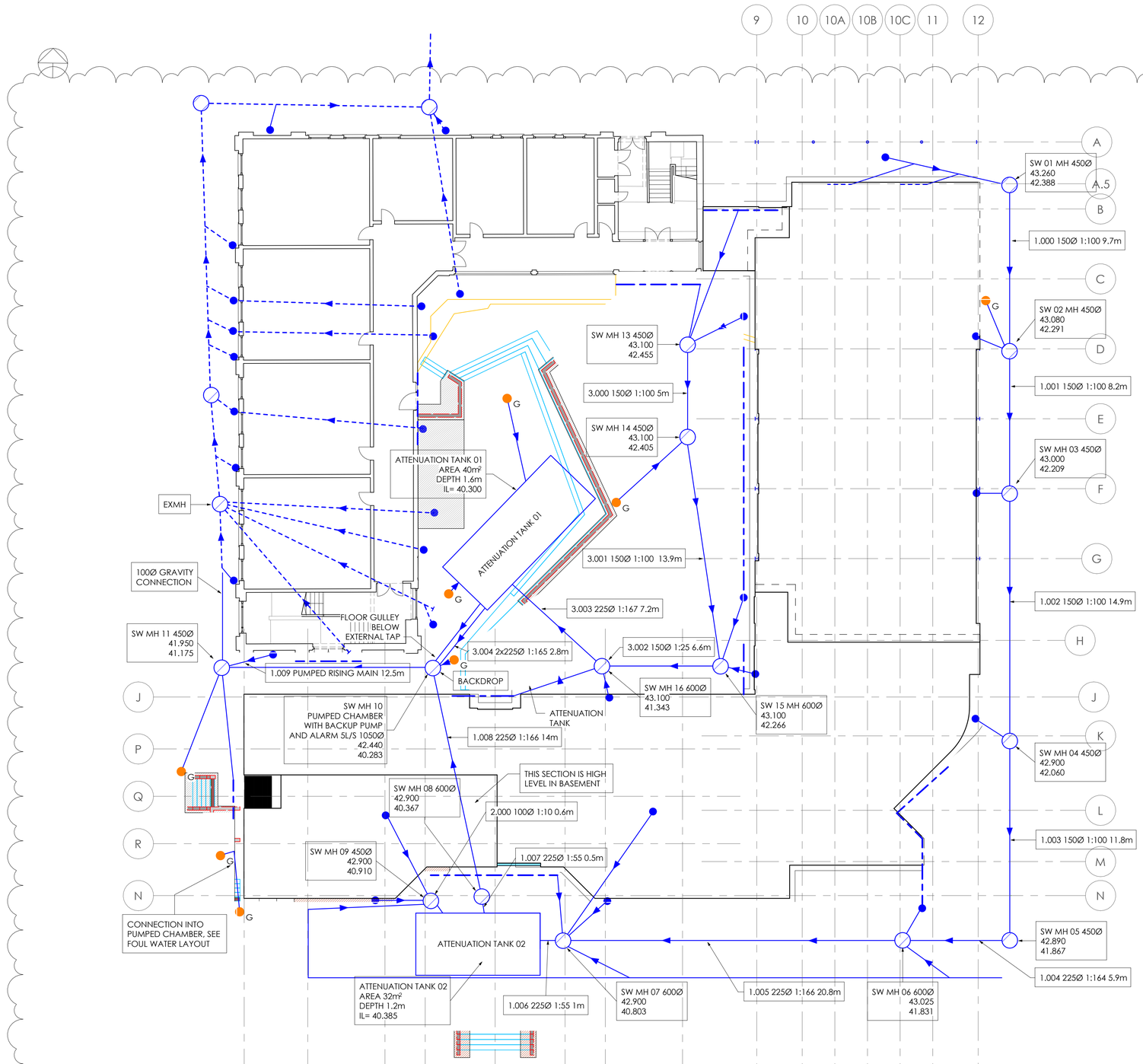
DO NOT SCALE FROM THIS DRAWING

ALL DIMENSIONS ARE IN MILLIMETRES U.N.O.

ALL HEIGHTS ARE IN METRES ABOVE ORDNANCE DATUM U.N.O.

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS

REFER TO ARCHITECTS DRAWINGS FOR SETTING OUT INFORMATION NOT SHOWN ON THIS DRAWING



KEY

- SURFACE MANHOLE
- DOWNPIPE
- PROPOSED SURFACE DRAIN REFER TO PLAN DIAMETER & FALL
- EXISTING SURFACE DRAINPIPE

ATTENUATION TANKS BY WAVIN AQUACELL OR SIMILAR APPROVED.

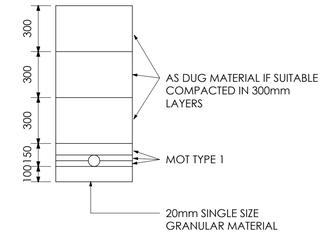
Manhole Ref	Cover Level	Invert Level	Manhole Type	Manhole Diameter	Cover Type	Notes
SWMH 01	43.260	42.388	PPIC	450Ø	A15	
SWMH 02	43.080	42.291	PPIC	450Ø	A15	
SWMH 03	43.000	42.209	PPIC	450Ø	A15	
SWMH 04	42.900	42.060	PPIC	450Ø	A15	
SWMH 05	42.890	41.867	PPIC	450Ø	A15	
SWMH 06	43.025	41.831	PPIC	600Ø	A15	
SWMH 07	42.900	40.803	PPIC	600Ø	A15	
SWMH 08	42.900	40.367	PPIC	600Ø	A15	
SWMH 09	42.900	40.975	PPIC	450Ø	A15	
SWMH 13	43.100	42.455	PPIC	450Ø	A15	
SWMH 14	43.100	42.405	PPIC	450Ø	A15	
SWMH 15	43.100	42.266	PPIC	600Ø	A15	
SWMH 16	43.100	41.343	PPIC	600Ø	A15	
SWMH 10	42.440	40.283	PPIC	1050Ø	A15	KINGSPAN PACKAGED PUMP STATION (KLARGESTER AQUAPUMP, OR SIMILAR) FOR SUBCONTRACTOR DESIGN SEE BELOW
SWMH 11	41.950	41.175	PPIC	450Ø	A15	
Existing connection	41.900	41.050				

OUTLINE SPECIFICATION FOR SURFACE WATER PUMPING STATION:

- DISCHARGE = 5l/s
- CHAMBER DIAMETER = 1050mm
- CHAMBER DEPTH = 2.157m
- WATER HEIGHT DURING THE EXTREME 100 YEAR+ 50% CLIMATE CHANGE EVENT = 1.353m
- BACKUP PUMP AND ALARM SYSTEM

RISING MAIN

- RISE = 0.887m
- LENGTH = 12.5m



DENOTES: DRAINAGE CHANNEL TO CONNECT INTO ADJACENT RWP LOCATIONS

G DENOTES: GULLY SEE LANDSCAPE PLAN

BACKFILL DETAIL

Scale 1 : 20

Rev	Revision Description:	Drn/Chk	Date:
T05	Issued for Tender	QK/DEP	15-07-2024
T04	Issued for Tender	QK/DEP	25-06-2024
T03	Issued for Tender	QK/DEP	10-04-2024
T02	Issued for Tender	QK/DEP	12-03-2024
T01	Issued for Tender	QK/DEP	29-02-2024
P01	For Information	QK/DEP	11-12-2023

Drawing No.: 1950-MGS-DP2-G100-PL-XX-0052

Rev: T05

Client: MANCHESTER GRAMMAR SCHOOL

Project: PROJECT 6 - PAVILION

Title: SURFACE WATER DRAINAGE

Scale at A1 :	Drawn by :	Checked by :	Date :
As indicated	QK	DEP	15/07/24

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NOTES:

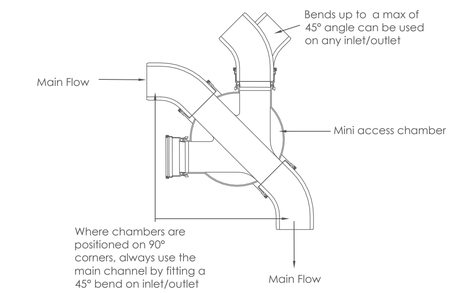
DO NOT SCALE FROM THIS DRAWING

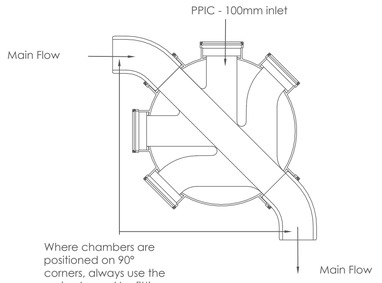
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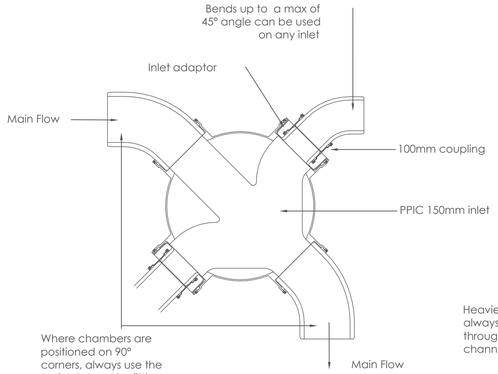
ALL HEIGHTS ARE IN METRES ABOVE ORDNANCE DATUM U.N.O.

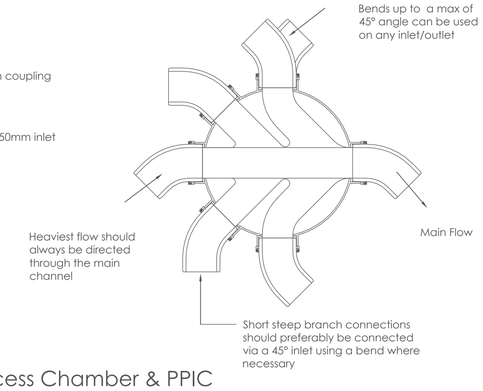
THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS

REFER TO ARCHITECTS DRAWINGS FOR SETTING OUT INFORMATION NOT SHOWN ON THIS DRAWING

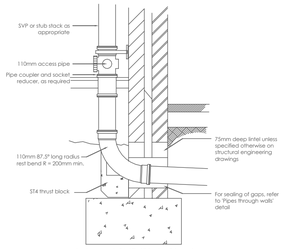




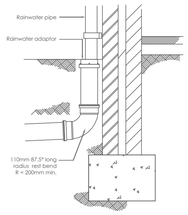




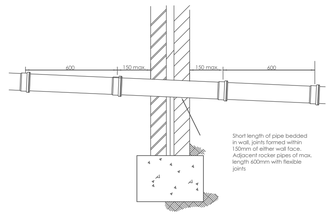
Mini Access Chamber & PPIC Installation Details
Scale 1:10



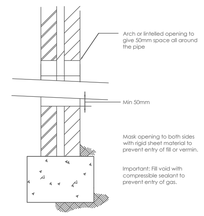
Internal SVP/Stub Stack Connection Through External Wall to Drain
Scale 1:20



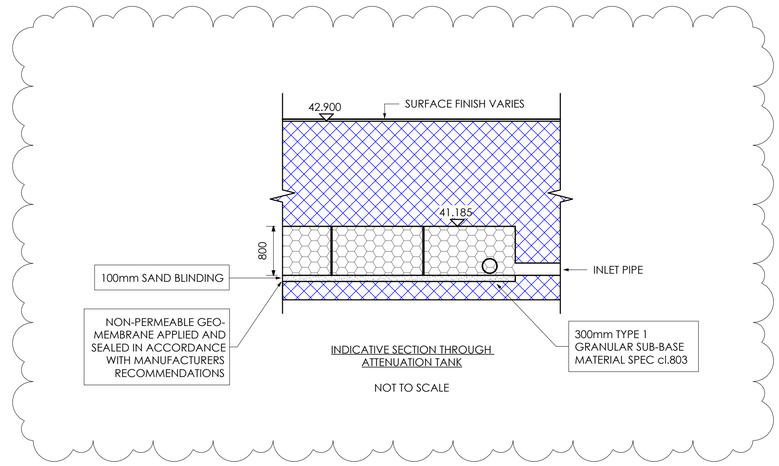
External RWP to Drain
Scale 1:20

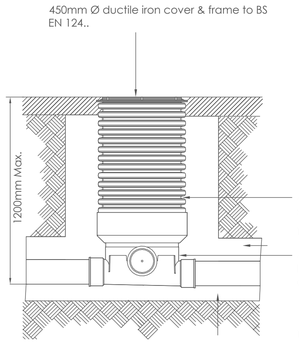


Pipes Through Walls (a)
Scale 1:20



Pipes Through Walls (b)
Scale 1:20

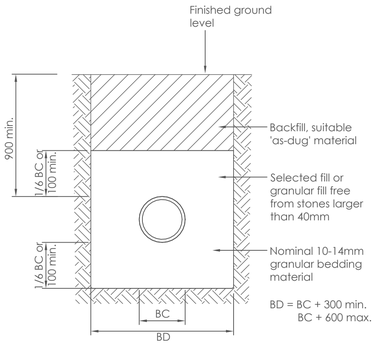




Inlet/Outlet & 4 branch connections for 100Ø pipes
Inlet/Outlet & 2 branch connections for 150Ø pipes
Note: Chambers in lightly trafficked areas to have to have 150mm ST4 concrete surround.

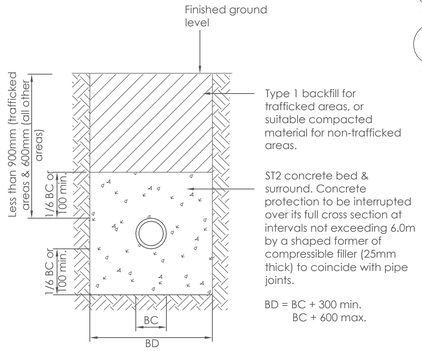
Typical Polypropylene Inspection Chamber Max. 1.2m Deep
Scale 1:20

(for use in soft areas, driveways and parking bays only)



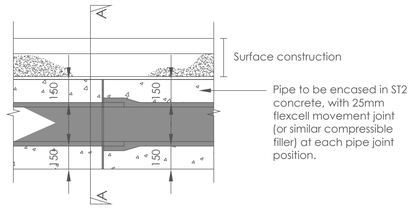
Typical Trench Detail
Scale 1:10

NOTE: To be used where cover depth:
- >0.6m fields & gardens
- >0.9m lightly trafficked areas e.g. light roads & drives



Shallow Trench Detail
Scale 1:10

NOTE: To be used where cover depth:
- <0.6m fields & gardens
- <0.9m lightly trafficked areas e.g. light roads & drives



Joints for Concrete Encased Pipes
Scale 1:10

Rev	Revision Description:	Drn/Chk	Date:
T03	Issued for Tender	QK/DEP	25-06-2024
T02	Issued for Tender	QK/DEP	10-04-2024
T01	Issued for Tender	QK/DEP	29-02-2024

Drawing No.: 1950-MGS-DP2-G100-PL-XX-0054 **Rev:** T03

Client: MANCHESTER GRAMMAR SCHOOL

Project: PROJECT 6 - PAVILION

Title: DRAINAGE DETAILS

Scale at A1 :	Drawn by :	Checked by :	Date :
As indicated	QK	DEP	25/06/24

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5. Appendix C – Response to MCC queries

Responses have been received from MCC on the proposed drainage strategy. This appendix sets out our response as follows:

Decision Notice Clause	Contained in submission	Approvable standard	Further information required:
Progression through the drainage hierarchy must be evidence based and supported by site investigation including assessments of ground conditions and infiltration testing in accordance with BRE365. Proposals of attenuation should achieve half drain time within 24 hours.	Y	Y	
Where surface water is connected to the public sewer, agreement in principle from United Utilities is required that there is adequate spare capacity in the existing system taking future development requirements into account. An email of acceptance of proposed flows and/or new connection will suffice.	Y	Y	

DP Squared Response

The proposed development connects to a site wide private drainage system that serves the entire Grammar School site.

The new pavilion replaces an existing pavilion of a similar size and catchment.

The existing surface water drainage is unrestricted in its connection to the site wide drainage, with an approximate surface water flow in excess of 30l/s for a 75mm/hour storm.

The proposed drainage limits the surface water discharge to 5l/s via attenuation tanks and is a significant reduction from the previous condition.

As there are no new connections to the public system proposed, and the flow is significantly reduced we have not approached Untied Utilities for a change in flow or new connection outside of the school boundary.

A finalised drainage layout showing all components, outfalls, levels and connectivity.	Y	N	-The developer has now included a rising main within the proposed SW network. In accordance with Sewers for Adoption – 8th edition, rising mains should be a minimum of 3m from any building/structure. The developer will need to ensure the above easement can be achieved within the layout, and clearly state the proposed easement within the drainage layout.

DP Squared Response

Rising Main – This is a private site, and the Client is aware of the proposed drainage arrangement and an easement is not required.

			- MCC records highlight a risk that the underground Nico Ditch ordinary watercourse is located within close proximity to the site (approximately onsite). While our records are frequently updated to ensure the highest level of accuracy, the records cannot guarantee 100% accuracy for all MCC underground assets. Has the developer taken any consideration to ensure this asset will be safeguarded during and following construction? The developer should ensure appropriate maintenance easements are maintained throughout the development.

DP Squared Response

The exact course of the ancient Nico Ditch is not known with certainty in the proximity of, or on the site of, the Manchester Grammar School. An existing building sits within much of the footprint of the proposed building and therefore if the ditch or another watercourse is in this vicinity this is most likely to have been previously disturbed. It should be noted that the ground level on which the building sits is considerably above the surrounding sports fields which sit circa 1,500mm lower.

A heritage appraisal of the site has been previously undertaken and has indicated that the archaeological potential of the site is considered to be low which would reinforce the unlikely nature of the presence of Nico Ditch. Finally, there are remaining visible remains of the ditch found to the west of Wilmslow Road and these remains strongly imply the ditch continues running a west / east below and along the route of Old Hall Lane.

MCC to clarify what further measures, if any, are necessary and also what easements are in place given the above commentary.

Hydraulic calculations of the proposed drainage system, including all design parameters. Calculations must Include Critical Storm Events for the 1 in 2, 1 in 30 and 1 in 100 + 45% Climate Change. Results must demonstrate no surcharge for the 1 in 2, no flooding in the 1 in 30 and no flooding of buildings for the 1 in 100 + 45% Climate Change.	Y	N	-The developer has provided a set of outline attenuation calculations. The developer is required to fully model the proposed network to ensure no flooding to exiting or proposed buildings for the 1:100 + 45% CC event. The provided calculations also only consider a 1:30 year event. -The developer must provide a full set of hydraulic calculations including all engineering parameters. The modelling must accurately reflect the surface water drainage layout manholes provided (1950-MGS-DP2-G100-PL-XX-0051) standard comment: The applicant must present a consistent package to discharge this condition (Including all layouts and calculations). The layout and calculations must be jointly updated to account for any edits required. When preparing a resubmission, the applicant must ensure that the drainage layout and hydraulic calculations correspond, and that they can be cross-referenced for checks. This includes layout annotations and schedule printouts.

			appropriate manhole sizing. This should also be reflected within the hydraulic model. - Given this application is at CDN stage, MCC would have no further comments to make however, it should be noted our records indicate the Nico Ditch to be in significant proximity to attenuation tank 02. The developer should review our informative on page 4 for further information (no further action). standard comment: The applicant must present a consistent package to discharge this condition (Including all layouts and calculations). The layout and calculations must be jointly updated to account for any edits required. When preparing a resubmission, the applicant must ensure that the drainage layout and hydraulic calculations correspond, and that they can be cross-referenced for checks. This includes layout annotations and schedule printouts.
Hydraulic calculations of the proposed drainage system, including all design parameters. Calculations must Include Critical Storm Events for the 1 in 2, 1 in 30 and 1 in 100 + 45% Climate Change. Results must demonstrate no surcharge for the 1 in 2, no flooding in the 1 in 30 and no flooding of buildings for the 1 in 100 + 45% Climate Change.	Y	N	- The submitted SW hydraulic calculations (Manchester Grammer) do not accurately reflect a pumped system. The included Dummy Node downstream should be set to the existing manhole invert level and the model will need to be updated to include a pumped system rather than gravity. - The submitted SW hydraulic calculations (Manchester Grammer) node dimensions are not accurately reflected within the SW layout (1950-MGS-DP2-G100-PL-XX-0052-T04). Manholes SW6, SW7, SW8, SW15, and SW16 manhole diameters do not correspond with the submitted drawing. The relevant document will need to be updated to reflect the correct manhole dimensions. -The submitted SW hydraulic calculations (Manchester Grammer) do not include attenuation dimensions. The modelling report will need updating to accurately reflect the design parameters.
			-Within the "Results for 100 year + 45% Critical Storm Duration", manhole S10 is discharging 7l/s. However, the agreed flow rate must reflect the proposed 5l/s, this will need to be amended to suit the agreed flow rate. standard comment: The applicant must present a consistent package to discharge this condition (Including all layouts and calculations). The layout and calculations must be jointly updated to account for any edits required. When preparing a resubmission, the applicant must ensure that the drainage layout and hydraulic calculations correspond, and that they can be cross-referenced for checks. This includes layout annotations and schedule printouts.

DP Squared Response

Refer to the updated calculations in Appendix A and the revised drawing in Appendix B

Construction details of flow control and SuDS elements.	N	N	-No construction details for the proposed flow control and attenuation tank has been provided. The developer must submit the below construction details for consideration: • Hydro-brake SWMH 10 • Attenuation Tanks -minimum level of cover is shown as 0.45m, the developer will need to supply the product specification to ensure this is in accordance with the provider.
Construction details of flow control and SuDS elements.	Y	N	Given this application is at CDN stage the developer is required to provide specific construction details for future reference. The developer is proposing a Pumped Surface Water chamber (by Kingspan or similar). The final design of this element will need to be submitted prior to approval.

DP Squared Response

Refer to the updated design drawings.
Note that the Hydrobrake has been substituted for a Pumped Surface Water chamber (by Kingspan or similar). This is due to revised levels dropping the base of the chamber and the requirement to pump back up to the gravity system. The final design of this element will be by a sub-contractor/supplier.

Noted on the Contractor Design item for the pumped surface water chamber, an outline specification has been added to the drawing.