



RIDGE

GORTON EDUCATION VILLAGE FLOOD RISK AND DRAINAGE STATEMENT

DECEMBER 2021

GORTON EDUCATION VILLAGE FLOOD RISK AND DRAINAGE STATEMENT BOWKER SADLER ARCHITECTS

Prepared for

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VERSION CONTROL

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1. OUTLINE FLOOD RISK AND DRAINAGE STRATEGY

This report provides a summary of the Flood Risk and Drainage Strategy at the Gorton Education Village scheme. The proposed scheme is to construct a new, 2 story, extension to the existing building at Gorton Education Village for educational use, the proposed development area is approximately 1150sq.m.

Table 1 below provides a summary of the Flood Risk and Drainage / SuDS Strategy for the scheme.

Table 1 – Drainage / SuDS Summary

Item	Brief Description
Fluvial Flooding	Fluvial Flood Zone 1 (Low Risk) on the EA flood maps for planning.
Overland Flow	A review of the Gov.uk surface water map shows majority of the site not being at risk of surface water flooding. There are no overland flow routes passing through the site, The risk of flooding from Surface water overland flow is considered to be low.
Infrastructure Failure	Not located in close proximity to structural, hydraulic or geotechnical infrastructure. The risk of flooding from Infrastructure failure is considered to be low
Artificial Sources	No indication through the SFRA of sewer flooding incidents. The risk of flooding form sewers is considered to be low
Groundwater Flooding	No indication through SFRA or online mapping, that the site is at risk of groundwater flooding. The risk of flooding from Groundwater is considered to be low
Critical Drainage Area	The SFRA maps indicates the site to be within a Critical Drainage Area. Therefore, a Flood Risk Assessment will be required as the site is greater than 0.5Ha within a Critical Drainage Area.
Flood Risk Assessment	An assessment of flood risk has been undertaken at the site. Based on the assessment of sources above, the site is considered to be at low risk of flooding from all sources.
Geology	At the time a writing this statement, a ground investigation report was not available. British Geological Survey (BGS) mapping and borehole information indicates that the site is underlain by superficial deposits over sedimentary bedrock (sandstone). In addition, the Landis Soilscales Map, shows ground conditions at the site to be '<i>Slowly permeable seasonally wet acid loamy and clayey soils</i>', with '<i>Impeded drainage</i>'.

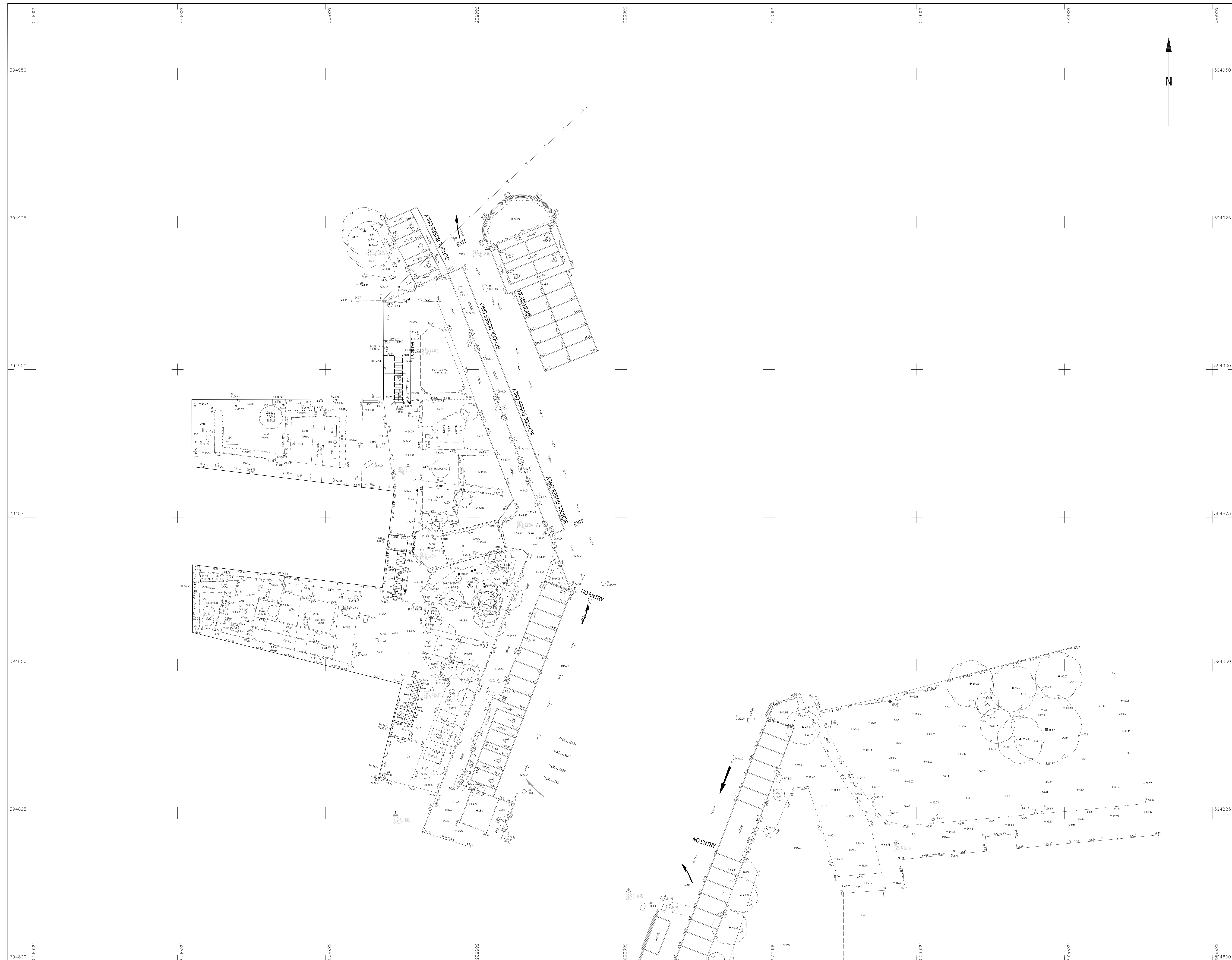
Item	Brief Description
Infiltration Rate	It is recommended soakaway testing is undertaken at the appropriate stage to confirm if infiltration is feasible. However, from the desktop survey of the ground conditions it is unlikely infiltration is feasible for the proposed development therefore it has been discounted.
Nearest Watercourses	A local watercourse (brook) is located approximately 100m north to the site.
Nearest Adopted / Private Sewers	Number of private foul and surface water sewers are located within the vicinity of the site. Appendix A includes the existing private sewer plans. The private surface water sewer from existing site currently discharges into the ordinary watercourse (brook), located north of the site.
Surface Water Outfall and SuDS Hierarchal Approach	Based on the above and having discounted Infiltration methods, surface water from the Proposed development will discharge into the unnamed brook to the north of the site via the existing private surface water network. For the outline strategy, discharge to the surface water system has been utilised to demonstrate that the site can be drained. For proposed impermeable areas and Outline Drainage Strategy – see Appendix C
Existing Discharge Rate	The site is currently occupied by educational building, footpaths, and car parking areas that are all positively drained. Although existing site extends to approximately 8000sq.m, only 1150sq.m (positively drained hardstanding areas) is considered for the proposed drainage strategy - see Appendix C for the Existing Impermeable Area Plan. The existing drainage discharges to the private surface water system at multiple points around the site (see existing drainage plans attached in Appendix A) - as shown on the topographical survey (extensive CCTV survey of the network is yet to be undertake and will be carried out to prove the connectivity of the existing drainage to the ordinary watercourse). Site is classed as Brownfield. Existing discharge rates are based on the Modified Rational method ($q=cia$: $i = 50\text{mm/hr}$) as detailed in the SuDS Manual. The Maximum runoff rate for proposed area is 10.7l/s. See Appendix D for the Existing runoff calculation.
Proposed Discharge Rate	Surface water runoff rate is to be 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. The maximum discharge rate is to be limited to the Brownfield run off rates with a 50% betterment. The maximum runoff rate for the development 5 l/s.
Allowance for Climate Change	40% - based on >50-year design life to 'the 2080's'.

Item	Brief Description
Proposed Attenuation Method and Volume	Geocellular Storage Tank – 24.3m3 In the case of his development, all surface water flows up to the 1 in 100 year event including an allowance for climate change will be retained below ground. The proposed drainage layout for the new development site will be designed in accordance with Building Regulations Part H guidance, i.e. up to the 30-year storm return period criterion and tested for the extreme 100-year event to confirm no flood risk to the building.
SuDS features	Water Quantity - Geocellular Storage Tank. Water Quality - Gullies and Silt traps.
Maintenance Responsibility	Management Company / Site owner
Foul Drainage Outfall	Proposed foul water is to discharge into the existing private foul water sewer (located around the proposed development) at multiple outfalls. The proposed private drainage layout for the new development site has been designed in accordance with BS EN 752: 2008 and Building Regulations Part H guidance.

2. APPENDICES

- Appendix A – Existing Site information
- Appendix B – Proposed Site Information
- Appendix C – Ridge Design Drawings
- Appendix D – Outline Surface Water Calculations

APPENDIX A – EXISTING SITE INFORMATION



Survey Notes

Grid: Local plane metric related to National Grid at HA1

Levels: OS datum from GNSS positioned converted using the National Grid Metric OSGB3611

Notes

Topographical Survey Legend

BUILDINGS AND WALLS

Building

Drain

Run

Passage

Gate with height

Gate

ENCE STYLES AND DESCRIPTIONS

Close Boundary

C/B

Compound

C

Chapel

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Sheet Index



The diagram shows a vertical rectangle representing a notebook. It is divided into three horizontal sections. The top section is labeled 'Sheet 1' in orange text. The middle section is empty. The bottom section is labeled 'Sheet 2' in black text. The entire notebook is outlined in black, and the sections are separated by thin black lines.

[illegible]



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STOCKPORT, SK6 3DY

Project

GORTON EDUCATION VILLAGE
50 WEMBLEY ROAD
MANCHESTER, M18 7DT

Drawing Title

TOPOGRAPHICAL SURVEY

Drawn By	YK	22/09/21	
Checked by	EAD	24/09/21	
Survey Date	August 2021		
Scale	1:200@A0		

Drawing No	57638/1	Revision
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Survey Notes	Grid: Local plane metric related to National Grid at Hx1
Levels:	OS datum from GNSD processing converted using the National Geospatial Model DGDGM15
Notes	
Topographical Survey Legend	
BUILDINGS AND WELLS	GENERAL INFORMATION
Building  Building, Gate  Path  Fosseage  Aid with Height  Clear Boundary  Completed Area  Obstacle Fencing  Obstacle  Handrail  Fire Alighting  Litter  Miscellaneous  Plant & Pools  Plant & Pools  Plant & Pools  Plant & Pools  Plant & Pools  Plant & Pools  Plant & Pools  Plant & Pools  Plant & Pools  Plant & Pools  Plant & Pools  Plant & Pools  Plant & Pools  Plant & Pools  Plant & Pools  Plant & Pools  Plant & Pools  Plant & Pools  Plant & Pools  Plant & Pools  Plant & Pools  Plant & Pools  Plant & Pools  Plant & Pools  Plant & Pools  Plant & Pools  Plant & Pools  Plant & Pools 	Petrol Pump  Basement Light  Fonthright  Day Type Channel  Day Type Channel  Day Type Channel  Day Type Channel  Day Type Channel  Day Type Channel  Day Type Channel  Day Type Channel  Day Type Channel  Day Type Channel  Day Type Channel  Day Type Channel  Day Type Channel  Day Type Channel  Day Type Channel  Day Type Channel  Day Type Channel  Day Type Channel  Day Type Channel  Day Type Channel  Day Type Channel  Day Type Channel  Day Type Channel  Day Type Channel  Day Type Channel  Day Type Channel  Day Type Channel  Day Type Channel  Day Type Channel  Day Type Channel  Day Type Channel  Day Type Channel  Day Type Channel  Day Type Channel



Sheet Index

Sheet 1

Sheet 2

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RICS



**THE SURVEY
ASSOCIATION**



ICES



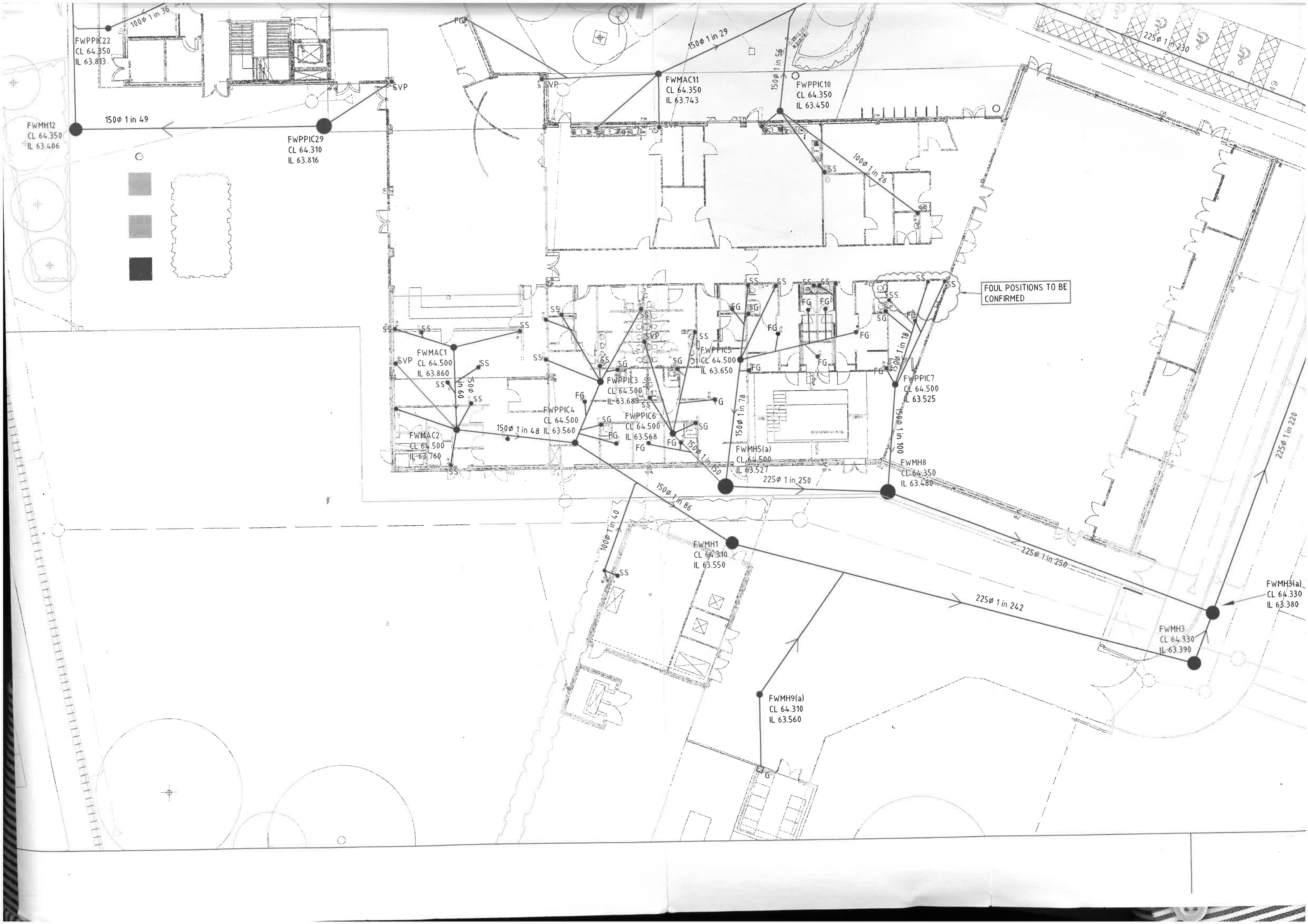
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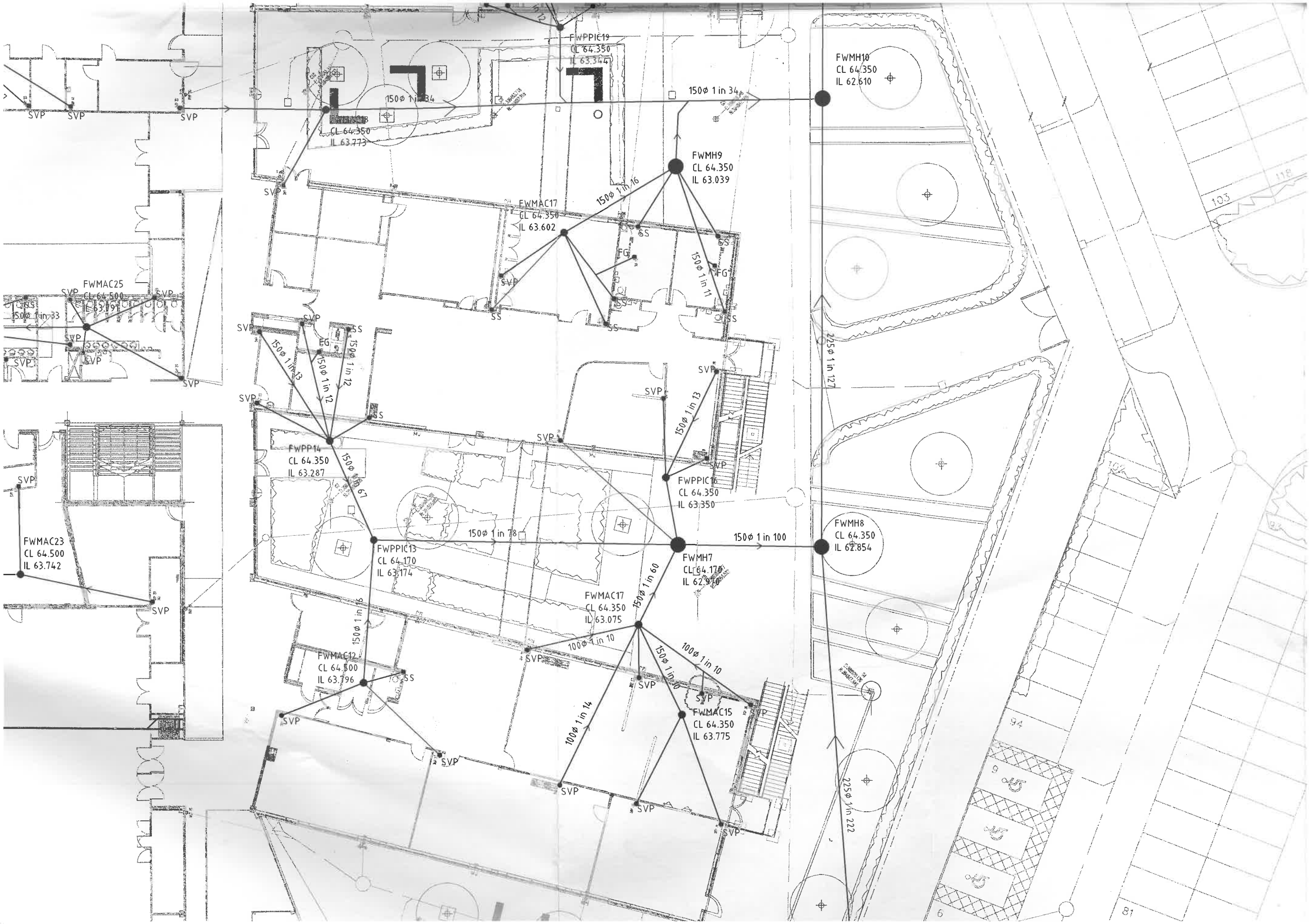
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STOCKPORT, SK6 3DY

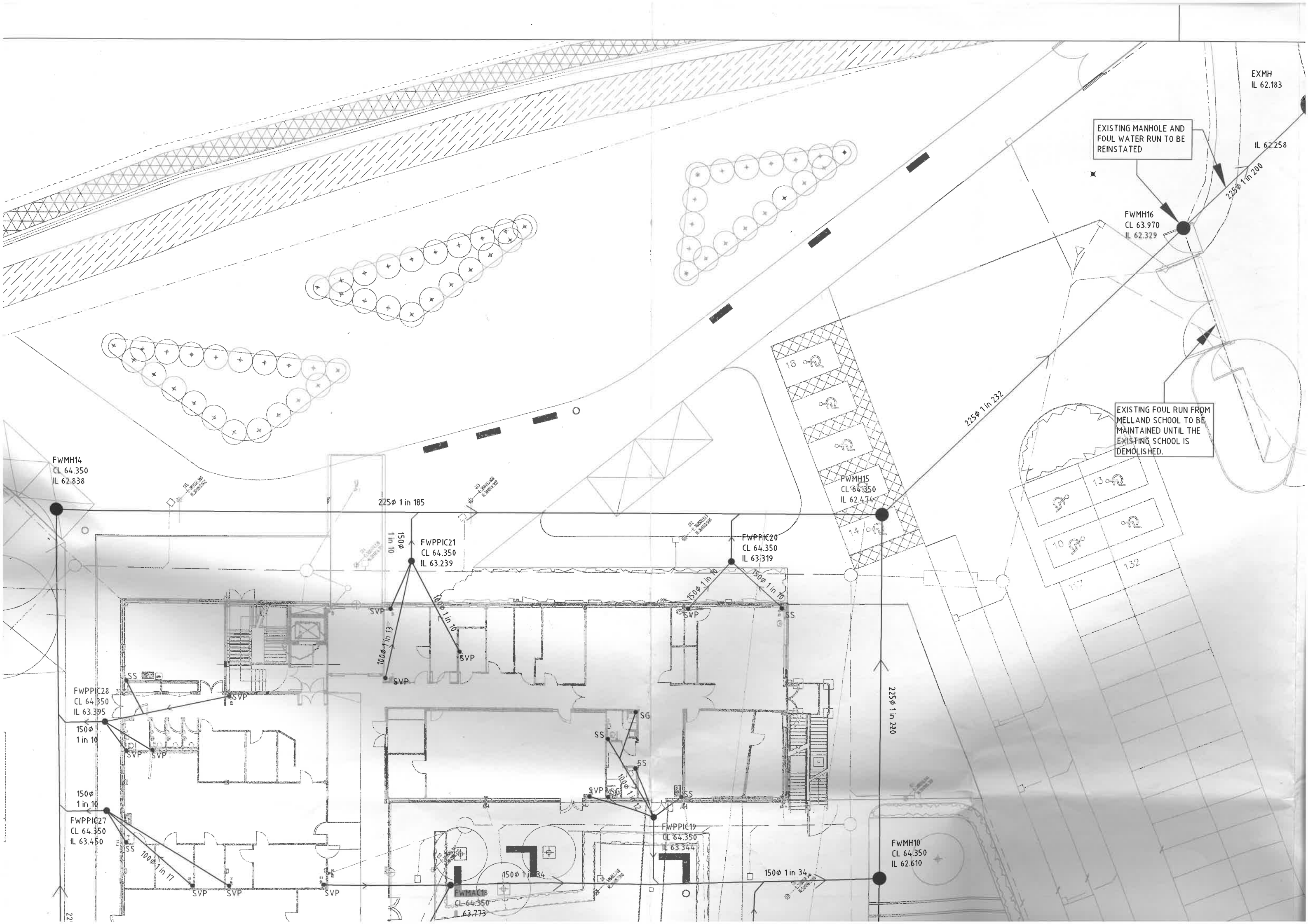
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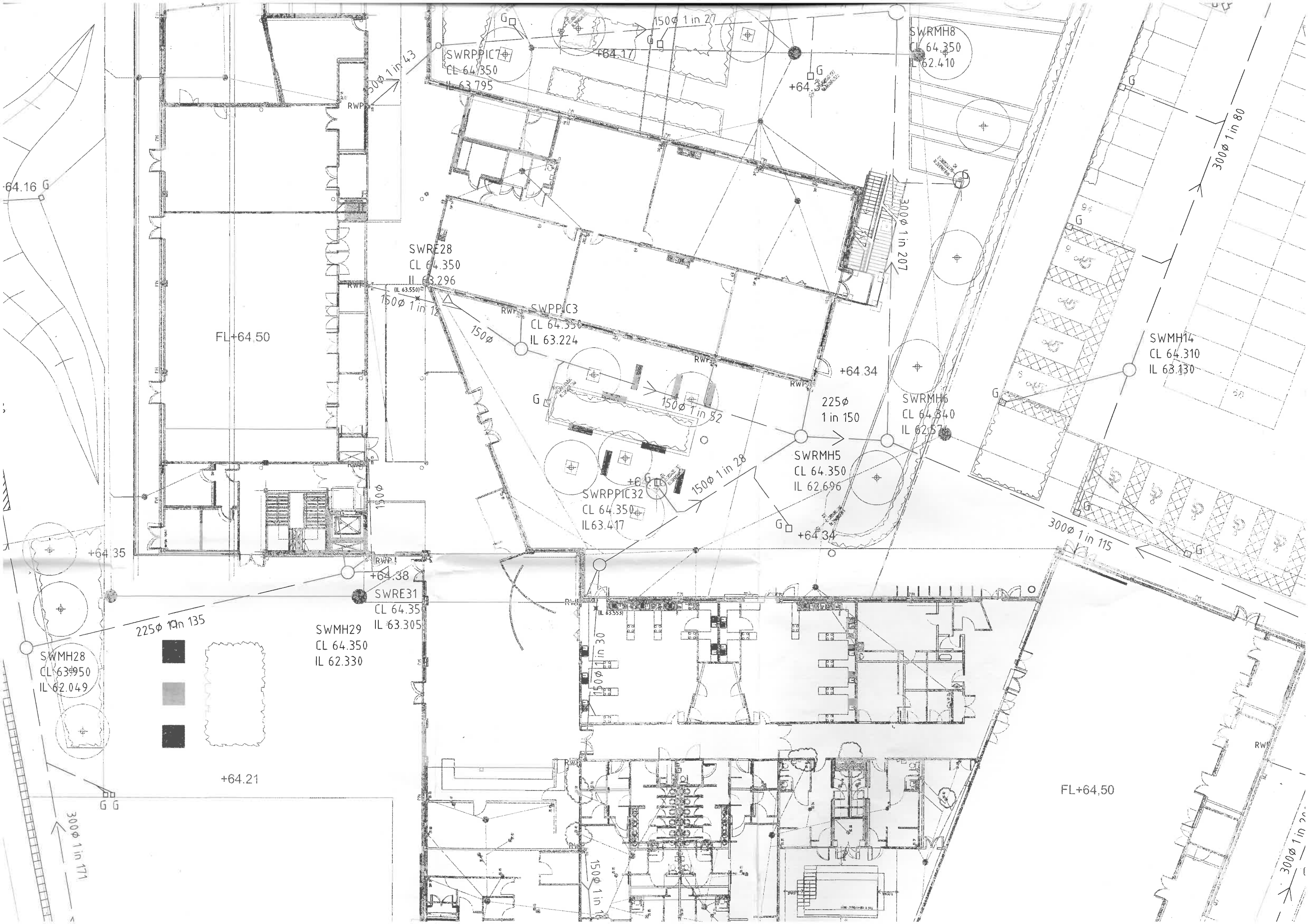
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MANCHESTER, M18 7DT

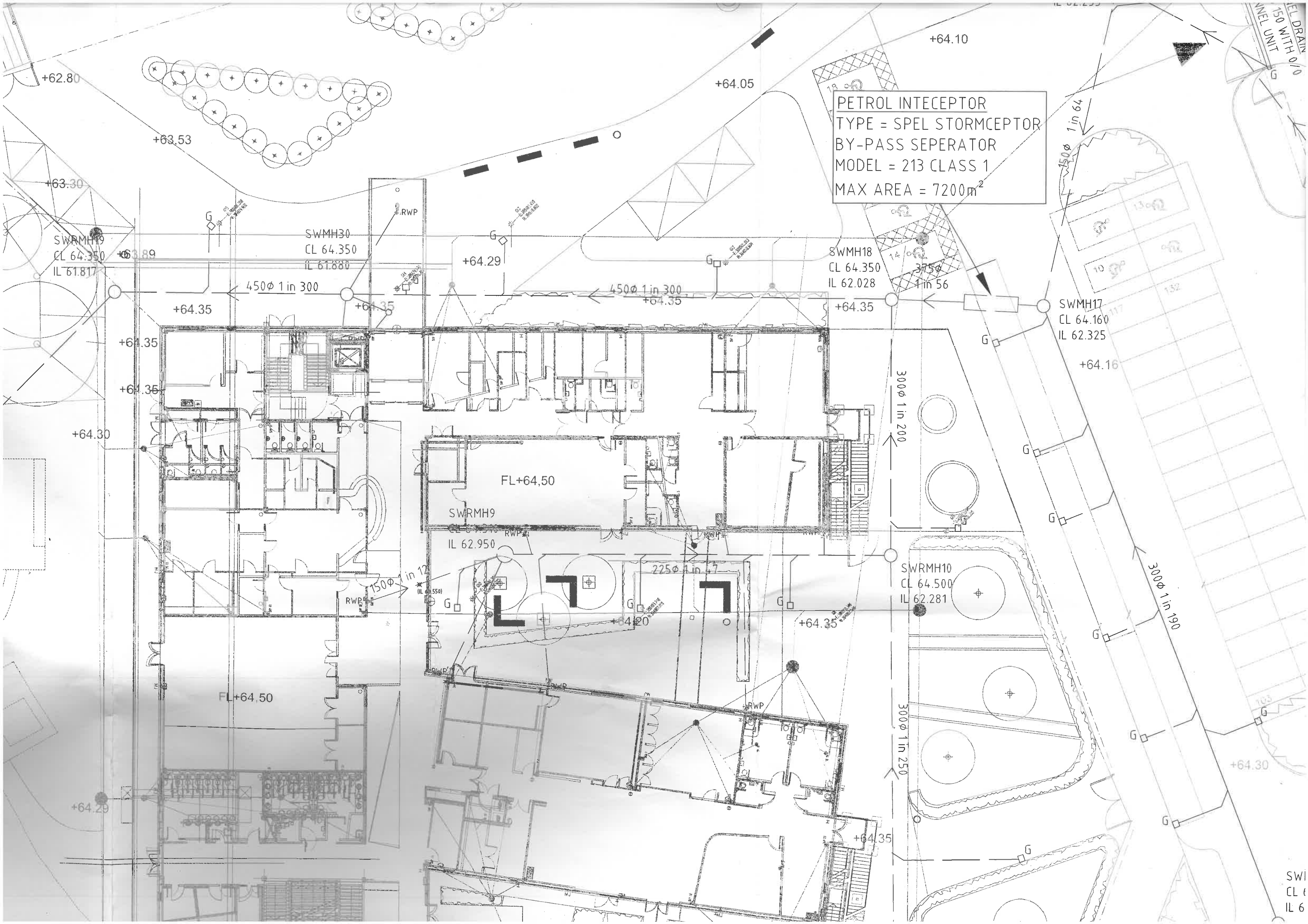
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YJK	22/09/21
Checked by	
EAD	24/09/21
Survey Date	
August 2021	
Scale	
1:200@A0	
Drawing No	
57638/2	
Revision	











PETROL INTECEPTOR
TYPE = SPEL STORMCEPTOR
BY-PASS SEPERATOR
MODEL = 213 CLASS 1
MAX AREA = 7200m²

SWRMH9
CL 64.350
IL 62.950

SWRMH10
CL 64.500
IL 62.281

SWMH17
CL 64.160
IL 62.325

SWMH18
CL 64.350
IL 62.028

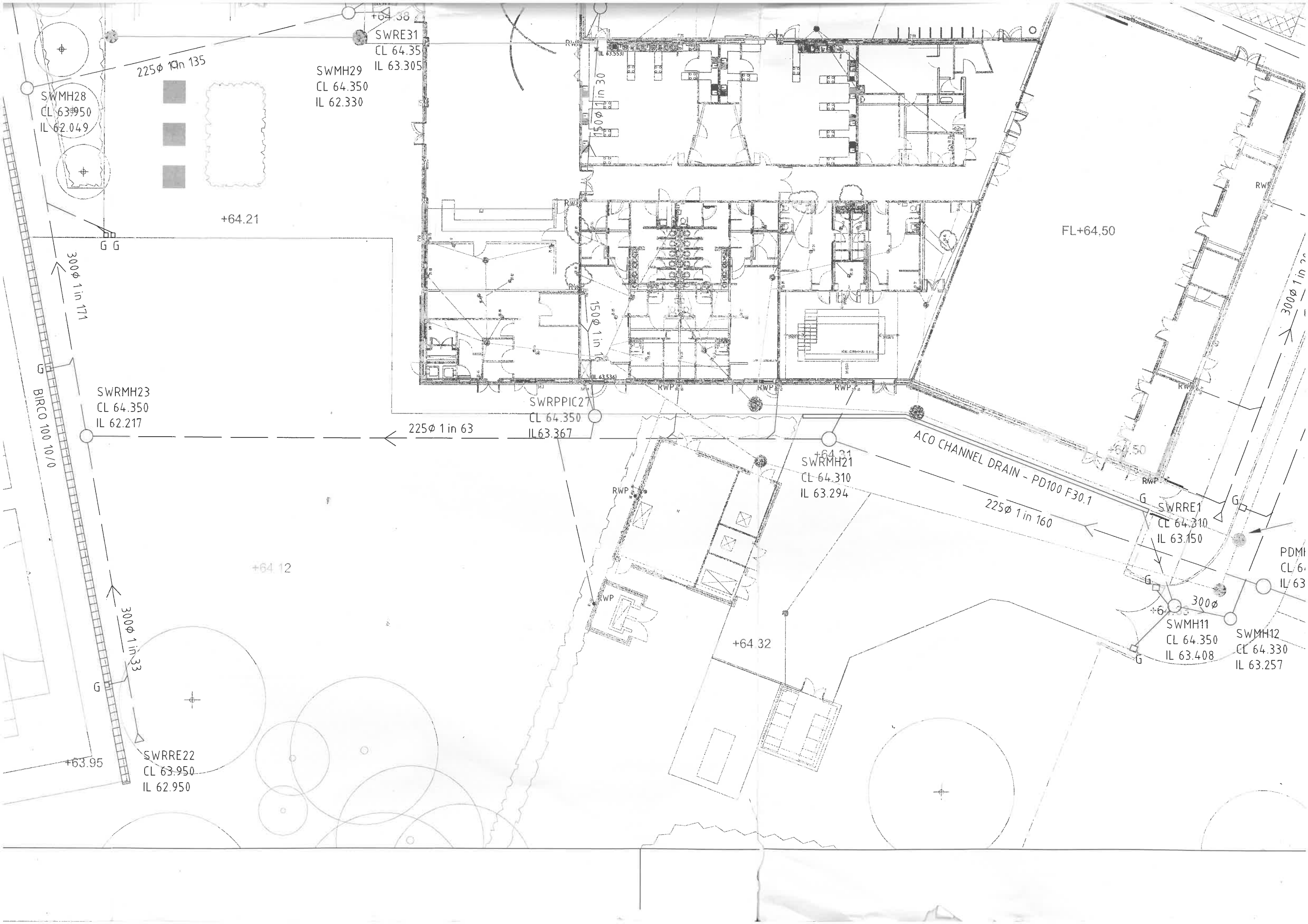
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IL 61.880

SWRMH9
CL 64.350
IL 61.817

FL+64,50

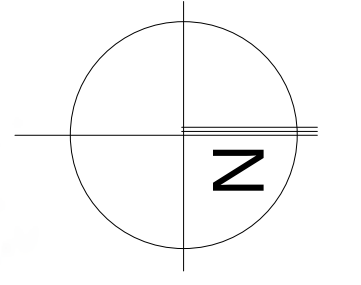
FL+64,50

SWI
CL 6
IL 6



APPENDIX B – PROPOSED SITE INFORMATION

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CHECK ALL DIMENSIONS ON SITE.
DRAWING TO BE READ IN CONJUNCTION WITH THE HEALTH AND SAFETY PLAN AND ALL RELEVANT RISK ASSESSMENTS.



19no. Additional parking bays

3no. bays lost to 2no. replacement disabled bays

2no. disabled bays lost

5no. bays lost

Line of existing parking bays

Kerb line amended

MHS - Formal entrance

MHS Drop Off Bay

Department Key:

- Existing Building
- Circulation
- Classrooms
- Store
- Support
- Teaching
- Toilets

Key:

- Site Boundary
- Extent of adjacent land in same ownership
- Pedestrian Access Point
- Vehicular Access Point
- Emergency Access Point

Non-net Area:

- Footprint of Building
- Pedestrian Access Pathway
- Vehicular Access Roadway
- Vehicle Parking Bays
- Existing Trees to be retained
- Proposed Trees

Soft Outdoor PE Area

Hard Outdoor PE Area

Soft Informal Area

Hard Informal Area

Habitat Area

Proposed Site Plan
1 : 200

REV	DATE	BY	CHKD
D	29/11/21	AT	AC
C	09/12/21	PM	AT
B	07/10/21	AT	AC
A	06/10/21	AT	AC

PROJECT
Gorton Education Village

CLIENT
Bright Futures Educational Trust

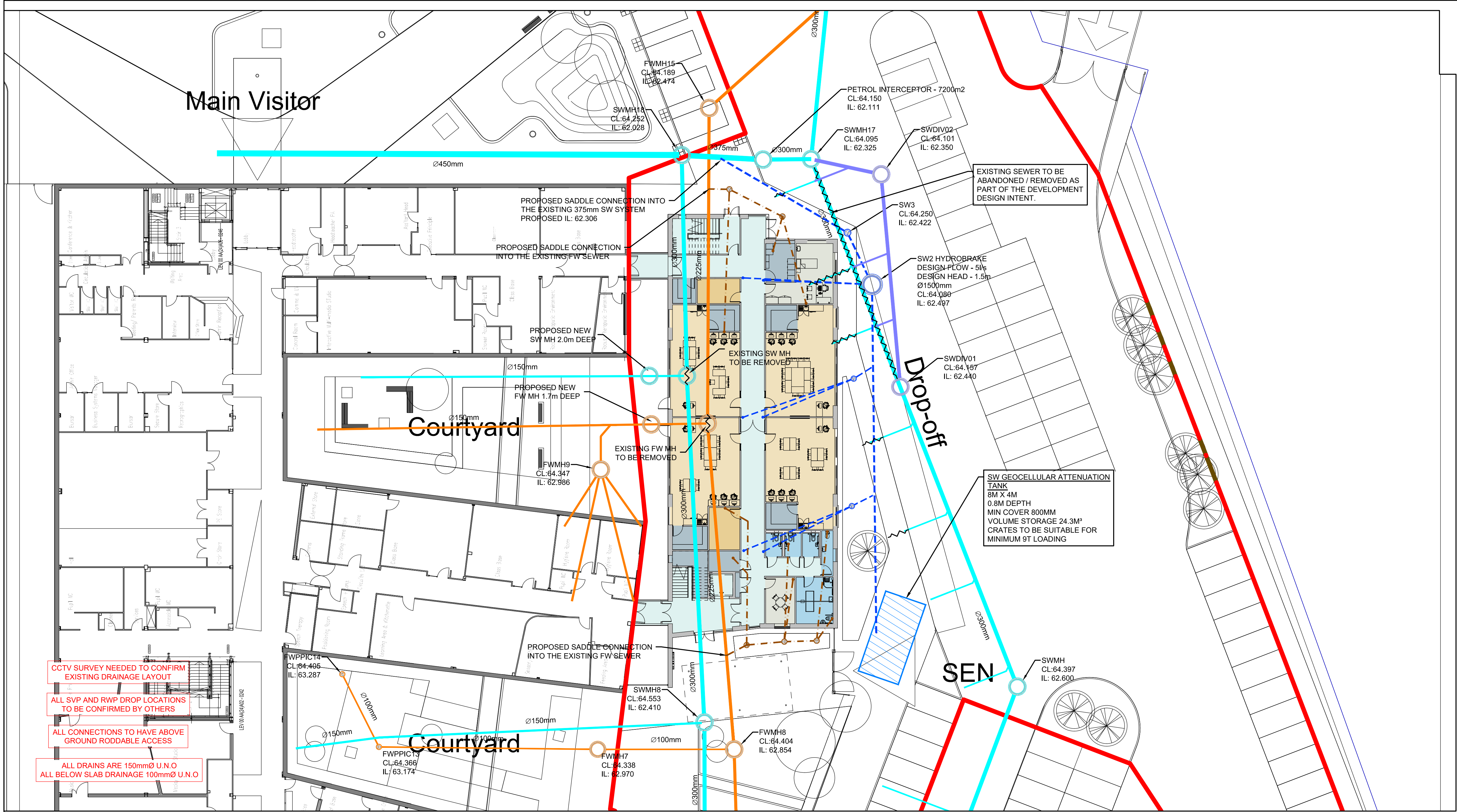
DRAWING
Proposed Site Plan

SCALE	SHEET SIZE	DRAWN	CHECKED	DATE
1 : 200	B4	AT	AC	10/21

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E: office@bowker-sadler.co.uk
W: www.bowker-sadler.co.uk

JOB No	DRAWING No	REVISION
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STATUS	PLANNING	

APPENDIX C – RIDGE DESIGN DRAWINGS



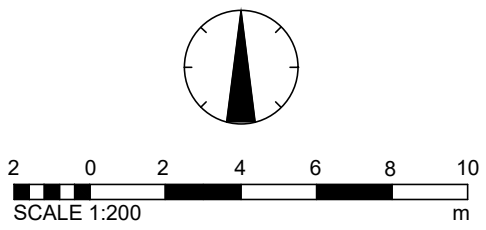
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SIGNIFICANT OR NON-OBSVIOUS RISKS AND RISKS WHICH ARE DIFFICULT TO MANAGE ARE IDENTIFIED ON THIS DRAWING USING THE FOLLOWING SYMBOL, IDENTIFIED TO THE RIGHT WITH BRIEF ACCOMPANYING TEXT. FOR FURTHER DETAILS OF THE RISKS IDENTIFIED BY DESIGNERS, REFERENCE SHOULD BE MADE TO CDM HAZARD REGISTER.



P01	PRELIMINARY ISSUE	01.11.21	AP	AM
REV	DESCRIPTION	DATE	BY	CHKD
ORIGINATOR:				

5TH FLOOR
BELVEDERE HOUSE
12 BOOTH STREET
MANCHESTER, M2 4AW

TEL: 0161 833 9579
WWW.RIDGE.CO.UK

CLIENT:
BOWKER SADLER ARCHITECTS

IN ASSOCIATION WITH:

PROJECT:
GORTON EDUCATION VILLAGE

TITLE:
PROPOSED DRAINAGE LAYOUT

ENG/TECH:	CSE:	ICSE:	SCALE: 1:200 @ A1				
AP	AM	AM	STATUS ISSUE: S2				
STATUS: PRELIMINARY							
UNLESS ISSUED FOR CONSTRUCTION - WORKS AT CLIENT/CONTRACTORS RISK							
S2 - Issued for Information							
PROJECT:	ORG:	ZONE:	LEVEL:	TYPE:	ROLE:	NUMBER:	REV:
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DRAINAGE NOTES

1. THE CONTRACTOR SHALL ALLOW FOR THE PROTECTION, TEMPORARY AND PERMANENT SUPPORT AND DIVERSION WORKS AS NECESSARY, TO ALL EXISTING SERVICES TO THE SATISFACTION OF THE PUBLIC UTILITIES.
2. THE CONTRACTOR SHALL ALLOW FOR DEALING WITH SURFACE WATER RUN-OFF INTO EXCAVATIONS AND FROM GROUNDWATER BY MEANS OF SUMPS, PUMPING AND DE-WATERING AS APPROPRIATE, IN ORDER TO KEEP THE EXCAVATION AS REASONABLY DRY AS POSSIBLE DURING THE CONSTRUCTION OF THE WORKS.
3. ALL PRIVATE DRAINAGE WITHIN THE SITE IS TO COMPLY WITH THE REQUIREMENTS OF BS EN 752 AND BUILDING REGULATIONS PART H. WHERE APPROPRIATE, ALL ADOPTED DRAINAGE SHALL BE DESIGN AND CONSTRUCTED IN ACCORDANCE WITH SEWERS FOR ADOPTION 6th EDITION AND THE ADOPTING AUTHORITIES STANDARD REQUIREMENTS.
4. ALL PRIVATE DRAINAGE PIPES TO BE LAID IN TRENCHES BEDDED CLASS 'B' ON SINGLE SIZED AGGREGATE AND BACKFILLED WITH APPROVED SELECTED FILL (40mm DOWN) REUSED FROM EXCAVATED MATERIAL UNDER BUILDINGS AND WHERE COVER TO INVERT IS LESS THAN 1200mm UNDER TRAFFICKED AREAS PIPES TO BE CAST IN CONCRETE (CLASS Z BEDDING), CLASS 'S' BED AND SURROUND MAY BE REQUIRED FOR SEWERS TO BE ADOPTED. REFER TO SPECIFIC DRAWINGS FOR FURTHER INFORMATION.
5. SELECTED BACKFILL MATERIAL SHALL CONSIST OF UNIFORM EXCAVATED MATERIAL, FREE FROM STONES LARGER THAN 40mm, CLAY LUMPS LARGER THAN 75mm, TREE ROOTS, CONTAMINATED MATERIAL. SELECTED BACKFILL MATERIAL IS TO BE PLACED IN LAYERS NOT EXCEEDING 150mm THICKNESS. THE MATERIAL SHALL BE COMPACTED TO

- ACHIEVE NOT LESS THAN 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED IN LABORATORY COMPACTION TESTS. SUFFICIENT TESTING SHALL BE CARRIED OUT, BY THE CONTRACTOR, TO DEMONSTRATE THIS IS ACHIEVED (NUMBER 12 AND FREQUENCY OF TESTING TO BE AGREED WITH SHD). WHERE THE MOISTURE CONTENT OF THE MATERIAL PROHIBITS COMPLIANCE WITH THE ABOVE 6F1 OR SIMILAR IMPORTED MATERIAL SHALL BE USED.
6. CONCRETE PROTECTION TO PIPEWORK IS TO BE PROVIDED AS FOLLOWS:
 - a) ALL PIPEWORK WITHIN PEDESTRIAN/SOFT AREAS WITH LESS THAN 600mm COVER
 - b) ALL PIPEWORK SUBJECT TO VEHICULAR OVERRUN WITH LESS THAN 1.2m COVER.
 7. ALL PIPEWORK WITHIN MANHOLES ARE TO BE LAID SOFFIT TO SOFFIT (U.N.O). ALL CHAMBER INVERT LEVELS ARE FOR THE OUTGOING PIPE LEVELS. BACKDROP PIPEWORK SHALL BE CONNECTED AT SOFFIT TO SOFFIT WITH THE RODDING ACCESS LEVEL SPECIFIED.
 8. ALL DRAINS TO BE LAID ACCURATELY TO LINE AND LEVEL IN STRICT ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS.
 9. ANY GRADIENTS OF DRAINS INDICATED ARE INDICATIVE ONLY AND THE CONTRACTOR SHALL INSTALL THE DRAINS TO THE SPECIFIED LEVELS SHOWN FOR EACH MANHOLE (U.N.O). CATCHPIT INVERT LEVELS ARE FOR THE OUTGOING PIPE WITH THE SUMP LEVEL SPECIFIED SEPARATELY.
 10. CO-ORDINATE SETTING OUT INFORMATION FOR MANHOLES IS TO THE INTERSECTION THE DRAINS AND NOT THE CENTRE OF THE MANHOLE.
 11. COVER LEVELS OF THE MANHOLES ARE PROVISIONAL AND SUBJECT TO ADJUSTMENT ON SITE TO SUIT THE FINISHED

- GROUND LEVELS. ALL EXTERNAL WORKS CONSTRUCTION AREAS TO BE AS LOCATED BY THE ARCHITECT.
12. MANHOLE COVERS AND FRAMES ARE TO BE IN ACCORDANCE WITH BS EN 124 AND THE FOLLOWING:
 - a) VEHICULAR AREAS: CLASS D400 (E600 IN VULNERABLE SE'RVICE YARD LOCATIONS), DOUBLE TRIANGULAR, 150mm DEEP DUCTILE IRON COVER AND FRAME WITH THREE POINT COVER SEATING, BADGED FW OR SW FOR FOUL OR SURFACE WATER DRAINAGE.
 - b) PEDESTRIAN AREAS: CLASS B125, 100mm DEEP, BADGED FW OR SW FOR FOUL OR SURFACE WATER DRAINAGE.
13. POSITIONS AND SIZES OF ABOVE GROUND FOUL AND SURFACE WATER DRAINAGE CONNECTIONS ARE TO BE CONFIRMED PRIOR TO CONSTRUCTION WITH THE ARCHITECT & M&E ENGINEER.
 14. GULLY GRATINGS AND STEEL CHANNEL COVERS ARE TO BE IN ACCORDANCE WITH BS EN 124 AS FOLLOWS:
 - a) AREAS SUBJECT TO VEHICULAR OVERRUN: CLASS D400 MINIMUM.
 - b) AREAS NOT SUBJECT TO REGULAR VEHICLE OVERRUN (ADJACENT TO KERBS ETC): CLASS C250.
 - c) GULLY GRATES ADJACENT TO KERBS SHALL BE HINGED ON THE SIDE OF THE TRAFFIC DIRECTION (LEFT HAND SIDE).
 15. ALL BRICKWORK IN CONNECTION WITH DRAINAGE IS TO BE SOLID CLASS B ENGINEERING BRICK TO BS 3921.
 16. ALL PRECAST CONCRETE PIPES, CHAMBER PRODUCTS AND ROAD GULLIES SHALL BE TO BS 5911 AND BE KITEMARKED.
 17. ALL DRAINAGE INSITU CONCRETE SHALL BE GEN3 (U.N.O).
 18. ALL INSITU AND CONCRETE PRODUCTS SHALL COMPLY WITH THE REQUIREMENTS FOR SULPHATE EXPOSURE IN ACCORDANCE WITH BRE SPECIAL DIGEST 1, CONCRETE IN

- AGGRESSIVE GROUND (2001) PART 1: TABLE 2.
19. UPON COMPLETION OF THE WORKS THE CONTRACTOR SHALL CLEAN ALL DRAINAGE BY JETTING, REMOVING ALL DEBRIS FROM SITE. NO DEBRIS SHALL BE PERMITTED TO ENTER THE EXISTING DRAINAGE SYSTEM.
 20. CONSTRUCTION JOINTS IN CONCRETE SURROUND MUST NOT BE WITHIN 150mm OF CHAMBER/SHAFT RING JOINTS.
 21. ROCKER PIPES TO BE SURROUNDED WITH CONCRETE LOCATED 150mm MINIMUM 200mm MAXIMUM FROM THE FIRST FLEXIBLE JOINT TO THE MANHOLE WALL.
 22. SOFT SPOTS IN THE TRENCH FORMATION SHALL BE REMOVED AND REPLACED WITH GRANULAR BEDDING UNLESS INSTRUCTED OTHERWISE.
 23. LATERAL CONNECTIONS IN BETWEEN MANHOLE RUNS SHALL BE FORMED BY USING PURPOSE MADE JUNCTION FITTINGS. BEND FITTINGS SHALL BE PROVIDED WHERE APPROPRIATE TO DIRECT THE FLOW INTO MAIN RUNS.
 24. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO LIAISE WITH BUILDING CONTROL FOR APPROVALS, INTERIM INSPECTION, SNAGGING AND FINAL INSPECTIONS OF THEIR WORK.
 25. THE CONTRACTOR SHALL CONFIRM THE LOCATION OF ALL EXISTING STATUTORY UNDERTAKERS APPARATUS AND SERVICE CONNECTIONS ADJACENT TO AND CROSSING THE WORKS BY TRIAL PITS PRIOR TO COMMENCING MACHINE DIG.
 26. AT THE CONCLUSION OF THE WORKS THE CONTRACTOR SHALL PROVIDE A MARKED UP DRAWING TO RECORD ANY AS BUILT VARIATIONS NOT SHOWN ON THE DRAWINGS.
 27. THE DRAINAGE SYSTEM IS NOT DESIGNED TO ACCEPT

- UNTREATED EFFLUENT FROM A COMMERCIAL KITCHEN CONTAINING GREASE AND OILS. REMOVAL OF GREASE AND OIL SHOULD BE MADE AT SOURCE USING A FLOOR MOUNTED ABOVE GROUND GREASE REMOVAL SYSTEM. IT IS RECOMMENDED THAT A MECHANICAL GREASE REMOVAL SYSTEM BE EMPLOYED FOR THIS PURPOSE NOT A PASSIVE SYSTEM.
28. PIPEWORK TO BE OF THE FOLLOWING MANUFACTURER: 100 / 150 / 225MM DIAMETER HEPPWORTH SUPERSLEEVE VITRIFIED CLAY PIPES (40kN/mmm CRUSHING STRENGTH), 300mm + TO BE CONCRETE CLASS M, ALTERNATIVELY POLYSEWER UPVC DRAINAGE SYSTEM BY POLYPIPE WHEN INSTALLED IN LINE WITH THE MANUFACTURERS RECOMMENDATIONS. FILTER DRAINAGE TO BE PERFORMED HDPE.
 29. ALL RWP, WPC & GULLY CONNECTIONS TO BE 100mm DIA UNO & ARE RODDABLE AT LOCATIONS ABOVE GROUND LEVEL.
 30. ALL INSPECTION CHAMBERS WITH A DEPTH GREATER THAN 1.2m TO HAVE A 350mm DIAMETER REDUCING PLATE LOCATED BENEATH COVER AND FRAME TO PREVENT ACCESS.

KEY

- EXISTING SW SEWER
- EXISTING FW SEWER
- PROPOSED SW IC
- PROPOSED SW SEWER
- PROPOSED FW IC
- PROPOSED DIVERTED SW SEWER
- PROPOSED DIVERTED SW MH



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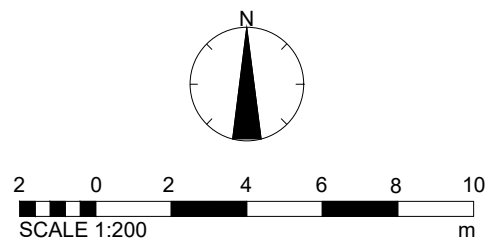
KEY

EXISTING SW SEWER & MANHOLE

EXISTING CW SEWER & MANHOLE

EXISTING IMPERMEABLE AREA

EXISTING GREENFIELD AREA



P01	ISSUED FOR INFORMATION	01.12.21	AM	PB
REV	DESCRIPTION	DATE	BY	CHKD

ORIGINATOR:

5TH FLOOR
BELVEDERE HOUSE
12 BOOTH STREET
MANCHESTER, M2 4AW

TEL: 0161 833 9579
WWW.RIDGE.CO.UK

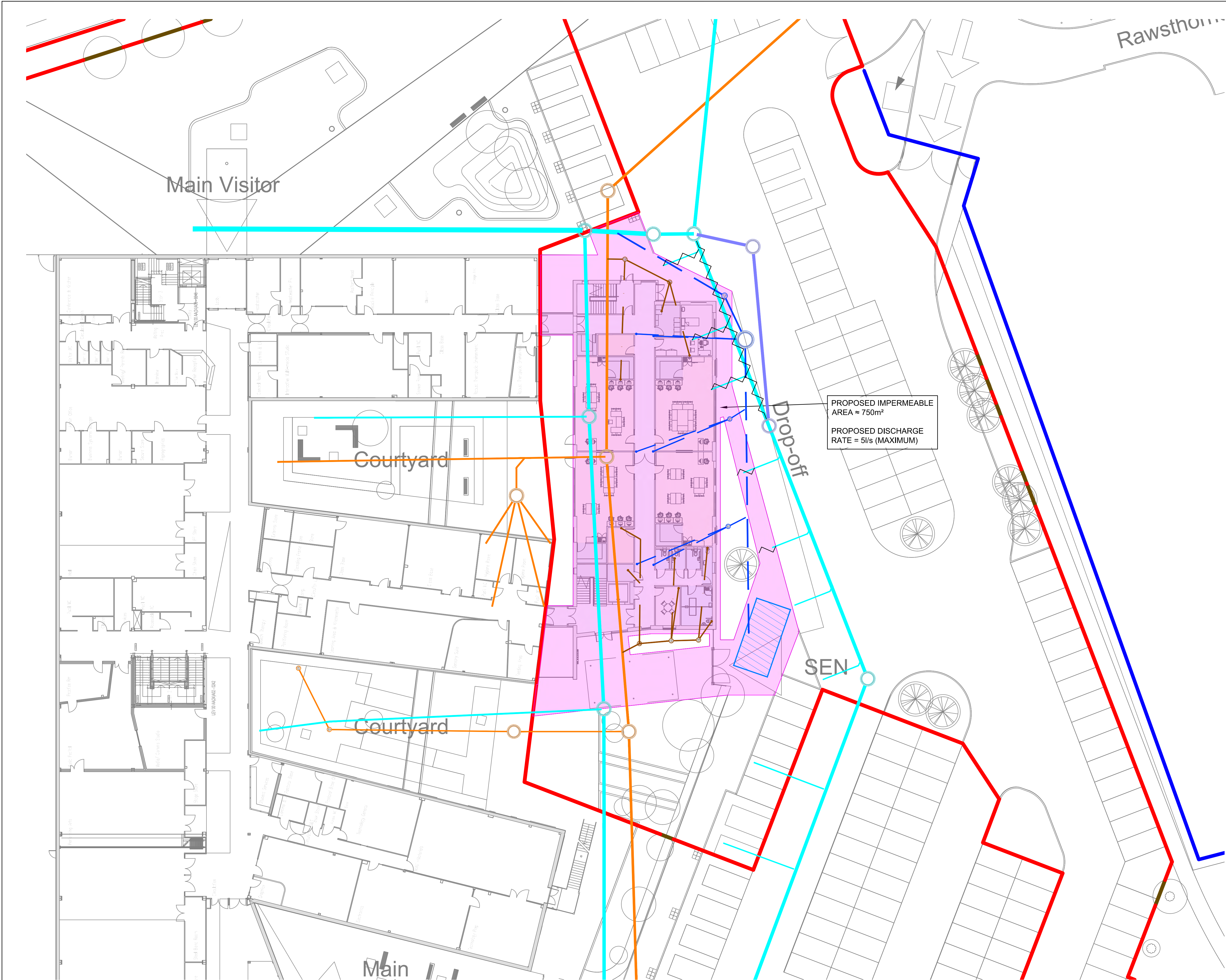
CLIENT:
BOWKER SADLER ARCHITECTS

IN ASSOCIATION WITH:

PROJECT:
GORTON EDUCATION VILLAGE

TITLE:
EXISTING DRAINAGE AREAS

ENG/TECH:	CSE:	ICSE:	SCALE:	1:200	@	A1
AM	PB	PB	STATUS ISSUE:	S2		
STATUS: INFORMATION						
UNLESS ISSUED FOR CONSTRUCTION - WORKS AT CLIENT/CONTRACTORS RISK						
SUITABILITY: S2 - Issued for Information						
PROJECT:	ORG:	ZONE:	LEVEL:	TYPE:	ROLE:	NUMBER:
5014379	RDG	ZZ	XX	DR	C	0002
						REV: P01



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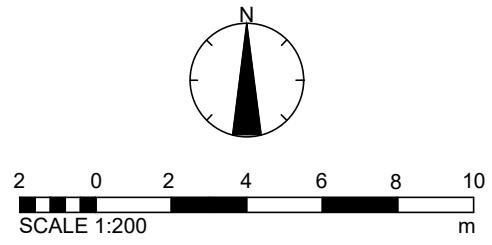
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- KEY
-  EXISTING SW SEWER & MANHOLE
 -  EXISTING CW SEWER & MANHOLE
 -  PROPOSED FW SEWER & MANHOLE
 -  PROPOSED SW SEWER & MANHOLE
 -  PROPOSED SW DIVERSION
 -  PROPOSED IMPERMEABLE AREA



P01	ISSUED FOR INFORMATION	01.12.21	AM	PB
REV	DESCRIPTION	DATE	BY	CHKD

ORIGINATOR:



5TH FLOOR
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TEL: 0161 833 9579
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CLIENT:
BOWKER SADLER ARCHITECTS

IN ASSOCIATION WITH:

PROJECT:
GORTON EDUCATION VILLAGE

TITLE: PROPOSED IMPERMEABLE AREAS					
ENG/TECH:	CSE:	ICSE:	SCALE:	1:200	@ A1
AM	PB	PB	STATUS ISSUE:	S2	
STATUS: INFORMATION					
UNLESS ISSUED FOR CONSTRUCTION - WORKS AT CLIENT/CONTRACTORS RISK					
SUITABILITY: S2 - Issued for Information					
PROJECT:	ORG:	ZONE:	LEVEL:	TYPE:	ROLE:
5014379	RDG	ZZ	XX	DR	C
NUMBER:				REV:	
0003				P01	

APPENDIX D – OUTLINE SURFACE WATER ATTENUATION CALCULATIONS

GORTON EDUCATIONAL VILLAGE**Preliminary Drainage Strategy**

Run off from Existing Site

Date
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ManchesterEngineer
AMChecked
PB**Formula for Calculating Run-off from Impermeable Areas:**

$$Q = 2.78 \times C_v \times i \times A_i$$

 C_v = volumetric run-off coefficient i = rainfall intensity - taken as 50mm/hr A_i = impervious area (hectares)CIRIA C753
'The SuDS Manual'
Section 24.6**Hydrological Growth Curve Factors:**(CIRIA C753: Table 24.2
Hydrometric Area 10)

1 year Factor = 0.87

2 year Factor = 0.93

30 year Factor = 1.70

100 year Factor = 2.08

Contributing Impermeable AreaImpermeable Area = 0.075 ha
= 750 m²

Assumed Impermeability Factor = 100 %

Contributing Impermeable Area = 750 m²**Run-off from Impermeable Surfaces:**

Surface	Area	Permeability Coefficient	Rainfall Intensity	Existing Discharge Rate
	(m ²)	(C _v)	(mm/hr)	(l/sec)
Existing impermeable areas	750	0.9	50	9.4

Greenfield Rate (l/s)	Brownfield Rate (l/s)	Total Discharge Rate, Q (l/s)
1.3	9.4	10.7

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Micro Drainage	Network 2018.1	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes Pipe Manhole Sizes Manhole

FSR Rainfall Model - England and Wales

Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	18.000	Add Flow / Climate Change (%)	0
Ratio R	0.361	Minimum Backdrop Height (m)	0.600
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
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)	400

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	20.408	0.204	100.0	0.053	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.001	5.442	0.055	98.9	0.053	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.002	13.634	0.136	100.3	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.34	62.701	0.053	0.0	0.0	0.0	1.00	17.8	7.2
1.001	50.00	5.43	62.497	0.106	0.0	0.0	0.0	1.01	17.9	14.4
1.002	50.00	5.65	62.442	0.106	0.0	0.0	0.0	1.00	17.7	14.4

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	Pipe Out PN Invert Level (m)	Diameter (mm)	Pipes In PN Invert Level (m)	Diameter (mm)	Backdrop (mm)
SW1	64.350	1.649	Open Manhole	1200	1.000	62.701	150		
SW2	64.080	1.583	Open Manhole	1500	1.001	62.497	150	1.000	62.497
SW3	64.250	1.808	Open Manhole	600	1.002	62.442	150	1.001	62.442
	64.268	1.962	Open Manhole	0		OUTFALL	1.002	62.306	150

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	150	SW1	64.350	62.701	1.499	Open Manhole	1200
1.001	o	150	SW2	64.080	62.497	1.433	Open Manhole	1500
1.002	o	150	SW3	64.250	62.442	1.658	Open Manhole	600

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	20.408	100.0	SW2	64.080	62.497	1.433	Open Manhole	1500
1.001	5.442	98.9	SW3	64.250	62.442	1.658	Open Manhole	600
1.002	13.634	100.3		64.268	62.306	1.812	Open Manhole	0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.002		64.268	62.306	0.000	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	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	30
Ratio R	0.361		

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: SW2, DS/PN: 1.001, Volume (m³): 3.1

Unit Reference	MD-SHE-0098-5000-1500-5000
Design Head (m)	1.500
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	98
Invert Level (m)	62.497
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	5.0	Kick-Flo®	0.878	3.9
Flush-Flo™	0.431	4.9	Mean Flow over Head Range	-	4.3

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)	Depth (m)	Flow (l/s)
0.100	3.2	0.800	4.3	2.000	5.7	4.000	7.9	7.000	10.3
0.200	4.4	1.000	4.1	2.200	6.0	4.500	8.4	7.500	10.7
0.300	4.8	1.200	4.5	2.400	6.2	5.000	8.8	8.000	11.0
0.400	4.9	1.400	4.8	2.600	6.5	5.500	9.2	8.500	11.3
0.500	4.9	1.600	5.1	3.000	6.9	6.000	9.6	9.000	11.6
0.600	4.8	1.800	5.4	3.500	7.4	6.500	10.0	9.500	11.9

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Storage Structures for Storm

Cellular Storage Manhole: SW1, DS/PN: 1.000

Invert Level (m) 62.701 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	32.0	32.0	0.800	32.0	50.1	0.801	0.0	50.1

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

Simulation Criteria

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

 Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.000 Cv (Summer) 0.750
 Region England and Wales Ratio R 0.361 Cv (Winter) 0.840

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

 Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960,
 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 40

									Water	Surcharged	Flooded
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Level (m)	Depth (m)	Volume (m³)
1.000	SW1	30 Winter	1	+0%	30/15	Summer			62.773	-0.078	0.000
1.001	SW2	30 Winter	1	+0%	1/15	Summer			62.765	0.118	0.000
1.002	SW3	30 Winter	1	+0%					62.497	-0.095	0.000

				Pipe			Level
PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Flow (l/s)	Status	Exceeded	
1.000	SW1	0.19		3.2	OK		
1.001	SW2	0.32		4.7	SURCHARGED		
1.002	SW3	0.29		4.7	OK		

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

Simulation Criteria

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

 Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.000 Cv (Summer) 0.750
 Region England and Wales Ratio R 0.361 Cv (Winter) 0.840

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

 Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960,
 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 40

									Water	Surcharged	Flooded	
	US/MH			Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Level	Depth	Volume
PN	Name	Storm		Period	Change	Surcharge	Flood	Overflow	Act.	(m)	(m)	(m³)
1.000	SW1	60	Winter	30	+0%	30/15	Summer			63.032	0.181	0.000
1.001	SW2	60	Winter	30	+0%	1/15	Summer			63.021	0.374	0.000
1.002	SW3	30	Winter	30	+0%					62.498	-0.094	0.000

		Pipe		Level	
PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	SW1	0.27		4.5	SURCHARGED
1.001	SW2	0.33		4.9	SURCHARGED
1.002	SW3	0.30		4.9	OK

Scott Hughes Design Ltd		Page 8
The Flint Glass Works 64 Jersey Street Manchester M4 6JW	GORTON EDUCATION VILLAGE SW RESULTS	
Date 30/11/2021 16:08 File SW.MDX	Designed by AM Checked by PB	
Micro Drainage	Network 2018.1	

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

Simulation Criteria

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

 Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.000 Cv (Summer) 0.750
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 Margin for Flood Risk Warning (mm) 300.0
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 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 40

									Water	Surcharged	Flooded	
	US/MH			Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Level	Depth	Volume
PN	Name	Storm		Period	Change	Surcharge	Flood	Overflow	Act.	(m)	(m)	(m³)
1.000	SW1	60 Winter		100	+40%	30/15 Summer				63.919	1.068	0.000
1.001	SW2	60 Winter		100	+40%	1/15 Summer				63.907	1.260	0.000
1.002	SW3	60 Winter		100	+40%					62.498	-0.094	0.000

		Pipe		Level	
PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	SW1	0.27		4.5	SURCHARGED
1.001	SW2	0.33		4.9	FLOOD RISK
1.002	SW3	0.30		4.9	OK



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