

36 Winstanley Road, Manchester, M40 7WN

Reference: 0250 - DD- 001

Sep-19

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Purpose of this report

- 1.1 The purpose of this statement is to accompany the technical drawings and details showing the proposed Sustainable Drainage System and to address each point relating to drainage as required by planning condition 10 of planning permission Ref: 130302/FO/2021.

Existing and Proposed Site

- 2.1 The estimated lifetime of this development is: 100 years
- 2.2 The distribution of catchment areas for existing and proposed site is as per table 1 below. See appendix A for details

Table 1 : Existing and Proposed catchment areas in hectares

Description	Existing Site	Proposed Site
Permeable Surface	0.005	0.009
Impermeable Surface	0.006	0.003
Total Development Area	0.011	0.011

- 2.3 The distribution of surfaces within the positively drained areas can be seen in appendix D and are summarised in table 2 below.

Site Characteristics

2.4 The site background is clearly identified through answers to the questions below

TOPIC	QUESTION	ANSWER
Protected species or habitat	Is the site near to designated sites and priority habitats?	No
Flood Plain	Is the site located in the flood plain?	No
Soils and Geology	Soil permeability? - See appendix B for results	No
Space constraints	Space for SuDS components?	No
Topography	Sited on a flat site?	Yes
	Sited on a steep slope (5-15%)	No
	Sited on a very steep slope (>15%)	No
Groundwater	Is ground Water less than 3m bgl?	No
Runoff characteristics	Is the development in a high risk flooding area?	No

Evaluation of Discharge Point

2.5 The SuDS design takes into account Building Regulations Section H3. Rainwater from roofs and paved areas is carried away from the surface to discharge to one of the following in order of priority:

Discharge to:	Site Assessment
Adequate infiltration system	The site has potential for infiltration at shallow depths. An infiltration rate of 0.0036m.hr
a watercourse	There are not watercourses in the proximity to the site
a surface water sewer	There are not public drains in the proximity to the site
a combined sewer system	There is a combined public drains in the proximity to the site

Peak Run-off Rate

- 3.1 The peak runoff rate for the existing site was calculated as per table 3. Calculation results are in table 5 and appendix C.

Table 3: Peak run-off rate calculation method for existing site

Method Used	Calculation Method
☐	This is a greenfield site, as the proposed development area is less than 50ha, the Institute of Hydrology(IoH). Report124 Flood Estimation for Small Catchments method has been used to estimate the site peak flow rates
☐	This is a brownfield site, runoff rates are calculated in accordance with best practice simulation modelling
☒	This is a brownfield site where the pre-development drainage isn't known therefore the runoff rates are calculated using the Greenfield run-off model (above) but using soil type 5

- 3.2 The runoff flow produced by the development will be controlled as per table

Table 4: Runoff discharge rate control

Control Used	Description of runoff discharge
☒	Water will be discharged into the ground via a SuDS as described in table 6 below
☐	The peak discharge rate has been reduced to pre-development Qbar flow
☐	The limiting discharge rate requires a flow rate less than 5l/s at discharge point, therefore a rate of 5l/s is used
☐	The peak discharge rate has been agreed with the local water company to be 1:30 storm event flow rate

Run-off Volumes

- 3.3 Micro Drainage was used to calculate the size of the attenuation based on the available infiltration rate, the size of the soakaways are calculated for all events up to the 1 in 100 including an allowance for climate change of 40%. See table 5 for value and appendix C for calculations.

Table 5: Peak discharge rates and anticipated attenuation volumes for SuDS

Return Period	Peak Discharge Rate		Infiltration Rate (m/hr)
	(l/s)		
Event	Existing	Proposed	
Qbar(1 in 2)	n/a	n/a	0.0034
1 in 30	n/a	n/a	0.0034
1 in 100	n/a	n/a	0.0034
1 in 100 + CC		n/a	0.0034

Drainage Hierarchy Evaluation

- 4.1 The drainage hierarchy evaluation is set up within the NPPF and the local SuDS documents of the Lead Local Flood Authority. The following drainage strategy is proposed by this development.

Table 6: Drainage Hierarchy Evaluation

Hierarchy	Feasible	Proposed
1 Store rainwater for later use	X	X
2 Use infiltration techniques, such as porous surfaces	✓	✓
3 Attenuate rainwater in ponds or open water features for gradual release	X	X
4 Attenuate rainwater by storing in tanks or sealed water features for gradual release	X	X
5 Discharge rainwater direct to a watercourse	X	X
6 Discharge rainwater to a surface water sewer/drain	X	X
7 Discharge rainwater to the combined sewer.	X	X

- 4.2 The location and details of the SuDS can be seen drainage layouts in appendix D. Calculations are in appendix C.
- 4.3 The drainage calculations demonstrate:
- No flooding occurs for the 1 in 30 storm events.
 - Any flooding for the 1 in 100 year +40% climate change event can be safely contained on site
- 4.4 The proposed drainage strategy demonstrate that the development can be sustainably drained, to comply with the requirements of the NPPF and planning conditions.

Management of Exceedance Flows

- 4.5 The drainage network has been designed to attenuate surface runoff for all events up to and including the 1% AEP + CC(1 in 100 years). However consideration has been given to what may happen when the design capacity of the surface water drainage network is exceeded. Surface water will flow to the lowest points within the site located to the front of the property. The flood risk to the buildings would therefore remain low. See appendix D.

Maintenance and Management plan responsibility

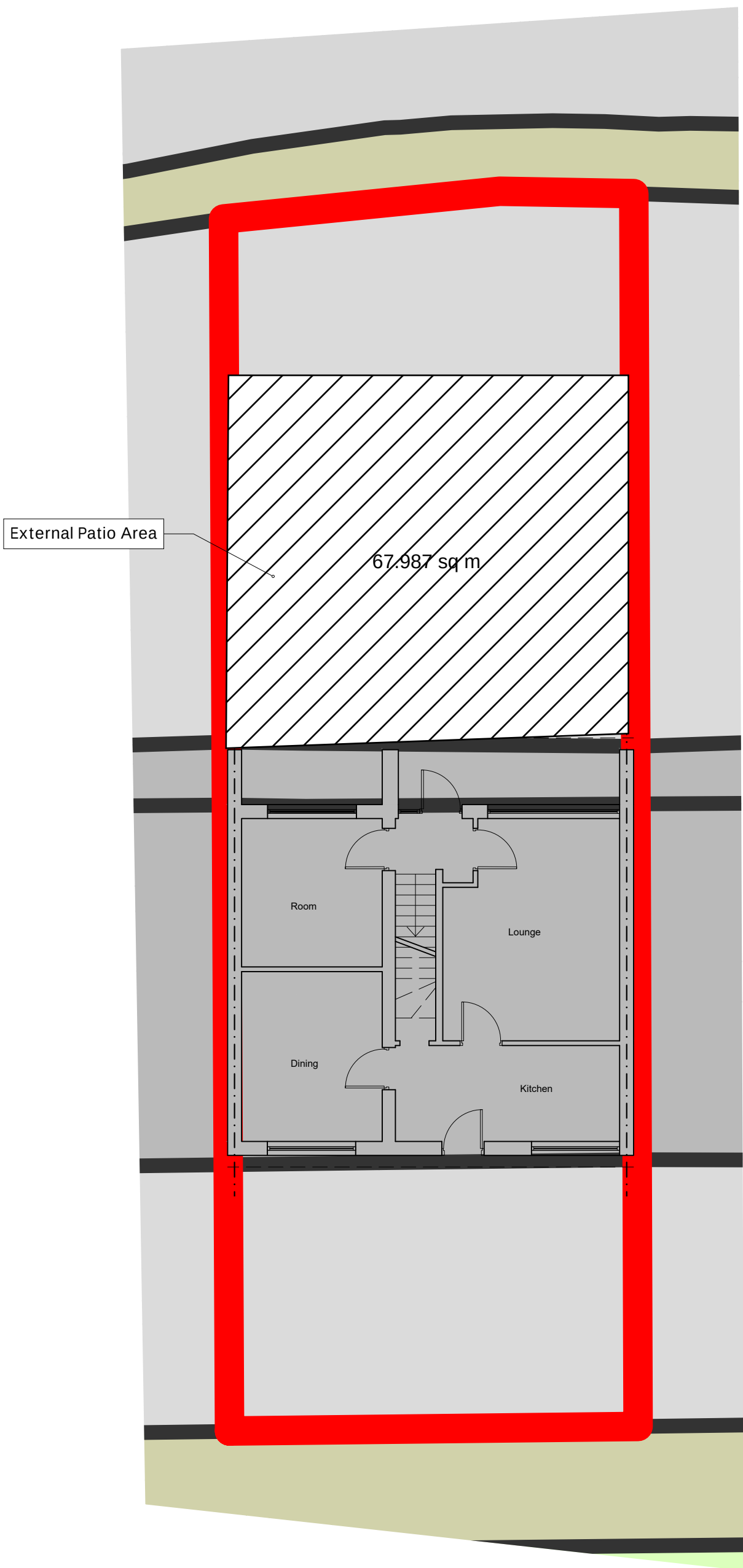
- 5.1 The SuDS will be maintained by The Owner the property

Maintenance and Management plan for proposed SuDS

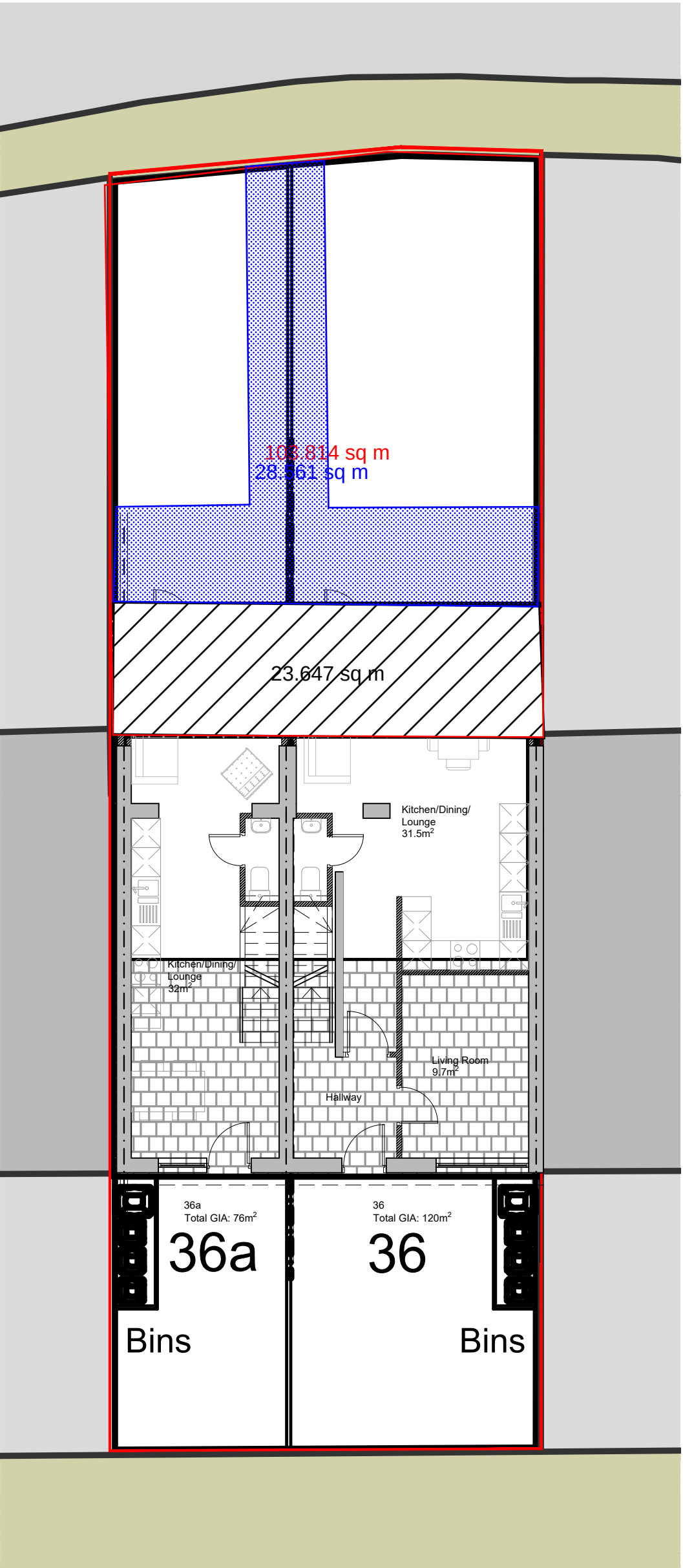
- 5.2 The maintenance and Management Plan Guidance from the SuDS Manual, CIRIA C753 (CIRIA, 2015) is to be followed for the effective maintenance of the proposed SuDS techniques outlined above. The maintenance for SuDS structures are as follow:

Operation and maintenance requirements for pervious pavements		
Maintenance schedule	Required action	Typical frequency
Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment
Occasional maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying	As required – once per year on less frequently used pavements
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving	As required
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth – if required, take remedial action	Three-monthly, 48 h after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

Appendix A



EXISTING SITE
1:100



PROPOSED SITE
1:100

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Drawing Scale Bar		Drawing Scale Bar	
Drawing scale	Line length	Drawing scale	Line length
1:5	= 0.25 metres	1:200	= 10.0 metres
1:10	= 0.5 metres	1:250	= 12.5 metres
1:20	= 1.0 metres	1:500	= 25.0 metres
1:25	= 1.25 metres	1:1000	= 50.0 metres
1:50	= 2.5 metres	1:1250	= 62.5 metres
1:100	= 5.0 metres	1:2500	= 125 metres
Measure length of line above for checking of scale			

GENERAL NOTES

KEY	
	PERMEABLE AREAS
	IMPERMEABLE AREAS
	STUDY AREA

Rev	Details	Date	By	Chd

Drawing Status:
PRELIMINARY



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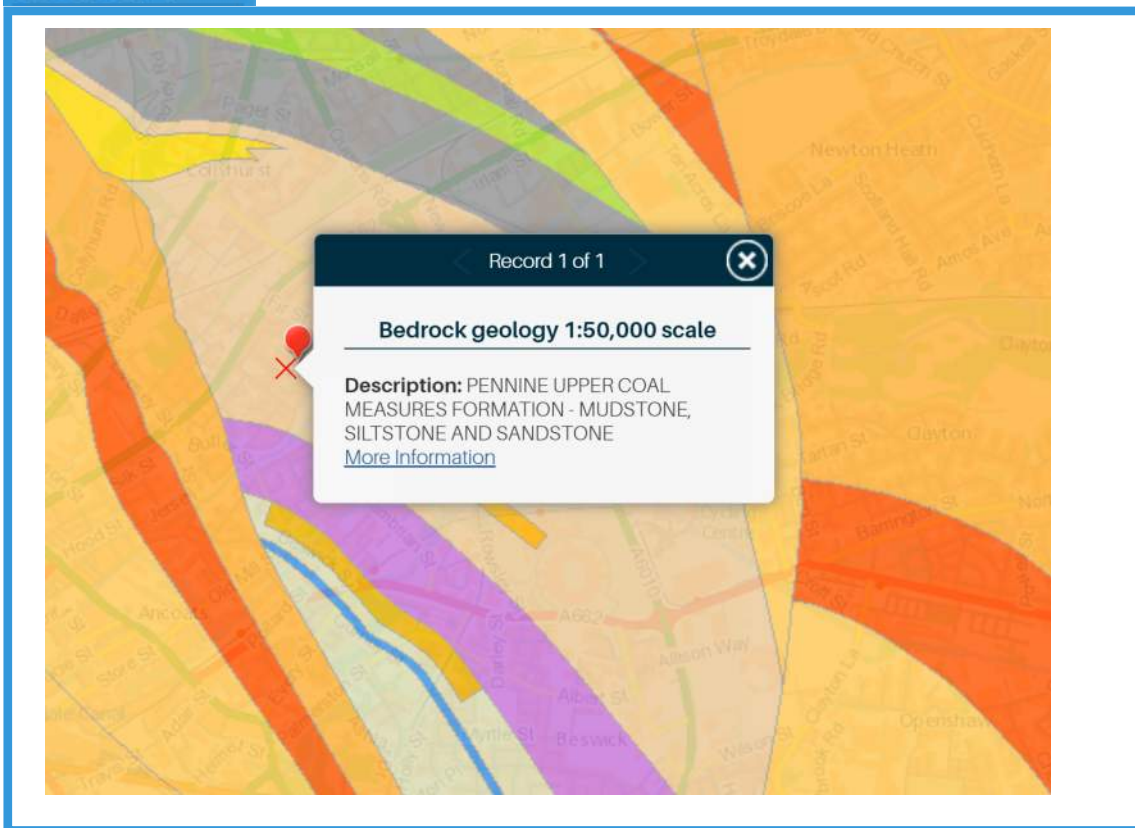
Drawing:
**Existing and Proposed Areas
Permeable and Impermeable**

Print Size:	Project No:	Drawing No:	Revision:
A1	250	001	P1

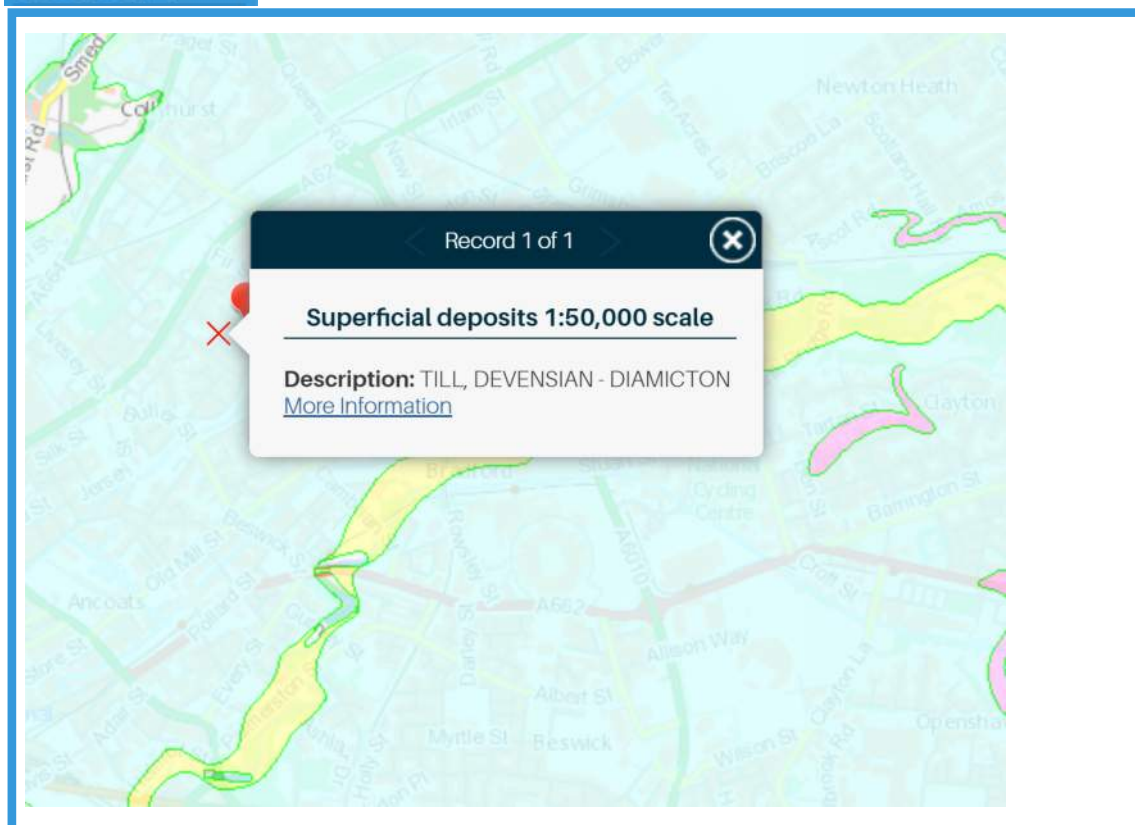
Appendix B

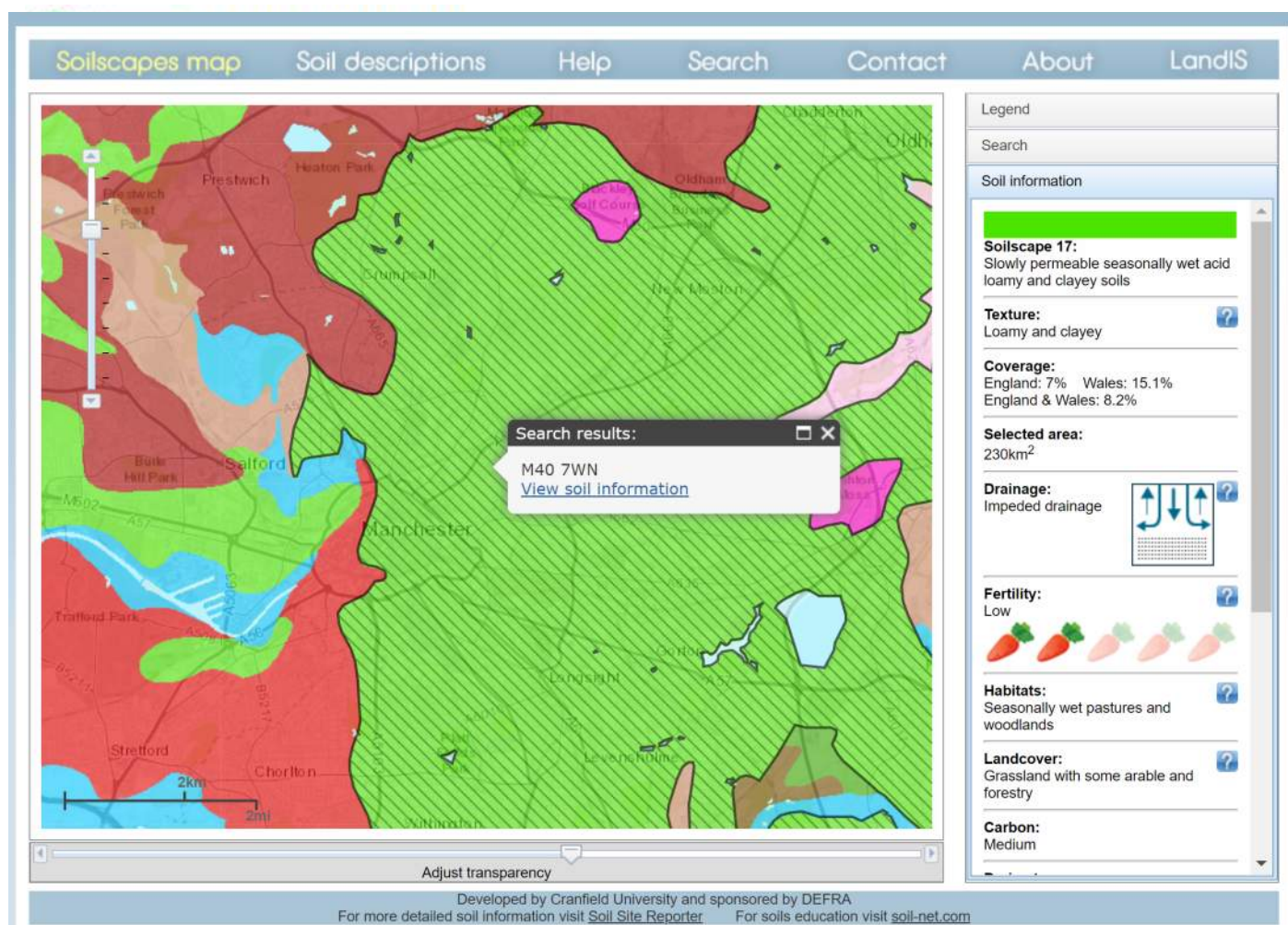


GEOLOGY - BEDROCK - MUDSTONE



GEOLOGY - SUPERFICIAL DEPOSITS - DIAMICTON





Appendix C

RIDA Reports		Page 1	
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Innovyze			Network 2018.1.1

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

M5-60 (mm)18.000

Ratio R0.360

Maximum Rainfall (mm/hr)50

Maximum Time of Concentration (mins)30

Foul Sewage (l/s/ha)0.000

Volumetric Runoff Coeff.0.750

PIMP (%)100

Add Flow / Climate Change (%)0

Minimum Backdrop Height (m)0.200

Maximum Backdrop Height (m)1.500

Min Design Depth for Optimisation (m)0.500

Min Vel for Auto Design only (m/s)1.00

Min Slope for Optimisation (1:X)500

Designed with Level Soffits

Time Area Diagram for Storm

Time AreaTime Area

(mins)(ha)(mins)(ha)

0-4 0.0024-8 0.001

Total Area Contributing (ha) = 0.003

Total Pipe Volume (m³) = 0.079

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	5.000	0.085	58.8	0.003	6.00	0.0	0.600	o	100	Pipe/Conduit	
1.001	5.000	0.085	58.8	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	6.08	99.400	0.003	0.0	0.0	0.0	1.01	7.9	0.4
1.001	50.00	6.17	99.315	0.003	0.0	0.0	0.0	1.01	7.9	0.4

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.001		100.000	99.230	0.000	0	0

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Innovyze	Network 2018.1.1	
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 0.360		
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RIDA Reports		Page 3
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Date 10/09/2021 22:36 File PROPOSED.MDX	Designed by Argemiro Checked by	
Innovyze	Network 2018.1.1	
Online Controls for Storm Pump Manhole: 2, DS/PN: 1.001, Volume (m³): 0.8 Invert Level (m) 99.315 Depth (m) Flow (l/s) 1.0000.0000		
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RIDA Reports		Page 4																								
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<u>Storage Structures for Storm</u> <u>Porous Car Park Manhole: 2, DS/PN: 1.001</u> <table> <tr> <td>Infiltration Coefficient Base (m/hr)</td> <td>0.00360</td> <td>Width (m)</td> <td>2.8</td> </tr> <tr> <td>Membrane Percolation (mm/hr)</td> <td>1000</td> <td>Length (m)</td> <td>10.0</td> </tr> <tr> <td>Max Percolation (l/s)</td> <td>7.8</td> <td>Slope (1:X)</td> <td>0.0</td> </tr> <tr> <td>Safety Factor</td> <td>2.0</td> <td>Depression Storage (mm)</td> <td>5</td> </tr> <tr> <td>Porosity</td> <td>0.30</td> <td>Evaporation (mm/day)</td> <td>3</td> </tr> <tr> <td>Invert Level (m)</td> <td>99.315</td> <td>Cap Volume Depth (m)</td> <td>0.300</td> </tr> </table>			Infiltration Coefficient Base (m/hr)	0.00360	Width (m)	2.8	Membrane Percolation (mm/hr)	1000	Length (m)	10.0	Max Percolation (l/s)	7.8	Slope (1:X)	0.0	Safety Factor	2.0	Depression Storage (mm)	5	Porosity	0.30	Evaporation (mm/day)	3	Invert Level (m)	99.315	Cap Volume Depth (m)	0.300
Infiltration Coefficient Base (m/hr)	0.00360	Width (m)	2.8																							
Membrane Percolation (mm/hr)	1000	Length (m)	10.0																							
Max Percolation (l/s)	7.8	Slope (1:X)	0.0																							
Safety Factor	2.0	Depression Storage (mm)	5																							
Porosity	0.30	Evaporation (mm/day)	3																							
Invert Level (m)	99.315	Cap Volume Depth (m)	0.300																							
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Innovyze				Network 2018.1.1			
<u>1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm</u>							
<u>Simulation Criteria</u>							
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 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							
<u>Synthetic Rainfall Details</u>							
Rainfall Model FSR Ratio R 0.361							
Region England and Wales Cv (Summer) 0.750							
M5-60 (mm) 18.000 Cv (Winter) 0.840							
Margin for Flood Risk Warning (mm) 10.0 DVD Status OFF							
Analysis Timestep Fine Inertia Status OFF							
DTS Status ON							
Profile(s) Summer and Winter							
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440							
Return Period(s) (years) 1, 30, 100							
Climate Change (%) 0, 0, 40							
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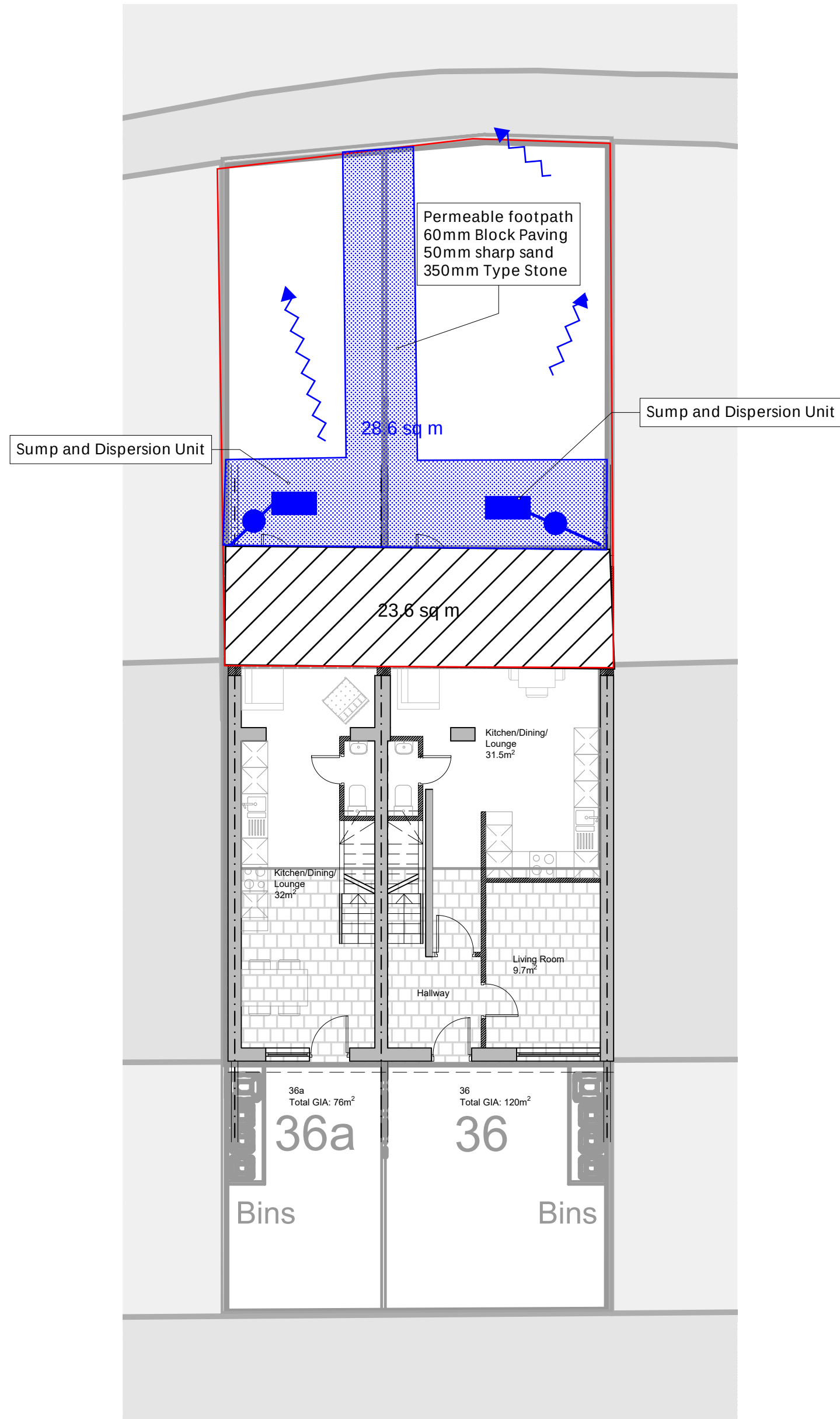
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Innovyze				Network 2018.1.1			
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<u>Simulation Criteria</u>							
Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000							
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000							
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 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							
<u>Synthetic Rainfall Details</u>							
Rainfall Model FSR Ratio R 0.361							
Region England and Wales Cv (Summer) 0.750							
M5-60 (mm) 18.000 Cv (Winter) 0.840							
Margin for Flood Risk Warning (mm) 10.0 DVD Status OFF							
Analysis Timestep Fine Inertia Status OFF							
DTS Status ON							
Profile(s) Summer and Winter							
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440							
Return Period(s) (years) 1, 30, 100							
Climate Change (%) 0, 0, 40							

Appendix D

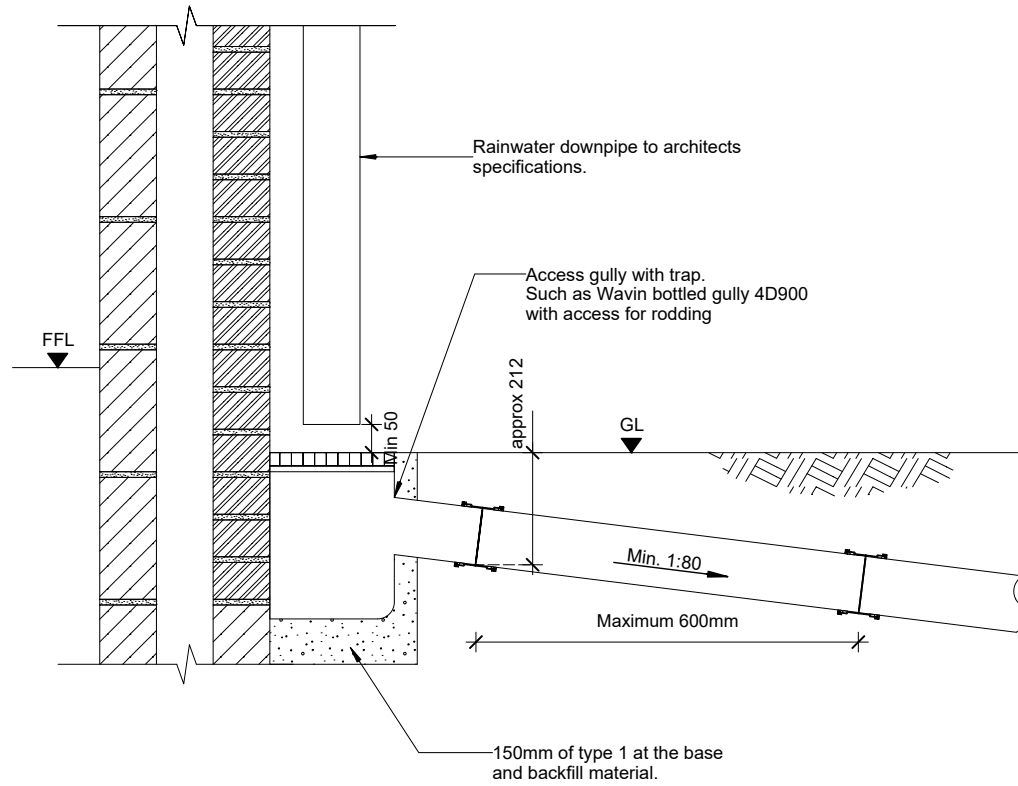
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1:50 = 2.5 metres		1:1250 = 62.5 metres	
1:100 = 5.0 metres		1:2500 = 125 metres	
Measure length of line above for checking of scale			

GENERAL NOTES

- All dimensions are in millimetres and levels in m AOD unless stated otherwise.
- Do not scale. If in any doubt, consult Engineer.
- Read in conjunction with the architects and engineers schedule drawings.
- Check inverts and sizes of existing pipes prior to the commencement of any work. Report any discrepancies to the engineer and await instructions.
- The location of services is shown as indicative. This drawing should be read in conjunction with the utilities drawings. No warranty to their accuracy can be given. The contractor shall take all necessary measures to satisfy himself as to the location of the existing services and connection points. Excavation should be undertaken in compliance with HSG47.
- Concrete structures design sulphate class and ACEC concrete class unknown.
- Pipework to be 110mm Thermoplastics U-PVC (Polypipe or similar) installed at levels marked on this drawing. Pipe bedding should be class Z in pipes within 1.5m of the building or shallower than 700mm below ground level. For all other areas the pipe bedding should be class S.
- Joints and fittings for gravity sewers shall comply with the relevant provisions of BS EN 1401-1, BS EN 1852 and BS EN 12666-1. Pipes shall have a limit of 6% deformation. Pipes shall be SN8 ring stiffness and stamped accordingly. Pipe sections shall not be longer than 3m.
- Plastic chambers and rings, including demarcation chambers, shall comply with BS EN 3598-1 or BS EN 13598-2 as appropriate.
- Inspection chamber covers and frames shall comply with the relevant provisions of BS EN 124 and should be double sealed.
- All inspection chamber covers shall be the non-ventilating type and shall have closed keyways.
- Testing of pipelines should be as follow:
Gravity Pipework: Air pipe testing. Pipework should withstand a pressure of 100mm water gauge and this should not fall by more than 25mm in a 5minute period. However where traps or gullies are connected they should withstand a pressure of 50mm water gauge and this should not fall by more than 12mm in a 5minute period. It is recommended that pipework installations are tested in sections rather than waiting to complete in one operation.
- Manhole covers to be set square to the building. Covers of existing manholes to be adjusted to match final ground levels.
- Granular Bedding for pipes shall be constructed by spreading and compacting granular bedding material over the full width of the pipe trench. After the pipes have been laid, additional granular material shall, if required, be placed and compacted equally on each side of the pipes and, where practicable, this shall be done in sequence with the removal of the trench supports.



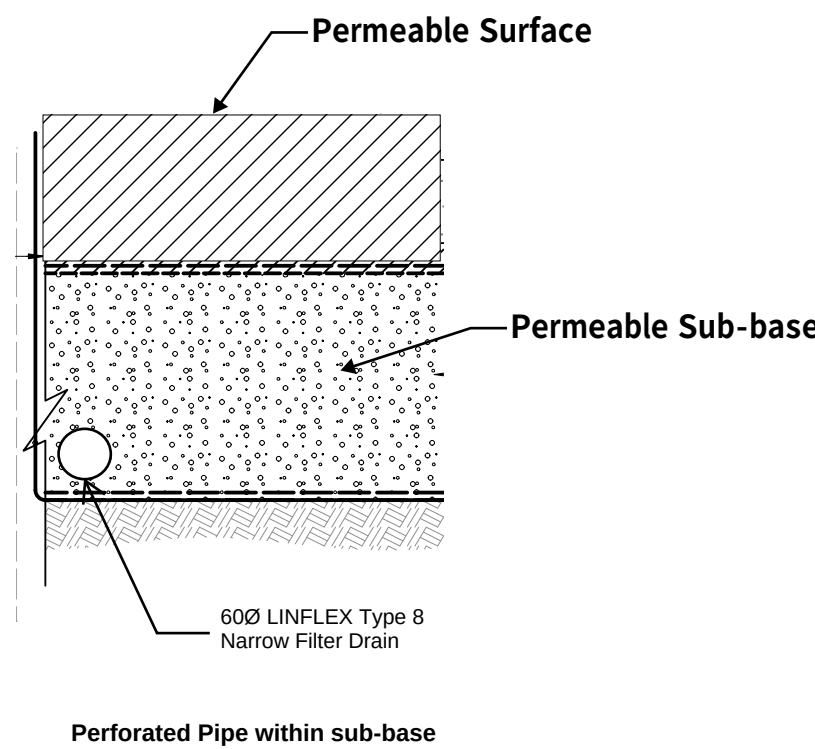
PROPOSED SITE
1:100



NOTES:

- This details shows the standard generic arrangement.
- The pipe and connector details will be different for each manufacturer of the components. They are to be in installed in accordance with the manufacturers recommendations.

8250 - External Rainwater (High Level)



KEY

- Proposed Surface Water Sewer
- Exceedance Flows

Rev	Details	Date	By	Chd
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Drawing Status:
PRELIMINARY



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Drawing:
Proposed Drainage Strategy