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1950

Project 6, MGS

Manchester

Drainage Strategy

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

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Project 6, Manchester Grammar School

For

Manchester Grammar School and OMI Architects

June 2023

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

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Rev	Date	By	Comment
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,

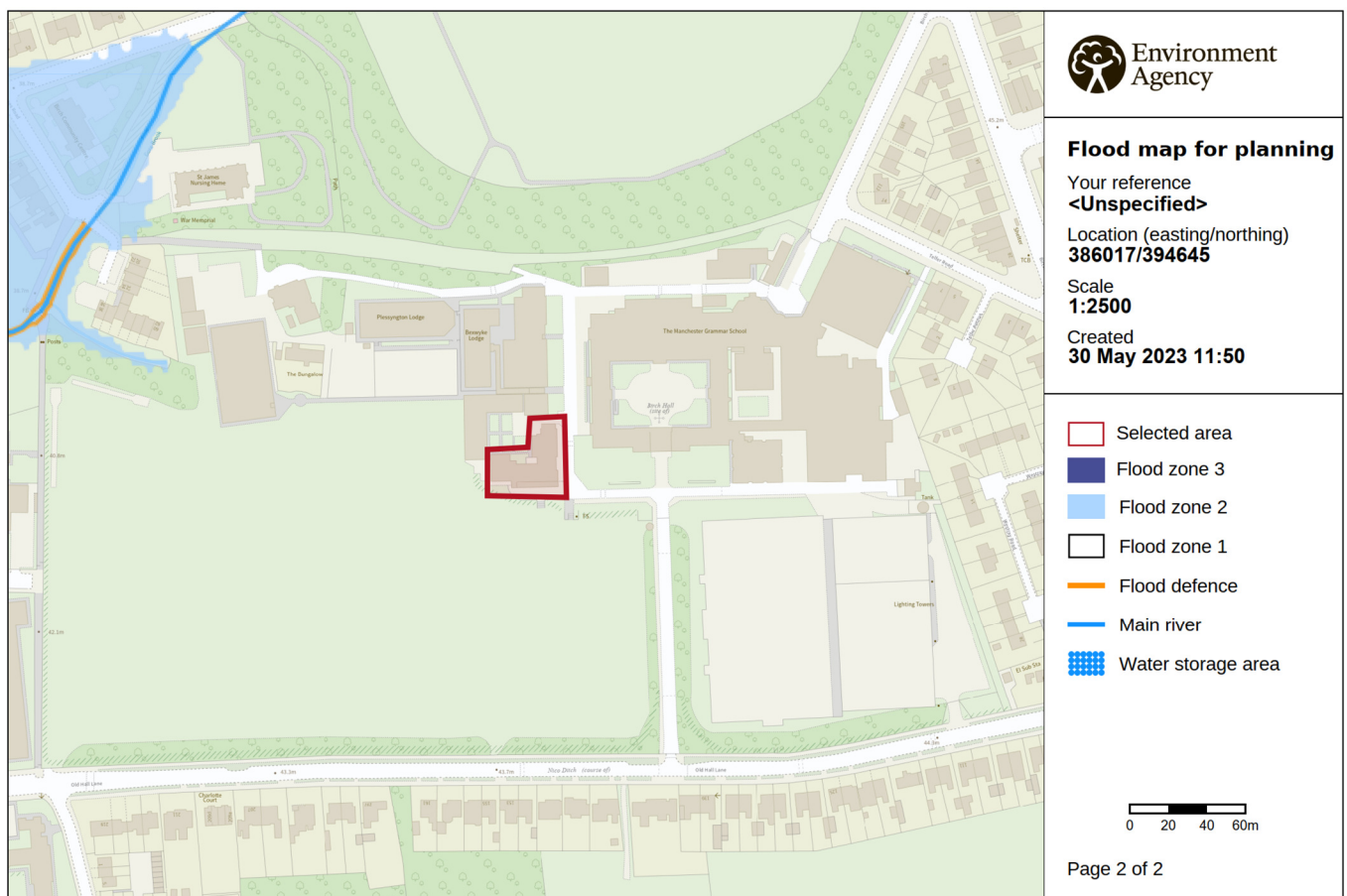
The existing surface water regime consists of:

- 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.

LK CONSULT LTD Eton Business Park, Eton Hill Road, Radcliffe, M26 2ZS Tel: 0161 763 7200 web: www.thelkgroup.com				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
Location (Observed measurements)		Dates		Engineer LKC		Job Number LKC 23 1086
Sheet 1/1						
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (Thickness) (m)	Description
0.10-0.30	D ES PID: 0.3ppm				(0.10)	MADE GROUND: TARMACADAM
0.30-1.10	D ES PID: 0.2ppm				(0.20)	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.
1.20-1.65	SPT N=12		2,2/2,3,3,4		(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.
1.20-1.50	ES PID: 0.3ppm				1.10	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.
1.50-2.00	D PP 152kPa		172, 147, 147, 147, 147/Av. 152.00			Clay becomes stiff very high strength at 1.50mbgl.
2.00-2.45	SPT N=15		2,2/3,4,4,4			
2.50-3.00	D PP 206kPa		196, 221, 196, 196, 221/Av. 206.00		(2.50)	Clay becomes very stiff very high strength at 2.50mbgl.
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.

2.1.4. 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.

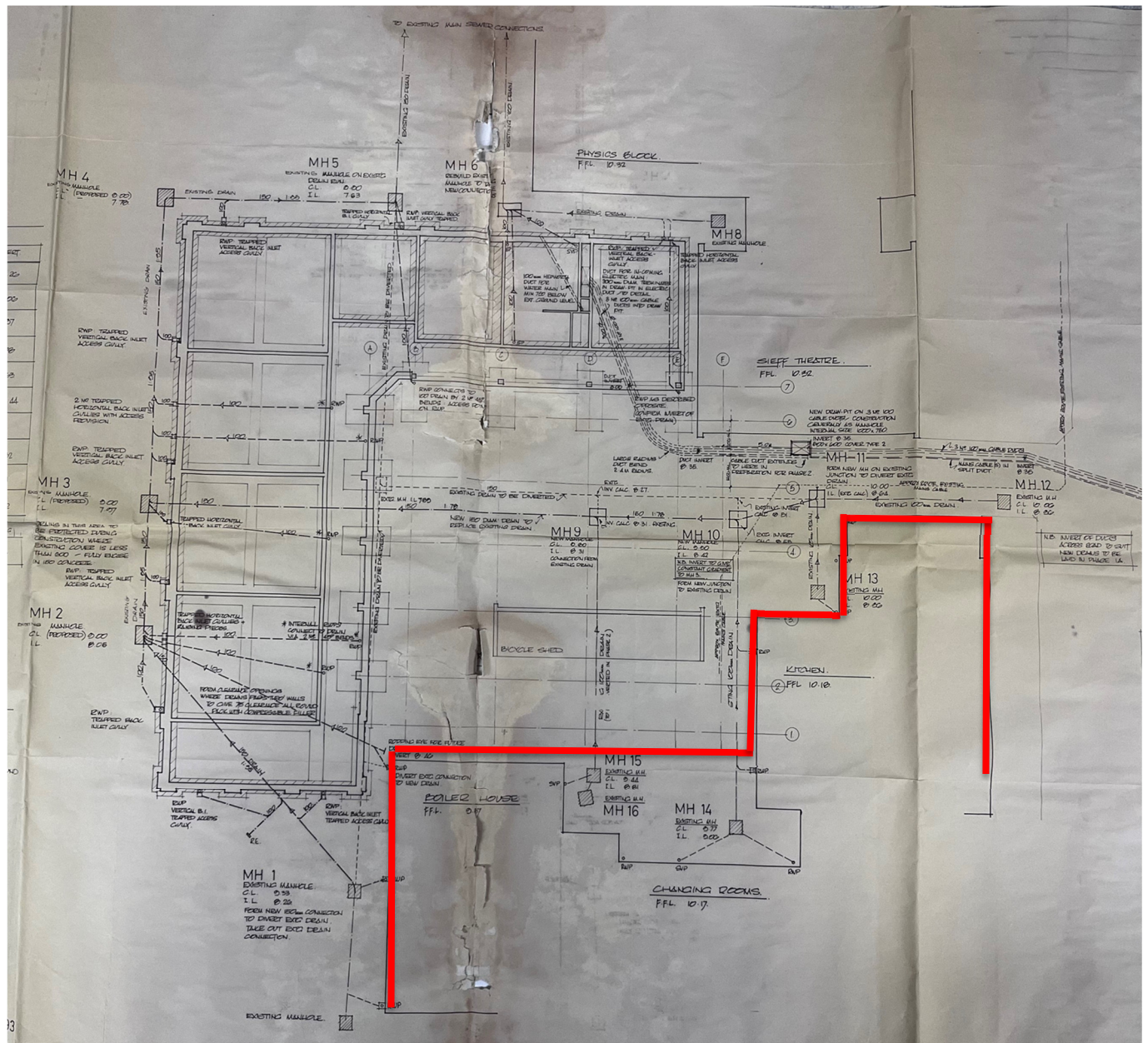


Figure 4 - Existing Drainage Plan - Existing Pavilion highlighted in Red.

2.2. Surface Water Proposal

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

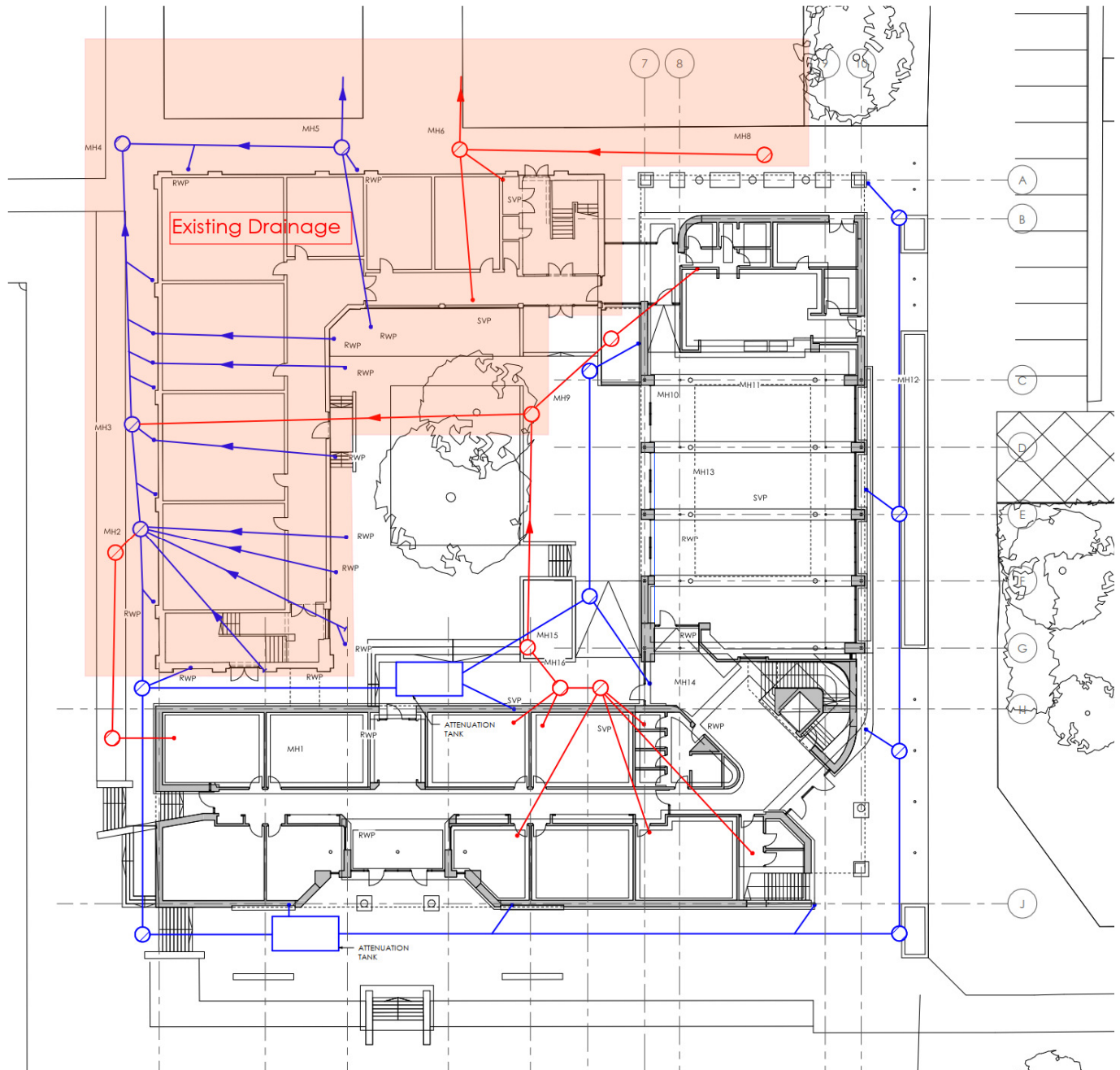


Figure 5 - Proposed Drainage Layout

The storage volume for each tank is 15m³ with an outflow limit of 2.5l/s for each tank.
The total storage is 30m³ with a combined outflow of 5l/s.

3. Appendix A – Attenuation Tank Design

Drainage Details

Area	600m ²	Allowable Discharge	2.5 ltr/sec
Catchment Type	Roof + Hardstanding	Climate Change	40%
Area Reduction Factor	0.9	Effective Area	756m ²
Soil Type	Silty sandy clay	Factor of Safety	1

Rainfall Data

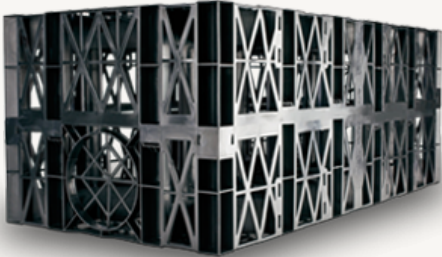
R Value	0.33	Storm Return Period	1 in 30 years
M5-60	18	County	Greater Manchester

Time	Z1 Value	y mm	Z2 Value	p mm	Inflow	Outflow	Storage Volume
5min	0.35	6.3	1.43	9.01	6.81	0.75	6.06
10min	0.5	9	1.46	13.14	9.93	1.5	8.43
15min	0.61	10.98	1.47	16.14	12.2	2.25	9.95
30min	0.78	14.04	1.47	20.64	15.6	4.5	11.1
1hr	1	18	1.51	27.18	20.55	9	11.55
2hr	1.22	21.96	1.52	33.38	25.23	18	7.23
4hr	1.56	28.08	1.51	42.4	32.06	36	-3.94
6hr	1.72	30.96	1.49	46.13	34.87	54	-19.13
10hr	2	36	1.49	53.64	40.55	90	-49.45
24hr	2.6	46.8	1.45	67.86	51.3	216	-164.7
48hr	3.25	58.5	1.41	82.49	62.36	432	-369.64

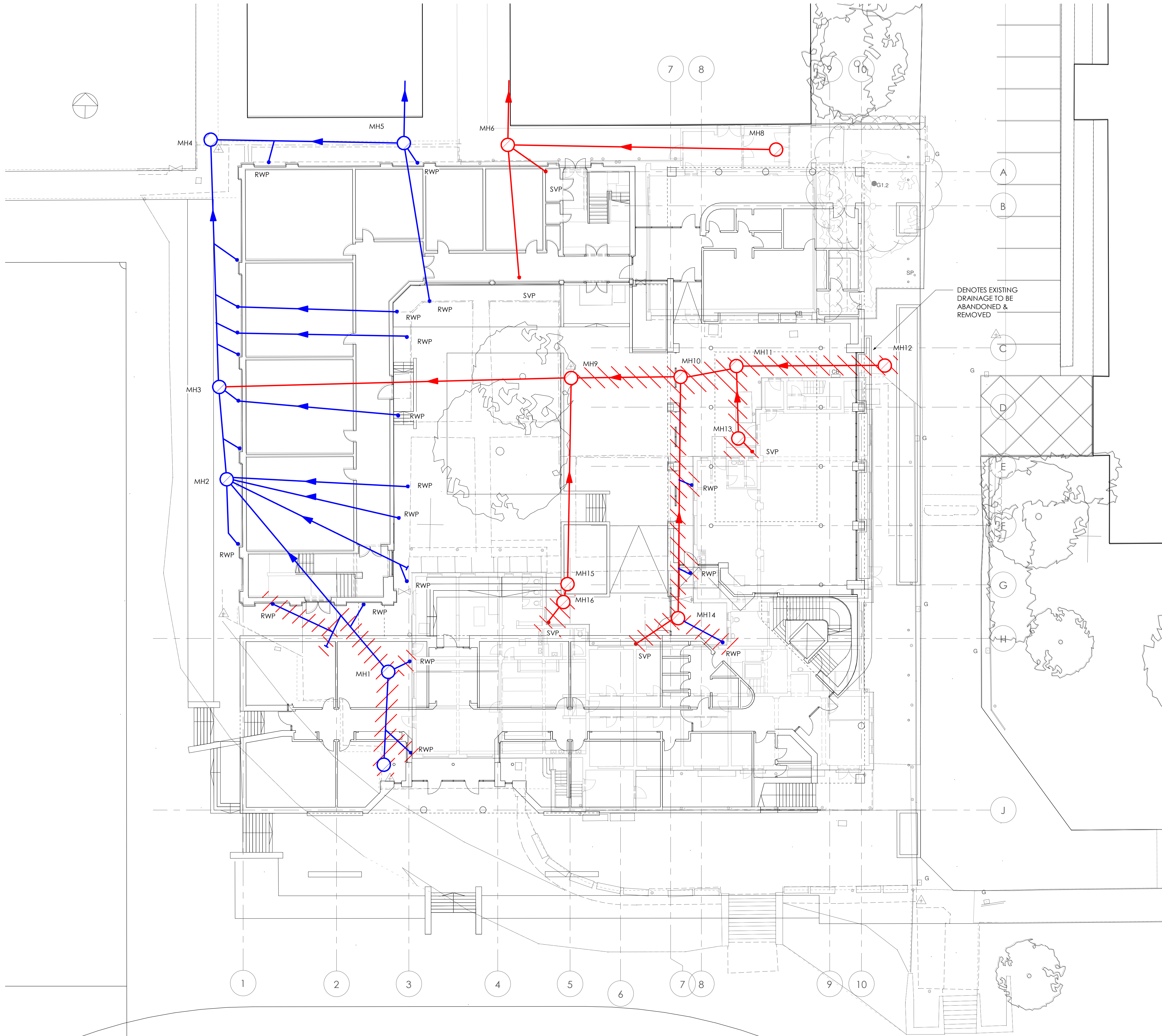
Critical storm duration (hrs)	1hr
Required Storage Height	11.55m
Volume from Dimensions	15.2m ³

Wavin Stormwater Management

Project Details			
Project Name	Manchester Grammer School Project 6	Produced By	Darren Paine
Client Name	MGS		
Site Address	Old Hall Lane, M13 0XT	Date	06/06/2023

Modular Units and Tank Details - 1950 MGS Drainage			
Length	4m	4 units	
Width	5m	10 units	
Depth	0.8m	2 units	
Total Number of Units		80 units	
		Void	95%
		Cover Depth	0.45m
		Installation Depth	1.25m
Recommended Unit			
Wavin recommend using the following unit for your installation.			
		AquaCell Eco	
		Product Number: 6LB025	
		AquaCell Eco is manufactured from specially reformulated, recycled material and has been designed for shallow, non-trafficked, landscaped applications.	

4. Appendix B – Drainage Drawings



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

EXISTING DRAINAGE TABLE		
REF.	CL	IL
MH1	9.33	8.26
MH2	9.00	8.06
MH3	9.00	7.97
MH4	9.00	7.78
MH5	9.90	7.63
MH6	9.00	9.44
MH7	-	-
MH8	-	9.82
MH9	9.80	8.31
MH10	9.90	8.42
MH11	10.00	8.64
MH12	10.06	8.96
MH13	10.00	8.96
MH14	9.77	9.06
MH15	9.44	8.81
MH16	-	-

NOTE:
LEVELS ARE NOT SET TO AOD LEVELS.
10.00 IS APPROX.

Drawing No.: 1950-MGS-DP2-G100-PL-XX-0050		Rev:	
Client: MANCHESTER GRAMMAR SCHOOL		defined by design (dp)² DP Squared Limited contact@dpquared.net Suite 3, Unit 8, Pennine Industrial Park Valley Road, Hebden Bridge, HX7 7BZ www.dpquared.net	
Project: PROJECT 6			
Title: EXISTING DRAINAGE			
Scale of A1: 1 : 150	Drawn by: JH	Checked by: ??	Date: ??

Rev	Revision-Description	Drn/Chk	Date
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NOTES:

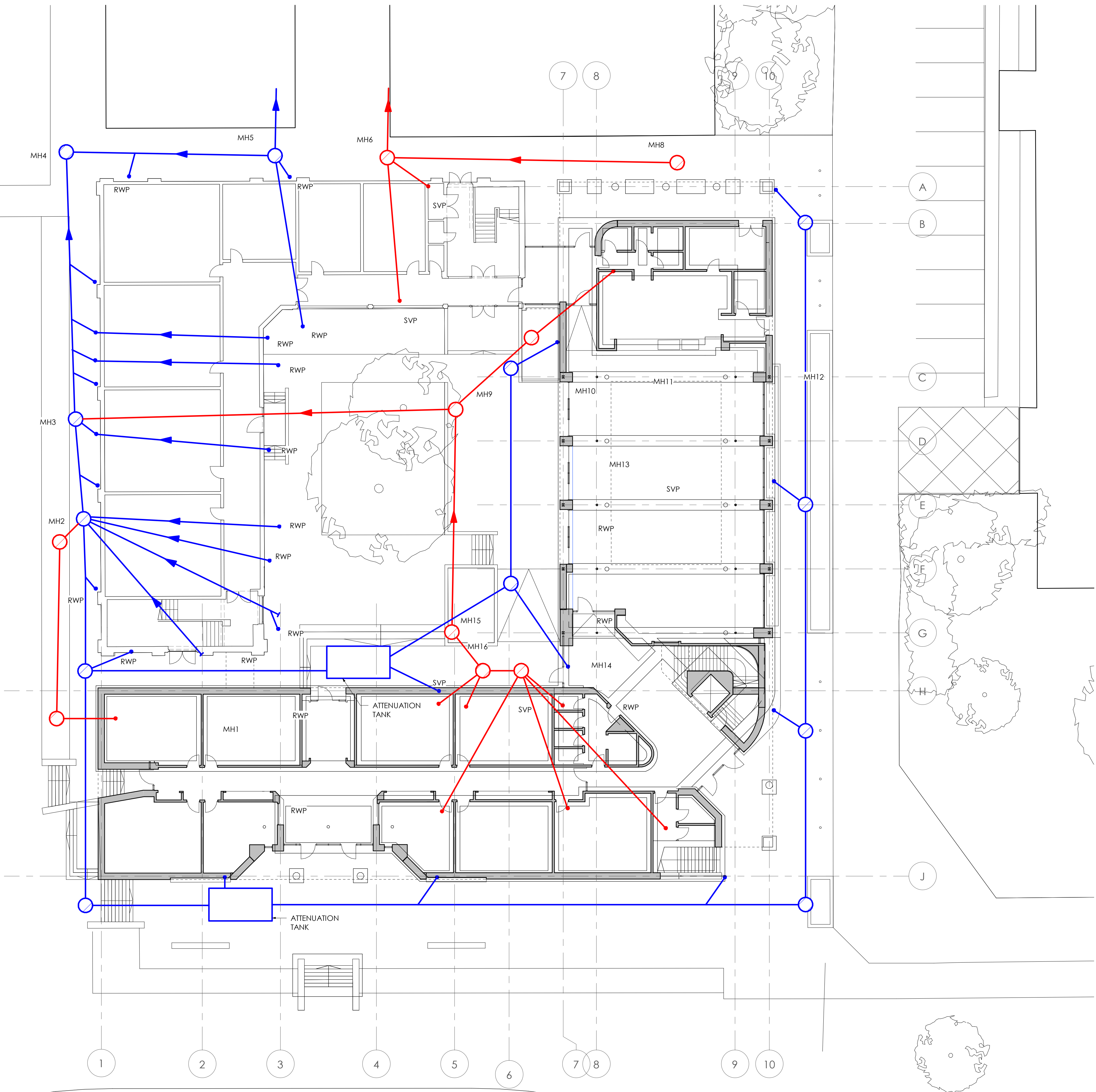
DO NOT SCALE FROM THIS DRAWING

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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

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Drawing No.: 1950-MGS-DP2-G100-PL-XX-0051 Rev:

Client: MANCHESTER GRAMMAR SCHOOL

Project: PROJECT 6

Title: PROPOSED DRAINAGE

defined by design (dp)²

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Rev Revision-Description: Drn/Chk Date:

Scale of A1: 1 : 150 Drawn by: ?? Checked by: ?? Date: ??