

## Report

Flood Risk Assessment & Surface Water Drainage Strategy

Sceaux Gardens, Camberwell, Southwark, London

Sweco UK Limited North Kiln, Felaw Maltings 46 Felaw Street Ipswich, IP2 8PN +44 1473 231 100



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## Status / Revisions

Rev.	Date	Reason for issue	Prepared	Reviewed	Approved
[1]	13.05.21	First Issue	Beverley Hunter	James Calvert	JRC

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Reg. Office Address: Sweco UK Limited Grove House Mansion Gate Drive Leeds, LS7 4DN +44 113 262 0000 Reg. No.: Reg. Office: Sweco UK Limited North Kiln, Felaw Maltings 46 Felaw Street Ipswich, IP2 8PN +44 1473 231 100 Beverley Hunter

+44 1473 231 100

beverley.hunter@sweco.co.uk



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### 1 Introduction

Sweco UK Ltd has been appointed by London Borough of Southwark to undertake a Flood Risk Assessment & Surface Water Drainage Strategy report for the proposed residential re-development at Sceaux Gardens, Camberwell, Southwark, London SE5 7DJ.

This report has been prepared for the sole use of London Borough of Southwark and the contents should not be relied upon by others without the express written authority of Sweco. If any unauthorised third party makes use of this report they do so at their own risk and Sweco owes them no duty of care or skill.

This report has been completed in accordance with the National Planning Policy Framework (NPPF) and its accompanying Planning Practice Guidance (PPG), and also takes into account the Department for Environment, Food and Rural Affairs (DEFRA) publication *Sustainable Drainage Systems Non-statutory technical standards for sustainable drainage systems* dated March 2015 and the London Plan policies SI 12 & SI 13. The report is an assessment of flood risk to the development, from on and off-site sources, and to off-site receptors caused by the re-development of the site. This report includes a SuDS assessment for the site, which sets out how the proposals will not increase off-site flood risk.

The site is shown on the Environment Agency (EA) *Flood map for planning* (see Figure 1) to lie in Flood Zone 1 (low risk). Flood Zone 1 is the area described as having less than a 0.1% annual probability of fluvial or tidal flooding. All land uses are appropriate in this flood zone.



Figure 1 - EA Flood map for planning



The Sequential Test, the aim of which is to steer new development to the areas with the lowest probability of flooding, is met; the Exception Test is not required as the site is located within Flood Zone 1.

This report concludes that in flood risk context, the proposals are safe and appropriate and do not cause increased flood risk; instead the proposals should result in reduced flood risk.



### 2 Site Description

#### 2.1 Existing site

The site comprises three buildings which are located within a predominantly residential area of the London Borough of Southwark. The site is centred on approximate Ordnance Survey (OS) grid reference 533397,176845 and the extent of the buildings extends to approximately 0.51 hectares.

The three buildings surround Sceaux Gardens and consist of 'Florian' to the north (Site 1), 'Racine' to the south (Site 2) and the Garage Site (Site 3) to the east. Sites 1 and 2 comprise existing residential development. Site 3 comprises single storey garages and is located to the east beyond the multi-storey residential block 'Marie Curie' which is located directly to the east of Sceaux Gardens.

Sceaux Gardens provides and established public open space in the centre of the development. The sites are surrounded by a range of residential development.

The existing site classification is 'More Vulnerable' in accordance with *Table 2: Flood Risk Vulnerability Classification* of the PPG.

#### 2.2 Hydrology

The nearest watercourse is the River Thames which lies approximately 3.5 kilometres (km) to the north and north-west of the site.

#### 2.3 Topography

A topographical survey of the site (see Appendix A) shows ground levels around Site 1 of circa 4.20 metres Above Ordnance Datum (mAOD). Ground levels around Site 2 are circa 4.4 mAOD and ground levels at Site 3 are circa 4.0 mAOD. A review of OS mapping shows land to generally fall from south to north.

As all of the sites are currently developed they are generally flat or have shallow surface gradients.

#### 2.4 Geology

British Geological Survey (BGS) mapping shows the site as being underlain by Interglacial Lacustrine Deposits (Clay and Silt) with a bedrock geology of Lambeth Group (Clay, Silt and Sand).



#### 2.5 Proposed site

It is proposed to demolish the existing buildings. The proposals are to then re-develop the site and create new residential units in a number of multi-storey blocks. The proposed site plan is included within the Appendix A.

The proposed site use classification is 'More Vulnerable' in accordance with *Table 2: Flood Risk Vulnerability Classification* of the PPG. As the site is located in Flood Zone 1 the proposed development is shown to be appropriate in accordance with *Table 3: Flood risk vulnerability and flood zone 'compatibility'* of the PPG and no Sequential Test (or Exception Test) is required.



### 3 Flood Risk

The NPPF requires flood risk from the following sources to be assessed:

- Fluvial sources (river flooding);
- Tidal sources (flooding from the sea);
- Pluvial sources (flooding resulting from overland flows);
- Groundwater sources;
- Artificial sources, canals, reservoirs etc, and;
- Increased surface water discharge.

Each of the sources are addressed separately below.

#### 3.1 Tidal and fluvial

Tidal flooding is typically the result of extreme tidal conditions caused by severe weather which may cause a storm surge where water is pushed onshore through elements such as high winds and storms. Fluvial flooding occurs when excessive rainfall over an extended period, flash downpours or heavy snow melt causes a river to exceed its capacity.

The site is shown on the EA *Flood map for planning* (see Figure 1 above) to lie in the low probability flood zone (Flood Zone 1). The *Extent of flooding from rivers or the sea* map (see Figure 2) also shows that the site is not in an area at risk of flooding from these sources.



Figure 2 - EA Extent of flooding from rivers or the sea



The nearest watercourse is the River Thames which lies approximately 3.5 kilometres (km) to the north and north-west of the site.

The site is not at any significant risk of flooding from a tidal or fluvial source.

#### 3.2 Pluvial

There is always a potential risk of surface water flooding from very high intensity rainfall events exceeding the capacity of drainage systems and causing flooding, especially in urban areas. Surface water run-off can be channelled either by natural features such as valley lines or by artificial features such as highways, to low points in the topography. If surface water is not able to flow away from the low points then pluvial flooding can occur.

Land to the south of the site lies at a higher elevation and as such has the potential to shed water in the direction of the site. Due to the urbanised nature of the land to the south, surface water is most likely to be intercepted by the highway drainage systems and other private drainage before reaching the site. Land to the north, east and west of the site lies at a similar elevation or lower than the site and therefore should not pose a flood risk to the site.

The GOV.UK *Extent of flooding from surface water* map (see Figure 3) shows the site to be at a very low risk of flooding from surface water.



Figure 3 – Extent of flooding from surface water map

Finished floor levels should adhere to normal good practice and be set above surrounding ground level with slopes away from buildings which should prevent any minor localised ponding or overland surface flow from entering the development.



#### 3.3 Infrastructure flooding

The closest sewer shown on the Thames Water (TW) sewer records (see Appendix B) is in Dalwood Street, north of the site. No connections are shown from the site, however, it is assumed that the on-site drainage network would discharge into this TW combined sewer.

If surcharging or blockage of the sewers/drains on or off site did occur it is possible that there may be localised surface flooding in areas surrounding the site. Raising ground levels above existing would help to mitigate against this low risk.

The site is considered to be at low risk of flooding from this source.

#### 3.4 Water bodies

There is a lake located in Burgess Park approximately 1 km to the north of the site. This is at a lower elevation than that of the site and as such should not pose a flood risk to the site.

There are no other significant water bodies (lakes, large ponds, reservoirs etc.) within the immediate vicinity of the site that appear likely to pose a risk to the site.

The GOV.UK *Extent of flooding* map (see Figure 4) shows that the site is not at risk of flooding from reservoir failure.

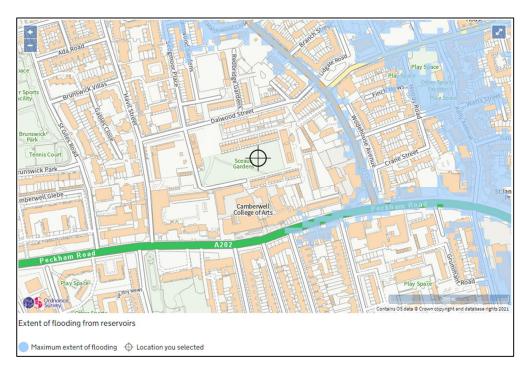


Figure 4 – Extent of flooding from reservoirs

The site is considered to be at low risk of flooding from this source.



#### 3.5 Groundwater

BGS mapping shows the site as being underlain by Interglacial Lacustrine Deposits (Clay and Silt) with a bedrock geology of Lambeth Group (Clay, Silt and Sand). It is considered unlikely that surface water would rise within these soils and express at the surface. If any groundwater did express at the surface it would be routed away from the development as described above.

The site is not located in a Groundwater Source Protection Sone nor is it underlain by an aquifer.

The site is not considered to be at significant risk of flooding from groundwater.

#### 3.6 Increased surface water discharge

The proposed development will decrease the impermeable area at the site which in turn would decrease surface water run-off generated by the site, however, surface water run-off should still be managed in order to not increase off-site flood risk. Surface water run-off from the site will be collected and attenuated on-site prior to discharge to the adjacent sewer which will provide betterment on the existing regime. See Section 4 for further information on the surface water drainage strategy.

The site is not considered to be at significant risk of flooding from surface water run-off generated on site.

#### 3.7 Flood risk summary

The site is considered to be at a low risk of flooding from all sources.



## 4 Surface Water Drainage Strategy

#### 4.1 Existing surface water drainage

It is currently assumed that all existing drainage from the existing buildings and hardstandings is drained via a private drainage networks and ultimately discharges to the TW sewer in Dalwood Street to the north.

The existing site is brownfield land with an impermeable area of approximately 0.388 ha. The existing surface water run-off rate has been calculated using the Modified Rational Method (see Brownfield Calculations in Appendix D) and are based on the existing impermeable areas of the three sites of development. The pre-development discharge rates are summarised in Table 1 below.

AEP Event	Brownfield Discharge Rate (I/s)				
	Site 1 (0.156ha)	Site 2 (0.128ha)	Site 3 (0.104ha)		
100%	16.5	13.5	11.0		
3.3%	40.5	33.2	27.0		
1%	52.6	43.2	35.1		

Table 1 - Brownfield rates

AEP = Annual Exceedance Probability

Due to the introduction of gardens / landscaped areas there will be a reduction in impermeable area.

#### 4.2 Proposed surface water drainage

The proposed development will decrease the impermeable area at the site which in turn would decrease surface water run-off generated by the site, however, surface water run-off should still be managed in order to not increase off-site flood risk and comply with planning requirements. The proposed impermeable area is approximately 0.256 ha.

The SuDS hierarchy requires that surface water run-off is controlled and preferably reused wherever possible. In the event that it cannot be re-used it should be disposed of to a receptor in the order described in Building Regulations Part H and the CIRIA publication *The SuDS Manual 2015* (C753):

- via infiltration,
- to watercourse, and finally,
- to sewers.



#### 4.2.1 Infiltration

The underlying geology of clay does not offer an opportunity to utilise infiltration features

#### 4.2.2 Watercourse

There are no watercourses in the vicinity of the site which are suitable for the discharge of surface water from the proposed development.

#### 4.2.3 <u>Sewer</u>

It is proposed to discharge surface water to the TW sewer located in Dalwood Street as per the assumed existing regime.

#### 4.3 Proposed surface water drainage strategy

The proposals result in a reduction in impermeable area and as such the discharge rate and volume of discharge will be reduced when compared to the existing site.

Due to the similar footprints and locations of the existing and proposed buildings, it is proposed that the surface water generated from the development will re-use the existing pipe network and connections.

It is recommended that a full CCTV survey / drainage survey of the existing pipework is carried out to establish confirmed routes and conditions of existing pipework.

Whilst the reduction in impermeable area results in a betterment in discharge rates / discharge volumes over the current scenario this should, where feasible, be improved on even further. However, due to the requirement to re-use existing connections from the site, the scope to incorporate attenuation features is limited. Where feasible, underground attenuation should be incorporated into the drainage design for the site as follows.

Attenuation has been sized to provide at least a 50% betterment on the existing brownfield discharge rates for each site to manage the temporary run-off storage required for rainfall events up to and including the 1% AEP annual probability event inclusive of 40% climate change. It is proposed that the attenuation is to be provided using cellular attenuation crates below ground located in parking/hardstanding areas. The contributing areas, volumes of attenuation required and discharge rates for each Site are summarised in Table 2.



Site	Contributing area (ha)	Attenuation volume required (m3)	Discharge rate (I/s)
1	0.080	23	25
2	0.121	45	20
3	0.055	17	15

Table 2 – Proposed at	ttenuation volumes
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The potential for incorporating SUD's features (i.e. lined permeable paving) should be further investigated and taken into account during the detailed design phase.

#### 4.4 Surface water treatment

Table 3 (below) discusses types of SuDS (taken from C753) and whether they could be utilised at this site.

Table 3: SuDS site suitability

SuDS Component	Site Suitability	Comments				
Green roofs	$\checkmark$	Could be used subject to requirements for services etc.				
Soakaways	×	Ground conditions unlikely to be suitable.				
Rainwater harvesting systems	$\checkmark$	Could be utilised for W.C. flushing etc. to reduce the use of potable water for the development, subject to financial viability.				
Filter strips	X	Not suitable due to site layout.				
Filter trenches	×	Not suitable due to site layout.				
Infiltration trenches	×	Not suitable due to site layout and impermeable geology.				
Swales	×	Not suitable due to site layout.				
Bioretention	×	Not suitable due to space requirements.				
Pervious pavements	$\checkmark$	Could potentially be utilised in hardstanding areas to provide attenuation at sub-base.				
Geocellular systems	$\checkmark$	Proposed to provide temporary storage of surface water run-off.				
Infiltration basins	×	Not suitable due to site layout.				
Detention basins	X	Not suitable due to site layout.				
Ponds	×	Not suitable due to site layout.				
Proprietary device	$\checkmark$	Could be utilised for treatment requirements.				



Stormwater wetlands	X	Not suitable due to size of development and nature of ground.
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#### 4.5 SuDS management and maintenance

To ensure that the SuDS features remain optimised and fully functional during the life time of the development, thus preventing an increase in the flood risk both within the site and elsewhere, maintenance of the system is crucial across the short, medium and long term timescales. Once the full suite of SuDS features are designed into the site, a management and maintenance plan should be drawn up to ensure ongoing maintenance.



### 5 Conclusions

The proposed site is shown to lie in the low probability flood risk area (Flood Zone 1) according to the EA flood maps.

Other flood risks to the site have been assessed as low and the site is considered to be at low risk from all sources of flooding.

Due to the ground conditions not being suitable for infiltration and there being no suitable watercourse in the vicinity of the site to discharge surface water to, it is proposed to discharge surface water run-off from the site to the TW sewer following the existing regime. It is currently assumed the existing site discharges to the combined sewer in Dalwood Street and this connection should be re-utilised to serve the proposed site.

Where feasible, underground attenuation should be incorporated into the drainage design for the site to provide temporary storage of surface water to allow a lesser discharge rate from the site. Attenuation has been sized to provide at least a 50% betterment on the existing brownfield discharge rates for each site to manage the temporary run-off storage required for rainfall events up to and including the 1% AEP annual probability event inclusive of 40% climate change. It is proposed that the attenuation is to be provided using cellular attenuation crates below ground located in parking/hardstanding areas.

Further opportunities should be investigated to incorporate SuDS into the development where practicable. These can provide the benefits of slowing the discharge of surface water run-off, removal of pollutants from the run-off and providing ecological benefits to the development.

Careful thought should be given to the levels design on the site in accordance with normal good practice to ensure that there is no likely flooding caused by overland flow and that any overland flow is directed around buildings in the event of a failure to the piped drainage system.

The site is located in Flood Zone 1 and is suitable for re-residential development. Surface water will be attenuated on-site and discharged at a restricted rate providing betterment on the current regime and thus reducing flood risk off-site.



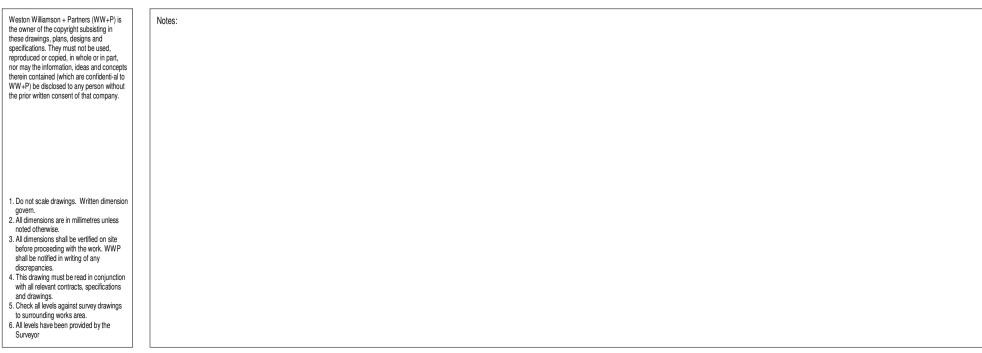
## Appendix A – Existing & Proposed Site

Site Block Plan

Topographical Survey

Proposed Site Plan





	Key Plan:	Architect:	
	Key Plan:	Anonitoot.	
		Westo	nWilliamson+Partners
		London Melbourne Sydney Toronto	12 Valentine Place London SE1 80H T: +44 (0)20 7401 8877 F: +44 (0)20 7401 8349 www.westonwilliamson.com
		Rev Date	Description



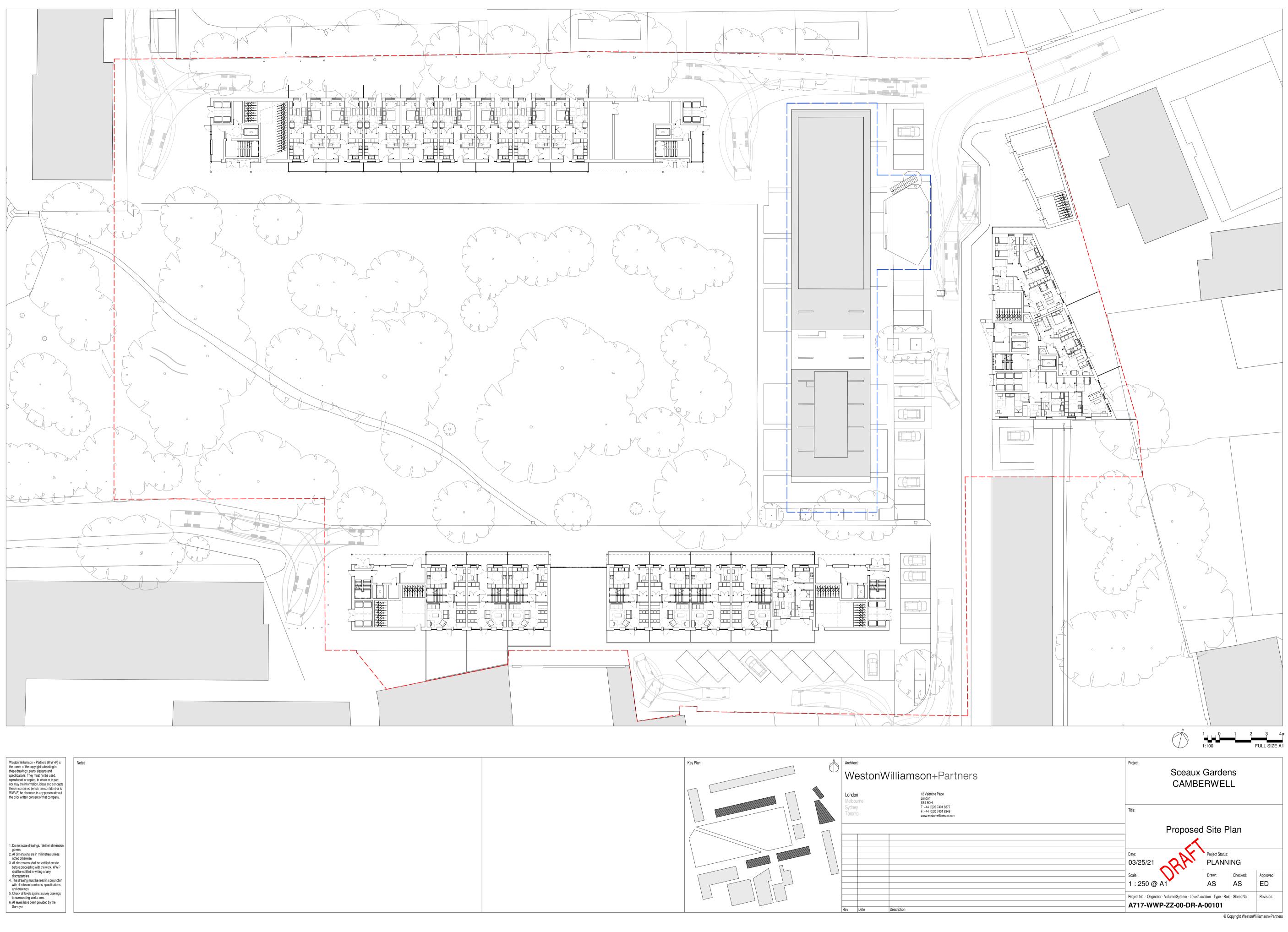
Sceaux Gardens Arboricultural Survey Overlay 1:500@A3







Camberwell WestonWilliamson+Partners





	Key Plan:	Architec		
		VVE	estonw	/illiamson+Partners
		Londor Melbou Sydney Toront	Irne	12 Valentine Place London SE1 8QH T: +44 (0)20 7401 8877 F: +44 (0)20 7401 8349 www.westonwilliamson.com
		Rev	Date	Description



### Appendix B – Sewer Records

Asset Location Search ref:ALS/ALS Standard/2017\_3487440



MLM Consulting Engineers Limited Felaw Maltings 46Felaw Street IPSWICH IP2 8PN

Search address supplied

Sceaux Gardens London SE5 7DL

Your reference	618331
Our reference	ALS/ALS Standard/2017_3487440

Search date 13 January 2017

#### Notification of Price Changes...

From **1 September 2016** Thames Water Property Searches will be increasing the prices of its Asset Location Searches. This will be the first price rise in three years and is in line with the RPI at 1.84%. The increase follows significant capital investment in improving our systems and infrastructure.

Enquiries received with a higher payment prior to 1 September 2016 will be non-refundable. For further details on the price increase please visit our website at

www.thameswater-propertysearches.co.uk





Search address supplied: Sceaux Gardens, London, SE5 7DL

Dear Sir / Madam

An Asset Location Search is recommended when undertaking a site development. It is essential to obtain information on the size and location of clean water and sewerage assets to safeguard against expensive damage and allow cost-effective service design.

The following records were searched in compiling this report: - the map of public sewers & the map of waterworks. Thames Water Utilities Ltd (TWUL) holds all of these.

This searchprovides maps showing the position, size of Thames Water assets close to the proposed development and also manhole cover and invert levels, where available.

Please note that none of the charges made for this report relate to the provision of Ordnance Survey mapping information. The replies contained in this letter are given following inspection of the public service records available to this company. No responsibility can be accepted for any error or omission in the replies.

You should be aware that the information contained on these plans is current only on the day that the plans are issued. The plans should only be used for the duration of the work that is being carried out at the present time. Under no circumstances should this data be copied or transmitted to parties other than those for whom the current work is being carried out.

Thames Water do update these service plans on a regular basis and failure to observe the above conditions could lead to damage arising to new or diverted services at a later date.

#### **Contact Us**

If you have any further queries regarding this enquiry please feel free to contact a member of the team on 0845 070 9148, or use the address below:

Thames Water Utilities Ltd Property Searches PO Box 3189 Slough SL1 4WW

Email: <u>searches@thameswater.co.uk</u> Web: <u>www.thameswater-propertysearches.co.uk</u>

<u>Thames Water Utilities Ltd</u>, Property Searches, PO Box 3189, Slough SL1 4W, DX 151280 Slough 13 T0845 070 9148<u>Esearches@thameswater.co.uk</u> I <u>www.thameswater-propertysearches.co.uk</u>



#### Waste Water Services

#### Please provide a copy extract from the public sewer map.

Enclosed is a map showing the approximate lines of our sewers. Our plans do not show sewer connections from individual properties or any sewers not owned by Thames Water unless specifically annotated otherwise. Records such as "private" pipework are in some cases available from the Building Control Department of the relevant Local Authority.

Where the Local Authority does not hold such plans it might be advisable to consult the property deeds for the site or contact neighbouring landowners.

This report relates only to sewerage apparatus of Thames Water Utilities Ltd, it does not disclose details of cables and or communications equipment that may be running through or around such apparatus.

The sewer level information contained in this response represents all of the level data available in our existing records. Should you require any further Information, please refer to the relevant section within the 'Further Contacts' page found later in this document.

For your guidance:

- The Company is not generally responsible for rivers, watercourses, ponds, culverts or highway drains. If any of these are shown on the copy extract they are shown for information only.
- Any private sewers or lateral drains which are indicated on the extract of the public sewer map as being subject to an agreement under Section 104 of the Water Industry Act 1991 are not an 'as constructed' record. It is recommended these details be checked with the developer.

#### Clean Water Services

#### Please provide a copy extract from the public water main map.

Enclosed is a map showing the approximate positions of our water mains and associated apparatus. Please note that records are not kept of the positions of individual domestic supplies.

For your information, there will be a pressure of at least 10m head at the outside stop valve. If you would like to know the static pressure, please contact our Customer Centre on 0800 316 9800. The Customer Centre can also arrange for a full flow and



pressure test to be carried out for a fee.

For your guidance:

- Assets other than vested water mains may be shown on the plan, for information only.
- If an extract of the public water main record is enclosed, this will show known public water mains in the vicinity of the property. It should be possible to estimate the likely length and route of any private water supply pipe connecting the property to the public water network.

#### Payment for this Search

A charge will be added to your suppliers account.



#### **Further contacts:**

#### Waste Water queries

Should you require verification of the invert levels of public sewers, by site measurement, you will need to approach the relevant Thames Water Area Network Office for permission to lift the appropriate covers. This permission will usually involve you completing a TWOSA form. For further information please contact our Customer Centre on Tel: 0845 920 0800. Alternatively, a survey can be arranged, for a fee, through our Customer Centre on the above number.

If you have any questions regarding sewer connections, budget estimates, diversions, building over issues or any other questions regarding operational issues please direct them to our service desk. Which can be contacted by writing to:

Developer Services (Waste Water) Thames Water Clearwater Court Vastern Road Reading RG1 8DB

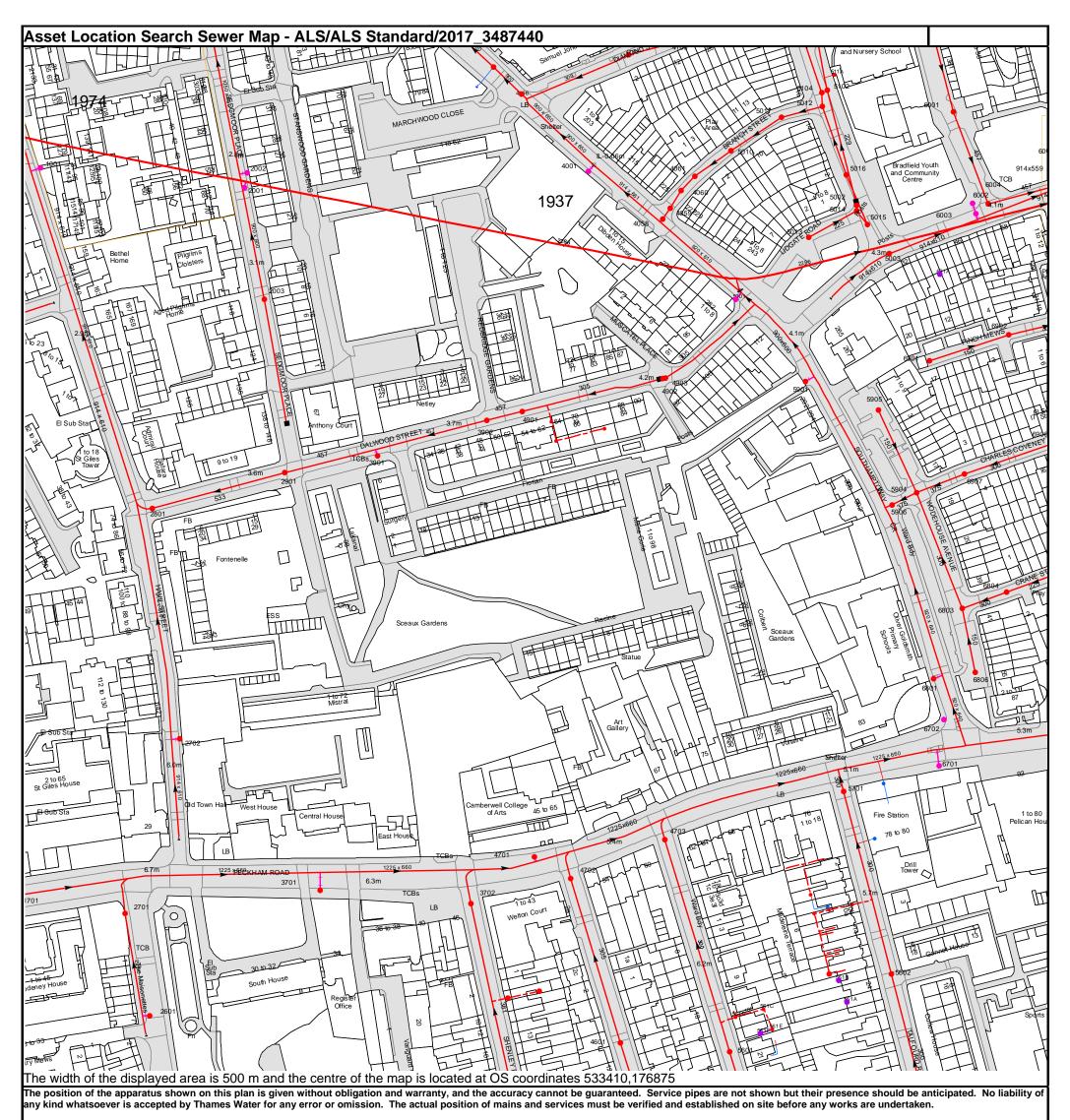
Tel: 0845 850 2777 Email: developer.services@thameswater.co.uk

#### **Clean Water queries**

Should you require any advice concerning clean water operational issues or clean water connections, please contact:

Developer Services (Clean Water) Thames Water Clearwater Court Vastern Road Reading RG1 8DB

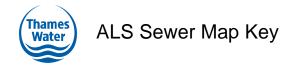
Tel: 0845 850 2777 Email: developer.services@thameswater.co.uk

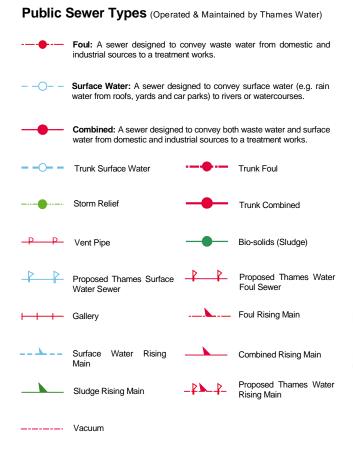


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Manhole Reference	Manhole Cover Level	Manhole Invert Level
5603	n/a	n/a
561B	n/a	n/a
5701	5.16	1.29
561A	n/a	n/a
5704	n/a	n/a
571C	n/a	n/a
571D	n/a	n/a
5602	6.23	2.37
6701	5.09	n/a
5905	4.4	3.43
5906	4.31	2.23
5904	3.78	2.55
6901	4.59	3.63
6801	4.71	n/a
601A	n/a	n/a
6702	n/a	n/a
6803	4.91	2.6
6907	4.51	2.45
6806	n/a	n/a
6804	4.91	2.69
6902	4.56	2.03
5015	n/a 4 27	n/a oo
5003	4.27	.99
6001	3.52	32
6002	n/a	n/a
6003	4.09	n/a
6004	4.03	57
4060	n/a	n/a
4061	n/a	n/a
5010	n/a	n/a
5011	n/a	n/a
5013	4.12	2.95
5104	n/a	n/a
5012	n/a	n/a
5102	3.77	.67
511A	n/a	n/a
5016	n/a	n/a
5014	4.27	2.81
5002	4	.97
5601	7.05	3.51
4601	7.12	3.9
561F	n/a	n/a
561E	n/a	n/a
561D	n/a	n/a
561C	n/a	n/a
3602	n/a	n/a
4602	n/a	n/a
5702	n/a	n/a
5703	n/a	n/a
5703 571A	n/a	n/a
3702	5.96	2.53
571B 3701	n/a 6.32	n/a
		n/a 2.4
4702	5.57	2.4
4701	5.38	n/a 2.26
4703	5.34	2.26
2901	3.5	.26
3901 401B	3.57	n/a
491B	n/a	n/a
491A	n/a	n/a
491C	n/a	n/a z
3902	3.68	.7
4901	3.76	.77
5901	3.95	n/a
4902	4.22	1.11
4903	4.22	1.11
2003	3.05	15
5001	3.804	.074
2001	2.6	n/a
2002	2.74	n/a
311A	n/a	732
4106	3.4	6
4001	3.39	n/a
4102	3.84	.67
4058	n/a	n/a
4059	n/a	n/a
2601	7.93	n/a
2701	6.91	3.91
2702	5.89	n/a
2801	3.71	.02
1001	2.51	n/a
The position of the apparatus shown on this pla	n is given without obligation and warranty, and the a	ccuracy cannot be guaranteed. Service pipes are not
shown but their presence should be anticipated.	o liability of any kind whatsoever is accepted by Tham	
of mains and services must be verified and establ	shed on site before any works are undertaken.	-





#### Sewer Fittings

A feature in a sewer that does not affect the flow in the pipe. Example: a vent is a fitting as the function of a vent is to release excess gas.

- Air Valve
  Dam Chase
- Fitting
  Meter

Meter

X

4

Ξ

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<u>\</u>-/

O Vent Column

#### **Operational Controls**

A feature in a sewer that changes or diverts the flow in the sewer. Example: A hydrobrake limits the flow passing downstream.

Control Valve Drop Pipe Ancillary

Outfall

Inlet

Undefined End

member of Property Insight on 0845 070 9148.

Weir

#### End Items

End symbols appear at the start or end of a sewer pipe. Examples: an Undefined End at the start of a sewer indicates that Thames Water has no knowledge of the position of the sewer upstream of that symbol, Outfall on a surface water sewer indicates that the pipe discharges into a stream or river.

6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in milimetres. Text next to a manhole indicates the manhole

reference number and should not be taken as a measurement. If you are

unsure about any text or symbology present on the plan, please contact a

#### **Other Symbols**

Symbols used on maps which do not fall under other general categories

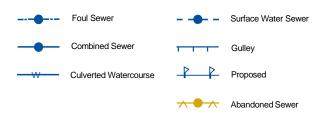
- ▲ / ▲ Public/Private Pumping Station
- \* Change of characteristic indicator (C.O.C.I.)
- Ø Invert Level
- Summit

#### Areas

Lines denoting areas of underground surveys, etc.

Agreement
Operational Site
Chamber
Tunnel
Conduit Bridge

#### Other Sewer Types (Not Operated or Maintained by Thames Water)



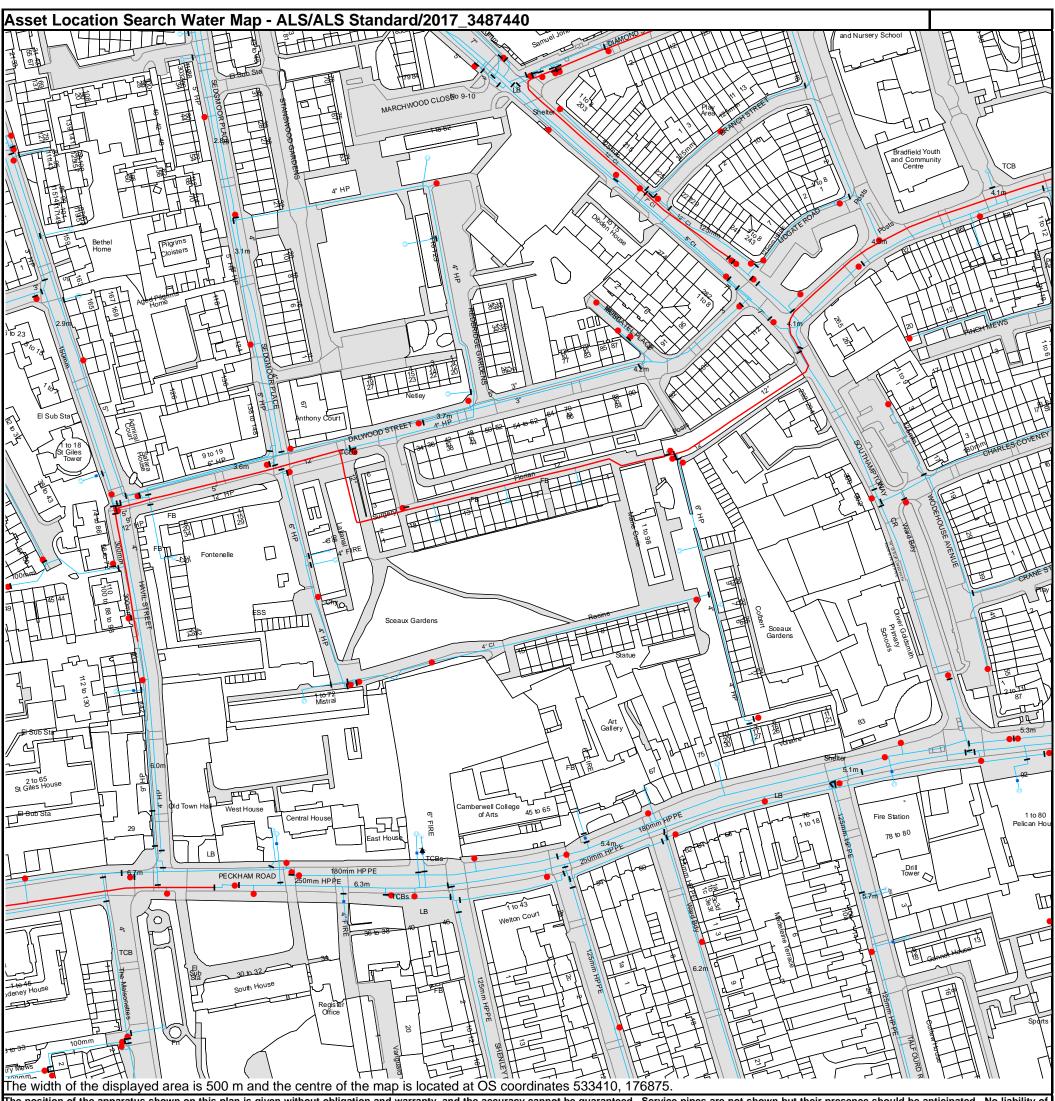
#### Notes:

1) All levels associated with the plans are to Ordnance Datum Newlyn.

2) All measurements on the plans are metric.

- Arrows (on gravity fed sewers) or flecks (on rising mains) indicate direction of flow.
- Most private pipes are not shown on our plans, as in the past, this information has not been recorded.
- 5) 'na' or '0' on a manhole level indicates that data is unavailable.

Thames Water Utilities Ltd, Property Searches, PO Box 3189, Slough SL1 4W, DX 151280 Slough 13 T 0845 070 9148 E searches@thameswater.co.uk I www.thameswater-propertysearches.co.uk



The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Based on the Ordnance Survey Map with the Sanction of the controller of H.M. Stationery Office, License no. 100019345 Crown Copyright Reserved.

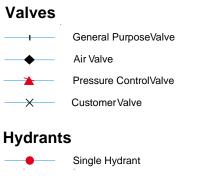


## ALS Water Map Key

#### Water Pipes (Operated & Maintained by Thames Water)

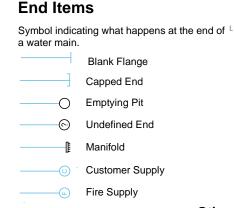
- Distribution Main: The most common pipe shown on water maps.
   With few exceptions, domestic connections are only made to distribution mains.
- Trunk Main: A main carrying water from a source of supply to a treatment plant or reservoir, or from one treatment plant or reservoir to another. Also a main transferring water in bulk to smaller water mains used for supplying individual customers.
- **Supply Main:** A supply main indicates that the water main is used as a supply for a single property or group of properties.
- FIRE Fire Main: Where a pipe is used as a fire supply, the word FIRE will be displayed along the pipe.
- **Metered Pipe:** A metered main indicates that the pipe in question supplies water for a single property or group of properties and that quantity of water passing through the pipe is metered even though there may be no meter symbol shown.
  - Transmission Tunnel: A very large diameter water pipe. Most tunnels are buried very deep underground. These pipes are not expected to affect the structural integrity of buildings shown on the map provided.
  - **Proposed Main:** A main that is still in the planning stages or in the process of being laid. More details of the proposed main and its reference number are generally included near the main.

PIPE DIAMETER	DEPTH BELOW GROUND		
Up to 300mm (12")	900mm (3')		
300mm - 600mm (12" - 24")	1100mm (3' 8")		
600mm and bigger (24" plus)	1200mm (4')		



## Meters

#### \_ \_ \_ \_



#### **Operational Sites**



#### **Other Symbols**

Data Logger

#### Other Water Pipes (Not Operated or Maintained by Thames Water)

 Other Water Company Main: Occasionally other water company water pipes may overlap the border of our clean water coverage area. These mains are denoted in purple and in most cases have the owner of the pipe displayed along them.

**Private Main:** Indiates that the water main in question is not owned by Thames Water. These mains normally have text associated with them indicating the diameter and owner of the pipe.

Thames Water Utilities Ltd, Property Searches, PO Box 3189, Slough SL1 4W, DX 151280 Slough 13 T 0845 070 9148 E searches@thameswater.co.uk I www.thameswater-propertysearches.co.uk

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- 4. Thames Water does not accept post-dated cheques-any cheques received will be processed for payment on date of receipt.
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- 7. Interest will be charged in line with current Court Interest Charges, if legal action is taken.
- 8. A charge may be made at the discretion of the company for increased administration costs.

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We publish several Codes of Practice including a guaranteed standards scheme. You can obtain copies of these leaflets by calling us on 0800 316 9800

If you are unhappy with our service you can speak to your original goods or customer service provider. If you are not satisfied with the response, your complaint will be reviewed by the Customer Services Director. You can write to him at: Thames Water Utilities Ltd. PO Box 492, Swindon, SN38 8TU.

If the Goods or Services covered by this invoice falls under the regulation of the 1991 Water Industry Act, and you remain dissatisfied you can refer your complaint to Consumer Council for Water on 0121 345 1000 or write to them at Consumer Council for Water, 1st Floor, Victoria Square House, Victoria Square, Birmingham, B2 4AJ.

Credit Card	BACS Payment	Telephone Banking	Cheque
Call <b>0845 070 9148</b> quoting your invoice number starting CBA or ADS.	Account number 90478703 Sort code 60-00-01 A remittance advice must be sent to: Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW. or email ps.billing@thameswater. co.uk	By calling your bank and quoting: Account number <b>90478703</b> Sort code <b>60-00-01</b> and your invoice number	Made payable to 'Thames Water Utilities Ltd' Write your Thames Water account number on the back. Send to: Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW or by DX to 151280 Slough 13

#### Ways to pay your bill

Thames Water Utilities Ltd Registered in England & Wales No. 2366661 Registered Office Clearwater Court, Vastern Rd, Reading, Berks, RG1 8DB.



#### Search Code

#### IMPORTANT CONSUMER PROTECTION INFORMATION

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#### The Search Code:

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  rely on the information included in property search reports undertaken by subscribers on residential
  and commercial property within the United Kingdom
- sets out minimum standards which firms compiling and selling search reports have to meet
- promotes the best practise and quality standards within the industry for the benefit of consumers and property professionals
- enables consumers and property professionals to have confidence in firms which subscribe to the code, their products and services.

By giving you this information, the search firm is confirming that they keep to the principles of the Code. This provides important protection for you.

#### The Code's core principles

Firms which subscribe to the Search Code will:

- display the Search Code logo prominently on their search reports
- act with integrity and carry out work with due skill, care and diligence
- at all times maintain adequate and appropriate insurance to protect consumers
- conduct business in an honest, fair and professional manner
- handle complaints speedily and fairly
- ensure that products and services comply with industry registration rules and standards and relevant laws
- monitor their compliance with the Code

#### Complaints

If you have a query or complaint about your search, you should raise it directly with the search firm, and if appropriate ask for any complaint to be considered under their formal internal complaints procedure. If you remain dissatisfied with the firm's final response, after your complaint has been formally considered, or if the firm has exceeded the response timescales, you may refer your complaint for consideration under The Property Ombudsman scheme (TPOs). The Ombudsman can award compensation of up to £5,000 to you if he finds that you have suffered actual loss as a result of your search provider failing to keep to the Code.

## Please note that all queries or complaints regarding your search should be directed to your search provider in the first instance, not to TPOs or to the PCCB.

#### **TPOs Contact Details**

The Property Ombudsman scheme Milford House 43-55 Milford Street Salisbury Wiltshire SP1 2BP Tel: 01722 333306 Fax: 01722 332296 Email: <u>admin@tpos.co.uk</u>

You can get more information about the PCCB from www.propertycodes.org.uk

#### PLEASE ASK YOUR SEARCH PROVIDER IF YOU WOULD LIKE A COPY OF THE SEARCH CODE



## Appendix C – Surface Water Drainage Strategy

Brownfield calculations

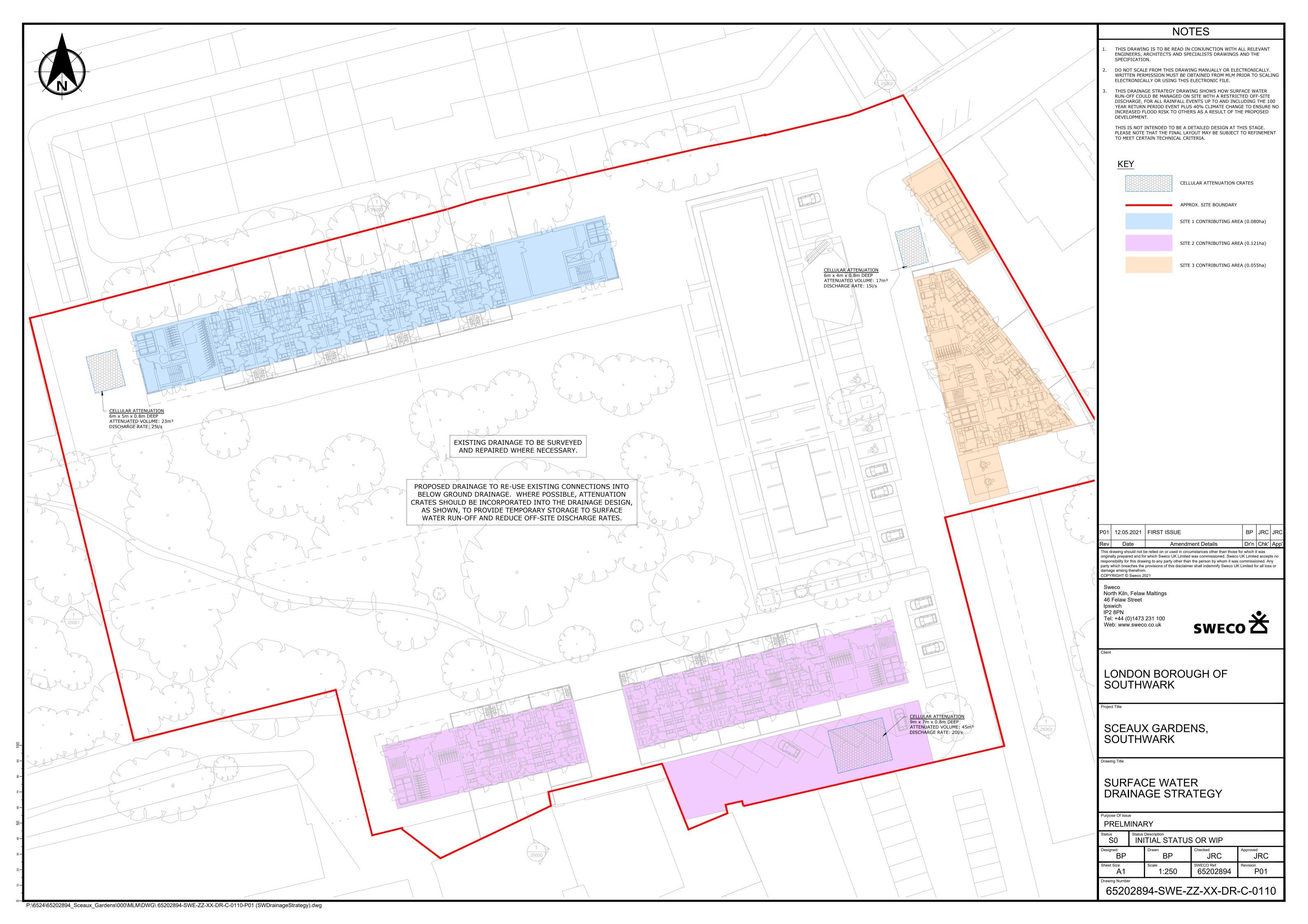
Sweco drawing 65202894-SWE-ZZ-XX-RP-C-0110 - Surface Water Drainage Strategy

Microdrainage calculations

		Project	Sceaux Garder	ns, London			Made BP	Ref	
SWECC	ъŽ	Section	Brownfield Rur	n-off - Site 1			Checked JRC	65202894 Sheet No.	
		Rev	Date Descri	ption		Made	Checked	1 of 3	
Ref.				Calculation	n			Output	
	1. Br	ownfield	Run-off Calcul	ation					
	Base	d on the	Modified Patic	nal Method th	e current discharge	rate from	the		
	Based on the Modified Rational Method the current discharge rate from the site for the 100%, 3.3% and 1% annual exceedance probability (AEP) events (1, 30 & 100 year) can be calculated as:								
	Q =	3.61 CiA							
			ic run-off co-ef	ficient	0.9	<i>.</i>			
		ainfall int Contribut	ensity ting Area		see below mm 0.156 ha	/ hr			
	Raint	fall intens	sity taken from	MicroDrainage	Rainfall Generator				
	100 3.3		32.561 79.949	mm / hr mm / hr					
	19		103.943	mm / hr					
	Disc	harge rat	Ъ.						
	100		16.503	/s					
	3.3	%	40.522	l/s					
	19	6	52.683	/s					

	~	Project	Sceaux Garc	lens, London			Made BP	Ref
SWECO	×	Section	Brownfield R	un-off - Site 2			Checked JRC	65202894
Junco		Rev	Date De 12.05.21	escription		Made	Checked	Sheet No. 3 of 3
Ref.		Calculation						
	1. Bro							
							41	
	Based on the Modified Rational Method the current discharge rate from the site for the 100%, 3.3% and 1% annual exceedance probability (AEP) events (1, 30 & 100 year) can be calculated as:							
	Q = 3	3.61 CiA						
			ic run-off co-	efficient	0.9			
		ainfall int Contribut	ensity ing Area		see below mi 0.128 ha			
	Rainf	all intens	sity taken from	m MicroDrainage	Rainfall Generato	or		
	100 3.39		32.561 79.949					
	1%		103.943					
	Disch	narge rat	e					
	100 3.3°		13.541 33.249					
	1%	0	43.227	l / s				

		Project	Sceaux Garde	ens, London			Made BP	Ref
SWECO	×	Section	Brownfield Ru	In-off - Site 3			Checked JRC	65202894
Junco		Rev	Date Des 12.05.21	cription		Made	Checked	Sheet No. 2 of 3
Ref.			12.03.21	Calculatio	n			Output
	1. Bro	ownfield	Run-off Calcı	ulation				
	Deee	-1					41	
	site f	or the 10	0%, 3.3% an		e current discharge eedance probabili as:		the	
	Q = 3	3.61 CiA						
			ic run-off co-e	efficient	0.9			
		ainfall int Contribut	ensity ing Area		see below mn 0.104 ha			
	Rainf	all intens	ity taken from	n MicroDrainage	Rainfall Generato	r		
	100 3.39		32.561 79.949	mm / hr mm / hr				
	3.3 1%		103.943					
	Diack	orgo rot	0					
		narge rat						
	100 3.39		11.002 27.014	/s  /s				
	1%		35.122	l/s				



Sweco UK			6==-					Page 1
Grove House			6520					
Mansion Gate Drive	2		Scea	ux Gar	dens, Lo	ndon		
Leeds LS7 4DN	SW A	ttenua	tion - S	ite 1		Micco		
Date 12/05/21		gned b				- Micro		
File 65202894-SWE-	-C		ked by	-			Drainad	
	JU AA-CA					0 1		
Innovyze			Sour	ce Con	trol 201	9.1		
Summar	<u>y of Res</u>	ults f	or 10	0 vear	Return	Period	(+40%	)
<u></u>						101104	( 100	<u>/_</u>
	E	Half Dr	ain Ti	me : 10	minutes.			
Storm	Max	Max	Ма		Max	Max	Max	Status
Event		-			Control $\Sigma$			
	(m)	(m)	(1/	s)	(1/s)	(l/s)	(m³)	
15 min Sum	mer 3.500	0.700		0.0	25.0	25.0	20.0	ОК
30 min Sum	mer 3.396	0.596		0.0	25.0	25.0	17.0	O K
60 min Sum	mer 3.198	0.398		0.0	25.0	25.0	11.3	0 K
120 min Sum	mer 3.018	0.218		0.0	24.0	24.0	6.2	O K
180 min Sum	mer 2.976	0.176		0.0	18.7	18.7	5.0	0 K
240 min Sum	mer 2.954	0.154		0.0	15.3	15.3	4.4	O K
360 min Sum	mer 2.927	0.127		0.0	11.3	11.3	3.6	O K
480 min Sum	mer 2.912	0.112		0.0	9.0	9.0	3.2	O K
600 min Sum	mer 2.901	0.101		0.0	7.6	7.6	2.9	O K
720 min Sum	mer 2.894	0.094		0.0	6.6	6.6	2.7	O K
960 min Sum	mer 2.883	0.083		0.0	5.3	5.3	2.4	O K
1440 min Sum	mer 2.870	0.070		0.0	3.8	3.8	2.0	O K
2160 min Sum	mer 2.859	0.059		0.0	2.8	2.8	1.7	O K
2880 min Sum	mer 2.852	0.052		0.0	2.2	2.2	1.5	O K
4320 min Sum	mer 2.843	0.043		0.0	1.5	1.5	1.2	O K
5760 min Sum	mer 2.838	0.038		0.0	1.2	1.2	1.1	O K
7200 min Sum	mer 2.834	0.034		0.0	1.0	1.0	1.0	O K
8640 min Sum	mer 2.832	0.032		0.0	0.8	0.8	0.9	0 K
10080 min Sum	mer 2.830	0.030		0.0	0.7	0.7	0.8	0 K
15 min Win	ter 3.597	0.797		0.0	25.0	25.0	22.7	ОК
	Storm		Rain		l Discharg			
	Event	(n	nm/hr)	Volume (m <sup>3</sup> )	Volume (m³)	(mins	5)	
						_		
	15 min Su			0.0			13	
	30 min Su			0.0			22	
	60 min Su		74.435	0.0			36	
	120 min Su		12.704	0.0			64	
	180 min Su		30.854	0.0			94	
	240 min Su		24.500	0.0			124	
	360 min Su		17.701	0.0			184	
	480 min Su		L4.056	0.0			246	
	600 min Su		L1.754	0.0			306	
	720 min Su		L0.155	0.0			366	
	960 min Su		8.069	0.0			486	
	440 min Su		5.834	0.0			734	
	160 min Su		4.219	0.0			088	
	880 min Su		3.352	0.0			468	
	320 min Su		2.349	0.0			148	
	760 min Su		1.826	0.0			936	
	200 min Su		1.501	0.0			648	
	640 min Su		1.280	0.0			328	
10	080 min Su		1.118	0.0			120	
10	080 min Sun 15 min Win			0.0 0.0			120 14	

weco UK rove House				6500	2894				Page 2
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ansion Gate	-					dens, L			
Leeds LS7 4DN						tion -	site 1		_ Micro
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File 65202894-SWE-ZZ-XX-CA-C					ked by				Dian
nnovyze				Sour	ce Con	trol 20	19.1		
S	ummary	of Ros	ulte	for 10	) vear	Return	Period	(+40%)	
<u>c</u>		JI Kes	uito.		<u>JU year</u>	Necuri	IEIIOU	(1100)	<u>_</u>
St	orm	Max	Max		ax	Max	Max	Max	Status
Ev	rent		-				E Outflow		
		(m)	(m)	(1,	/s)	(1/s)	(1/s)	(m³)	
30 m.	in Winter	3.452	0.652		0.0	25.0	25.0	18.6	ΟK
60 m.	in Winter	3.153	0.353		0.0	25.0	25.0	10.1	ΟK
	in Winter				0.0	19.5	19.5	5.2	0 K
	in Winter				0.0	14.3	14.3	4.2	ΟK
	in Winter				0.0	11.4	11.4	3.7	O K
	in Winter				0.0	8.3	8.3	3.0	ΟK
	in Winter				0.0	6.6	6.6	2.7	ΟK
	in Winter				0.0	5.6	5.6	2.4	ΟK
	in Winter				0.0	4.8	4.8	2.2	O K
	in Winter				0.0	3.8	3.8	2.0	ΟK
	in Winter				0.0	2.8	2.8	1.7	ΟK
	in Winter				0.0	2.0	2.0	1.4	O K
	in Winter				0.0	1.6	1.6	1.2	O K
	in Winter				0.0	1.1	1.1	1.0	O K
	in Winter				0.0	0.9	0.9	0.9	
	in Winter				0.0	0.7	0.7		ΟK
	in Winter				0.0	0.6	0.6		ΟK
10080 m.	in Winter	2.825	0.025		0.0	0.5	0.5	0.7	ΟK
		Storm		Rain			ge Time-P		
		Event	(1	mm/hr)	Volume (m³)	Volume (m³)	e (mins	3)	
		min Wi			0.0		.6	23	
		min Wi		74.435	0.0		.0	38	
		min Wi		42.704	0.0		.4	64	
		min Wi		30.854	0.0		.2	94	
		min Wi		24.500	0.0			124	
		min Wi		17.701	0.0			186	
		min Wi		14.056	0.0			246	
		min Wi		11.754	0.0			306	
		min Wi		10.155	0.0			366	
		min Wi		8.069	0.0			490 732	
		min Win min Win		5.834	0.0			732 100	
				4.219	0.0				
		min Wi min Wi		3.352 2.349	0.0			420 192	
		min Wi			0.0			192 896	
		min Wi		1.826					
		min Wi		1.501	0.0			608 320	
		min Wi		1.280	0.0 0.0			320 008	
	10000	TUTI AATI	L	T.TTO	0.0	120	.2 J		

Sweco UK		Page 3
Grove House	65202894	
Mansion Gate Drive	Sceaux Gardens, London	
Leeds LS7 4DN	SW Attenuation - Site 1	– Micro
Date 12/05/21	Designed by BP	
File 65202894-SWE-ZZ-XX-CA-C	Checked by JRC	Drainage
Innovyze	Source Control 2019.1	
Ra	infall Details	
Rainfall Mod	el FEH	
Return Period (year		
FEH Rainfall Versi		
	on GB 533850 177350 TQ 33850 77350	
C (1ki D1 (1ki		
D2 (1ki		
D3 (1k	m) 0.243	
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Tot	al Area (ha) 0.080	
	ime (mins) Area com: To: (ha)	
	0 4 0.080	
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Sweco UK						Page 4	
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	<u>Cell</u>	ular Stora	ige Struc	<u>ture</u>			
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Depth (m)	Area (m²) Inf.	Area (m²)	Depth (m)	Area (m²) 1	Inf. Area	(m²)	
0.000 0.800	30.0 30.0	0.0	0.801	0.0		0.0	
	<u>Hydro-Bra</u>	ke® Optimu	um Outflo	w Control			
	1	Unit Referen	ce MD-SHE-	0221-2500-0	0800-2500		
	D	esign Head (	m)		0.800		
	Des	ign Flow (l/			25.0		
		Flush-Fl			alculated		
		Objecti Applicati		se upstream	n storage Surface		
		Sump Availab			Yes		
		Diameter (m			221		
	In	vert Level (			2.800		
Minimu	um Outlet Pipe	Diameter (m	m)		300		
Suge	gested Manhole	Diameter (m	m)		1500		
	Contro	l Points	Head (m)	) Flow (l/s	;)		
	Design Point	(Calculated	d) 0.800	25.	0		
		Flush-Flo					
	N 51	Kick-Flo					
	Mean Flow ov	er Head Rang	je -	- 20.	۷		
The hydrological ca Hydro-Brake® Optimu Hydro-Brake Optimu	um as specifie	d. Should a	nother typ	e of contro	ol device d	other than a	
invalidated					Double (m)		
Depth (m) Flow (1,			-		_		
	7.4     1.200       1.8     1.400	30.3 32.7	3.000 3.500	47.2 50.8	7.000 7.500	71.2 73.6	
	4.9 1.600	34.8	4.000	54.2	8.000	76.0	
	1.9 1.800	36.9	4.500	57.4	8.500	77.8	
	1.2 2.000	38.8	5.000	60.4	9.000	80.1	
0.600 22	2.7 2.200	40.6	5.500	63.3	9.500	82.3	
	5.0 2.400	42.4	6.000	66.0			
1.000 2	7.8 2.600	44.0	6.500	68.7			
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cove House					2894					
insion Gat				Sceaux Gardens, London						
Leeds LS7 4DN Date 12/05/21 File 65202894-SWE-ZZ-XX-CA-C Innovyze					SW Attenuation - Site 2					
					gned b	y BP			– Micro Draina	
					ked by	JRC				
					ce Con	trol 201	9.1			
	<u>Summary c</u>				-	Return minutes.	Period	(+40%)	<u>)</u>	
	Storm	Max	Max	Ма		Max	Max	Max	Status	
	Event					Control E				
		(m)	(m)	(1/	s)	(1/s)	(1/s)	(m³)		
15	min Summer	3.652	0.652		0.0	20.0	20.0	39.0	ОК	
30	min Summer	3.628	0.628		0.0	20.0	20.0	37.6	ОК	
60	min Summer	3.541	0.541		0.0	20.0	20.0	32.4	0 K	
120	min Summer	3.388	0.388		0.0	20.0	20.0	23.2	0 K	
180	min Summer	3.281	0.281		0.0	19.9	19.9	16.8	0 K	
240	min Summer	3.218	0.218		0.0	19.5	19.5	13.0	0 K	
360	min Summer	3.171	0.171		0.0	16.0	16.0	10.2	0 K	
	min Summer				0.0	13.1	13.1	8.9	0 K	
	min Summer				0.0	11.2	11.2	8.0		
720	min Summer	3.123	0.123		0.0	9.8	9.8	7.3	O K	
	min Summer				0.0	7.9	7.9	6.4		
	min Summer				0.0	5.7	5.7	5.4		
	min Summer				0.0	4.2	4.2	4.5		
	min Summer				0.0	3.3	3.3	4.0		
	min Summer				0.0	2.3	2.3	3.3		
	min Summer				0.0	1.8	1.8	2.9		
	min Summer				0.0	1.5	1.5	2.6		
	min Summer				0.0	1.3	1.3			
	min Summer				0.0	1.1 20.0	1.1 20.0	2.2 44.5		
		Storm		Rain		Discharge	e Time-P	eak		
		Event	(1	nm/hr)	Volume	Volume	(mins	•)		
					(m³)	(m³)				
	15	min Su	mmer 22	26.146	0.0	51.3	3	16		
		min Su			0.0			25		
	60	min Su	mmor -				-	42		
	00	III Su	nuner .	74.435	0.0	67.	C			
		min Su		12.704	0.0 0.0			72		
	120		mmer 4			77.	5			
	120 180	min Su	mmer 4 mmer 3	12.704	0.0	77. 84.0	5	72		
	120 180 240	min Su min Su	mmer 4 mmer 3 mmer 2	12.704 30.854	0.0	77. 84.(	5 0 :: 9 ::	72 102		
	120 180 240 360	min Su min Su min Su	mmer 4 mmer 3 mmer 2 mmer 1	12.704 30.854 24.500	0.0 0.0 0.0	77. 84.0 88.9	5 0 9	72 102 130		
	120 180 240 360 480 600	min Su min Su min Su min Su min Su min Su	mmer 4 mmer 2 mmer 1 mmer 1 mmer 1	42.704 30.854 24.500 L7.701	0.0 0.0 0.0 0.0	77.5 84.0 88.5 96.4 102.0	5 0 9 4 0	72 102 130 188		
	120 180 240 360 480 600 720	min Su min Su min Su min Su min Su min Su min Su	mmer 4 mmer 2 mmer 1 mmer 1 mmer 1 mmer 1 mmer 1	42.704 30.854 24.500 17.701 14.056	0.0 0.0 0.0 0.0 0.0	77.8 84.0 88.9 96.4 102.0	5 0 9 4 0 5	72 102 130 188 248		
	120 180 240 360 480 600 720 960	min Su min Su min Su min Su min Su min Su min Su min Su	mmer 4 mmer 2 mmer 2 mmer 1 mmer 1 mmer 1 mmer 1 mmer 1	42.704 80.854 24.500 17.701 14.056 11.754 10.155 8.069	0.0 0.0 0.0 0.0 0.0 0.0 0.0	77.3 84.0 88.9 96.0 102.0 106.0 110.1	5 0 9 4 0 5 6 1	72 102 130 188 248 308 368 490		
	120 180 240 360 480 600 720 960 1440	min Su min Su min Su min Su min Su min Su min Su min Su min Su	mmer 4 mmer 2 mmer 1 mmer 1 mmer 1 mmer 1 mmer 1 mmer 1 mmer 1	42.704 30.854 24.500 17.701 14.056 11.754 10.155 8.069 5.834	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	77.3 84.0 88.9 96.0 102.0 106.0 110.0 117.1 127.0	5 9 4 0 5 6 5 1 0	72 102 130 188 248 308 368 490 734		
	120 180 240 360 480 600 720 960 1440	min Su min Su min Su min Su min Su min Su min Su min Su	mmer 4 mmer 2 mmer 1 mmer 1 mmer 1 mmer 1 mmer 1 mmer 1 mmer 1	42.704 80.854 24.500 17.701 14.056 11.754 10.155 8.069	0.0 0.0 0.0 0.0 0.0 0.0 0.0	77.3 84.0 88.9 96.0 102.0 106.0 110.0 117.1 127.0	5 9 4 0 5 6 5 1 0	72 102 130 188 248 308 368 490		
	120 180 240 360 480 600 720 960 1440 2160	min Su min Su min Su min Su min Su min Su min Su min Su min Su	mmer 2 mmer 2 mmer 1 mmer 1 mmer 1 mmer 1 mmer 1 mmer 1 mmer 1 mmer 1 mmer 1	42.704 30.854 24.500 17.701 14.056 11.754 10.155 8.069 5.834	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	77.5 84.0 88.9 96.0 102.0 106.0 110.0 117.1 127.0 137.8	5 9 4 5 6 6 6 1 7 7 8 1	72 102 130 188 248 308 368 490 734		
	120 180 240 360 480 600 720 960 1440 2160 2880 4320	min Su min Su min Su min Su min Su min Su min Su min Su min Su min Su	mmer 4 mmer 3 mmer 2 mmer 1 mmer 1	42.704 80.854 24.500 17.701 14.056 11.754 10.155 8.069 5.834 4.219 3.352 2.349	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	77. 84. 88. 96. 102. 106. 110. 117. 127. 137. 146. 153.	5 9 4 6 6 1 7 7 8 1 7 8 1 7 7 7 7 7 7 7 7 7 7 7 7	72 102 130 188 248 308 368 490 734 100 456 164		
	120 180 240 360 480 600 720 960 1440 2160 2880 4320 5760	min Su min Su	mmer 4 mmer 3 mmer 2 mmer 1 mmer 1	42.704 80.854 24.500 17.701 14.056 11.754 10.155 8.069 5.834 4.219 3.352 2.349 1.826	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	77. 84. 88. 96. 102. 106. 110. 117. 127. 137. 146. 153. 159.	5 9 4 6 6 1 7 7 8 1 7 7 8 1 7 7 7 7 7 7 7 7 7 7 7	72 102 130 188 248 308 368 490 734 100 456 164 864		
	120 180 240 360 480 600 720 960 1440 2160 2880 4320 5760 7200	min Su min Su	mmer 4 mmer 3 mmer 1 mmer 1	42.704 30.854 24.500 17.701 14.056 11.754 10.155 8.069 5.834 4.219 3.352 2.349 1.826 1.501	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	77. 84. 88. 96. 102. 106. 110. 117. 127. 137.8 146. 153. 159. 163.	5 9 4 6 5 1 5 3 1 5 2 2 5 3	72 102 130 188 248 308 368 490 734 100 456 164 864 584		
	120 180 240 360 480 600 720 960 1440 2160 2880 4320 5760 7200 8640	min Su min Su	mmer 4 mmer 3 mmer 2 mmer 1 mmer 1	42.704 80.854 24.500 17.701 14.056 11.754 10.155 8.069 5.834 4.219 3.352 2.349 1.826	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	77. 84. 88. 96. 102. 106. 110. 117. 127. 137. 146. 153. 159. 163. 167.	5 9 4 6 5 1 5 3 1 5 2 2 5 3 2 4	72 102 130 188 248 308 368 490 734 100 456 164 864		

Sto: Even 30 mir 60 mir 120 mir 180 mir 240 mir 360 mir 480 mir 600 mir 720 mir	SWE-ZZ- mmary c rm nt Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter	Df         Resu           Max         Level I           (m)         3.712 (0)           3.594 (0)         3.55 (0)           3.219 (0)         3.178 (0)           3.143 (0)         3.143 (0)           3.124 (0)         3.124 (0)           3.102 (0)         3.0102 (0)           3.090 (0)         3.075 (0)           3.063 (0)         3.056 (0)           3.041 (0)         3.037 (0)	Max Depth (m) 0.712 0.594 0.355 0.219 0.178 0.143 0.124 0.111 0.102 0.090 0.075 0.063 0.056 0.047 0.041	Scea SW A Desi Chec Sour for 10	ttenua gned b ked by ce Con 0 year nx ration (	-	9.1 Period Max	Max	Status 0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K
eeds         LS7         4DN           vate         12/05/21           'ile         65202894           nnovyze         Stor           Stor         Ever           30         mir           60         mir           120         mir           60         mir           120         mir           140         mir           140         mir           140         mir           2160         mir           1420         mir           1420         mir           1420         mir           1420         mir           1430         mir           5760         mir           1200         mir           1200         mir           1200         mir	SWE-ZZ- mmary c rm nt Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter	Df         Resu           Max         Level I           (m)         3.712 (0)           3.594 (0)         3.55 (0)           3.219 (0)         3.178 (0)           3.143 (0)         3.143 (0)           3.124 (0)         3.124 (0)           3.102 (0)         3.0102 (0)           3.090 (0)         3.075 (0)           3.063 (0)         3.056 (0)           3.041 (0)         3.037 (0)	Max Depth (m) 0.712 0.594 0.355 0.219 0.178 0.143 0.124 0.111 0.102 0.090 0.075 0.063 0.056 0.047 0.041	SW A Desi Chec Sour for 10 Ma Infilt	ttenua gned b ked by ce Con 0 year x ration ( 's) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	tion - S: y BP JRC trol 2019 <b>Return</b> Max Control Σ (1/s) 20.0 20.0 20.0 20.0 20.0 19.5 16.7 12.4 9.9 8.3 7.2 5.8 4.2 3.0 2.4	ite 2 9.1 Period Max Outflow (1/s) 20.0 20.0 20.0 20.0 20.0 19.5 16.7 12.4 9.9 8.3 7.2 5.8 4.2 3.0 2.4	Max Volume (m <sup>3</sup> ) 42.6 35.6 21.2 13.1 10.6 8.5 7.4 6.7 6.1 5.4 4.5	<b>Status</b> <b>Status</b> O K O K O K O K O K O K O K O K
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<u>Sur</u> <u>Sur</u> <u>Sto</u> <u>Ever</u> 30 min 60 min 120 min 120 min 180 min 240 min 360 min 480 min 600 min 720 min 960 min 1440 min 2160 min 2880 min 4320 min 5760 min 7200 min 8640 min	mmary c rm nt Minter Minter Winter	Df         Resu           Max         Level I           (m)         3.712 (0)           3.594 (0)         3.55 (0)           3.219 (0)         3.178 (0)           3.143 (0)         3.143 (0)           3.124 (0)         3.124 (0)           3.102 (0)         3.0102 (0)           3.090 (0)         3.075 (0)           3.063 (0)         3.056 (0)           3.041 (0)         3.037 (0)	Max Depth (m) 0.712 0.594 0.355 0.219 0.178 0.143 0.124 0.111 0.102 0.090 0.075 0.063 0.056 0.047 0.041	Sour for 10 Ma Infilt	ce Con 0 year x ration ( 's) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	<pre>trol 2019     Return     Max Control Σ (1/s)     20.0     20.0     20.0     20.0     19.5     16.7     12.4     9.9     8.3     7.2     5.8     4.2     3.0     2.4</pre>	Max           Outflow           (1/s)           20.0           20.0           20.0           19.5           16.7           12.4           9.9           8.3           7.2           5.8           4.2           3.0           2.4	Max Volume (m <sup>3</sup> ) 42.6 35.6 21.2 13.1 10.6 8.5 7.4 6.7 6.1 5.4 4.5	Status 0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K
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30 min 60 min 120 min 120 min 240 min 360 min 480 min 720 min 960 min 1440 min 2160 min 2880 min 4320 min 5760 min 7200 min 8640 min	nt Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter	Level I (m) 3.712 ( 3.594 ( 3.355 ( 3.219 ( 3.178 ( 3.143 ( 3.143 ( 3.143 ( 3.124 ( 3.111 ( 3.102 ( 3.090 ( 3.090 ( 3.090 ( 3.095 ( 3.063 ( 3.056 ( 3.041 ( 3.037 (	Depth (m) 0.712 0.594 0.355 0.219 0.178 0.143 0.124 0.111 0.102 0.090 0.075 0.063 0.056 0.047 0.041	Infilt	nation       0.0         0.0       0.0         0.0       0.0         0.0       0.0         0.0       0.0         0.0       0.0         0.0       0.0         0.0       0.0         0.0       0.0         0.0       0.0         0.0       0.0         0.0       0.0         0.0       0.0         0.0       0.0         0.0       0.0         0.0       0.0         0.0       0.0	Control Σ (1/s) 20.0 20.0 20.0 19.5 16.7 12.4 9.9 8.3 7.2 5.8 4.2 3.0 2.4	Outflow (1/s) 20.0 20.0 20.0 19.5 16.7 12.4 9.9 8.3 7.2 5.8 4.2 3.0 2.4	Volume (m <sup>3</sup> ) 42.6 35.6 21.2 13.1 10.6 8.5 7.4 6.7 6.1 5.4 4.5	0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K
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60 mir 120 mir 180 mir 240 mir 360 mir 480 mir 600 mir 720 mir 240 mir 240 mir 240 mir 240 mir 5760 mir 7200 mir 8640 mir	Minter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter	3.594 ( 3.355 ( 3.219 ( 3.178 ( 3.143 ( 3.143 ( 3.124 ( 3.111 ( 3.102 ( 3.090 ( 3.075 ( 3.063 ( 3.056 ( 3.041 ( 3.037 (	0.594 0.355 0.219 0.178 0.143 0.124 0.111 0.102 0.090 0.075 0.063 0.056 0.047 0.041		0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	20.0 20.0 19.5 16.7 12.4 9.9 8.3 7.2 5.8 4.2 3.0 2.4	20.0 20.0 19.5 16.7 12.4 9.9 8.3 7.2 5.8 4.2 3.0 2.4	35.6 21.2 13.1 10.6 8.5 7.4 6.7 6.1 5.4 4.5	0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K
120 mir 180 mir 240 mir 360 mir 480 mir 600 mir 720 mir 960 mir 1440 mir 2160 mir 2880 mir 4320 mir 5760 mir 7200 mir 8640 mir	Minter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter	3.355 ( 3.219 ( 3.178 ( 3.143 ( 3.143 ( 3.124 ( 3.111 ( 3.102 ( 3.090 ( 3.090 ( 3.095 ( 3.063 ( 3.056 ( 3.041 ( 3.037 (	0.355 0.219 0.178 0.143 0.124 0.124 0.124 0.102 0.090 0.075 0.063 0.056 0.047 0.041		0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	20.0 19.5 16.7 12.4 9.9 8.3 7.2 5.8 4.2 3.0 2.4	20.0 19.5 16.7 12.4 9.9 8.3 7.2 5.8 4.2 3.0 2.4	21.2 13.1 10.6 8.5 7.4 6.7 6.1 5.4 4.5	0 K 0 K 0 K 0 K 0 K 0 K
240 min 360 min 480 min 720 min 960 min 1440 min 2160 min 2880 min 4320 min 5760 min 7200 min 8640 min	Minter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter	3.178 ( 3.143 ( 3.124 ( 3.111 ( 3.090 ( 3.090 ( 3.075 ( 3.063 ( 3.056 ( 3.047 ( 3.041 ( 3.037 (	0.178 0.143 0.124 0.111 0.102 0.090 0.075 0.063 0.056 0.047 0.041		0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	16.7 12.4 9.9 8.3 7.2 5.8 4.2 3.0 2.4	16.7 12.4 9.9 8.3 7.2 5.8 4.2 3.0 2.4	10.6 8.5 7.4 6.7 6.1 5.4 4.5	0 K 0 K 0 K 0 K 0 K
240 min 360 min 480 min 720 min 960 min 1440 min 2160 min 2880 min 4320 min 5760 min 7200 min 8640 min	Minter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter	3.178 ( 3.143 ( 3.124 ( 3.111 ( 3.090 ( 3.090 ( 3.075 ( 3.063 ( 3.056 ( 3.047 ( 3.041 ( 3.037 (	0.178 0.143 0.124 0.111 0.102 0.090 0.075 0.063 0.056 0.047 0.041		0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	16.7 12.4 9.9 8.3 7.2 5.8 4.2 3.0 2.4	16.7 12.4 9.9 8.3 7.2 5.8 4.2 3.0 2.4	10.6 8.5 7.4 6.7 6.1 5.4 4.5	0 K 0 K 0 K 0 K 0 K
360 min 480 min 600 min 720 min 960 min 1440 min 2160 min 4320 min 5760 min 7200 min 8640 min	Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter	3.143 ( 3.124 ( 3.111 ( 3.090 ( 3.090 ( 3.075 ( 3.063 ( 3.056 ( 3.047 ( 3.041 ( 3.037 (	0.143 0.124 0.111 0.102 0.090 0.075 0.063 0.056 0.047 0.041		0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	12.4 9.9 8.3 7.2 5.8 4.2 3.0 2.4	12.4 9.9 8.3 7.2 5.8 4.2 3.0 2.4	8.5 7.4 6.7 6.1 5.4 4.5	0 K 0 K 0 K 0 K
480 min 600 min 720 min 960 min 1440 min 2160 min 2880 min 4320 min 5760 min 7200 min 8640 min	Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter	3.124 ( 3.111 ( 3.102 ( 3.090 ( 3.075 ( 3.063 ( 3.056 ( 3.047 ( 3.041 ( 3.037 (	0.124 0.111 0.102 0.090 0.075 0.063 0.063 0.056 0.047 0.041		0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	9.9 8.3 7.2 5.8 4.2 3.0 2.4	9.9 8.3 7.2 5.8 4.2 3.0 2.4	7.4 6.7 6.1 5.4 4.5	0 K 0 K 0 K 0 K
600 min 720 min 960 min 1440 min 2160 min 2880 min 4320 min 5760 min 7200 min 8640 min	Minter Winter Winter Winter Winter Winter Winter Winter Winter Winter	3.111 ( 3.102 ( 3.090 ( 3.075 ( 3.063 ( 3.056 ( 3.047 ( 3.041 ( 3.037 (	0.111 0.102 0.090 0.075 0.063 0.056 0.056 0.047 0.041		0.0 0.0 0.0 0.0 0.0 0.0 0.0	8.3 7.2 5.8 4.2 3.0 2.4	8.3 7.2 5.8 4.2 3.0 2.4	6.7 6.1 5.4 4.5	0 K 0 K 0 K
720 mir 960 mir 1440 mir 2160 mir 2880 mir 4320 mir 5760 mir 7200 mir 8640 mir	Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter	3.102 ( 3.090 ( 3.075 ( 3.063 ( 3.056 ( 3.047 ( 3.041 ( 3.037 (	0.102 0.090 0.075 0.063 0.056 0.056 0.047 0.041		0.0 0.0 0.0 0.0 0.0 0.0	7.2 5.8 4.2 3.0 2.4	7.2 5.8 4.2 3.0 2.4	6.1 5.4 4.5	0 K 0 K 0 K
960 mir 1440 mir 2160 mir 2880 mir 4320 mir 5760 mir 7200 mir 8640 mir	Minter Winter Winter Winter Winter Winter Winter Winter	3.090 ( 3.075 ( 3.063 ( 3.056 ( 3.047 ( 3.041 ( 3.037 (	0.090 0.075 0.063 0.056 0.047 0.041		0.0 0.0 0.0 0.0 0.0	5.8 4.2 3.0 2.4	5.8 4.2 3.0 2.4	5.4 4.5	ок ок
1440 min 2160 min 2880 min 4320 min 5760 min 7200 min 8640 min	Winter Winter Winter Winter Winter Winter Winter	3.075 ( 3.063 ( 3.056 ( 3.047 ( 3.041 ( 3.037 (	0.075 0.063 0.056 0.047 0.041		0.0 0.0 0.0 0.0	4.2 3.0 2.4	4.2 3.0 2.4	4.5	ΟK
2160 min 2880 min 4320 min 5760 min 7200 min 8640 min	Winter Winter Winter Winter Winter Winter	3.063 ( 3.056 ( 3.047 ( 3.041 ( 3.037 (	0.063 0.056 0.047 0.041		0.0 0.0 0.0	3.0 2.4	3.0 2.4		
2880 min 4320 min 5760 min 7200 min 8640 min	Winter Winter Winter Winter Winter	3.056 ( 3.047 ( 3.041 ( 3.037 (	0.056 0.047 0.041		0.0	2.4	2.4	3.8	O 17
4320 min 5760 min 7200 min 8640 min	h Winter h Winter h Winter h Winter	3.047 ( 3.041 ( 3.037 (	0.047 0.041		0.0				ΟK
5760 min 7200 min 8640 min	n Winter n Winter n Winter	3.041 ( 3.037 (	0.041			1.7	1.7	3.4	O K
7200 min 8640 min	n Winter n Winter	3.037 (			0.0			2.8	0 K
8640 mir	n Winter		0.037		0.0	1.3	1.3	2.4	ΟK
					0.0	1.1	1.1	2.2	ΟK
10080 mir	Winter	3.034 (	0.034		0.0	0.9	0.9	2.0	ОК
	. WINCEL	3.032 (	0.032		0.0	0.8	0.8	1.9	0 K
		Storm		Rain	Flooded	l Discharge	e Time-P	eak	
		Event	(	mm/hr)	Volume (m³)	Volume (m³)	(mins	3)	
	30	min Win	ter 1	29.742	0.0	65.9	)	26	
	60	min Win	ter	74.435	0.0	75.0	5	44	
	120	min Win	ter	42.704	0.0	86.8	3	76	
		min Win		30.854	0.0			102	
		min Win		24.500	0.0			130	
		min Win		17.701	0.0			188	
		min Win		14.056	0.0			248	
		min Win		11.754	0.0			308	
		min Win		10.155	0.0			370	
		min Win		8.069	0.0			490	
		min Win		5.834	0.0			490 736	
		min Win		4.219	0.0			100	
		min Win		3.352	0.0			444	
		min Win		2.349	0.0			156	
		min Win		1.826	0.0			872	
	7200	min Win	ter	1.501	0.0			672	
	8640	min Win	ter	1.280	0.0	187.2	2 4	328	
	10080	min Win	ter	1.118	0.0	190.8	3 4	952	

Sweco UK		Page 3
Grove House	65202894	
Mansion Gate Drive	Sceaux Gardens, London	
Leeds LS7 4DN	SW Attenuation - Site 2	– Micro
Date 12/05/21	Designed by BP	
File 65202894-SWE-ZZ-XX-CA-C	Checked by JRC	Drainage
Innovyze	Source Control 2019.1	
Ra	infall Details	
Rainfall Mod	el FEH	
Return Period (year		
FEH Rainfall Versi		
	on GB 533850 177350 TQ 33850 77350	
C (1k		
D1 (1k D2 (1k		
D3 (1k		
E (1k	m) 0.324	
F (1k		
Summer Stor Winter Stor		
Cv (Summe		
Cv (Winte		
Shortest Storm (min		
Longest Storm (min		
Climate Change	8 +40	
Ti	me Area Diagram	
Tot	al Area (ha) 0.121	
	ime (mins) Area com: To: (ha)	
	0 4 0.121	
©19	82-2019 Innovyze	

Sweco UK						Page 4
rove House		652028	394			
Mansion Gate Drive		Sceaux	Gardens,	, London		
Leeds LS7 4DN		SW Att	enuation	- Site 2		Micro
ate 12/05/21		Desigr	ned by BP			
Tile 65202894-SWE-	ZZ-XX-CA-C.	Checke	ed by JRC			Drainag
Innovyze			e Control	2019.1		
		<u>Model D</u>	<u>etails</u>			
	Storage i	s Online Co	over Level	(m) 4.400		
	<u>Cell</u>	ular Stora	age Struc	<u>ture</u>		
	I tion Coeffici tion Coeffici		/hr) 0.0000	)0 Por		
Depth (m) A	rea (m²) Inf.	Area (m²)	Depth (m)	Area (m²) :	Inf. Area	(m²)
0.000 0.800	63.0 63.0	0.0	0.801	0.0		0.0
	<u>Hydro-Bra</u>	ke® Optim	<u>um Outflo</u>	w Control		
		Unit Referen	nce MD-SHE-	0201-2000-0	0800-2000	
		esign Head		0201 2000	0.800	
	Des	ign Flow (l,	/s)		20.0	
		Flush-F			alculated	
		-	ive Minimi	se upstream	-	
		Applicat: Sump Availab			Surface	
		Diameter (r			Yes 201	
	In	vert Level			3.000	
Minimu	m Outlet Pipe				225	
Sugg	ested Manhole	Diameter (r	nm)		1500	
	Contro	l Points	Head (m)	) Flow (l/s	;)	
	Design Point	(Calculate	d) 0.800	20.	0	
		Flush-Fl				
		Kick-Fl				
	Mean Flow ov	er Head Ran	ge -	- 16.	4	
The hydrological ca Hydro-Brake® Optimu	m as specifie	d. Should a	another typ	e of contro	ol device d	other than a
Hydro-Brake Optimum invalidated	® be utilised	then these	storage ro	uting calc	ulations wi	ill be
Depth (m) Flow (l/	s) Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
	.9 1.200	24.3	3.000	37.7	7.000	56.8
	.0 1.400	26.1	3.500	40.6	7.500	58.7
0.300 20		27.8	4.000	43.3		60.6
0.400 19		29.5	4.500	45.8	8.500	62.1
	.2 2.000 .7 2.200	31.0 32.4	5.000 5.500	48.2 50.5	9.000 9.500	63.9 65.7
	.0 2.200	33.8	6.000	52.7	5.500	0.0.1
2.000 20	.2 2.600	35.2	6.500	54.8		
1.000 22	1	I				
1.000 22						
1.000 22		01982-2019	. Taxa			

Sweco UK									Page 1	
Grove House				65202						
Mansion Gat	Mansion Gate Drive					Sceaux Gardens, London				
Leeds LS7	SW At	tenua	tion - S	ite 3		Micco				
Date 12/05/		ned b				-Micro				
File 652028	-0		ked by	-			Drainac			
	7- SWE-44-	AN-CA					0 1			
Innovyze				Sourc	e Con	trol 201	9.1			
	<u>Summary c</u>	of Ros	ulte f	or 100	lvear	Return	Period	(+40%)	)	
	<u>banany</u> c	<u>/                                    </u>	uits i	.01 100	<u>ycar</u>	Recurn	ICIIOU	(1400)	<u></u>	
		:	Half Dr	ain Tim	ne : 10	minutes.				
	Storm	Max	Max	Ma	x	Max	Max	Max	Status	
	Event	Level	Depth	Infiltr	ation (	Control $\Sigma$	Outflow	Volume		
		(m)	(m)	(1/:	s)	(1/s)	(l/s)	(m³)		
15	min Summer	3 341	0 641		0.0	15.0	15.0	14.6	ОК	
	min Summer				0.0	15.0	15.0	14.0	0 K	
	min Summer				0.0	15.0	15.0	9.1	ОК	
	min Summer				0.0	14.8	14.8	4.9		
	min Summer				0.0	12.6	12.6	3.7		
	min Summer				0.0	10.4	10.4	3.1		
	min Summer				0.0	7.7	7.7	2.6		
	min Summer				0.0	6.2	6.2	2.0		
	min Summer				0.0	5.3	5.3	2.3		
	min Summer				0.0	3.3 4.6	3.3 4.6	1.9	OK	
	min Summer				0.0	3.6	3.6	1.7		
	min Summer				0.0	2.6	2.6	1.4		
	min Summer				0.0	1.9	1.9	1.2		
	min Summer				0.0	1.5	1.5	1.0		
4320	min Summer	2.738	0.038		0.0	1.1	1.1	0.9	0 K	
5760	min Summer	2.733	0.033		0.0	0.8	0.8	0.8	O K	
7200	min Summer	2.730	0.030		0.0	0.7	0.7	0.7	O K	
8640	min Summer	2.728	0.028		0.0	0.6	0.6	0.6	O K	
10080	min Summer	2.726	0.026		0.0	0.5	0.5	0.6	ОК	
15	min Winter	3.433	0.733		0.0	15.0	15.0	16.7	ОК	
		Storm	I	Rain 3	Flooded	Discharge	e Time-P	eak		
		Storm Event			Flooded Volume	Discharge Volume	e Time-P (mins			
						-				
	:	Event		m/hr)	Volume	Volume (m <sup>3</sup> )	(mins			
	15	<b>Event</b> min Su	(n	<b>nm/hr)</b> 26.146	Volume (m³)	Volume (m <sup>3</sup> ) 23.3	<b>(mins</b>	;)		
	15 30	<b>Event</b> min Su	(m mmer 22 mmer 12	<b>nm/hr)</b> 26.146	Volume (m <sup>3</sup> ) 0.0	Volume (m <sup>3</sup> ) 23.2 26.	<b>(mins</b> 3 7	14		
	15 30 60	<b>Event</b> min Su min Su	(m mmer 22 mmer 12 mmer 7	<b>nm/hr)</b> 26.146 29.742	Volume (m <sup>3</sup> ) 0.0 0.0	Volume (m <sup>3</sup> ) 23. 26. 30.	<b>(mins</b> 3 7 7	14 22		
	15 30 60 120	<b>Event</b> min Su min Su min Su	(m mmer 22 mmer 12 mmer 7 mmer 4	<b>m/hr)</b> 26.146 29.742 74.435	Volume (m <sup>3</sup> ) 0.0 0.0	Volume (m <sup>3</sup> ) 23. 26. 30. 35.	(mins 3 7 2	14 22 38		
	15 30 60 120 180	min Su min Su min Su min Su	(m mmer 22 mmer 12 mmer 7 mmer 4 mmer 3	m/hr) 26.146 29.742 74.435 42.704 80.854	Volume (m <sup>3</sup> ) 0.0 0.0 0.0 0.0	Volume (m <sup>3</sup> ) 23. 26. 30. 35. 38.	(mins 3 7 2 2	14 22 38 66		
	15 30 60 120 180 240	min Su min Su min Su min Su min Su min Su min Su	(m mmer 22 mmer 12 mmer 7 mmer 4 mmer 3 mmer 2	m/hr) 26.146 29.742 74.435 42.704 80.854 24.500	Volume (m <sup>3</sup> ) 0.0 0.0 0.0 0.0 0.0 0.0	Volume (m <sup>3</sup> ) 23. 26. 30. 35. 38. 40.	(mins 3 7 2 2 4	14 22 38 66 94 124		
	15 30 60 120 180 240 360	min Su min Su min Su min Su min Su min Su min Su min Su	(m mmer 22 mmer 12 mmer 7 mmer 4 mmer 3 mmer 2 mmer 1	<b>am/hr)</b> 26.146 29.742 74.435 42.704 30.854 24.500 .7.701	Volume (m <sup>3</sup> ) 0.0 0.0 0.0 0.0 0.0 0.0 0.0	Volume (m <sup>3</sup> ) 23. 26. 30. 35. 38. 40. 43.	(mins 3 7 2 2 4 8	14 22 38 66 94 124 184		
	15 30 60 120 180 240 360 480	Event min Su min Su min Su min Su min Su min Su min Su min Su	(m mmer 22 mmer 12 mmer 7 mmer 4 mmer 3 mmer 2 mmer 1 mmer 1	<b>am/hr)</b> 26.146 29.742 74.435 42.704 80.854 24.500 .7.701 .4.056	Volume (m <sup>3</sup> ) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	Volume (m <sup>3</sup> ) 23. 26. 30. 35. 38. 40. 43. 46.	(mins 3 7 2 2 4 8 4	14 22 38 66 94 124 184 246		
	15 30 60 120 180 240 360 480 600	Event min Su min Su min Su min Su min Su min Su min Su min Su min Su	(m mmer 22 mmer 12 mmer 7 mmer 4 mmer 3 mmer 2 mmer 1 mmer 1 mmer 1	<b>m/hr)</b> 26.146 29.742 74.435 42.704 30.854 24.500 .7.701 .4.056 .1.754	Volume (m <sup>3</sup> ) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Volume (m <sup>3</sup> ) 23. 26. 30. 35. 38. 40. 43. 46. 48.	(mins 3 7 2 2 4 8 4 5	14 22 38 66 94 124 184 246 306		
	15 30 60 120 180 240 360 480 600 720	Event min Su min Su min Su min Su min Su min Su min Su min Su min Su	(m mmer 22 mmer 12 mmer 7 mmer 4 mmer 3 mmer 2 mmer 1 mmer 1 mmer 1 mmer 1	<b>m/hr)</b> 26.146 29.742 74.435 42.704 80.854 24.500 .7.701 4.056 1.754 0.155	Volume (m <sup>3</sup> ) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Volume (m <sup>3</sup> ) 23. 26. 30. 35. 38. 40. 43. 46. 48. 50.	(mins 3 7 2 2 4 8 4 5 3	14 22 38 66 94 124 184 246 306 366		
	15 30 60 120 180 240 360 480 600 720 960	Event min Su min Su min Su min Su min Su min Su min Su min Su min Su min Su	(m mmer 22 mmer 12 mmer 7 mmer 4 mmer 3 mmer 2 mmer 1 mmer 1 mmer 1 mmer 1 mmer 1	<b>m/hr)</b> 26.146 29.742 74.435 42.704 80.854 24.500 .7.701 4.056 1.754 .0.155 8.069	Volume (m <sup>3</sup> ) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Volume (m <sup>3</sup> ) 23. 26. 30. 35. 38. 40. 43. 46. 48. 50. 53.	(mins 3 7 2 2 4 8 4 5 3 2	14 22 38 66 94 124 184 246 306 366 486		
	15 30 60 120 180 240 360 480 600 720 960 1440	Event min Su min Su	(m mmer 22 mmer 12 mmer 7 mmer 4 mmer 3 mmer 2 mmer 1 mmer 1 mmer 1 mmer 1 mmer 1 mmer 1 mmer 1	<b>m/hr)</b> 26.146 29.742 74.435 42.704 80.854 24.500 .7.701 4.056 1.754 0.155 8.069 5.834	Volume (m <sup>3</sup> ) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Volume (m <sup>3</sup> ) 23. 26. 30. 35. 38. 40. 43. 46. 48. 50. 53. 57.	(mins 3 7 2 2 4 8 4 5 3 2 7	14 22 38 66 94 124 184 246 306 366 486 734		
	15 30 60 120 180 240 360 480 600 720 960 1440 2160	Event min Su min Su	(m mmer 22 mmer 12 mmer 7 mmer 4 mmer 3 mmer 2 mmer 1 mmer 1 mmer 1 mmer 1 mmer 1 mmer 1 mmer 1 mmer 1 mmer 1	<b>m/hr)</b> 26.146 29.742 74.435 42.704 80.854 24.500 .7.701 4.056 1.754 .0.155 8.069 5.834 4.219	Volume (m <sup>3</sup> ) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Volume (m <sup>3</sup> ) 23. 26. 30. 35. 38. 40. 43. 46. 48. 50. 53. 57. 62.	(mins 3 7 2 2 4 8 4 5 3 2 7 6 1	14 22 38 66 94 124 184 246 306 366 486 734 088		
	15 30 60 120 180 240 360 480 600 720 960 1440 2160 2880	Event min Su min Su	(m mmer 22 mmer 12 mmer 7 mmer 4 mmer 3 mmer 2 mmer 1 mmer 1 mmer 1 mmer 1 mmer 1 mmer 1 mmer 1 mmer mmer mmer mmer	<b>m/hr)</b> 26.146 29.742 74.435 42.704 80.854 24.500 7.701 4.056 1.754 0.155 8.069 5.834 4.219 3.352	Volume (m <sup>3</sup> ) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Volume (m <sup>3</sup> ) 23. 26. 30. 35. 38. 40. 43. 46. 48. 50. 53. 57. 62. 66.	(mins 3 7 2 2 4 8 4 5 3 2 7 6 1 4 1	14 22 38 66 94 124 184 246 306 366 486 734 088 464		
	15 30 60 120 180 240 360 480 600 720 960 1440 2160 2880 4320	Event min Su min Su	(m mmer 22 mmer 12 mmer 7 mmer 4 mmer 3 mmer 1 mmer 1 mmer 1 mmer 1 mmer 1 mmer 1 mmer 1 mmer mmer mmer mmer mmer mmer	m/hr) 26.146 29.742 74.435 42.704 80.854 24.500 7.701 4.056 1.754 0.155 8.069 5.834 4.219 3.352 2.349	Volume (m <sup>3</sup> ) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Volume (m <sup>3</sup> ) 23. 26. 30. 35. 38. 40. 43. 46. 48. 50. 53. 57. 62. 66. 69.	(mins 3 7 2 2 4 8 4 5 3 2 7 6 1 1 8 2 2 7 6 1 1 8 2 2	14 22 38 66 94 124 184 246 306 366 486 734 088 464 172		
	15 30 60 120 180 240 360 480 600 720 960 1440 2160 2880 4320 5760	Event min Su min Su	(m mmer 22 mmer 12 mmer 7 mmer 4 mmer 3 mmer 2 mmer 1 mmer 1	m/hr) 26.146 29.742 74.435 42.704 80.854 24.500 7.701 4.056 1.754 0.155 8.069 5.834 4.219 3.352 2.349 1.826	Volume (m <sup>3</sup> ) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Volume (m <sup>3</sup> ) 23. 26. 30. 35. 38. 40. 43. 46. 48. 50. 53. 57. 62. 66. 69. 72.	(mins 3 7 2 2 4 8 4 5 3 2 7 6 1 1 8 2 2 7 6 1 1 8 2 2 3 2 2 3 2 2	14 22 38 66 94 124 184 246 306 366 486 734 088 464 172 936		
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	15 30 60 120 180 240 360 480 600 720 960 1440 2160 2880 4320 5760 7200	Event min Su min Su	(m mmer 22 mmer 12 mmer 7 mmer 4 mmer 3 mmer 2 mmer 1 mmer 1	m/hr) 26.146 29.742 74.435 42.704 80.854 24.500 7.701 4.056 1.754 0.155 8.069 5.834 4.219 3.352 2.349 1.826	Volume (m <sup>3</sup> ) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Volume (m <sup>3</sup> ) 23. 26. 30. 35. 38. 40. 43. 46. 48. 50. 53. 57. 62. 66. 69. 72. 74.	(mins 3 7 2 2 4 8 4 5 3 2 7 6 1 4 8 2 7 6 1 1 8 2 2 3 2 3 3 3	14 22 38 66 94 124 184 246 306 366 486 734 088 464 172 936		
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Grove House         65202294           Mansion Gate Drive         Sceaux Gardens, London           Leeds LS7 4DN         SW Attenuation - Site 3           Date 12/05/21         Designed by JRC           File 65202294-SWE-ZZ-XX-CA-C         Checked by JRC           Source Control 2019.1           Colspan="2">Source Control 2019.1 <th col<="" th=""><th>Mansion Gate Drive       Sceaux Gardens, London         Leeds LS7 4DN       SW Attenuation - Site 3         Date 12/05/21       Designed by BP         File 65202894-SWE-ZZ-XX-CA-C       Checked by JRC         Innovyze       Source Control 2019.1         Summary of Results for 100 year Return Period (+40%)         Storm Max Max Max Max Max Control 2       Max Max Control 2       Max Max Control 2       Max Max Control 2       Max Status for 00 year Return Period (+40%)         30 min Winter 3.324 0.624       0.0       15.0       15.0       14.2       0 f         60 min Winter 3.073 0.373       0.0       15.0       15.0       14.2       0 f         120 min Winter 2.833 0.133       0.0       9.8       9.8       3.0       0 f         180 min Winter 2.795 0.095       0.0       5.7       5.7       2.2       0 f         360 min Winter 2.775 0.075       0.0       3.8       3.8       1.7       0 f         600 min Winter 2.775 0.075       0.0       3.8       3.8       1.7       0 f         720 min Winter 2.770 0.070       0.3       3.3       3.1.6       0 f         960 min Winter 2.775 0.052       0.0       1.9       1.9       1.2       0 f         1440 min</th><th></th></th>	<th>Mansion Gate Drive       Sceaux Gardens, London         Leeds LS7 4DN       SW Attenuation - Site 3         Date 12/05/21       Designed by BP         File 65202894-SWE-ZZ-XX-CA-C       Checked by JRC         Innovyze       Source Control 2019.1         Summary of Results for 100 year Return Period (+40%)         Storm Max Max Max Max Max Control 2       Max Max Control 2       Max Max Control 2       Max Max Control 2       Max Status for 00 year Return Period (+40%)         30 min Winter 3.324 0.624       0.0       15.0       15.0       14.2       0 f         60 min Winter 3.073 0.373       0.0       15.0       15.0       14.2       0 f         120 min Winter 2.833 0.133       0.0       9.8       9.8       3.0       0 f         180 min Winter 2.795 0.095       0.0       5.7       5.7       2.2       0 f         360 min Winter 2.775 0.075       0.0       3.8       3.8       1.7       0 f         600 min Winter 2.775 0.075       0.0       3.8       3.8       1.7       0 f         720 min Winter 2.770 0.070       0.3       3.3       3.1.6       0 f         960 min Winter 2.775 0.052       0.0       1.9       1.9       1.2       0 f         1440 min</th> <th></th>	Mansion Gate Drive       Sceaux Gardens, London         Leeds LS7 4DN       SW Attenuation - Site 3         Date 12/05/21       Designed by BP         File 65202894-SWE-ZZ-XX-CA-C       Checked by JRC         Innovyze       Source Control 2019.1         Summary of Results for 100 year Return Period (+40%)         Storm Max Max Max Max Max Control 2       Max Max Control 2       Max Max Control 2       Max Max Control 2       Max Status for 00 year Return Period (+40%)         30 min Winter 3.324 0.624       0.0       15.0       15.0       14.2       0 f         60 min Winter 3.073 0.373       0.0       15.0       15.0       14.2       0 f         120 min Winter 2.833 0.133       0.0       9.8       9.8       3.0       0 f         180 min Winter 2.795 0.095       0.0       5.7       5.7       2.2       0 f         360 min Winter 2.775 0.075       0.0       3.8       3.8       1.7       0 f         600 min Winter 2.775 0.075       0.0       3.8       3.8       1.7       0 f         720 min Winter 2.770 0.070       0.3       3.3       3.1.6       0 f         960 min Winter 2.775 0.052       0.0       1.9       1.9       1.2       0 f         1440 min		
Leeds         LST 4DN         SW Attenuation - Site 3           Date 12/05/21         Designed by BP Checked by JRC         Designed by BP Checked by JRC           Source Control 2019.1           Control 2019.1           Source Control 2019.1           Source Control 2019.1           Source Control 2019.1           Source Control 2	Leeds       LS7 4DN       SW Attenuation - Site 3         Date 12/05/21       Designed by BP       Checked by JRC         File 65202894-SWE-ZZ-XX-CA-C       Source Control 2019.1         Source Control 2019.1         Summary of Results for 100 year Return Period (+40%)         Storm       Max         Summary of Results for 100 year Return Period (+40%)       Checked by JRC         Summary of Results for 100 year Return Period (+40%)       Max         Max       Max       Max       Max       Max <td col<="" td=""><td></td></td>	<td></td>		
Leeds         LST 4DN         SW Attenuation - site 3           Date 12/05/21         Designed by BP           File 65202894-SWE-ZZ-XX-CA-C         Designed by BC           Innovyze         Source Control 2019.1           Of Results for 100 year Return Period (+40%)           Source Control 2017.0           Adv max           Max           Max           Max           Max           Max           Max           Source Control 2017.0           On in Winter 3.073 0.073           On in Winter 2.062           On in Winter 2.063           On in Winter 2.775 0.075           On in Winter 2.776 0.070         On	Leeds         LS7 4DN         SW Attenuation - Site 3           Date 12/05/21         Designed by BP         Checked by JRC           File 65202894-SWE-ZZ-XX-CA-C         Source Control 2019.1           Source Control 2019.1           Summary of Results for 100 year Return Period (+40%)           Summary of Results for 100 year Return Period (+40%)           Summary of Results for 100 year Return Period (+40%)           Summary of Results for 100 year Return Period (+40%)           Summary of Results for 100 year Return Period (+40%)           Summary of Results for 100 year Return Period (+40%)           Source Control 2019.1           Source Control 2019.1           Summary of Results for 100 year Return Period (+40%)           Source Control 2019.1           Source Control 2019.1 <th colspan<="" td=""><td>rn</td></th>	<td>rn</td>	rn	
Date 12/05/21         Designed by BP Checked by JRC         Designed by BP Checked by JRC           Innovyze         Source Control 2019.1           Source Control 2019.1 </td <td>Date 12/05/21         Designed by BP Checked by JRC         Designed by BP Checked by JRC           Innovyze         Source Control 2019.1           Summary of Results for 100 year Return Period (+40%)         Source Control 2019.1           Storm         Max         Max<td></td></td>	Date 12/05/21         Designed by BP Checked by JRC         Designed by BP Checked by JRC           Innovyze         Source Control 2019.1           Summary of Results for 100 year Return Period (+40%)         Source Control 2019.1           Storm         Max         Max <td></td>			
File 65202894-SWE-ZZ-XX-CA-C         Checked by JRC           Source Control 2019.1           Source Control 2019.1           Source Control 2019.1           Source Control 2 Dutflow Volume (m) (m) (m) (1/s) Control 2 Outflow Volume (m) (1/s) Control 2 Outflow Volume (m) (m) (1/s) Control 2 Outflow Volume (m) (1/s) Control 2.0           30 min Winter 3.073 0.073         0.0         15.0         15.0         8.5         0.8           120 min Winter 2.833 0.133         0.0         9.8         9.8         0.8         0.8           240 min Winter 2.735 0.055         0.0         5.7         5.7         2.2         0.8           480 min Winter 2.775 0.075         0.0         3.8         3.8         1.7         0.8           600 min Winter 2.775 0.052         0.0         1.9         1.2         0.8           960 min Winter 2.720 0.052         0.0         1.4         1.4         0.0           2160 min Winter 2.720 0.022         0.0         0.4         0.4         0.5         0.6           2160 min Winter 2.722 0.022         0.0         0.4         0.4         0.5         0.6           2160 min	File 65202894-SWE-ZZ-XX-CA-C       Checked by JRC         Source Control 2019.1         Summary of Results for 100 year Return Period (+40%)         Storm       Max			
Innovyze         Source Control 2019.1           Source Control 2019.1 <td colspan="2" contro<="" source"="" td=""><td>Storm         Max         Max<!--</td--><td>aina</td></td></td>	<td>Storm         Max         Max<!--</td--><td>aina</td></td>		Storm         Max         Max </td <td>aina</td>	aina
Summary of Results for 100 year Return Period (+40%).           Storm         Max         Max <th< td=""><td>Summary of Results for 100 year Return Period (+40%)           Storm         Max         <tht< td=""><td></td></tht<></td></th<>	Summary of Results for 100 year Return Period (+40%)           Storm         Max         Max <tht< td=""><td></td></tht<>			
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Storm         Max         Max </th <th></th>			
From         Level         Operation         Call (1/2)	EventLevel (m)Depth (m)Infiltration (l/s)Control (l/s)2 Outflow (l/s)Volume (m3)30 min Winter3.3240.6240.0015.015.014.20.660 min Winter3.0730.3730.0015.015.08.50.8120 min Winter2.8680.1680.0013.213.23.80.8180 min Winter2.8330.1330.009.89.83.00.8240 min Winter2.8150.1150.007.97.92.60.8360 min Winter2.7550.0950.005.75.72.20.8600 min Winter2.7750.0750.003.83.81.70.8600 min Winter2.7750.0750.003.33.31.60.8960 min Winter2.7700.0700.003.33.31.60.8960 min Winter2.7520.0520.001.41.41.00.81440 min Winter2.7520.0520.001.41.41.00.8280 min Winter2.7320.0320.000.80.80.70.8280 min Winter2.7320.0320.000.80.80.70.8280 min Winter2.7320.0320.000.60.60.60.6			
(m)         (m)         (1/s)         (1/s)         (1/s)         (m*)           30         min Winter         3.324         0.624         0.0         15.0         15.0         14.2         0 K           60         min Winter         2.686         0.168         0.0         15.0         15.0         14.2         0 K           120         min Winter         2.886         0.132         13.2         3.8         0 K           120         min Winter         2.833         0.133         0.0         9.8         3.0         0 K           240         min Winter         2.783         0.083         0.0         4.6         4.6         1.9         0 K           600         min Winter         2.775         0.075         0.0         3.8         3.3         1.6         0 K           1400         min Winter         2.775         0.02         2.6         2.6         1.4         0 K           14140         min Winter         2.729         0.028         0.0         1.4         1.4         1.0         0 K           2160         min Winter         2.720         0.028         0.0         0.6         0.6         0.6         0 K <th>(m)(m)(1/s)(1/s)(1/s)(m³)30 min Winter3.3240.6240.015.015.014.20.460 min Winter3.0730.3730.015.015.08.50.4120 min Winter2.8680.1680.013.213.23.80.4180 min Winter2.8330.1330.09.89.83.00.4240 min Winter2.8150.1150.07.97.92.60.4360 min Winter2.7950.0950.05.75.72.20.4480 min Winter2.7750.0750.03.83.81.70.4600 min Winter2.7750.0750.03.33.31.60.6960 min Winter2.7610.0610.02.62.61.40.41440 min Winter2.7520.0520.01.91.91.20.4280 min Winter2.7390.0390.01.11.10.90.4280 min Winter2.7320.0320.00.80.80.70.4320 min Winter2.7280.0280.00.60.60.60.6</th> <th>s</th>	(m)(m)(1/s)(1/s)(1/s)(m³)30 min Winter3.3240.6240.015.015.014.20.460 min Winter3.0730.3730.015.015.08.50.4120 min Winter2.8680.1680.013.213.23.80.4180 min Winter2.8330.1330.09.89.83.00.4240 min Winter2.8150.1150.07.97.92.60.4360 min Winter2.7950.0950.05.75.72.20.4480 min Winter2.7750.0750.03.83.81.70.4600 min Winter2.7750.0750.03.33.31.60.6960 min Winter2.7610.0610.02.62.61.40.41440 min Winter2.7520.0520.01.91.91.20.4280 min Winter2.7390.0390.01.11.10.90.4280 min Winter2.7320.0320.00.80.80.70.4320 min Winter2.7280.0280.00.60.60.60.6	s		
30 min Winter 3.073 0.373       0.0       15.0       15.0       14.2       0 K         60 min Winter 3.073 0.373       0.0       15.0       15.0       15.0       8.5       0 K         120 min Winter 2.868 0.168       0.0       13.2       13.2       3.8       0 K         180 min Winter 2.815 0.115       0.0       7.9       7.9       2.6       0 K         360 min Winter 2.795 0.095       0.0       5.7       5.7       2.2       0 K         480 min Winter 2.775 0.075       0.0       3.8       3.8       1.7       0 K         720 min Winter 2.770 0.070       0.0       3.3       3.1       1.6       0 K         960 min Winter 2.770 0.070       0.0       3.8       3.8       1.7       0 K         720 min Winter 2.770 0.070       0.0       3.8       3.8       1.7       0 K         2160 min Winter 2.724 0.024       0.0       1.4       1.4       1.4       0 K         1440 min Winter 2.728 0.028       0.0       1.4       1.4       1.4       0 K         2260 min Winter 2.728 0.028       0.0       0.4       0.4       0.5       0 K         2000 min Winter 2.728 0.022       0.0       0.4       0.4       0.5	30 min Winter       3.324       0.624       0.0       15.0       15.0       14.2       0 H         60 min Winter       3.073       0.373       0.0       15.0       15.0       8.5       0 H         120 min Winter       2.868       0.168       0.0       13.2       13.2       3.8       0 H         180 min Winter       2.833       0.133       0.0       9.8       9.8       3.0       0 H         240 min Winter       2.815       0.115       0.0       7.9       7.9       2.6       0 H         360 min Winter       2.795       0.095       0.0       5.7       5.7       2.2       0 H         480 min Winter       2.783       0.083       0.0       4.6       4.6       1.9       0 H         600 min Winter       2.775       0.075       0.0       3.8       3.8       1.7       0 H         720 min Winter       2.761       0.061       0.0       2.6       2.6       1.4       0 H         960 min Winter       2.752       0.052       0.0       1.9       1.9       1.2       0 H         1440 min Winter       2.739       0.039       0.0       1.4       1.4       1.0       0			
60 min Winter 3.073 0.373       0.0       15.0       15.0       8.5       0 K         120 min Winter 2.868 0.168       0.0       13.2       13.2       3.8       0 K         240 min Winter 2.813 0.115       0.0       7.9       7.9       2.6       0 K         360 min Winter 2.783 0.095       0.0       5.7       5.7       2.2       0 K         400 min Winter 2.775 0.075       0.0       3.8       3.8       1.7       0 K         960 min Winter 2.770 0.070       0.0       3.3       3.3       1.6       0 K         960 min Winter 2.752 0.052       0.0       1.9       1.9       1.2       0 K         1440 min Winter 2.739 0.039       0.0       1.1       1.1       0.9       0 K         280 min Winter 2.739 0.032       0.0       0.8       0.8       0.7       0 K         2160 min Winter 2.726 0.026       0.0       0.4       0.4       0.5       0 K         7200 min Winter 2.722 0.022       0.0       0.4       0.4       0.5       0 K         10080 min Winter 2.722 0.022       0.0       0.4       0.4       0.5       0 K         10080 min Winter 2.722 0.022       0.0       30.4       46       46         <	60 min Winter 3.073 0.3730.015.015.08.50 H120 min Winter 2.868 0.1680.013.213.23.80 H180 min Winter 2.833 0.1330.09.89.83.00 H240 min Winter 2.815 0.1150.07.97.92.60 H360 min Winter 2.795 0.0950.05.75.72.20 H480 min Winter 2.783 0.0830.04.64.61.90 H600 min Winter 2.775 0.0750.03.83.81.70 H720 min Winter 2.761 0.0610.02.62.61.40 H1440 min Winter 2.752 0.0520.01.91.91.20 H2160 min Winter 2.739 0.0390.01.11.10.90 H280 min Winter 2.732 0.0320.00.80.80.70 H5760 min Winter 2.728 0.0280.00.60.60.60 H			
120 min Winter 2.868 0.168       0.0       13.2       13.2       3.8       0 K         180 min Winter 2.813 0.133       0.0       9.8       3.0       0 K         240 min Winter 2.795 0.095       0.0       7.9       7.9       2.2       0 K         360 min Winter 2.775 0.075       0.0       3.8       3.8       1.7       0 K         600 min Winter 2.775 0.075       0.0       3.8       3.8       1.7       0 K         720 min Winter 2.775 0.052       0.0       1.9       1.4       0 K         960 min Winter 2.739 0.039       0.0       1.4       1.4       0 K         1440 min Winter 2.732 0.052       0.0       1.9       1.9       0 K         2160 min Winter 2.739 0.039       0.0       1.1       1.1       0.9       0 K         4320 min Winter 2.732 0.028       0.0       0.6       0.6       0.6       0 K         700 min Winter 2.724 0.024       0.0       0.4       0.4       0.5       0 K         10080 min Winter 2.722 0.022       0.0       34.4       40         120 min Winter 129.742       0.0       30.0       24       66         180 min Winter 127.70       0.0       34.4       40       40       40 <td>120 min Winter 2.868 0.1680.013.213.23.80180 min Winter 2.833 0.1330.09.89.83.00240 min Winter 2.815 0.1150.07.97.92.60360 min Winter 2.795 0.0950.05.75.72.20480 min Winter 2.783 0.0830.04.64.61.90600 min Winter 2.775 0.0750.03.83.81.70720 min Winter 2.770 0.0700.03.33.31.60960 min Winter 2.761 0.0610.02.62.61.401440 min Winter 2.752 0.0520.01.91.91.202160 min Winter 2.739 0.0390.01.11.10.904320 min Winter 2.732 0.0320.00.80.80.705760 min Winter 2.728 0.0280.00.60.60.60</td> <td></td>	120 min Winter 2.868 0.1680.013.213.23.80180 min Winter 2.833 0.1330.09.89.83.00240 min Winter 2.815 0.1150.07.97.92.60360 min Winter 2.795 0.0950.05.75.72.20480 min Winter 2.783 0.0830.04.64.61.90600 min Winter 2.775 0.0750.03.83.81.70720 min Winter 2.770 0.0700.03.33.31.60960 min Winter 2.761 0.0610.02.62.61.401440 min Winter 2.752 0.0520.01.91.91.202160 min Winter 2.739 0.0390.01.11.10.904320 min Winter 2.732 0.0320.00.80.80.705760 min Winter 2.728 0.0280.00.60.60.60			
180 min Winter 2,833 0.133       0.0       9.8       9.8       3.0       0 K         240 min Winter 2,795 0.095       0.0       7.9       7.9       2.6       0 K         480 min Winter 2,795 0.095       0.0       5.7       5.7       2.2       0 K         600 min Winter 2,770 0.070       0.0       3.8       3.8       1.7       0 K         700 min Winter 2,770 0.070       0.0       3.3       3.3       1.6       0 K         960 min Winter 2,770 0.070       0.0       1.9       1.9       1.2       0 K         1440 min Winter 2,772 0.052       0.0       1.9       1.9       1.2       0 K         2160 min Winter 2,7740 0.044       0.0       1.4       1.4       1.0       0 K         2280 min Winter 2,728 0.028       0.0       0.6       0.6       0.6       0 K         320 min Winter 2,724 0.024       0.0       0.4       0.4       0.5       0 K         3640 min Winter 2,722 0.022       0.0       0.4       0.4       0.5       0 K         10080 min Winter 2,722 0.022       0.0       0.4       0.4       0.5       0 K         10080 min Winter 2,722 0.022       0.0       30.0       24       66       180 <t< td=""><td>180 min Winter 2.833 0.1330.09.89.83.00.8240 min Winter 2.815 0.1150.07.97.92.60.8360 min Winter 2.795 0.0950.05.75.72.20.8480 min Winter 2.783 0.0830.04.64.61.90.8600 min Winter 2.775 0.0750.03.83.81.70.8720 min Winter 2.770 0.0700.03.33.31.60.8960 min Winter 2.761 0.0610.02.62.61.40.81440 min Winter 2.752 0.0520.01.91.91.20.82160 min Winter 2.739 0.0390.01.11.10.90.84320 min Winter 2.728 0.0280.00.60.60.60.6</td><td></td></t<>	180 min Winter 2.833 0.1330.09.89.83.00.8240 min Winter 2.815 0.1150.07.97.92.60.8360 min Winter 2.795 0.0950.05.75.72.20.8480 min Winter 2.783 0.0830.04.64.61.90.8600 min Winter 2.775 0.0750.03.83.81.70.8720 min Winter 2.770 0.0700.03.33.31.60.8960 min Winter 2.761 0.0610.02.62.61.40.81440 min Winter 2.752 0.0520.01.91.91.20.82160 min Winter 2.739 0.0390.01.11.10.90.84320 min Winter 2.728 0.0280.00.60.60.60.6			
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7200 min Winter 2.726 0.026       0.0       0.5       0.5       0.6       0 K         8640 min Winter 2.722 0.022       0.0       0.4       0.4       0.5       0 K         10080 min Winter 2.722 0.022       0.0       0.4       0.4       0.5       0 K         Storm Rain Flooded Discharge Time-Peak (mins) (m <sup>3</sup> )         Storm Rain (mm/hr)       Volume Volume (mins)         30 min Winter 129.742       0.0       30.0       24         60 min Winter 74.435       0.0       34.4       40         120 min Winter 30.854       0.0       42.8       96         240 min Winter 14.056       0.0       51.9       244         600 min Winter 11.754       0.0       54.3       306         720 min Winter 11.754       0.0       54.3       366         720 min Winter 10.155       0.0       56.3       364         960 min Winter 3.352       0.0       74.3       1452         2160 min Winter 3.352       0.0       74.3       1452         4320 min Winter 1.826       0.0       81.0       2912         7000 min Winter 1.826       0.0       81.0       2912         7000 min Winter 1.826       0.0       81.0       2912		K		
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Storn EventRain (mm/hr)Flooded Volume (m <sup>3</sup> )Discharge Volume (mins) (m <sup>3</sup> )30minWinter Ninter129.7420.030.02460minWinter Vinter74.4350.034.440120minWinter42.7040.039.466180minWinter30.8540.042.896240minWinter24.5000.0045.3126360minWinter11.7540.0051.9244600minWinter10.1550.0056.3364960minWinter10.1550.0055.64901440minWinter5.8340.0064.77322160minWinter3.3520.074.31452320minWinter3.3520.074.31452320minWinter1.8260.081.029122200minWinter1.8260.081.029127200minWinter1.2800.083.23624860minWinter1.2800.085.14368	8640 min Winter 2.724 0.024 0.0 0.4 0.4 0.5 O H	K		
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IUUSU MIN WINTER I, IIS U.U 86./ 4992				
	10080 min winter 1.118 0.0 86.7 4992			

Sweco UK		Page 3
Grove House	65202894	
Mansion Gate Drive	Sceaux Gardens, London	
Leeds LS7 4DN	SW Attenuation - Site 3	Micco
Date 12/05/21	Designed by BP	- Micro
File 65202894-SWE-ZZ-XX-CA-C	Checked by JRC	Drainage
Innovyze	Source Control 2019.1	
Ra	infall Details	
Rainfall Mode	el FEH	
Return Period (years		
FEH Rainfall Versio		
	on GB 533850 177350 TQ 33850 77350	
C (1kr D1 (1kr		
D2 (1kr		
D3 (1kr	n) 0.243	
E (1kr		
F (1kr Summer Storr		
Winter Storr		
Cv (Summe	r) 0.750	
Cv (Winter		
Shortest Storm (mins Longest Storm (mins		
Climate Change	,	
<u> </u>	ne Area Diagram	
Tota	al Area (ha) 0.055	
т	ime (mins) Area	
Fr	om: To: (ha)	
	0 4 0.055	
©198	32-2019 Innovyze	

Frove House						Page 4
LOVC HOUSE		6520289	94			
Mansion Gate Drive		Sceaux	Gardens	, London		
leeds LS7 4DN				- Site 3		Micco
ate 12/05/21		Designe	ed by BP			Micro
ile 65202894-SWE-Z	7-77-07-0		l by JRC			Drainag
	Z-XX-CH-C.			2010 1		<u> </u>
innovyze		Source	Control	2019.1		
		<u>Model De</u>	<u>tails</u>			
	Storage i	s Online Cov	er Level	(m) 4.100		
	<u>Cell</u>	ular Storaç	<u>ge Struc</u>	<u>ture</u>		
	ion Coeffici	nvert Level ent Base (m/H ent Side (m/H	nr) 0.0000	00 Por		
Depth (m) Are	ea (m²) Inf.	Area (m²) D	epth (m)	Area (m²) ]	nf. Area	(m²)
0.000 0.800	24.0 24.0	0.0	0.801	0.0		0.0
	<u>Hydro-Bra</u>	ke® Optimur	n Outflo	w Control		
	1	Unit Referenc	e MD-SHE-	0177-1500-0	800-1500	
		esign Head (m			0.800	
	Des	ign Flow (l/s	;)		15.0	
		Flush-Flc			alculated	
		-		se upstream	-	
		Applicatic Sump Availabl			Surface	
		Diameter (mm			Yes 177	
	In	vert Level (m			2.700	
Minimum		Diameter (mm			225	
Surres	sted Manhole	Diameter (mm	1)		1200	
bugger						
Dugger	Contro	l Points	Head (m)	) Flow (l/s	)	
					-	
		l Points (Calculated) Flush-Flo <sup>1</sup>	0.800	0 15.	0	
		(Calculated)	0.800 0.288	0 15. 8 15.	0	
:	Design Point	(Calculated) Flush-Flo <sup>r</sup>	) 0.800 ™ 0.288 ® 0.590	0 15. 8 15.	0 0 0	
:	Design Point Mean Flow ov culations ha as specifie	(Calculated) Flush-Flo <sup>7</sup> Kick-Flo0 er Head Range ve been based d. Should ar	) 0.800 M 0.288 D 0.590 e H on the H nother typ	0 15. 8 15. 0 13. - 12. Nead/Dischar De of contro	0 0 5 cge relation	other than a
The hydrological calc Hydro-Brake® Optimum Hydro-Brake Optimum®	Design Point Mean Flow ov culations ha as specifie be utilised	(Calculated) Flush-Flo <sup>7</sup> Kick-Flo0 er Head Range ve been based d. Should ar then these s	0 0.800 M 0.288 D 0.590 e A on the H nother typ storage ro	0 15. 8 15. 0 13. - 12. Mead/Dischar De of contro Duting calcu	0 0 5 5 1 device o 1 device o	other than a ill be
The hydrological calc Hydro-Brake® Optimum Hydro-Brake Optimum® invalidated Depth (m) Flow (1/s) 0.100 6.3	Design Point Mean Flow ov culations ha as specifie be utilised <b>Depth (m)</b> 3 1.200	(Calculated) Flush-Flo <sup>7</sup> Kick-Flo0 er Head Range ve been based d. Should ar then these s Flow (1/s) D 18.2	0 0.800 M 0.288 D 0.590 e	0 15. 8 15. 0 13. - 12. Mead/Dischar be of contro buting calcu Flow (1/s) 28.2	0 0 5 rge relation 1 device of 1 dations with Depth (m) 7.000	ther than a till be Flow (1/s) 42.4
The hydrological calc Hydro-Brake® Optimum Hydro-Brake Optimum® invalidated Depth (m) Flow (1/s) 0.100 6.3 0.200 14.7	Design Point Mean Flow ov culations ha as specifie be utilised <b>Depth (m)</b> 1.200 1.400	(Calculated) Flush-Flo <sup>3</sup> Kick-Floo er Head Range ve been based d. Should an then these s Flow (1/s) D 18.2 19.6	0 0.800 M 0.288 D 0.590 e	0 15. 8 15. 0 13. - 12. Nead/Dischar be of contro puting calcu Flow (1/s) 28.2 30.4	0 0 5 rge relation 1 device of 1 dations with Depth (m) 7.000 7.500	ther than a ill be Flow (1/s) 42.4 43.9
The hydrological calc Hydro-Brake® Optimum Hydro-Brake Optimum® invalidated Depth (m) Flow (1/s) 0.100 6.3 0.200 14.7 0.300 15.0	Design Point Mean Flow ov culations ha as specifie be utilised <b>Depth (m)</b> 1.200 1.400 0.	<pre>(Calculated) Flush-Flo<sup>3</sup> Kick-Floo eer Head Range ve been based d. Should an then these s Flow (1/s) D 18.2 19.6 20.9</pre>	0 0.800 M 0.288 D 0.590 e 0.590 e 0.590 A on the H nother typ storage ro epth (m) 3.000 3.500 4.000	0 15. 8 15. 0 13. - 12. Mead/Dischar be of contro buting calcu Flow (1/s) 28.2 30.4 32.4	0 0 5 5 1 device o 1 ations with Depth (m) 7.000 7.500 8.000	ther than a ill be Flow (1/s) 42.4 43.9 45.3
The hydrological calc Hydro-Brake® Optimum Hydro-Brake Optimum® invalidated Depth (m) Flow (1/s) 0.100 6.3 0.200 14.7 0.300 15.0 0.400 14.7	Design Point Mean Flow ov culations ha as specifie be utilised <b>Depth (m)</b> 1.200 1.400 1.600 7 1.800	<pre>(Calculated) Flush-Flo<sup>3</sup> Kick-Floo eer Head Range ve been based d. Should an then these s Flow (1/s) D 18.2 19.6 20.9 22.1</pre>	0 0.800 M 0.288 D 0.590 e 0.590 e 0.590 A on the H nother typ storage ro epth (m) 3.000 3.500 4.000 4.500	0 15. 8 15. 0 13. - 12. Mead/Dischar be of contro puting calcu Flow (1/s) 28.2 30.4 32.4 34.3	0 0 5 5 0 device o 1 device o 1 diations with <b>Depth (m)</b> 7.000 7.500 8.000 8.500	Flow (1/s) 42.4 43.9 45.3 46.4
The hydrological calc Hydro-Brake® Optimum Hydro-Brake Optimum® invalidated Depth (m) Flow (1/s) 0.100 6.3 0.200 14.7 0.300 15.0 0.400 14.7 0.500 14.2	Design Point Mean Flow ov culations ha as specifie be utilised <b>Depth (m)</b> 1.200 1.400 1.600 1.800 2.000	<pre>(Calculated) Flush-Flo<sup>3</sup> Kick-Floo eer Head Range ve been based d. Should an then these s Flow (1/s) D 18.2 19.6 20.9 22.1 23.2</pre>	0 0.800 M 0.288 D 0.590 e 0.590 e 0.590 e 0.590 A on the H nother typ storage ro epth (m) 3.000 3.500 4.000 4.500 5.000	0 15. 8 15. 0 13. - 12. Mead/Dischar be of contro buting calcu Flow (1/s) 28.2 30.4 32.4 34.3 36.1	0 0 5 5 1 device of 1 device of 1 device of 1 device of 1 device of 1 device of 1 device of 1 device of 1 device of 1 device o	Flow (1/s) 42.4 43.9 45.3 46.4 47.8
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The hydrological calc Hydro-Brake® Optimum Hydro-Brake Optimum® invalidated <b>Depth (m) Flow (1/s)</b> 0.100 6.3 0.200 14.7 0.300 15.0 0.400 14.7 0.500 14.2 0.600 13.1 0.800 15.0	Design Point Mean Flow ov culations ha as specifie be utilised <b>Depth (m)</b> 1.200 1.400 1.600 7 1.800 2.200 2.200 0 2.400	<pre>(Calculated) Flush-Flo<sup>3</sup> Kick-Floo eer Head Range ve been based d. Should an then these s Flow (1/s) D 18.2 19.6 20.9 22.1 23.2 24.3 25.3</pre>	0 0.800 M 0.288 D 0.590 e 0.590 e 0.590 c 0.590 c 0.590 c 0.500 c 0.500 c 0.000 c 0.800 c 0.800 c 0.280 c 0.500 c 0.500 c 0.500 c 0.281 c 0.281 c 0.590 c 0.590 c 0.500 c 0.000 c 0.0000 c 0.0000 c 0.0000 c 0.0000 c 0.0000 c 0	0 15. 8 15. 0 13. - 12. Mead/Dischar be of contro puting calcu Flow (1/s) 28.2 30.4 32.4 34.3 36.1 37.8 39.4	0 0 5 5 1 device of 1 device of 1 device of 1 device of 1 device of 1 device of 1 device of 1 device of 1 device of 1 device o	Flow (1/s) 42.4 43.9 45.3 46.4 47.8