

PROPOSED STUDENT ACCOMADATION
MAKSONS HOUSE
52 STATION ROAD
WEST DRAYTON
MIDDLESEX
UB7 7BT

SUDS STATEMENT
APRIL 2016
16032.D100

SUDS STATEMENT
PROPOSED STUDENT ACCOMODATION, MAKSONS HOUSE
STATION ROAD, WEST DRAYTON, MIDDLESEX

MAY 2016

Issue	Prepared by	Checked by	NOTES	Date
D100	JC	SM		04/05/16

1.0 Introduction

Shear Design Ltd has been appointed to prepare a Sustainable Urban Drainage System (SUDS) Statement in respect of a proposed student accommodation at 52 Station Road, West Drayton, Middlesex, UB7 7BT.

The purpose of this statement is to identify suitable Sustainable Urban Drainage Systems for the disposal of surface water from the site and identify methods to minimise water use on the site.

2.0 Existing Conditions

The site comprises of an existing building fronting on to Station Road with existing hardstanding to the rear and side. The site has pedestrian and vehicular access from Station Road to the east. Access is to remain unchanged.

The existing site has an area of 1192 m² and is completely impermeable. This comprises of 701 m² of hardstanding and 491 m² of roof area. See drawing 16032-100 for Existing Impermeable Areas Plan in **Appendix A**.

To establish the existing discharge rate of the site, the run off from hardstanding and roof areas has been calculated. As per Building Regulations: Part H, a nominal rainfall intensity of 50mm/hr has been used.

$$\text{Existing discharge} = \text{Impermeable Area} \times 50\text{mm/hr}$$

Therefore:

$$\text{Existing Discharge} = 1192 \times 50 \times 0.000278 = 16.57 \text{ l/s}$$

It is understood that all existing hardstanding and roof areas within the site boundary are positively drained into the existing public sewer network.

3.0 SUDS Solution

Within Part H of the Building Regulations there is a hierarchy of discharge options to deal with surface water drainage. These are:

- i) Soakaways
- ii) Discharge to watercourse
- iii) Connection to Public Sewer

For soakaways to be a viable option for surface water disposal, there must be at least 6m from the soakaway to the nearest building foundation. Due to the site being located in a densely developed area, it has been determined that soakaways will not be a feasible method of surface water disposal.

The existing site layout comprises 1192m² of impermeable area, meaning that the site is currently 100% impermeable. Through the introduction of an area of permeable paving and landscaping, the proposed site is to have a permeable area of 258m² and an impermeable area of 934m². In addition to this a portion of roof area is to discharge to water butts which will over flow into the permeable paving. Post-development the site is to be 78.4% impermeable. Further details of the pre and post development impermeable areas plans can be found attached in drawings 16032-100 and 16032-101 attached in **Appendix A**.

From inspection of local mapping, it can be seen that the closest water course to the site is Fray's River situated approximately 200m to the west of the site. Due to the site being located within a heavily developed urban environment conveying surface water from the site to this water course would not be possible. Therefore surface water disposal via discharge to a water course is not possible.

Due to the above, all surface water will need to discharge into a Public Sewer. Existing hardstanding within the site area appears to be positively drained into the existing public combined sewer in Station Road at a peak rate of 16.6 l/s. This has been calculated in accordance with Building Regulations Part H.

The local drainage authority require that for a discharge into an existing connection, there must be a reduction of 20% on the existing condition. Due to the introduction of some permeable paving, there will be a reduction in impermeable area of 21.6%. Due to the use of water butts, an area of roof area of 251 m³ is to be being taken from the sites surface water discharge. This will give a post-development discharge rate of 9.5 l/s, providing a betterment of 42.7 % compared to the existing condition.

In addition to this, the addition of rainwater butts is proposed. These will receive a portion on the surface water runoff from the roof area of the existing building. These water butts will hold water for the use on the landscaping to the rear of the site. This will assist in the reduction of water usage. Details of the proposed SUDS techniques can be found in drawing 16032-102 attached in **Appendix A**.

4.0 Existing Water Usage

The existing building currently has a total internal area of 634m². This is split between 334m² on the ground floor and 300m² on the second floor. The ground floor is currently 50% retail space and 50% storage. Assuming that there is 1 FTE (Full Time Employee) per 19m² for retail premises, an occupation of 9 persons has been calculated.

$$\text{GF Occupation} = 334 \times 0.5 / 19 = 9 \text{ persons}$$

Due to the known use of the building, an occupation of 5 has been assumed as a more accurate figure.

The first floor of the existing building was previously used as office space. Assuming that there is 1 FTE (Full Time Employee) per 12m² for serviced office space, an occupation of 25 people has been calculated.

$$\text{FF Occupation} = 300/12 = 25 \text{ persons}$$

This gives a total occupation number for the existing building of 30 persons. Due to the existing building only being used for 12 hours per day, a factor of two has been loaded on the peak discharge rate. As per Flows and Loads 4, retail and serviced office spaces have a discharge rate of 90 l/per person/day. This figure has been used in the calculation of the existing peak discharge. The existing peak discharge is as follows:

$$\text{EPD} = (30 \times 90)/(12 \times 3600) \times 6 \times 1.1 = 0.413 \text{ l/s}$$

The above figures are conservative and use the latest water usage figures which are based on the use of more efficient plumbing provisions.

The proposed peak discharge of the site is based on the development of 29 single occupancy student rooms. Based on this use, there is to be a daily discharge of 120 l/per person per day. The proposed peak discharge as per Building Regulations Part H is as follows:

$$\text{PPD} = (29 \times 120)/(24 \times 3600) \times 6 \times 1.1 = 0.266 \text{ l/s}$$

Again, this is a conservative estimate as the rooms have limited plumbing facilities (shower, WC and wash basin) and communal kitchens.

Based on the above calculations there is a reduction in both water usage and foul discharge.

5.0 Maintenance and Management

The SUDS manual 2007 outlines operation and maintenance requirement for pervious surfaces and this along with manufacturers guidance will be the basis for maintain the operation of the system.

The maintenance responsibility for the permeable pavement system and its surrounding area will be placed with an appropriate responsible organisation. The pervious pavement system will need to be regularly cleaned of silt and other sediments to preserve their infiltration capability as per the manufacturer's recommendations which is usually 3 times a year. At end of winter, mid-summer and autumn leaf fall or as required based on site specific observations.

The permeable paving system is a low maintenance system requiring little maintenance and as such the design life is equivalent to standard block paving system.

As with any block paved area, if there is any damage, or the surface becomes stained in any way, the blocks can easily be removed and replaced. However if, for any reason it is necessary to disturb the sub-base system beneath the blocks it is essential that it is replaced by the procedure shown here.

1. New Geotextile should be cut and installed allowing a 300mm overlap, all edges should be sealed with a double sided adhesive tape.
2. Replace the layer of sub-base stone with clean 5-20mm stone, compact stone to the level beneath the geotextile layer. If have damaged the geotextile patch with new grid allowing an overlap of 300mm either side.
3. New Geotextile should be cut and installed ensuring that any joints are overlapped by 300mm.
4. Replace the laying course 2-6mm stone and screed to finished level.
5. 5. Relay blocks and compact with plate vibrator.
6. 6. Scatter and brush in surface dressing ensuring all joints are filled.

To ensure to ongoing effectiveness of SUDS techniques used, maintenance records are to be completed at regular intervals. CIRIAs Maintenance Guidelines from the SUDS Manual have been included in **Appendix B**.

6.0 Conclusion

Although the site offers limited scope for the use of SUDS, the proposed design has incorporated permeable paving, reducing the total impermeable area of the site by 21.6%. Provision of water butts will also assist in reduced water usage, as well as the use of modern plumbing fittings for reduced flows in accordance with the latest Building Regulations.

**SUDS STATEMENT
PROPOSED STUDENT ACCOMODATION, MAKSONS HOUSE
STATION ROAD, WEST DRAYTON, MIDDLESEX**

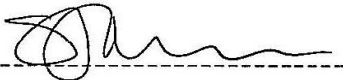
MAY 2016

Report carried out and prepared by:



**ON BEHALF OF SHEAR DESIGN LTD
JAMES COLSTON BEng (Hons)
GRADUATE ENGINEER**

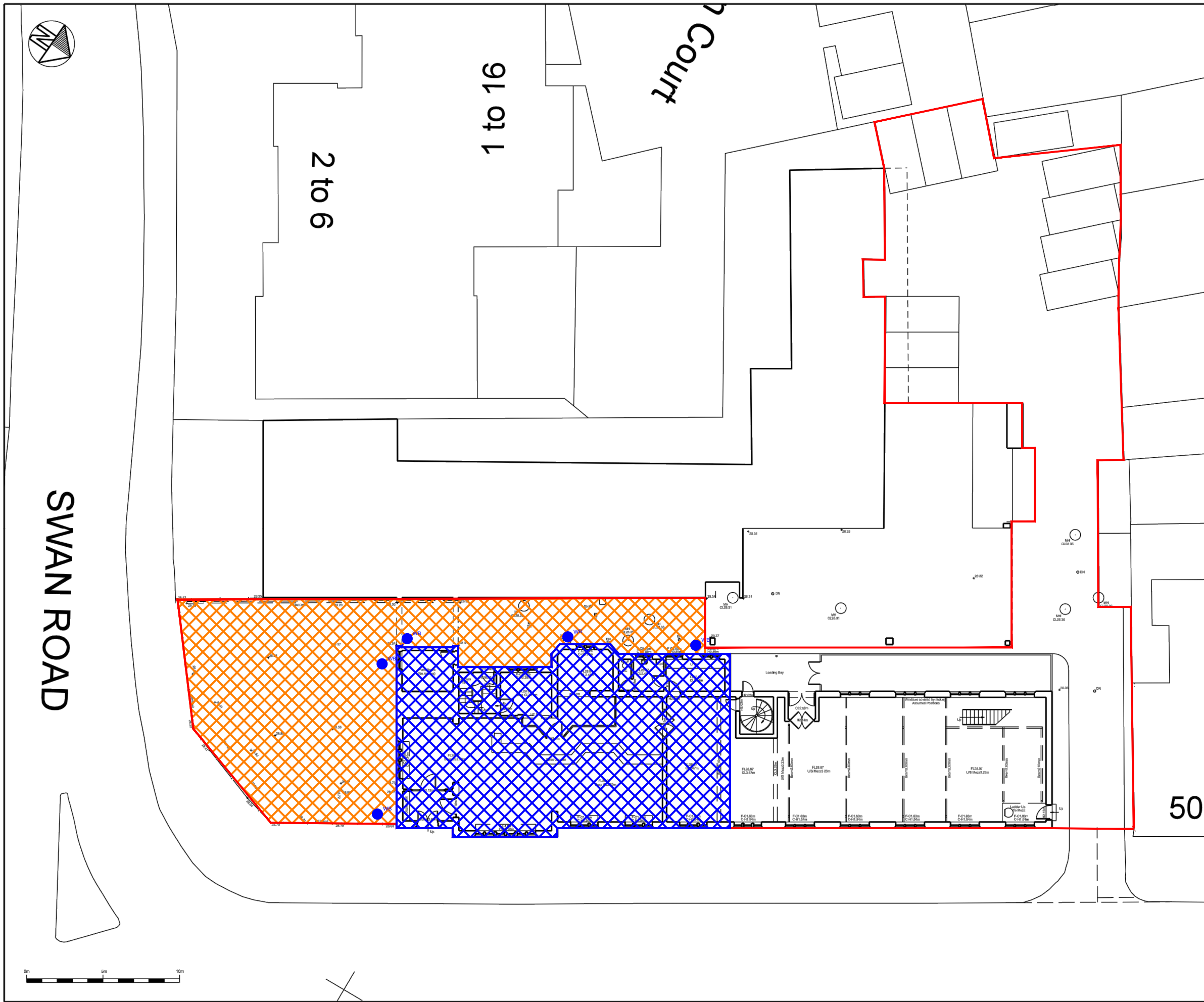
Report checked by:



**ON BEHALF OF SHEAR DESIGN LTD
SIMON MASON I.Eng M.I.C.E.**

APPENDIX A

Existing Impermeable Areas Plan – 16032-100
Proposed Impermeable Areas Plan – 16032-101
Proposed SUDS – 16032-102



NOTES

- GENERAL**
- 1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
 - 2. ALL LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.
 - 3. ALL LEVELS RELATE TO ORDNANCE DATUM UNLESS NOTED OTHERWISE.
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 - 5. ANY DISCREPANCIES TO BE REPORTED IMMEDIATELY TO THE ENGINEER.
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KEY



PROPOSED PERMEABLE PAVING



PORTION OF ROOF AREA DRAINING TO WATER BUTTS WITH OVERFLOW TO PERMEABLE PAVING



WATERBUTT

REV	DATE	DESCRIPTION	BY	CHK
AMENDMENTS				

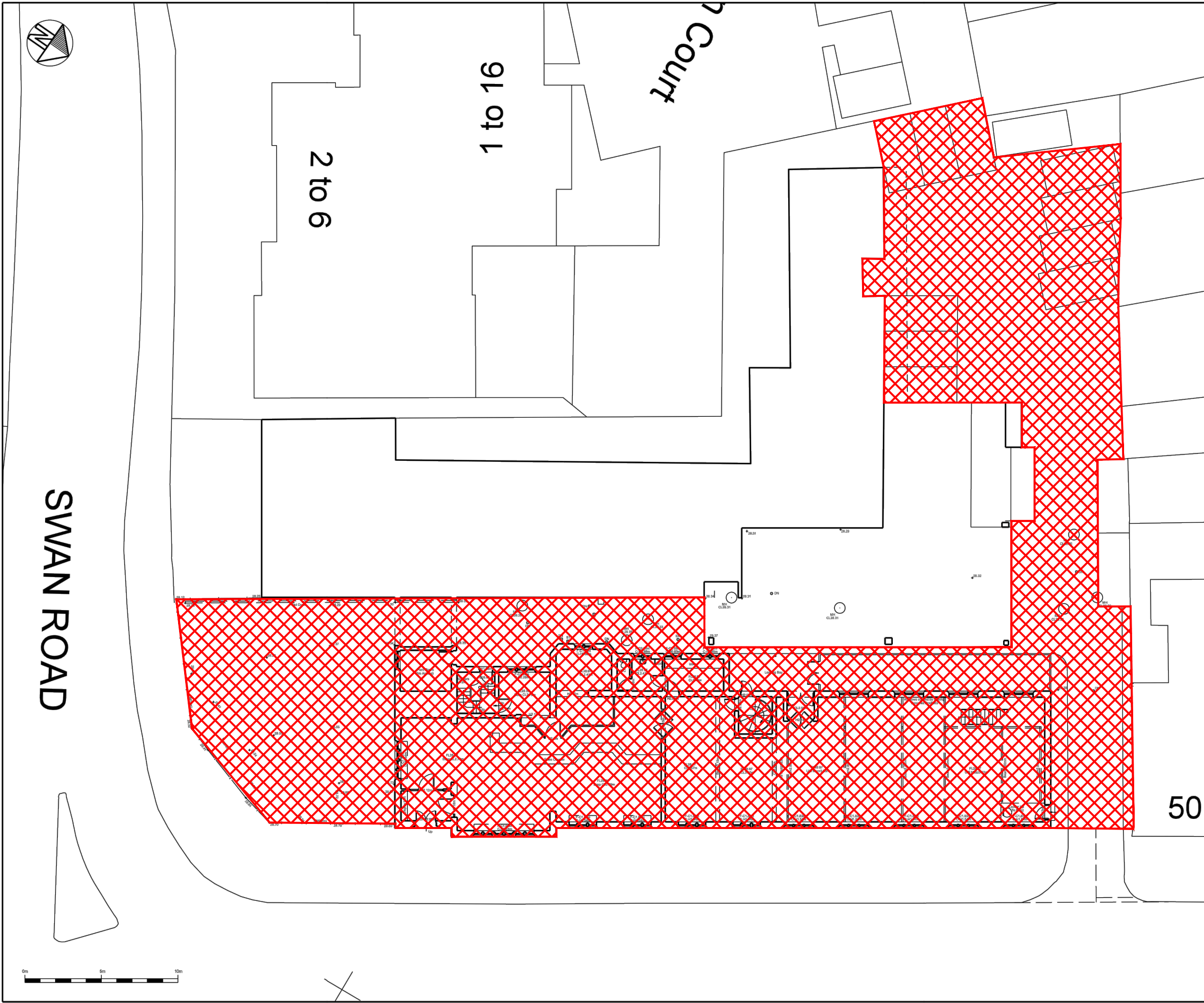
CLIENT: MESSERS KARBANI

PROJECT: MAKSONS HOUSE, 52 STATION ROAD, WEST DRAYTON, UB7 7BT

TITLE: PROPOSED SUDS PLAN

SHEAR design
Consulting Civil and Structural Engineers
7 Ashtree Court - Woody Close - Cardiff Gate Business Park - Cardiff - CF23 8RW
Tel: 029 2054 7000 - Fax: 029 2054 7001 - www.shear-design.com - enquiries@shear-design.com

DRAWN: JC	CHECKED: SM	DATE: 19.04.16	SCALE: 1:250 @ A3
STATUS KEY: I = INFORMATION P = PRELIMINARY A = APPROVAL CO = CONTRACT T = TENDER C = CONSTRUCTION AB = AS-BUILT			
STATUS: I	DRAWING NUMBER: 16032-102	REVISION: -	



NOTES

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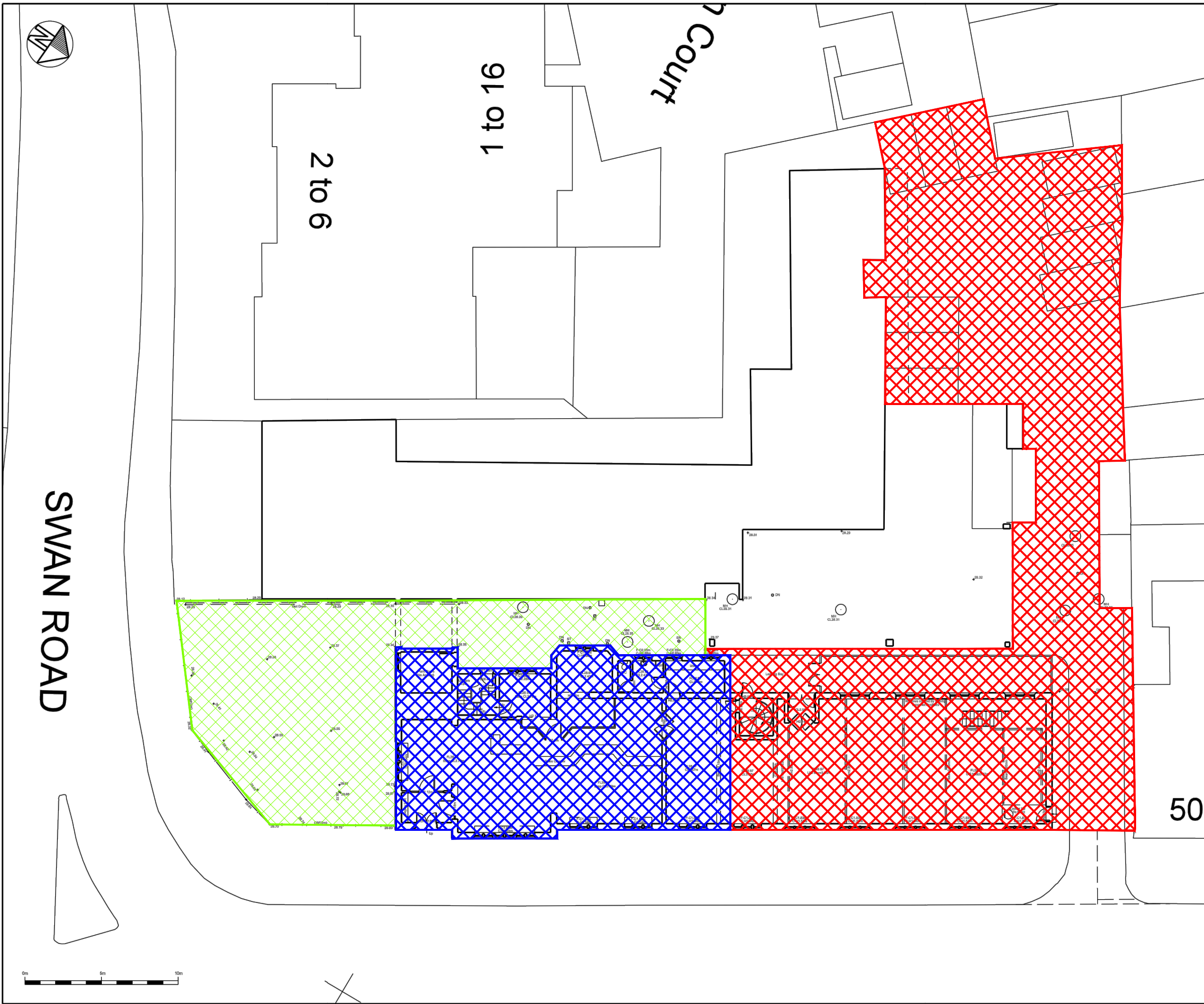
KEY



IMPERMEABLE AREA = 1192 m²

TOTAL SITE AREA = 1192 m²

REV	DATE	DESCRIPTION	BY	CHK
AMENDMENTS				
CLIENT: MESSRS KARBNI				
PROJECT: MAKSONS HOUSE, 52 STATION ROAD, WEST DRAYTON, UB 7 7BT				
TITLE: EXISTING IMPERMEABLE AREAS PLAN				
 Consulting Civil and Structural Engineers 7 Ashtree Court - Woodsy Close - Cardiff Gate Business Park - Cardiff - CF23 8RW Tel: 029 2054 7000 - Fax: 029 2054 7001 - www.shear-design.com - enquiries@shear-design.com				
DRAWN:	JC	CHECKED:	SM	DATE: 19.04.16
STATUS KEY: I = INFORMATION P = PRELIMINARY A = APPROVAL CO = CONTRACT		SCALE: 1:250 @ A3		
T = TENDER C = CONSTRUCTION AB = AS-BUILT				
STATUS:	I	DRAWING NUMBER:	16032-100	REVISION: -



NOTES

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KEY

-  IMPERMEABLE AREA = 934 m²
 -  PERMEABLE AREA = 258 m²
 -  PORTION OF ROOF AREA DRAINING TO WATER BUTTS WITH OVERFLOW TO PERMEABLE PAVING
- TOTAL SITE AREA = 1192 m²

REV	DATE	DESCRIPTION	BY	CHK
AMENDMENTS				
CLIENT: MESSERS KARBANI				
PROJECT: MAKSONS HOUSE, 52 STATION ROAD, WEST DRAYTON, UB7 7BT				
TITLE: PROPOSED IMPERMEABLE AREAS PLAN				
 Consulting Civil and Structural Engineers 7 Ashtree Court - Woodsy Close - Cardiff Gate Business Park - Cardiff - CF23 8RW Tel: 029 2054 7000 - Fax: 029 2054 7001 - www.shear-design.com - enquiries@shear-design.com				
DRAWN: JC		CHECKED: SM	DATE: 19.04.16	SCALE: 1:250 @ A3
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STATUS: I		DRAWING NUMBER: 16032-101		REVISION: -

APPENDIX B

CIRIA Maintenance Schedule Documents C753

Table B.25 SuDS maintenance inspection checklist			
General information			
Site ID			
Site location and co-ordinates (GIS if appropriate)			
Elements forming the SuDS scheme		Approved drawing reference(s)	
Inspection frequency		Approved specification reference	
Type of development		Specific purpose of any parts of the scheme (eg biodiversity, wildlife and visual aspects)	

Inspection date								
	Details	Y/N	Action required	Date completed	Details	Y/N	Action required	Date Completed
General inspection items								
Is there any evidence of erosion, channelling, ponding (where not desirable) or other poor hydraulic performance?								
Is there any evidence of accidental spillages, oils, poor water quality, odours or nuisance insects?								
Have any health and safety risks been identified to either the public or maintenance operatives?								
Is there any deterioration in the surface of permeable or porous surfaces (eg rutting, spreading of blocks or signs of ponding water)?								

C753 The SuDS Manual

Appendix B: Maintenance inspection checklist



Silt/sediment accumulation								
Is there any sediment accumulation at inlets (or other defined accumulation zones such as the surface of filter drains or infiltration basins and within proprietary devices)? If yes, state depth (mm) and extent. Is removal required? If yes, state waste disposal requirements and confirm that all waste management requirements have been complied with (consult environmental regulator)								
Is surface clogging visible (potentially problematic where water has to soak into the underlying construction or ground (eg underdrained swale or infiltration basin)?								
Does permeable or porous surfacing require sweeping to remove silt?								
System blockages and litter build-up								
Is there evidence of litter accumulation in the system? If yes, is this a blockage risk?								
Is there any evidence of any other clogging or blockage of outlets or drainage paths?								
Vegetation								
Is the vegetation condition satisfactory (density, weed growth, coverage etc)? (Check against approved planting regime.)								
Does any part of the system require weeding, pruning or mowing? (Check against maintenance frequency stated in approved design.)								
Is there any evidence of invasive species becoming established? If yes, state action required								
Infrastructure								
Are any check dams or weirs in good condition?								
Is there evidence of any accidental damage to the system (eg wheel ruts?)								

C753 The SuDS Manual

Appendix B: Maintenance inspection checklist



Is there any evidence of cross connections or other unauthorised inflows?								
Is there any evidence of tampering with the flow controls?								
Are there any other matters that could affect the performance of the system in relation to the design objectives for hydraulic, water quality, biodiversity and visual aspects? (Specify.)								
Other observations								
Information appended (eg photos)								
Suitability of current maintenance regime								
Continue as current Increase maintenance Decrease maintenance								
Next inspection								
Proposed date for next inspection								

Table B.16 Design assessment checklist: pervious pavement

General information			
Site ID			
Asset ID(s)			
Pavement Location(s) and co-ordinates		Drawing reference(s)	
Date of assessment		Specification reference(s)	
Primary function of pavement	Attenuation/infiltration/water quality		

Check	Summary details ¹	Acceptable (Y/N)	Comments/ remedial actions
Surfacing (Section 20.1 and 20.2)			
Type of surfacing (block paving, porous asphalt or plastic reinforced gravel/grass)			
Confirm surfacing is suitable for the location and will withstand likely forces (eg turning forces from HGVs)			
Confirm that all shallow services are located within service corridors beneath impermeable surface, as far as possible			
Permeability of surface layer			
Specified joint infill or grid infill			
Specified binder for porous asphalt (to ensure maximum adhesion to aggregate)			
Specified filler for porous asphalt (to ensure maximum adhesion to aggregate)			
Dimensions (Section 20.9)			
Length (m)			
Width (m)			
Depth of capping layer (m)			
Depth of sub-base (m)			
Depth of laying course or regulating layer (m)			
Maximum longitudinal or cross gradient (1 in ?)			
Distance between check dams in sub-base (if provided) (m)			
Inflows (Section 20.10.1)			
Provide a description of the contributing catchment land use (ie overlying surface only or additional inflows) and its size (m ²)			
Where the pavement accepts point source inflows, does the design include suitable energy diffusers?			
Outfall arrangements (Section 20.10.2)			
Is the pavement designed to allow infiltration into the subgrade? If yes, attach infiltration assessment			

Check	Summary details ¹	Acceptable (Y/N)	Comments/ remedial actions
Provide details of any flow control systems, overflow arrangements and limiting discharge rate from pavement			
Is a geomembrane required to prevent infiltration or protect foundations? If yes, give reason			
Depth to maximum likely groundwater level (m)			
Attenuation (Section 20.5)			
Confirm voids ratio of sub-base material			
Demonstrate collection pipework is of sufficient capacity?			
Demonstrate that if the sub-base is used to convey water, the flow capacity will be sufficient?			
Provide calculations for maximum water depth and return period for the design event			
Check dams required because of sloping subgrade? If yes, provide details			
Structural pavement design (Section 20.9)			
CBR* used in design and confirm it is appropriate to the soils below the site when wetted			
Assumed traffic loads used in design			
Design method used for structural design and provide calculations			
Landscape (Sections 20.7 and 20.12)			
Is the proposed planting adjacent to the pavement appropriate to the location?			
Is pavement protected from silt wash off from adjacent planting areas?			
Critical materials and product specifications (Section 20.11)			
Geomembrane			
Geotextile (non-woven)			
Geogrids			
Blocks/asphalt/plastic grids			
Block jointing or grid infill material			
Laying course			
Base course (Note: where this is to be used as a temporary running course during construction, demonstrate that the puncture frequency is sufficient to support the design hydraulic performance of the system)			
Sub-base			
Capping layer			
Topsoil			
Other (including proprietary systems)			
Constructability (Section 20.13)			

Appendix B: Pervious pavement checklist

Check	Summary details ¹	Acceptable (Y/N)	Comments/ remedial actions
Are there any identifiable construction risks? If yes, state and confirm acceptable risk management measures are proposed. (Note: key requirement to protect permeable surface during construction.)			
Maintainability (Section 20.14)			
Confirm that access for maintenance is acceptable and summarise details			
Are there specific features that are likely to pose maintenance difficulties? If yes, identify mitigation measures required			

Pavement design acceptability	Summary details including any changes required	Acceptable (Y/N)	Date changes made
Acceptable: Minor changes required: Major changes required/redesign:			

Note

¹ CBR = California bearing ratio. This is a penetration test for evaluation of the mechanical strength of subgrades and basecourses.