	N	A	

301 St Vincent Street, Glasgow

Drainage Strategy

OCIM

Job No: 1039797

Doc Ref: SVS-CDL-XX-XX-RP-C-10201

Revision: D

Revision Date: 08 March 2024

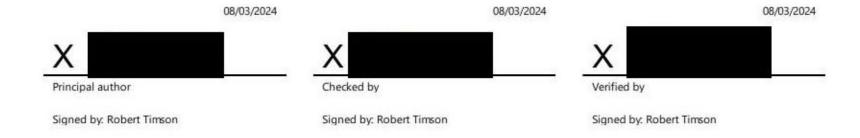


Project title 301 St Vincent Street, Glasgow		Job Number	
Report title	Drainage Strategy	1039797	

Document Revision History

Revision Ref	Issue Date	Purpose of issue / description of revision
-	07 February 2024	Issued for Information
A	29 February 2024	Issued for Information
В	4 Mar 2024	Minor amendments – Appendix B
С	6 Mar 2024	Minor amendment – Appendix B updated
D	8 Mar 2024	No technical changes. Osborne + Co replaced with OCIM

Document Validation (latest issue)



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Introduction



1.0 Introduction

1.1 Context and Purpose

OCIM ('the Client') intend to refurbish and upgrade an existing structure located at 301 St Vincent St, Glasgow G2 5HN. The site is rectangular in shape and occupies an approximate area of 0.91ha. The centre of the site is at National Grid Reference (NGR) NS 58188 65564. The site comprises an existing building of three cores (east, central, and west), currently used by Santander Bank. The proposed landscape strategy by Murray & Associates indicates a change in soft and hard landscaping areas in the courtyards and roofs at different levels. The proposed WC provision by LOM Architecture and Design indicates an increase in the number of WCs and showers.

Appendix A and Figure 1.1 below indicates the site location.

This report outlines the impact of the proposed refurbishment on surface and foul water management at the site in support of the planning application.



Figure 1.1 : Site Location

1.2 References

The following documents and references provide background information used in the preparation of this report:

- National Planning Framework 4 (NPF4) (13 February 2023)
- SEPA: Technical Flood Risk Guidance for Stakeholders: Version 13 (June 2022)
- SEPA: Climate Change Allowances for Flood Risk Assessment in land use planning version 3 (April 2023)
- 4. SEPA: Flood Risk and Land Use Vulnerability Guidance v 4.0 (July 2018)
- 5. Flood Risk Assessment and Drainage Impact Assessment: Planning Guidance for Developers (2011)
- 6. CIRIA C753: The SuDS Manual (2015)
- 7. British Standard BS EN 752:2017 Drain and sewer systems outside buildings Sewer system management
- 8. BSRIA Rules of Thumb: Guidelines for building services (5th Edition) (2011)



2.0

Existing Site and Proposed Development



2.0 Existing Site and Proposed Development

2.1 Site Details

Table 2.1 : Site Details

Site Area & Shape	The site is rectangular in shape and occupies an approximate area of 0.91ha.
Site Boundaries & Adjacent Land Use	The site is on the western edge of Glasgow city centre.
	North: St Vincent Street runs along the northern boundary of the site and intersects with Holland Street. Opposite the site there is St Columba Church of Scotland and variety of office buildings.
	South : William Street is located to the southwest of the site. Also, a high level exit viaduct from the M8 is located along the southern boundary, with a variety of office buildings beyond.
	East: To the east is Pitt Street, intersecting with St Vincent Lane with a mix of business/ residential areas.
	West: To the west there is an office block and its car park, with the M8 elevated viaduct beyond.
Site Topography	A topographical survey of the site was undertaken by Plowman Craven in December 2023. The topographical survey is included in Appendix D.
	The site is an existing building. The topographical survey shows, the northern side slopes gradually from east to west. Both the eastern and western boundaries slope north to east. No consistent gradient is shown on the southern boundary.
Existing Land Uses & Features	The site is currently occupied by Santander Bank and comprises an existing building with a mix of hard and soft landscaping, and skylight roofs.

2.2 Proposed Development

The site comprises an existing building of three cores (east, central, and west core) occupied by Santander Bank. The current landscape strategy proposal by Murray & Associates indicates a change in soft and hard landscaping areas in the courtyards of the second and third floors, and on the roofs of the third and fourth floors. The proposed WC provision by LOM Architecture and Design indicates an increase in provision of WCs and showers. Appendix B contains the landscape plans by Murray & Associates.

Table 2.2 presents changes in hard landscaping proposed by Murray & Associates. Increases or decreases in hard landscaping are both attributed to changes in soft landscaping.



Table 2.2: The Proposed Change in Hard Landscaping Areas

Location	Existing Hard Landscaping Area	Proposed Hard Landscaping Area	Additional Hard Landscapeing	
Fourth Floor Roof (Western Terrace)	90m²	125m²	35m ²	
Fourth Floor Roof (Eastern Terraces)	132m²	109m²	- 23m²	
Third Floor Roof (Western Terrace)	80m²	120m ²	40m²	
Third Floor Roof (Eastern Terrace)	240m²	212m ²	- 28m²	
Third Floor Courtyard (Western Side)	260m²	258m ²	- 2m²	
Third Floor Courtyard (Eastern Side)	268m²	231m ²	- 37m²	
Second Floor Courtyard (Western Side)	87m²	97m²	10m²	
Second Floor Courtyard (Eastern Side)	144m²	146m²	2m²	
*Addition	130m²			
*Addition	85m²			

^{*}Approximation based on current proposals by LOM

Total Change in Hard Landscaping Area	Increased by 218m ²



3.0

Proposed Drainage Strategy



3.0 Proposed Drainage Strategy

3.1 Planning Policy

In accordance with the Scottish Water and SEPA requirements, separate foul and surface water systems will be applied within the site. A reference has been made to Flood Risk Assessment and Drainage Impact Assessment: Planning Guidance for Developers by Glasgow City Council to check any specific requirements in addition to SEPA guidance.

The key parameters which will be used in the design of the proposed surface water drainage network is as follows:

- The rate and volume of surface water runoff from the post-development situation does not exceed the surface water runoff from the existing site.
- The 1 in 2-year flood event will be attenuated on site without surcharge (expect immediately upstream of the flow control device).
- The 1 in 30-year flood event will be attenuated on site in a surcharged network.
- The 1 in 200-year flood event* plus climate change** will be attenuated. Should overland flows result as part of the drainage strategy then these must also be retained within the property boundary.

*In accordance with SEPA's 'Flood Risk and Land Use Vulnerability Guidance' document Table 1, the proposed development falls under the 'Least Vulnerable Uses' and so must avoid the 1 in 200-year flood event plus climate change** event. offices are considered 'Least Vulnerable Uses' requiring lesser flood avoidance of the 1 in 200-year flood event plus climate change.

**In accordance with the most recent requirements from SEPA 'Climate Change Allowances for Flood Risk Assessment in Land use planning' document, a 41% of Peak Rainfall Intensity Allowance uplift will be applied to the site as it is within the Clyde River Basin Region.

3.2 Surface Water

3.2.1 Surface Water Management Plan

Reference has been made to Scottish Water's Surface Water Policy: standard advice note and process guidance (2017).

The hierarchy of surface water disposals states that firstly, surface water should be stored and reused, secondly discharged to the ground. If this is not reasonably practicable, discharge to a watercourse and if this is not reasonably practicable to a sewer. Preference is given firstly to a surface water sewer and in the case of no other means, a combined sewer.

There is no significant demand for non-potable water on the site throughout its design life; and the re-use of rainwater is not a viable/cost-effective part of the solution for managing surface water on the site, taking account of the potential water supply benefits of such a system.

In the case of the proposed development, ground conditions are currently unknown and earthworks are outside the scope of the proposed refurbishment. It is therefore assumed for the purpose of this report that infiltration methods are not a suitable method of surface water disposal design development provides an opportunity for using such methods. In this event a ground investigation would be required. No watercourses have been identified within the vicinity of the site, therefore discharge to the existing sewer network is proposed.

Surface water flows from additional hard surfaces within the site will be managed and treated using SuDS and restricted to existing runoff rates for all storms up to the 1:200-year event including a 41% allowance for climate change, in accordance with SEPA and Glasgow City Council requirements.



3.2.2 SuDS Selection

In line with current legislation and planning policy, the incorporation of SuDS techniques for the collection and conveyance of surface water is required for the proposed development.

Reference is made to SEPA publication WAT-RM-08, Regulation of Sustainable Urban Drainage Systems. Section 3.2.2 of the SEPA document specifies the required levels of SuDS and states:

"Runoff should be treated to prevent negative impacts on receiving water quality. Table 3.4 of the SuDS Manual sets out the water quality management approach for differing land uses. For most developments, this can be achieved by following the Simple Index Approach as described in section 26.7.1 of the CIRIA SuDS Manual to determine the type of SuDS required for the site. A simple index Approach (SIA) Tool is available to help determine whether the proposed SuDS are in line with the Simple Index Approach and acceptable."

The SuDS features proposed for this development have been chosen in line with The SuDS Manual and are described below. It is assumed that the developer will adopt and maintain the surface water system, including SuDS.

3.3 SuDS Types

3.3.1 Green Roof

The roofs and courtyards will have a mix of soft and hard landscaping, it is proposed that soft landscaping areas are designed as green roofs. A typical example and detail of a green roof is shown in Figure 3.1.

A green roof system will collect and treat the runoff from the hard landscaping on the roofs and courtyards. Runoff will be conveyed/ treated through the substrate. Outlets will direct surface water runoff via a traditional downpipe system through the existing drainage network before discharge to the existing sewer network. Therefore, it is proposed that the new hard landscaping areas should be designed with a gentle slope to direct the surface water runoff towards the adjacent green roof areas for treatment.

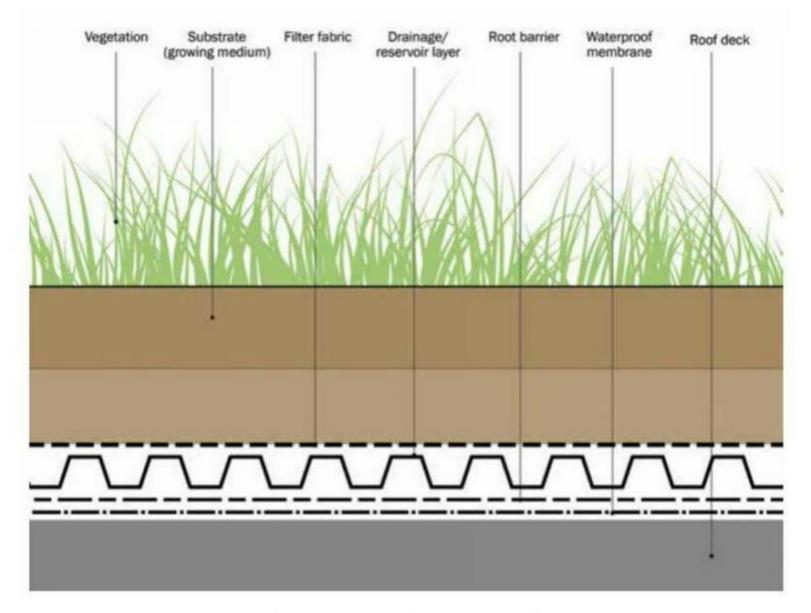


Figure 3.1: Typical Example of a Green Roof Section



3.3.2 Attenuation

Based on the landscape proposal by Murray & Associates, the site will have an additional 218m² of impermeable areas compared to the existing, resulting in more surface water runoff compared to the existing which is managed by the drainage system on-site. Therefore attenuation features such as a blue roof are proposed to manage and reduce flows from the building.

Based on the current design an estimated additional storage volume (calculated in Info Drainage software) of 13m³ will be required.

3.4 Foul Water

Foul water generated by the proposed development will be collected in a piped system.

There is an existing Scottish Water combined sewer running beneath the site, as shown in Figure 3.2 and Appendix C. It is assumed that piped connections from the building to the combined sewer are currently in place. According to the WC Provision report by LOM Architecture and Design, the new toilets are retained in the existing position to facilitate servicing and access to existing risers, therefore, no additional connections/ change in the discharge point are proposed.

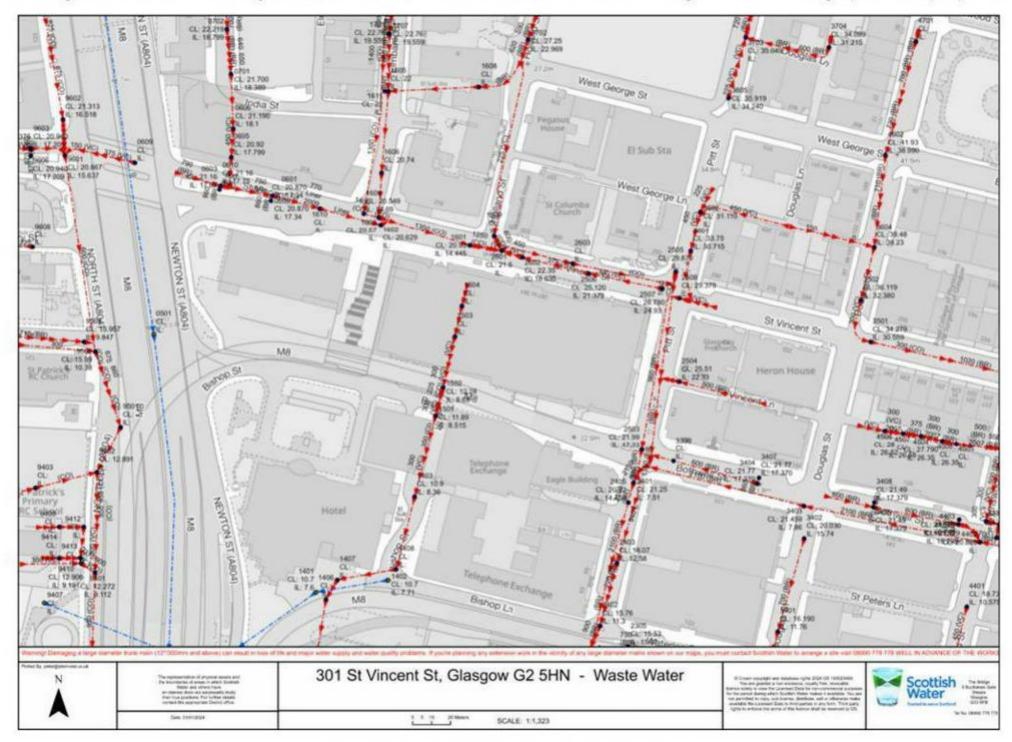


Figure 3.2 : Scottish Water - Waste Water Map Extract

3.5 Controlling Surface Water Pollution During Construction

Measures will need to be taken to control pollution during construction. A non-exhaustive list of activities to be considered and/or undertaken are listed below.



- Appropriate storage of materials and plant during wet weather.
- Certain activities may need to be postponed during excessively wet conditions.
- Procedures for delivery ensure vehicles transporting loose materials are covered.
- Procedures for oil spillages and clean-up.
- All plant and machinery regularly inspected for leaks and damages.
- Control of silty surface runoff as a result of the construction process.
- Temporary SuDS measures for construction stage prior to surface water discharge.
- Control measures specified to capture pollutants must be suitable for use in an urban environment which is constrained for space

The chosen contractor will be required to provide Risk Assessments & Method Statements (RAMS) to ensure that contaminated flows do not exit the site. Measures will also need to be taken to control drainage cross contamination of foul drainage construction and the chosen contractor will be required to submit detailed RAMS for review. Review of SEPA documents: Engineering in the Water Good Practice Guide; Temporary Construction Methods and Supporting Guidance (WAT-SG-75) Sector Specific Guidance: Construction Sites is recommended.

3.6 Operation and Maintenance

In accordance with the CIRIA SuDS manual, infiltration systems require regular maintenance. The following tables outline the operation and maintenance requirements for green roofs and flow controls as per the CIRIA SuDS Manual.

3.6.1 Green Roof

Table 3.1: Green Roof Operation and Maintenance Requirements

Maintenance Schedule	Required Action	Frequency
Regular inspections	Inspect all components including soil substrate, vegetation, drains, irrigation systems (if applicable) membranes and roof structure for proper operation, integrity of waterproofing and structural stability	Annually and after severe storms
	Inspect soil substrate for evidence of erosion channels and identify any sediment sources	Annually and after severe storms
	Inspect drain inlets to ensure unrestricted runoff from the drainage layer to the conveyance or roof drain system	Annually and after severe storms
	Inspect underside of roof for evidence of leakage	Annually and after severe storms
Regular maintenance	Remove debris and litter to prevent clogging of inlet drains and interface with plant growth	Six monthly and annually or as required
	During establishment (i.e. year one), replace dead plants as required	Monthly (but usually responsibility of manufacturer)
	Post establishment, replace dead plants as required (where >5% of coverage)	Annually (in Autumn)
	Remove fallen leaves and debris from deciduous plant foliage	Six monthly or as required



	Remove nuisance and invasive vegetation, including weeds	Six monthly or as required
	Mow grasses, prune shrubs and manage other planting (if appropriate) as requires – clippings should be removed and not allowed to accumulate	Six monthly or as required
Remedial actions	If erosion channels are evident, these should be stabilised with extra soil substrate similar to the original material, and sources of erosion damage should be identified and controlled	As required
	If drain inlet has settled, cracked or moved, investigate and repair as appropriate.	As required

Inspection and maintenance of the green/brown roofs on the site should also be in line with Section 4.2 of the Bird Hazard Management Plan (Ramboll Environ Doc ref: UK12-22252_BHMP) for the site in order to ensure the SuDS feature is not attracting birds to the local area.



4.0

Pre and Post Development Flows



4.0 Pre and Post Development Flows

4.1 Foul – Pre-Development Flow

The pre-development foul discharge was calculated based on the population number provided in the WC Provision report by LOM architecture and design. As the population is greater than 1000, a reference has been made to BSRIA Rules of Thumb guidelines for building services as the Flows and Loads 4 only serves up to 1000 population.

Table 4.1 : Foul - Pre-Development Flows Summary

Туре	Flow / Persons (I/day)	Persons	Total Flow / Day (I/day)	Average Flow (I/s)	2.5 x DWF (l/s)
Office with Canteen	45	2,329	104,805	1.213	3.03

Total	3.03 l/s	

4.2 Surface Water – Pre-Development Flow

A summary of the pre-development flows for the existing site have been calculated and can be found in Table 4.2. Calculations have been made in accordance with 'BS EN 752-4:2008 Drain and sewer systems outside buildings.

Table 4.2 : Surface Water - Pre-Development Flows Summary

Area	Catchment (m²)	Runoff Coefficient	Rainfall Intensity (mm/hr)	Discharge (I/s)	Total Discharge (I/s)
Permeable	3354	0.1	25.7	2.4	2.4
Impermeable	5746	1	25.7	41.0	41.0

Total 43.40 l/s	Total	43.40 l/s	
-----------------	-------	-----------	--

4.3 Foul – Post Development Flow

The previous use of the building suggests that the current continual occupancy rate is higher than that proposed for the new development. The office facilities and conference centre in a the post-covid environment are expected to be subject to lighter use. Although there is a proposed increase in WC provision and an increase on the number of showers, it is expected that detailed calculation at the next stage of development will show that that flow is not significantly altered.

A Pre-development Enquiry will be submitted to Scottish Water if required.



4.4 Surface Water – Post Development Flow

Table 4.3 : Summary of Surface Water - Post-Development Flows Summary

Area	Catchment (m²)	Runoff Coefficient	Rainfall Intensity (mm/ hr)	Discharge (l/s)	Total Discharge (I/s)
Permeable	3,136	0.1	25.7	2.2	2.2
Impermeable	5,964	1	25.7	42.6	42.6
				Total	44.8 l/s

The post-development surface water flows be restricted to existing runoff rates, as required by Glasgow City Council requirements. The approximate total increase in the impermeable area is 218m².

4.5 Discharge Points

The discharge points of surface water will be the existing discharge points from the existing (and maintained) green roofs, since the proposed management plan suggests draining surface water from the hard landscaping areas to the existing soft landscaping areas, assuming that a surface water drainage system is already in place.

Since the total post-development foul water flow is less than the pre-development one, and the new toilet blocks are proposed in the same position as the existing ones, there will be no changes to the current foul system discharge points.



5.0

Summary



5.0 Summary

The site is at located at 301 St Vincent St, Glasgow G2 5HN and comprises an existing building of three cores (east, central, and west) used by Santander Bank.

The current proposals indicate a modest increase in the combined area of hard landscaping in the courtyards and impermeable roof. The proposed WC provision by LOM Architecture and Design indicates an increase in population, although lighter building use combined with modern low-volume flush toilets are expected to result in similar foul flows.

Green and blue roofs will be used to treat, attenuate, and manage flowrates within the site. It is suggested that the new hard landscaping areas should be designed with a gentle slope to direct the surface water runoff towards the adjacent green roof areas for treatment, assuming that the existing green roofs has an appropriate drainage network in place. The blue roof will be designed to accommodate the additional flow volume resulted from the increase in hard landscaping.

Attenuation will be designed for up to and including the 1 in 200-year flood event including an allowance for 41% climate change.

Surface water runoff from the site will be restricted to ensure that there are no increases in runoff from the proposed change of use.



6.0

Appendices



6.0 Appendices



Appendix A - Site Location

1031836 A4 Malmaison 21 West George Street



Crown Copyright Licence No. 100022432

Approximate centre of the site at

NGR: NS 58188 65564

Nearest Postcode G2 5HN

301 St Vincent Street, Project:

Glasgow

Osborne + Co Client:

LOM Architecture and Architect:

Design

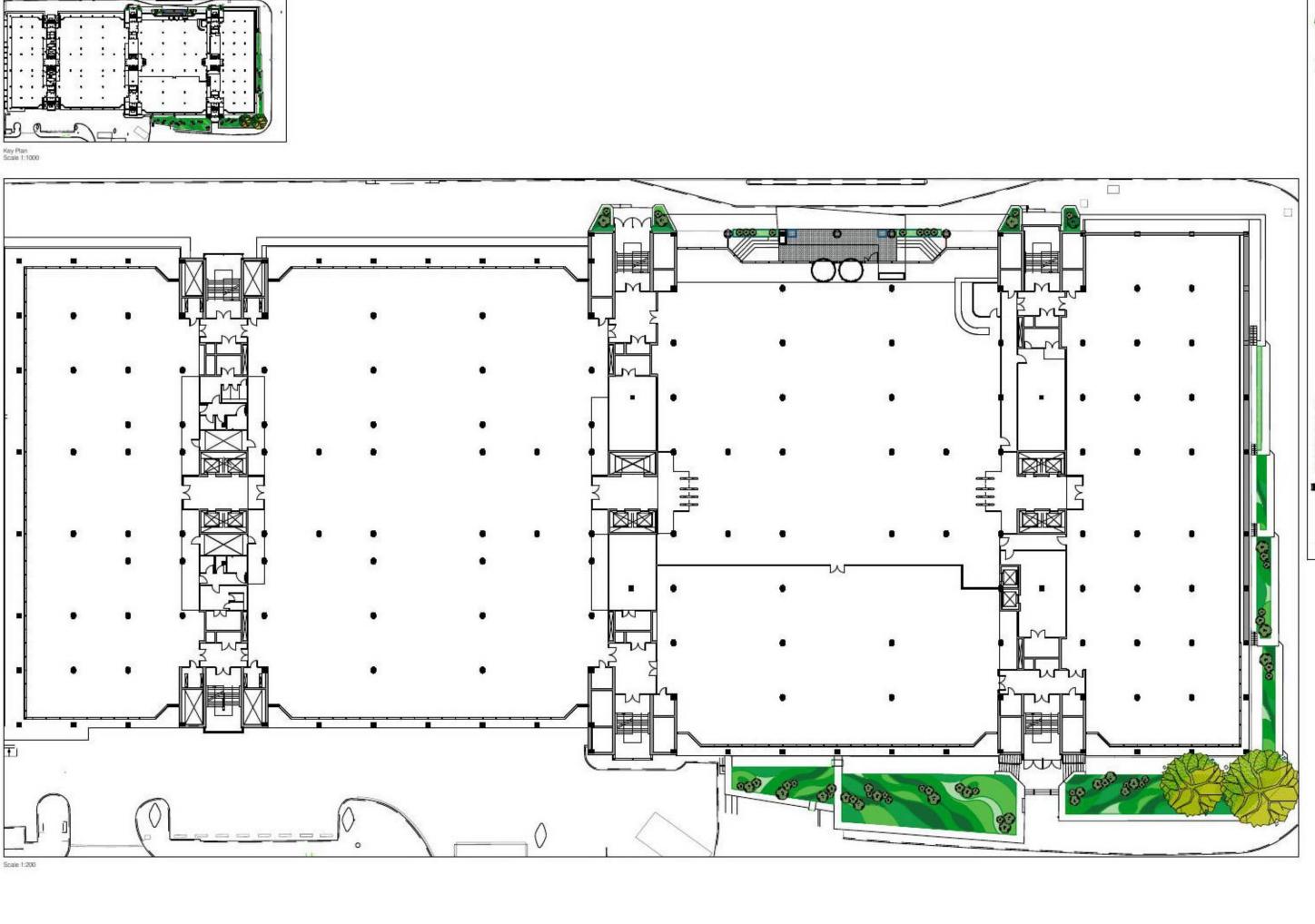
Title			Scale	NTS
	Location Plan		Date	07/02/24
			Drawn	AZ
Stage	Drawing No.	Rev.	Checked	RT
-	Figure 1	-		

Consulting Engineers

Exchange Place 1, Semple Street, Edinburgh, EH3 8BL



Appendix B - Proposed Development Plan (Extract)



Legend: Soft Landaca

Existing vegetation to retain





Light Grey Paving Flags or Existing Paving retained subject to further analysis and autability assessment

Gravel Trim

Existing concrete egding - 600mm height
Proposed metal egding - 450mm height
Proposed metal egding - 150mm height

murray & associates landscape architecture

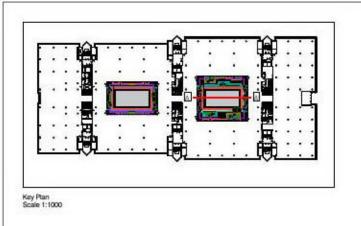
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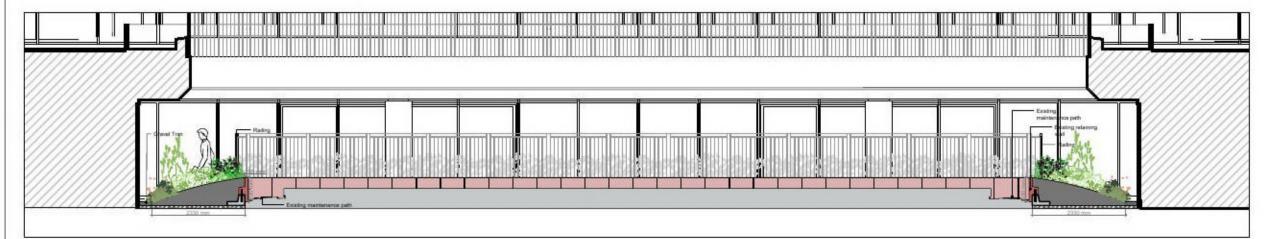
Osborne + OO on behalf of Santander

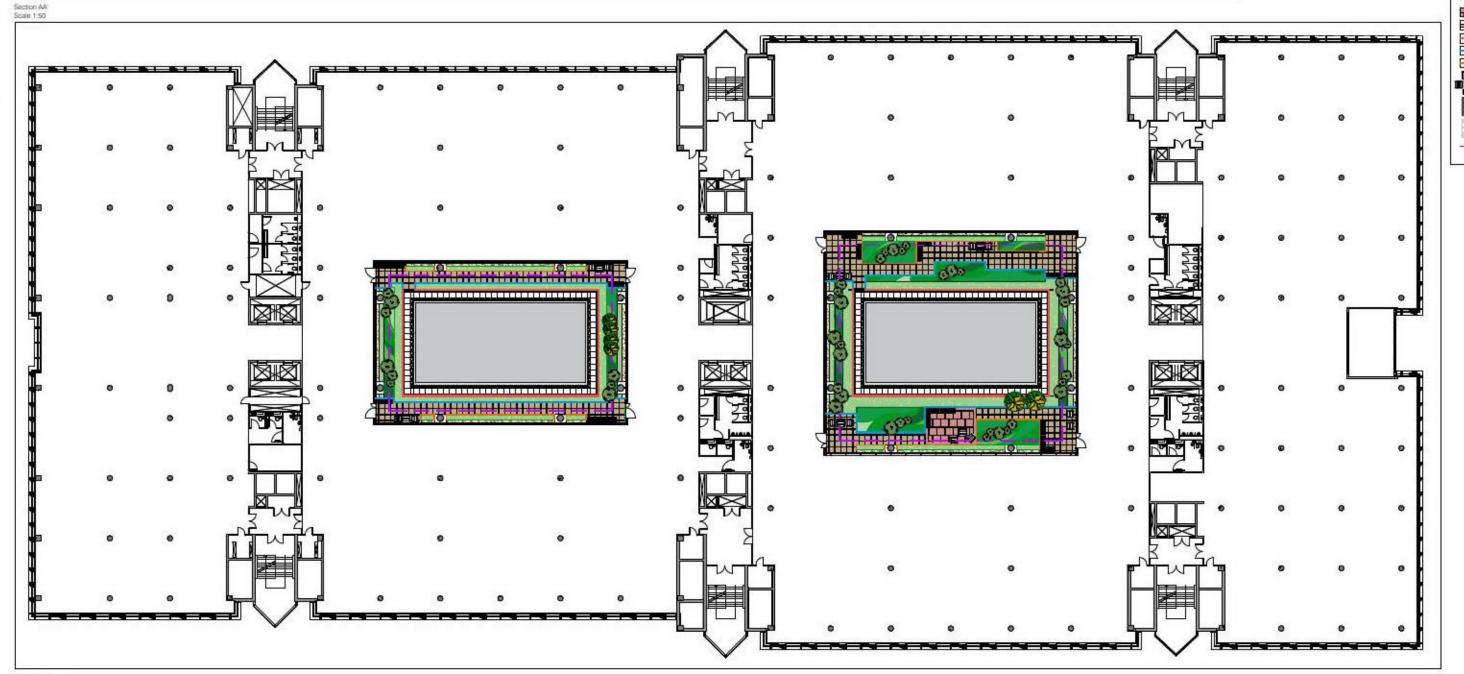
301 St Vincent Street

Landscape Plan - Ground Level

1918_91_9_01	A1
As Shown	Ä
Planning	05/03/24







Legend: Soft Landscape



Existing vegetation to retain



TreesSpecimen Shrubs

#is aquifolium **. Corylus aveillara**. Beilula jacquientonisi.
Plannifa pensios, Vibunum opulus **

Veregata**

Ornamental Pollinator Planting

- <u>Strutus</u> - Cornus sungavess*, Marianto aquifolium*,
Lavandula anguerisia "Hidoshi", Sancoccus hoskamine
ser hockerisani "Ghosperia",
- <u>Peartraph</u> - Echtracea purpures "White Sweri", Echtracea
bannatics*, Beggeria purpures "White Sweri", Echtracea
bannatics*, Beggeria purpures "White Sweri", Echtracea
hannatics "A Beggeria purpures", Melahabanati Mariahami Mariahami Mariahami Basariaha
Canocheri", Aquilegia sulgaris*, Eupsterium Stroobell*,
Eupsterium Chacooles*, "Ne Deel Around Midnight*,
Antarria reago: "Pels Pride"

Other Ornamental Planting

- <u>Personals</u> - <u>Africanthus sinenate "Saver Charm"</u>, Libertia granditus, Mosés Hands Lip", Mosés Hant Blush¹, Salvie Little Spire", Asther Cappuscher¹, Artible Vision Volcano¹, Ophiopogon planticopuse

Sensory Planting

- <u>Strutus</u> - Heistripsum delicum, Levendule angueldoler, Romannus officiales Mes Jesseph Upriphi, Postroutus Antonius Administrativo, Fostroutum vulgarer, Selve verbenaca, Tubaghie violense.

NOTE: All planting indicative and to be reviewed at a further and more detailed alage.

Light Grey Paving Flags or Existing Paving retained subject to further analysis and autability someoment

Feature Paving Gravel Trem

Proposed metal egding - 450mm height

Proposed metal egding - 150mm height

Pergola on feature paving area

Overhang - Please rafer to Architects drawings for details and specifications

murray & associates

landscape architecture

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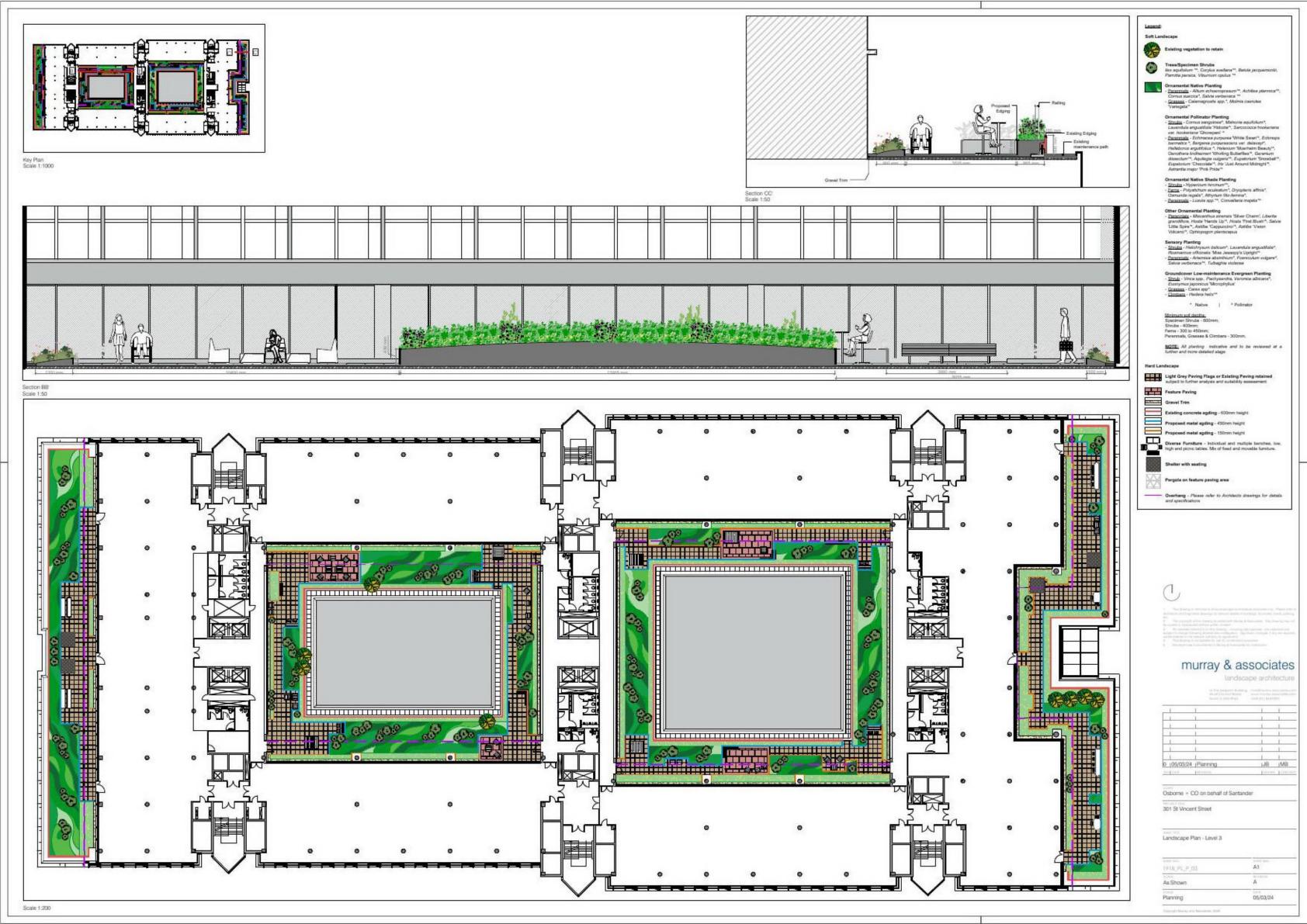
Osborne + CO on behalf of Santander

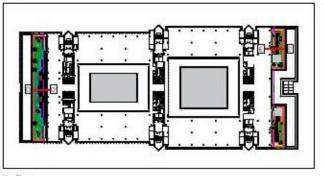
301 St Vincent Street

Landscape Plan - Level 2

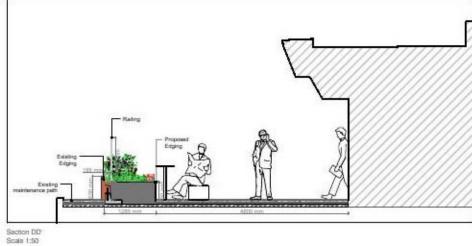
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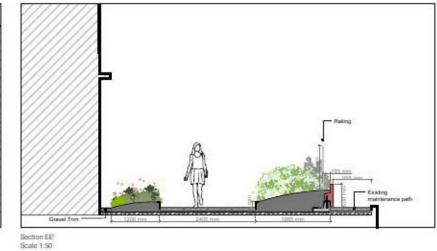
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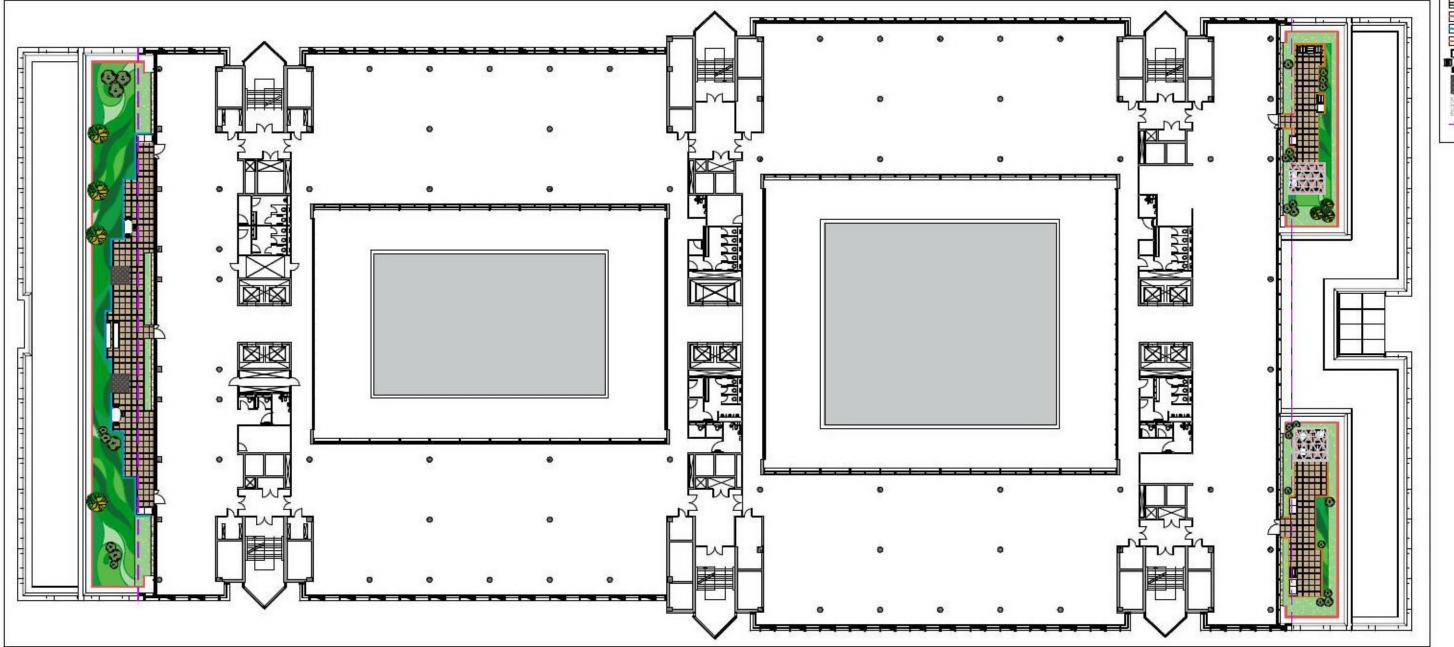




Key Plan Scale 1:1000







Legend:

Soft Landscap



Existing vegetation to retain



Light Grey Paving Flags or Existing Paving retained subject to further analysis and autability someoment

Gravel Trim

Existing concrete egding - 600mm height
Proposed metal egding - 450mm height
Proposed metal egding - 150mm height

Pergola on feature paving area

murray & associates

landscape architecture

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Osborne + CO on behalf of Santander

301 St Vincent Street

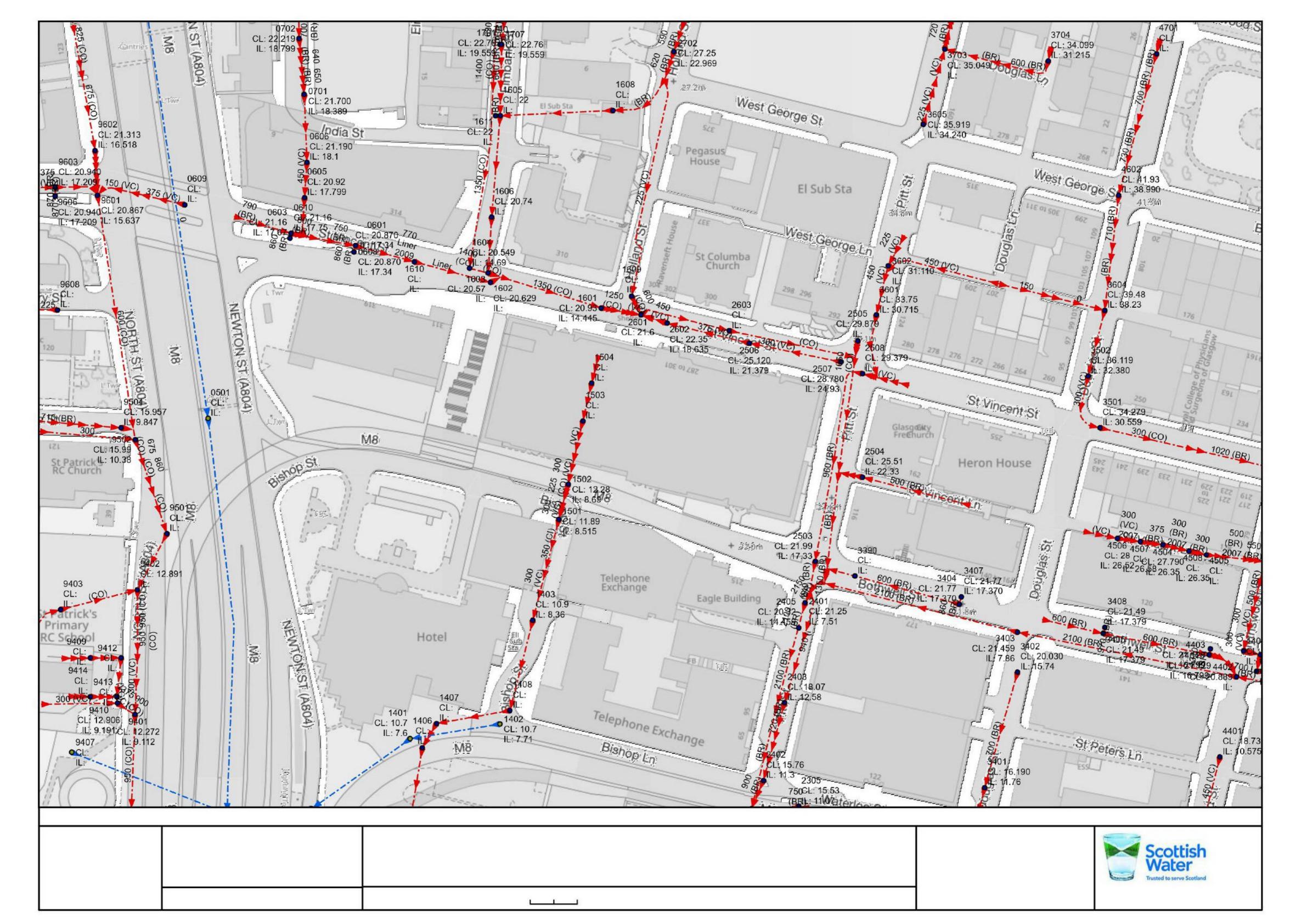
Landscape Plan - Level 4

A1 1918_PL_P_04 As Shown Planning 05/03/24

Scale 1:200

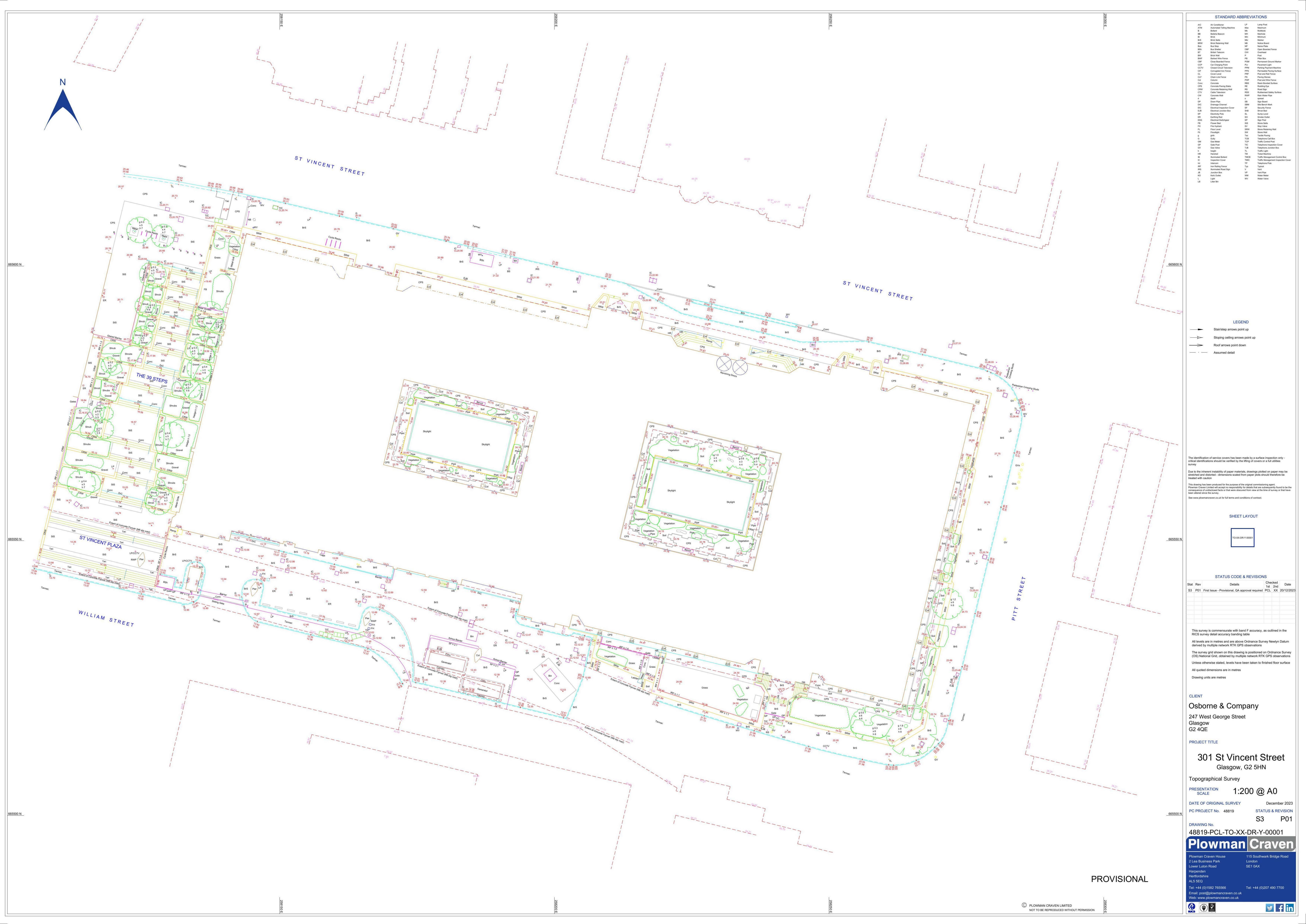


Appendix C - Scottish Water - Waste Water Map Extract





Appendix D - Topographical Survey





Appendix E - Greenfield Runoff Estimation



Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Ammar Zaza
Site name:	301 St Vincent Street, Glasgow
Site location:	Glasgow

Site Details

55.86226° N Latitude: 4.2673° W Longitude:

This is an estimation of the greenfield runoff rates that are used to meet normal best practice Reference: 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.

Feb 07 2024 17:02

2869381256

Runoff estimation approach

IH124

Site characteristics

Total site area (ha):

Methodology

Q_{BAR} estimation method:

SPR estimation method:

Calculate from SPR and SAAR

Calculate from SOIL type

Notes

(1) Is $Q_{BAR} < 2.0 \text{ I/s/ha}$?

Date:

When QBAR is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

Soil characteristics

Default Edited

SOIL type:

HOST class:

SPR/SPRHOST:

4	4
N/A	N/A
0.47	0.47

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

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.

Hydrological characteristics

SAAR (mm):

Hydrological region:

Growth curve factor 1 year.

Growth curve factor 30 years:

Growth curve factor 100 years:

Growth curve factor 200 years:

Default Edited 990 990 2 2 0.87 0.87 1.95 1.95 2.63 2.63 2.99 2.99

(3) Is $SPR/SPRHOST \le 0.3$?

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

Q _{BAR} (I/s	s):	6.59	6.59
1 in 1 ye	ar (l/s):	5.73	5.73
1 in 30 y	ears (I/s):	12.85	12.85
1 in 100	year (l/s):	17.33	17.33
1 in 200	years (I/s):	19.71	19.71

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

