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SURFACE WATER AND SuDS DRAINAGE DESIGN REPORT

for

Proposed electric fast charging hub and drive-thru coffee building

at

Applegreen Naas Road Service Station,
Tootenhill, Rathcoole, Dublin D24DH00

3644-Rep SWD-000

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Project No: **3644**
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1 Introduction

1.1 Background

JA Gorman Consulting Engineers Ltd have prepared this report to address Point 7 and Point 8 of South Dublin County Councils request for Additional Information on Planning File Ref. SD22A/0114.

This report aims to consider the main engineering elements involved with the proposed application for the proposed development to include:

- Design of surface water network including provision of SuDS elements.

1.2 Existing Site

The application site is located to the east of the existing Applegreen Rathcoole Service Station and just off the N7 Naas Road. The site previously contained Tootenhill House. The house was demolished, and the site was cleared several years ago. The site is currently a vacant site with hardcore surfacing.

1.3 Proposals

The proposed development consists of the provision of an Electric Fast Charging Hub and the construction of a Drive-Thru Coffee Building. There will be a small sub-station required for the development.

2 Surface Water Design

2.1 Existing Surface Water

There is no drainage infrastructure located on the proposed site.

The Surface Water from the adjacent Applegreen Service Station is attenuated in two no. separate underground attenuation tanks before being discharged into the existing underground culvert at greenfield runoff rates. The culvert passes through the Applegreen site from the south-west and passes in a north-east direction under the N7 Nass Road.

2.2 Proposed Surface Water Design

The proposed development will comprise of a new surface water drainage system to collect generated surface water run-off and attenuated it before discharging to the existing underground culvert to the west.
The proposed surface water drainage network for the site is illustrated on drawing number P3644-C008. The site is designed with impermeable surfaces running to permeable paving infiltration systems and gullies. No surface water or rainwater will discharge into the foul sewer network. The storm network will include connections to:

- Roof drainage
- Surface water gullies
- Infiltration trenches
- Permeable Paving drainage systems located underneath car parking bays
- Attenuation System.

The proposed surface water drainage system will be installed in the access/drive—thru lanes and discharge into a new *stormtech* attenuation system located in the western corner of the site. The surface water discharge from the site will be attenuated by a *Hydrobrake* flow control unit installed in manhole S1.05. A new outfall pipe and manhole will be constructed from the proposed site to the existing underground culvert at the entrance to the service station as illustrated on drawing number P3644-C008.

The network has been designed (pipe sizes, gradients etc.) using 'BS EN 752:2008 Drain and Sewer Systems outside buildings' and Building Regulations 2010, TGD Part H, and the Greater Dublin Strategic Drainage Study (GDSDS) and by using the industry standard software package '*Microdrainage*'.

2.3 Surface Water Policy

The management of the surface water for the proposed development has been designed to comply with the policies and guidelines outlined in the Greater Dublin Strategic Drainage Study (GDSDS). The guidelines in the above policies require the following main criteria to be provided by the design:

	Criteria	Design Proposal
1	River Quality Protection	Satisfied by providing interception storage and treatment – permeable paving, infiltration trenches, bypass interceptor
2	River Regime Protection	Satisfied by attenuating to greenfield run-off rates.
3	Level of Service (Flooding) for the site	Satisfied by surface water drainage design and run-off contained within the site. The site has been modelled to ensure that (i) flooding does not occur during the 30-year storm event and (ii) only localized spot flooding occurs during the 100-year storm event and that this spot flooding does it threaten water vulnerable areas or the proposed development nor does it impede emergency vehicle access.
4	River Flood Protection	Satisfied by permeable paving in parking bays and QBAR greenfield runoff rate

Table 1.0

2.4 SuDS Proposals

The proposed developments drainage system has been designed in accordance with the principles of Sustainable Urban Drainage Systems (SuDS) in accordance with the recommendations of the GDSDS.
The following SUDS components were identified as being suitable to manage the surface water from the proposed site:

- Reduce surface water runoff
- Reduce pollutant impact
- Attenuate surface water runoff
- Replicate the natural characteristics of rainfall runoff for the site

The relatively small size of this site limits the SuDS options. The GDSDS recommends the use of unlined pervious paving for small site. Permeable Paving (System B – partial infiltration, Load Category 2) is now proposed at the car parking spaces. A Stormtech Attenuation system, which has been shown to improve discharge quality, with a by-pass interceptor and a hydro-brake flow control device is also proposed.
The combination of permeable paving and attenuation system is believed to be sufficient in terms of SuDS measures for this development.

2.5 Attenuation & SW Discharge Flow Control:

The outflow (greenfield rate) from the gravity system within the site to the existing culvert has been calculated in accordance with the Institute of Hydrology Report 124: Flood Estimation for Small Catchments. QBAR has been calculated as 1.77 l/sec (refer to Appendix A). GDSDS requires max discharge of QBAR or 2.0l/sec/ha. The site area is 0.27ha, which at 2.0l/sec/ha, gives a discharge rate of 0.54l/sec/ha. Both of these are

below the minimum rate of discharge without the risk of blockage, i.e., 5.0l/sec and so the maximum rate of discharge will be set to 5.0l/sec.

A bypass interceptor with integrated silt chambers, in accordance with IS EN 858, will be fitted to the inlet side of the attenuation tank, to further treat surface water run-off.

A Hydrobrake flow control device will be fitted to the outlet of the attenuation tank to ensure that the maximum surface water discharge from this site will be limited to 5.0 litres per second

The Micro-Drainage calculations for the surface water network are presented in Appendix B of this report. In accordance with IS 752-4:Part 4, the surface water network was initially designed to carry a 2-year storm event without surcharge. Self-cleansing flows of greater than 0.75m/s are provided generally, although this is not always possible at upstream pipe-runs where contributing areas are low. In these cases, minimum gradients of 1:DN or greater are provided, thus meeting the recommendations of IS EN 752-4 for ensuring self-cleansing flow velocities.

Attenuated storage will be provided by StormTech SC740 chambers (or similar). The attenuation storage chambers have been sized to ensure that all surface water during the 100year critical storm event with a 20% climate change factor applied, can be contained onsite without giving rise to flooding. Details of the proposed attenuation tank are provided in Appendix C.

2.6 Contributing Areas

The overall site area (inside redline boundary) is 0.27 hectares. This area is broken down into smaller areas of different surface type which have different run-off coefficients as outlined in Table 2.0 below:

Site Characteristics – Surface Water Network			
	Area (m2)	Runoff Coefficient	Effective Area (ha)
Areas already connected to existing SW Network	567	n/a	n/a
Roof Area	225	1.0	225.00
Impermeable Paved Area (Roads & Hardstanding)	1,076	0.9	968.40
Permeable Paving (Car Park Bays)	421	0.5	210.50
Permeable Areas (landscaping)	373	0.1	37.30

2.7 Interception Volumes

To prevent pollutants or sediments discharging into water courses the GDSDS requires 'interception storage' to be incorporated into the development. This interception storage is designed to receive the run-off for rainfall depths of 5mm or less. The infiltration system located underneath the permeable paving, the infiltration trench, and the infiltration layer in the stormtech system will provide sufficient interception volumes.

2.8 Design Standards

The surface water network has been designed to comply with the policies and guidelines outlined in 'BS EN 752:2008 Drain and Sewer Systems outside buildings' and Building Regulations 2010, TGD Part H and the Greater Dublin Strategic Drainage Study

(GDSDS). The surface water drainage network has been designed to cater for the 100-year storm event with a 20% additional allowance for climate change to each pipe run.

The following design parameters apply:

• Return Period	5 years
• Time of Entry	5 minutes
• Pipe Friction	0.6mm
• Minimum Velocity	1.0m/sec
• Standard Average Annual Rainfall	920 mm
• M5-60	17.000 mm
• Ration r	0.300
• Climate Change	20%
• Pipe Cover:	1200mm for Pipes under trafficked areas 900mm for Pipes under footpaths 600mm for Pipes within landscape areas

2.9 Climate Change

As part of the proposal, the design software has applied a 20% increase to the rainfall intensities to allow for climate change and as required by the GDSDS for attenuation storage design.

2.10 Surface Water Design Summary

The combination of permeable paving and attenuation system is believed to be sufficient in terms of SuDS measures for this development.

3 SUDS Management & Maintenance Plan

It is recognised that however well it is designed and installed, a drainage system is only as effective as its subsequent maintenance. Maintenance is required to all parts of the hard standing areas and drainage systems. In addition to routine visual inspections, it is vital that drainage channels, gullies, permeable paving, and interceptors are regularly inspected and routinely maintained in accordance with manufacturer's instructions.

The SuDS elements and associated maintenance requirements are illustrated on drawing number P3644-C010 included with this submission. Further details are provided in the separate SuDS Management and Maintenance Plan. The SuDS Maintenance Schedule is included in Appendix D of this Report.

The SuDS maintenance plan and associated drawing will be provided separately in the O&M Manual for the site and the management of the plan will be the responsible of the Manager of the site.

4 Appendices

Appendix 4.1 QBAR Greenfield Runoff Rate

Print | Close Report

HR Wallingford
Working with water

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Aidan O'Donoghue
Site name:	Rathcoole Coffee
Site location:	Naas Road

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	53.27879° N
Longitude:	6.48738° W
Reference:	1373463812
Date:	Oct 03 2022 12:16

Runoff estimation approach IH124

Site characteristics

Total site area (ha): 0.27

Methodology

Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics	Default	Edited
SOIL type:	2	2
HOST class:	N/A	N/A
SPR/SPRHOST:	0.3	0.3

Hydrological characteristics	Default	Edited
SAAR (mm):	920	920
Hydrological region:	12	12
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 30 years:	2.13	2.13
Growth curve factor 100 years:	2.61	2.61
Growth curve factor 200 years:	2.86	2.86

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates	Default	Edited
Q_{BAR} (l/s):	0.68	0.68
1 in 1 year (l/s):	0.58	0.58
1 in 30 years (l/s):	1.44	1.44
1 in 100 year (l/s):	1.77	1.77
1 in 200 years (l/s):	1.94	1.94

Appendix 4.2 Microdrainge Surface Water Design Calculations

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	k (mm)	HYD SECT	DIA (mm)	Section Type
1.000	22.891	0.153	149.6	0.018	5.00	0.600	o	225	Pipe/Conduit
1.001	18.880	0.147	128.4	0.051	0.00	0.600	o	225	Pipe/Conduit
2.000	6.569	0.044	149.3	0.028	5.00	0.600	o	225	Pipe/Conduit
1.002	18.230	0.121	150.7	0.007	0.00	0.600	o	225	Pipe/Conduit
3.000	2.917	0.019	153.5	0.025	5.00	0.600	o	225	Pipe/Conduit
1.003	3.634	0.124	29.3	0.007	0.00	0.600	o	225	Pipe/Conduit
1.004	12.093	0.000	0.0	0.000	0.00	0.600	o	225	Pipe/Conduit
1.005	6.590	1.796	3.7	0.000	0.00	0.600	o	225	Pipe/Conduit

PN	US/MH Name	US/CL (m)	US/IL (m)	US C.Depth (m)	DS/CL (m)	DS/IL (m)	DS C.Depth (m)	Ctrl	US/MH (mm)
1.000	S1.00	126.941	125.491	1.225	126.884	125.338	1.321		1200
1.001	S1.01	126.884	125.338	1.321	126.714	125.191	1.298		1200
2.000	S3.00	126.780	125.235	1.320	126.714	125.191	1.298		1200
1.002	S1.02	126.714	125.191	1.298	126.781	125.070	1.486		1200
3.000	S2.01	126.785	125.089	1.471	126.781	125.070	1.486		1200
1.003	S1.03	126.781	125.070	1.486	126.801	124.946	1.630		1200
1.004	S1.04	126.801	124.946	1.630	126.461	124.946	1.290		1200
1.005	S1.05	126.461	124.946	1.290	126.399	123.150	3.024	Hydro-Brake®	1200

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S1.00	126.941	1.450	Open Manhole	1200	1.000	125.491	225				
S1.01	126.884	1.546	Open Manhole	1200	1.001	125.338	225	1.000	125.338	225	
S3.00	126.780	1.545	Open Manhole	1200	2.000	125.235	225				
S1.02	126.714	1.523	Open Manhole	1200	1.002	125.191	225	1.001	125.191	225	
								2.000	125.191	225	
S2.01	126.785	1.696	Open Manhole	1200	3.000	125.089	225				
S1.03	126.781	1.711	Open Manhole	1200	1.003	125.070	225	1.002	125.070	225	
								3.000	125.070	225	
S1.04	126.801	1.855	Open Manhole	1200	1.004	124.946	225	1.003	124.946	225	
S1.05	126.461	1.515	Open Manhole	1200	1.005	124.946	225	1.004	124.946	225	
S1.06	126.399	3.249	Open Manhole	1200 x 1200		OUTFALL		1.005	123.150	225	

No coordinates have been specified, layout information cannot be produced.

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	225	S1.00	126.941	125.491	1.225	Open Manhole	1200
1.001	o	225	S1.01	126.884	125.338	1.321	Open Manhole	1200
2.000	o	225	S3.00	126.780	125.235	1.320	Open Manhole	1200
1.002	o	225	S1.02	126.714	125.191	1.298	Open Manhole	1200
3.000	o	225	S2.01	126.785	125.089	1.471	Open Manhole	1200
1.003	o	225	S1.03	126.781	125.070	1.486	Open Manhole	1200
1.004	o	225	S1.04	126.801	124.946	1.630	Open Manhole	1200
1.005	o	225	S1.05	126.461	124.946	1.290	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	22.891	149.6	S1.01	126.884	125.338	1.321	Open Manhole	1200
1.001	18.880	128.4	S1.02	126.714	125.191	1.298	Open Manhole	1200
2.000	6.569	149.3	S1.02	126.714	125.191	1.298	Open Manhole	1200
1.002	18.230	150.7	S1.03	126.781	125.070	1.486	Open Manhole	1200
3.000	2.917	153.5	S1.03	126.781	125.070	1.486	Open Manhole	1200
1.003	3.634	29.3	S1.04	126.801	124.946	1.630	Open Manhole	1200
1.004	12.093	0.0	S1.05	126.461	124.946	1.290	Open Manhole	1200
1.005	6.590	3.7	S1.06	126.399	123.150	3.024	Open Manhole	1200 x 1200

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)
1.005	S1.06	126.399	123.150	0.000	1200	1200

Online Controls for Storm

Hydro-Brake® Optimum Manhole: S1.05, DS/PN: 1.005, Volume (m³): 2.1

Unit Reference	MD-SCL-0099-5000-1000-5000
Design Head (m)	1.000
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise blockage risk
Application	Surface
Sump Available	Yes
Diameter (mm)	99
Invert Level (m)	124.946
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)	1.000	5.0	Kick-Flo®	0.572	3.9
Flush-Flo™	0.237	5.0	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	3.6	0.800	4.5	2.000	6.9	4.000	9.5	7.000	12.4
0.200	5.0	1.000	5.0	2.200	7.2	4.500	10.1	7.500	12.8
0.300	4.9	1.200	5.4	2.400	7.5	5.000	10.6	8.000	13.2
0.400	4.7	1.400	5.8	2.600	7.8	5.500	11.1	8.500	13.6
0.500	4.4	1.600	6.2	3.000	8.3	6.000	11.6	9.000	14.0
0.600	4.0	1.800	6.6	3.500	9.0	6.500	12.0	9.500	14.4

Storage Structures for Storm

Cellular Storage Manhole: S1.04, DS/PN: 1.004

Invert Level (m) 124.688 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	25.0	0.0	3.600	0.0	0.0	7.200	0.0	0.0
0.400	25.0	0.0	4.000	0.0	0.0	7.600	0.0	0.0
0.800	25.0	0.0	4.400	0.0	0.0	8.000	0.0	0.0
1.200	0.0	0.0	4.800	0.0	0.0	8.400	0.0	0.0
1.600	0.0	0.0	5.200	0.0	0.0	8.800	0.0	0.0
2.000	0.0	0.0	5.600	0.0	0.0	9.200	0.0	0.0
2.400	0.0	0.0	6.000	0.0	0.0	9.600	0.0	0.0
2.800	0.0	0.0	6.400	0.0	0.0	10.000	0.0	0.0
3.200	0.0	0.0	6.800	0.0	0.0			

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 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	Ratio R	0.300
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	17.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm) 100.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS Status OFF

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	20, 20, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
1.000	S1.00	120 Winter	100	+20%	100/30 Winter				126.179	0.463
1.001	S1.01	120 Winter	100	+20%	100/30 Summer				126.177	0.614
2.000	S3.00	120 Winter	100	+20%	30/60 Winter				126.173	0.713
1.002	S1.02	120 Winter	100	+20%	30/30 Winter				126.172	0.756
3.000	S2.01	120 Winter	100	+20%	30/30 Summer				126.164	0.850
1.003	S1.03	120 Winter	100	+20%	30/15 Winter				126.163	0.868
1.004	S1.04	120 Winter	100	+20%	30/15 Summer				126.160	0.989
1.005	S1.05	120 Winter	100	+20%	30/15 Summer	100/480 Summer			126.151	0.980

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S1.00	0.000	0.07		2.5	SURCHARGED	
1.001	S1.01	0.000	0.23		9.5	SURCHARGED	
2.000	S3.00	0.000	0.12		3.4	SURCHARGED	
1.002	S1.02	0.000	0.32		12.2	SURCHARGED	
3.000	S2.01	0.000	0.11		3.1	SURCHARGED	
1.003	S1.03	0.000	0.30		14.9	SURCHARGED	
1.004	S1.04	0.000	0.59		7.4	SURCHARGED	
1.005	S1.05	0.000	0.03		5.4	SURCHARGED	

Appendix 4.3 Attenuation Tank Details

Resolute Group

INPUTS

Project Name	Drive Rathcoole
Project Reference	JN200567
Date	30-Sep-22
Designer	LP
Liner	Permeable
Chamber Model	SC740
Required Storage Volume	25 m^3
Stone Porosity	43%
Excavation Batter	60 °
Stone Above Chambers	0.15 m
Stone Foundation Depth	0.15 m
Chamber Seperation	0.15 m
Spacing at Sides	0.6 m
Spacing at Ends	0.6 m
No. of Rows	2
No. of Chambers per Row	3
Manholes - 1500mm dia.	1
Isolator Rows	1

RESULTS

System Volume and Bed Size

Installed Storage Volume	25.0 m^3
Height per Chamber	0.762
Width per Chamber	1.295
Length per Chamber	2.169
Depth of System	1.062 m
Tank Overall Installed Width at Base	3.9 m
Tank Overall Installed Length at Base	8.1 m
Area of Dig at Base of System	32 m^2
Area of Dig at Top of System	48 m^2

System Components

Chambers	6
Endcaps	4
Amount of Stone Required (m3)	35 m^3
Amount of Stone Required (tonne)	57 m^3
Volume of excavation (not including top-fill)	43 m^3

Appendix 4.4 SuDS Maintenance Schedule

Applegreen Rathcoole Coffee Drive Thru SuDS Maintenance Summary			
Type	**Activity**	**Normal Maintenance (Site) or SuDS Specific Maintenance (SuDS)**	**Suggested Frequency**
Regular Maintenance			
Litter	Pick up all litter in Landscaping areas along with remainder of the site - remove from site	Site	Daily
Landscaping	Mow all grass verges and complete landscaping maintenance as recommended in Landscaping Management Plan	Site (Landscaping Contractor)	As required or minimum 1 visit monthly
Inlets & Outlets	Inspect monthly, remove any silt or debris from around aprons and inlets	SuDS	I visit Monthly
Permeable Paving	Sweep all paving regularly to keep surfaces tidy	Site (Landscaping Contractor)	1 visit annually or as required
Occasional Tasks			
Permeable Paving	Sweep and suction brush permeable paving when ponding occurs	SuDS	As required - estimate 10-15 year intervals
Flow Controls	Annual inspection of flow control chambers and units - remove any silt and check for free flow	SuDS	1 visit annually
Silt Management	Inspect drainage systems (road gullies, manholes, inlets) annually for silt accumulation. Excavate any silt and removed from site	Site and SuDS	1 visit annually or as required
Landscaping	Complete landscaping maintenance as recommended in Landscaping Management Plan. Remove lower branches as required.	SuDS (Landscaping Contractor)	
Remedial Works			
General SuDS	Inspect SuDS elements to check for damage or failure when carrying out other tasks.	SuDS	Monthly
	Undertake remedial work as required		As required