Marston & Grundy LLP
Consulting Engineers

DRAINAGE CONDITION REPORT

For a

PROPOSED COMMERCIAL DEVELOPMENT AT GREENBROW ROAD, NEWALL GREEN

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for

Seva Patidar Ltd

Marston & Grundy LLP
Consulting Engineers

Quality Management

Job No	12860		
Project	Greenbrow Road, Wythenshaw.		
Location	Anchors Away Play, Greenbrow Road, Manchester, M23 2XQ.		
Title	Drainage Condition Report		
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Revision History

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1 Introduction

1.1 In November 2022, a planning application was submitted to Manchester City Council for the erection of single storey extension, with associated elevational alterations in association with the use of the property as 1 no. retail store and 2 no. non-food retail units with associated cycle parking, car parking, access alterations, servicing area, plant compound and landscaping at Anchors Away Play, Greenbrow Road, Manchester, M23 2XQ.

1.2 Planning approval was granted in February 2023 (Ref: 135433/FO/2022) subject to a number of planning conditions, including two conditions relating to the drainage of the development.

1.3 This report has been prepared to remove one of the drainage related planning conditions relevant to the application. The condition is number 6.

2 Drainage Strategy

2.1 Existing Drainage

2.1.1 The United Utilities sewer records have been reviewed and confirms a 600mm diameter combined water sewer passes just within the western boundary, flowing north towards Simonsway. A smaller 225mm diameter combined sewer flows west along the southern boundary and outfalls to this larger sewer. There are no surface water sewers in close proximity. Refer to Figure 5 below for further details.

2.1.2 CCTV survey has been undertaken and has informed that the existing car park and nursery building are served by a combined drainage network that outfalls to the 600mm combined sewer via a 150mm diameter connection.

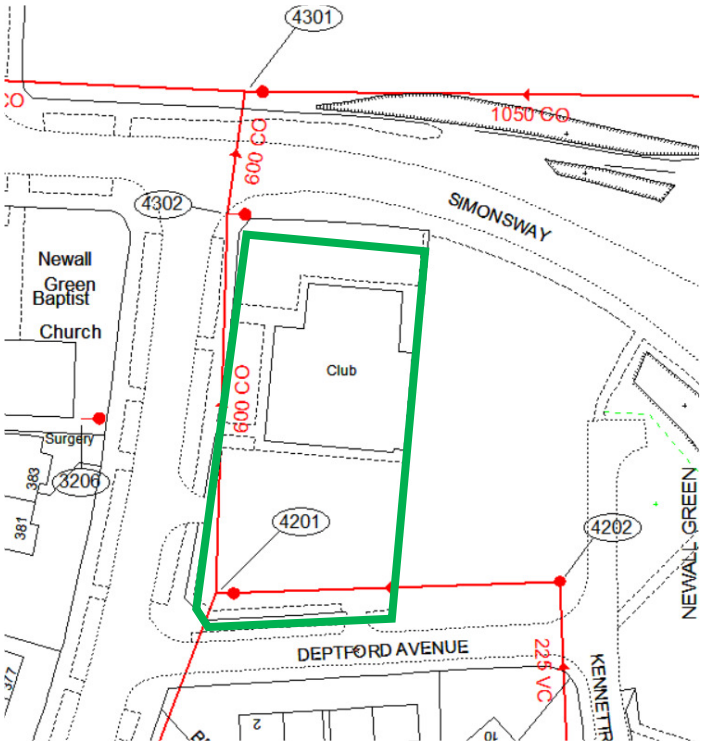


Figure 1 United Utilities Sewer Records

2.2 Existing Runoff

2.2.1 The existing site currently comprises the nursery building and tarmac carpark and can therefore be classed for drainage purposes as Brownfield. Figure 2 below defines the existing brownfield runoff rates.

Existing Impermeable Area (ha)	Brownfield Rates		
	1 yr (30mm/hr)	30yr (65mm/hr)	100yr (95mm/hr)
0.155	12.9 l/s	28.0 l/s	40.9 l/s

Figure 2 Brownfield Runoff Rates

2.3 Geotechnical Assessment

A review of the BGS dataset would indicate the superficial deposits to encompass Alluvium – clay, sands and gravels.

A number of trial pits have been undertaken at the site. The findings from this were that the underlying ground encompassed stiff clays. Refer to the photographs below indicating the stiff clay sub strata.

Figure 3 Photographs of Existing Clay Ground Conditions

In light of these findings, infiltration as a means of draining the site has been discounted.

2.4 SuDS Hierarchal Approach

Based on the existing drainage configuration, plus an assessment of the local site conditions, the SuDS hierarchal approach for discharge of surface water at the development site is considered in detail below:

3

Method	Suitability	Suitability for Development
Infiltration to Ground	No	Cohesive ground conditions would preclude the use of infiltration-based options.
Connection to Watercourse	No	No watercourse in close proximity.
Connection to Surface Water Sewer	No	No surface water sewer in close proximity.
Connection to a Combined Sewer	Yes	Reuse existing connection to combined sewer at restricted rates.

Figure 4: SuDS Hierarchal Approach

2.5 Surface Water Drainage Strategy

2.5.1 The general principal of the surface water drainage strategy is for the roof area of the retained building to be unchanged as the below ground drainage network will not be changing and more fundamentally it combines with the foul drainage.

2.5.2 However, there are opportunities to amend the car parking area, and, in this regard, a new area of permeable surfacing will be incorporated into the central parking area to collect the runoff from the surfacing and direct to the underlying stone mattress that will act as treatment, flow control and attenuation. An orifice plate flow control from this area will be restricted to 5l/s to provide a significant reduction in the predevelopment peak flow rates.

2.5.3 The proposed private drainage layout for the new development building will be designed in accordance with BS EN 752: 2017 and Building Regulations Part H guidance. This is to indicate no flooding for up to the 30-year storm event.

2.5.4 Flooding can occur on a local scale beyond the 30-year criterion due to runoff exceeding the capacity of the minor system during extreme events and it can only be addressed on a site-specific basis. NPPF Guidance states that properties should be protected against flooding from extreme events (1 in 30 year) and that flood pathways are identified when the drainage system is exceeded.

2.5.5 The proposed network has been simulated in the Microdrainage Design Software and takes into account the peak discharge rate of 5l/s. Source Controls measures have also been included within the network in the form of the central area of permeable paving. Further details on the drainage strategy plan can be found in Appendix A with the calculations in Appendix B.

3 Drainage Related Planning Condition and Responses

3.1 Planning Conditions

The specific condition is written below in italic with the M&G response in Blue beneath.

Condition 6

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.

As described in Section 2, an assessment of the existing ground conditions and a full assessment of the SuDS Hierarchal approach has been considered. This has determined that the surface water discharge option is to outfall from the redesigned parking area at a peak rate of 5l/s to the adjacent combined sewer via an existing connection.

The drainage GA drawing in Appendix A and calculations in Appendix B define further.

Furthermore the following sub-items have also been answered in blue:

a) *A finalised drainage layout showing all components, outfalls, levels and connectivity;* refer to Appendix A for the Drainage GA.
b) *Maximised integration of green SuDS components (utilising infiltration or attenuation) if practicable; infiltration not possible.* Permeable surfacing included.
c) *An existing and proposed impermeable areas drawing to accompany all discharge rate calculations.* Impermeable areas remain the same.
d) *Surface water should be restricted to a rate of 5 l/s.* 5l/s restriction to the parking area
e) *A blockage risk assessment is undertaken as part of the drainage strategy to support proposed flows less than 5 l/s. If the risk cannot be adequately managed, a higher minimum discharge rate should be considered / agreed with relevant parties.* Exceedance water retained in the lower lying parking area.
f) *Runoff volume in the 1 in 100-year, 6 hours rainfall shall be constrained to a value as close as is reasonably practicable to the greenfield runoff volume for the same event, but never to exceed the runoff volume from the development site prior to redevelopment;* impermeable area remains the same post development.
g) *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 25% climate change;* no flooding for the 1 in 100 year plus 30% CC.
h) *Assessment of overland flow routes for extreme events. 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.* Potential flooding to only occur to the lower lying car park area. Building raised up above surrounding ground levels.
i) *Progression through the drainage hierarchy shall be evidence based and supported by site investigation. Results of ground investigation carried out under*

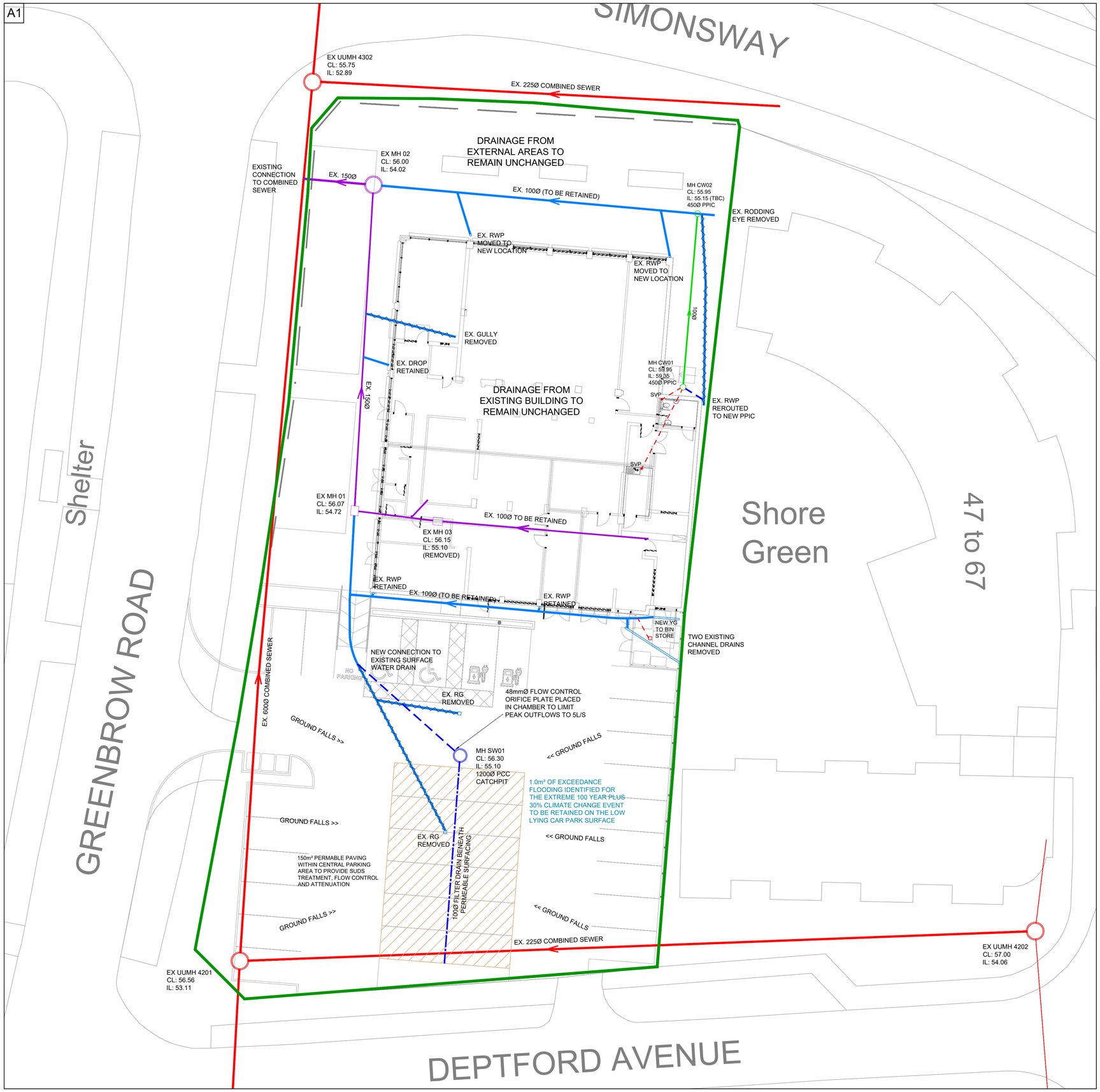
Building Research Establishment Digest 365. Site investigations should be undertaken in locations and at proposed depths of the proposed infiltration devices. Proposal of the attenuation that is achieving half emptying time within 24 hours. If no ground investigations are possible or infiltration is not feasible on site, evidence of alternative surface water disposal routes (as follows) is required. SuDS hierarchy approach considered and discussed in the report.

J) *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. UU confirmed approval to reuse existing connection to the combined sewer via a pre development enquiry and response to the LPA.*

K) *Hydraulic calculation of the proposed drainage system; Refer to Appendix B for the hydraulic calculations.*

L) *Construction details of flow control and SuDS elements. Typical catchpit construction and permeable surfacing detailed on the drainage GA.*

Appendix A – Marston & Grundy Drawings



DRAINAGE NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT DRAWINGS, SPECIFICATIONS AND DOCUMENTATION.
2. THE POSITION, SIZE AND LEVELS OF ALL DRAINS ARE TO BE CONFIRMED ON SITE PRIOR TO THE COMMENCEMENT OF THE WORKS AND ANY DISCREPANCIES REPORTED IMMEDIATELY TO THE ENGINEER.
3. DO NOT SCALE FROM THIS DRAWING, WORK TO DIMENSIONS OR CO-ORDINATES PROVIDED. ALL LEVELS ARE IN METRES AND ALL DIMENSIONS ARE IN MILLIMETRES, UNLESS OTHERWISE NOTED.
4. 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.
5. 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.
6. ALL PRIVATE DRAINAGE WITHIN THE SITE IS TO COMPLY WITH THE REQUIREMENTS OF THE RELEVANT BRITISH/EUROPEAN STANDARD AND THE BUILDING REGULATIONS PART H.
7. 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.
8. 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.
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 THE RELEVANT BRITISH/EUROPEAN STANDARD AND THE FOLLOWING:
   a) VEHICULAR AREAS: CLASS E600 & D400, 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/C250, 100MM DEEP, BADGED FW OR SW FOR FOUL OR SURFACE WATER DRAINAGE.
13. HEAVY DUTY COVER SLABS ARE TO BE USED WITHIN VEHICULAR TRAFFICKED AREAS.
14. GULLY GRATINGS AND STEEL CHANNEL COVERS ARE TO BE IN ACCORDANCE WITH THE RELEVANT BRITISH/EUROPEAN STANDARD 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).
16. POSITIONS AND SIZES OF ABOVE GROUND FOUL AND SURFACE WATER DRAINAGE CONNECTIONS ARE TO BE CONFIRMED PRIOR TO CONSTRUCTION WITH THE ARCHITECT AND M&E ENGINEER.
17. DIAMETER OF PCC MANHOLES VARIES WITH PIPE SIZE, AND IS TO BE IN ACCORDANCE WITH THE TABLES SHOWN ON THE ACCOMPANYING MARSTON & GRUNDY STANDARD DETAILS DRAWINGS.
18. ALL BRICKWORK IN CONNECTION WITH DRAINAGE IS TO BE SOLID CLASS B ENGINEERING BRICK TO THE RELEVANT BRITISH/EUROPEAN STANDARD.
19. ALL PRECAST CONCRETE PIPES, CHAMBER PRODUCTS AND ROAD GULLIES SHALL BE TO THE RELEVANT BRITISH/EUROPEAN STANDARD AND SHOULD BE KITE-MARKED/CE-MARKED ACCORDINGLY.
20. ALL BELOW GROUND PLASTIC/GRP TANKS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS INSTRUCTIONS. THEY SHALL BE PROVIDED WITH SUFFICIENT CONCRETE SURROUND TO COUNTER FLOATATION AND SHALL HAVE A WALL THICKNESS ADEQUATE TO RESIST THE HIGHEST GROUND WATER LEVEL WHICH COULD BE ENCOUNTERED AT THEIR LOCATION.
21. ALL EXISTING DRAINAGE/STRUCTURES TO BE ABANDONED SHALL BE BROKEN OUT AND REMOVED FROM SITE, THE EXCAVATION SHALL BE BACKFILLED WITH A SUITABLE GRANULAR MATERIAL TO THE REQUIRED LEVEL. ALTERNATIVELY, DEEP DRAINS MAY BE CLEANED AND GROUTED WITH A 1:10 CEMENTITIOUS GROUT, WITH STRUCTURES BROKEN DOWN 1M BELOW FINISHED GROUND LEVEL AND BACKFILLED WITH A SUITABLE GRANULAR MATERIAL.
22. 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.
23. DESIGN ASSUMES THAT NO WATER AUTHORITY SEWERS OR OTHER DRAINAGE SYSTEMS REQUIRE MODIFICATION, DIVERSION OR ABANDONING.
24. BACKFILL TO ALL DRAINAGE TRENCHES TO BE CLASS 6F1 MATERIAL.
25. ALL WPC'S, SRWP'S AND RWP'S ARE SHOWN INDICATIVELY. LOCATIONS SHALL BE CONFIRMED BY OTHERS.
26. ALL MANHOLES LESS THAN 1.5M DEEP ARE CONSIDERED AS NONE MAN ENTRY AND SHALL BE MAINTAINED FROM GROUND LEVEL.

NOTES

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KEY

- EXISTING COMBINED WATER PUBLIC SEWER
- EXISTING COMBINED WATER DRAINAGE
- EXISTING SURFACE WATER DRAINAGE
- EXISTING DRAINAGE TO BE ABANDONED
- PROPOSED SURFACE WATER DRAINAGE
- PROPOSED FOUL WATER DRAINAGE
- PROPOSED PERMEABLE SURFACING
  - 80mm BLOCK PAVING
  - 30mm 2-5mm BEDDING COURSE
  - GEOTEXTILE MEMBRANE
  - 250mm TYPE 3 SUB BASE
  - GEOTEXTILE MEMBRANE
- SITE BOUNDARY

SVP SOIL VENT PIPE
RWP RAINWATER PIPE
SG SUMP GULLY TO CHANNEL DRAIN

LOCATIONS, DEPTH AND SIZE OF ALL EXISTING DRAINAGE TBC PRIOR TO WORKS COMMENCING

NOTE ALL RWP AND SVP LOCATIONS TO BE CONFIRMED BY OTHERS

ALL PIPEWORK TO BE 100Ø UNLESS NOTED OTHERWISE

Rev	Description	By	Date	Chk'd
P3	DRAINAGE LAYOUT UPDATED	PG	20.06.23	DG
P2	SITE PLAN UPDATED	PG	12.06.23	DG
P1	PRELIMINARY ISSUE	PG	16.06.22	DG

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Client
SEVA PATIDAR LIMITED

Project
PROPOSED CONVEINIENCE STORE
GREENBROW ROAD, NEWALL GREEN

Drawing
DRAINAGE GA

Purpose of Issue	Status
FOR INFORMATION	

Scale @ A1	Date	Drawn	Checked
1:150	16.06.22	PG	DG

Project No.	Drawing No.	Revision
12860	100	P3

Appendix B – Hydraulic Calculations

	Greenbrow road Surface Water Network V1
Date 20/06/2023 File Greenbrow Road - SW Net...	Designed by paulg Checked by
Innovyze	Network 2017.1.2

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	0.393	Minimum Backdrop Height (m)	0.200
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)	500

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.079	4-8	0.010

Total Area Contributing (ha) = 0.089

Total Pipe Volume (m³) = 0.583

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	15.000	0.150	100.0	0.089	4.00	0.0	0.600	o	150	Pipe/Conduit	
1.001	18.000	0.380	47.4	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	4.25	55.250	0.089	0.0	0.0	0.0	1.00	17.8	12.1
1.001	50.00	4.45	55.100	0.089	0.0	0.0	0.0	1.47	25.9	12.1

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	Greenbrow road Surface Water Network V1	
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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	RE	56.300	55.250	0.900	Open Manhole	150
1.001	o	150	SW01	56.300	55.100	1.050	Open Manhole	1200

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	15.000	100.0	SW01	56.300	55.100	1.050	Open Manhole	1200
1.001	18.000	47.4	EX DRAIN	56.070	54.720	1.200	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)
1.001	EX DRAIN	56.070	54.720	54.720	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 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	1
Number of Online Controls	1	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	0.393		

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Online Controls for Storm

Orifice Manhole: SW01, DS/PN: 1.001, Volume (m³): 1.6

Diameter (m) 0.048 Discharge Coefficient 0.600 Invert Level (m) 55.100

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Storage Structures for Storm

Porous Car Park Manhole: SW01, DS/PN: 1.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	15.0
Max Percolation (l/s)	41.7	Slope (1:X)	80.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	55.950	Cap Volume Depth (m)	0.250

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	Greenbrow road Surface Water Network V1	
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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 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	1
Number of Online Controls	1	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	0.393
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
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	RE	15 Winter	1	+0%	1/15 Summer	30/15 Summer			55.991
1.001	SW01	15 Winter	1	+0%	1/15 Summer				55.970

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	RE	0.591	0.000	0.39		6.4	SURCHARGED	14
1.001	SW01	0.720	0.000	0.18		4.4	SURCHARGED	

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	Greenbrow road Surface Water Network V1	
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Innovyze	Network 2017.1.2	

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

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Storage Structures 1
Number of Online Controls 1 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 0.393
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
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status OFF
DVD Status ON
Inertia Status ON

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	RE	15 Winter	30	+0%	1/15 Summer	30/15 Summer			56.301
1.001	SW01	30 Winter	30	+0%	1/15 Summer				56.190

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	RE	0.901	1.082	1.28		21.0	FLOOD	14
1.001	SW01	0.940	0.000	0.21		5.0	FLOOD RISK	

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	Greenbrow road Surface Water Network V1	
Date 20/06/2023 File Greenbrow Road - SW Net...	Designed by paulg Checked by	
Innovyze	Network 2017.1.2	

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

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	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	0.393
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
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	RE	30 Winter	100	+30%	1/15 Summer	30/15 Summer			56.307
1.001	SW01	60 Winter	100	+30%	1/15 Summer				56.286

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	RE	0.907	7.497	1.25		20.4	FLOOD	14
1.001	SW01	1.036	0.000	0.21		5.2	FLOOD RISK	

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