

**NEWLANDS,
WATERLOOVILLE,
HAMPSHIRE.**

**PROPOSED OUTLINE SUDS
STRATEGY STATEMENT**

OCTOBER 2010

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WATERLOOVILLE,
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Project Code:	GTWville2.2
Prepared by:	Joe Heydon
Approved by:	Paul Stewart
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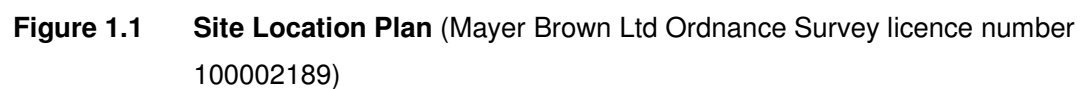
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1. EXISTING SITE LOCATION

- 1.1 As shown on the site location map, **Figure 1.1**, the proposed development site is located to the west of Waterlooville in Hampshire. The red line boundary for the site is indicated on this figure.
- 1.2 The A3 forms the eastern boundary to the site and the Grainger application site itself currently consists of approximately 209 hectares of fields and areas of woodland. The site is located mainly within the administrative area of Winchester City Council (WCC), but the eastern edge of the site lies within the administrative area of Havant Borough Council (HBC).
- 1.3 **Figure 1.2** outlines the Ordnance Survey plan for the site. **Figure 1.3** outlines the existing contours within the site. Contours are displayed at 0.5m intervals. Elevations on the site vary between 30m & 60m AOD.



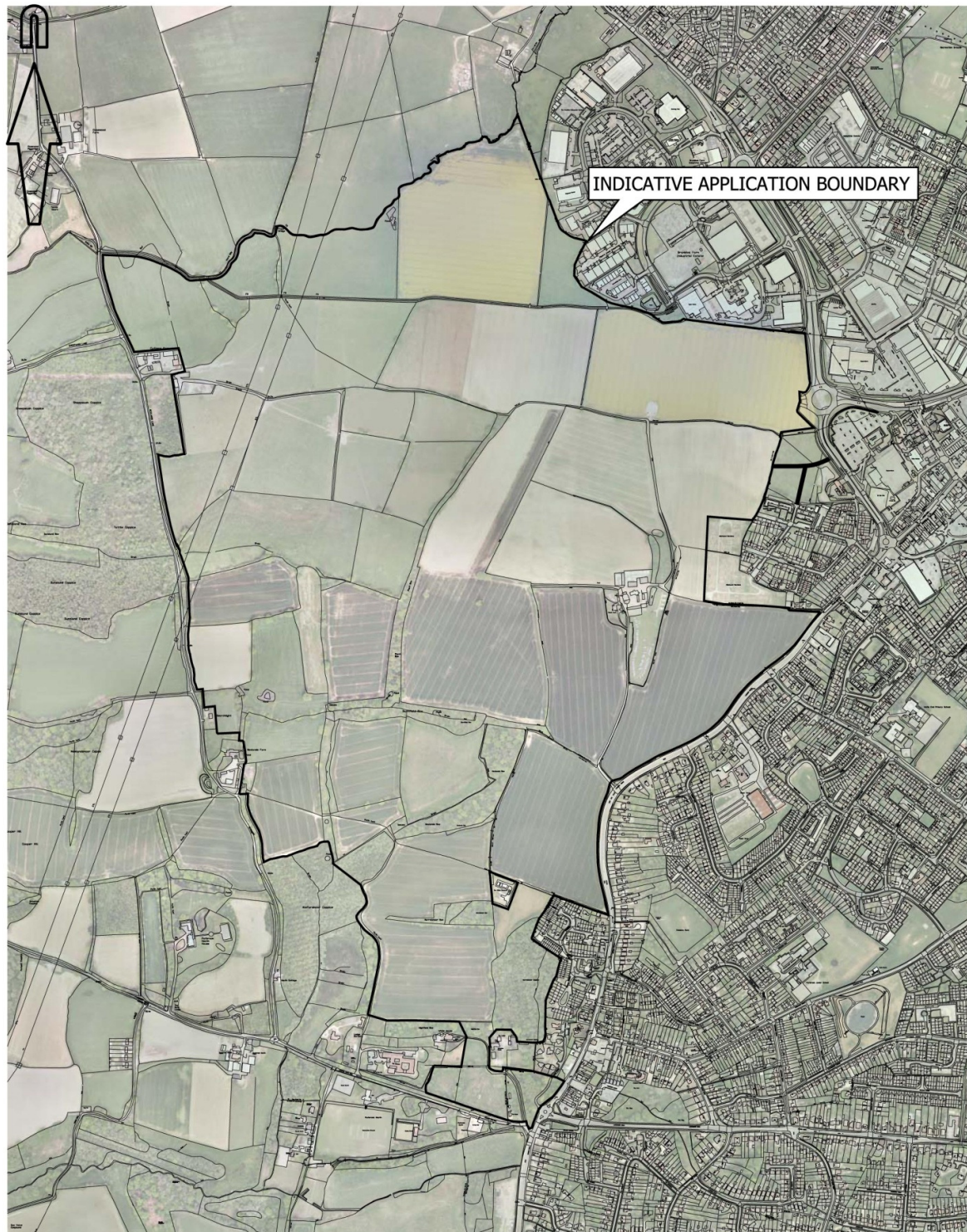


Figure 1.2 **Ordnance Survey Plan** (Mayer Brown Ltd Ordnance Survey licence number 100002189)

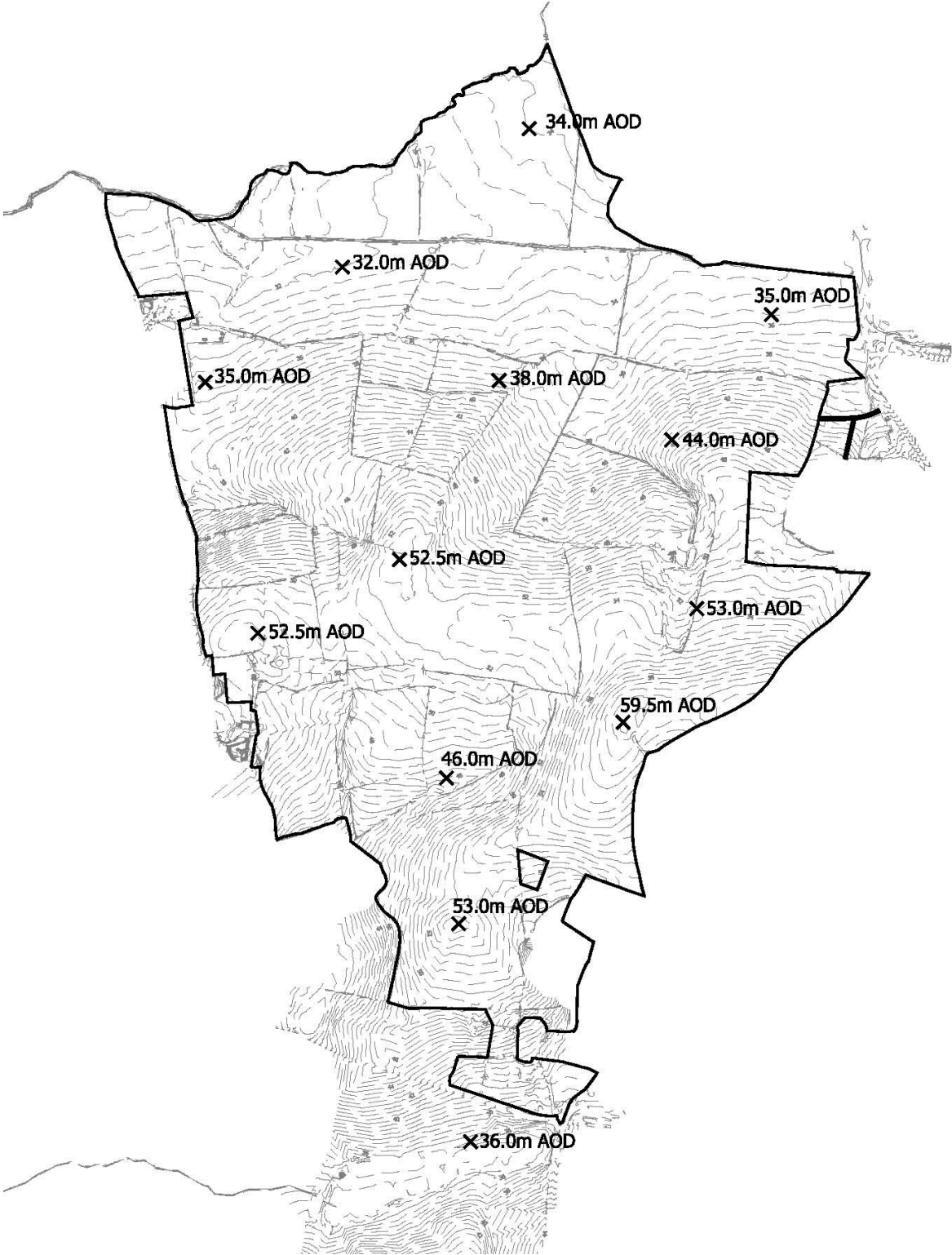


Figure 1.3 Existing Site Contours Plan

2. EXISTING SURFACE WATER DRAINAGE, GEOLOGY & HYDROGEOLOGY

- 2.1 The two main receiving waters for run-off from the development site are North Purbrook Stream to the south, and the River Wallington in the central area of the site. Please see **Figure 2.1** of this Report for a location plan of the existing main watercourses.
- 2.2 Southern Water records indicate that there are no adopted surface water drainage structures on the site. Surface water sewers are located within London Road and within existing urban areas adjacent to the site.
- 2.3 The current land use is farming, both arable and grazing. The proportion of impervious areas is very low and existing run-off is assumed as Greenfield. **Figure 2.2** gives a plan of the watercourses, with the main identified catchment areas and discharge points from the site shown.
- 2.4 The existing site is not located within a Groundwater Protection Zone, as defined by the Environment Agency's indicative groundwater source protection zone map.
- 2.5 The site has been the subject of several previous studies and investigations in 2004, 2007 and 2008. The most recent ground investigation was undertaken by Card Geotechnics in 2009/2010 (**Ref. 1**). The 2010 report summarises the available information and supplements it with the results of recent additional site specific investigation across the proposed development site.
- 2.6 Based on the infiltration tests carried out in the ground investigation, the site is generally not suitable for infiltration drainage, as the predominant soil type is clay and groundwater levels over a seasonal period can be high in places.



Figure 2.1 Existing Site Main Watercourses (Mayer Brown Ltd Ordnance Survey licence number 100002189)

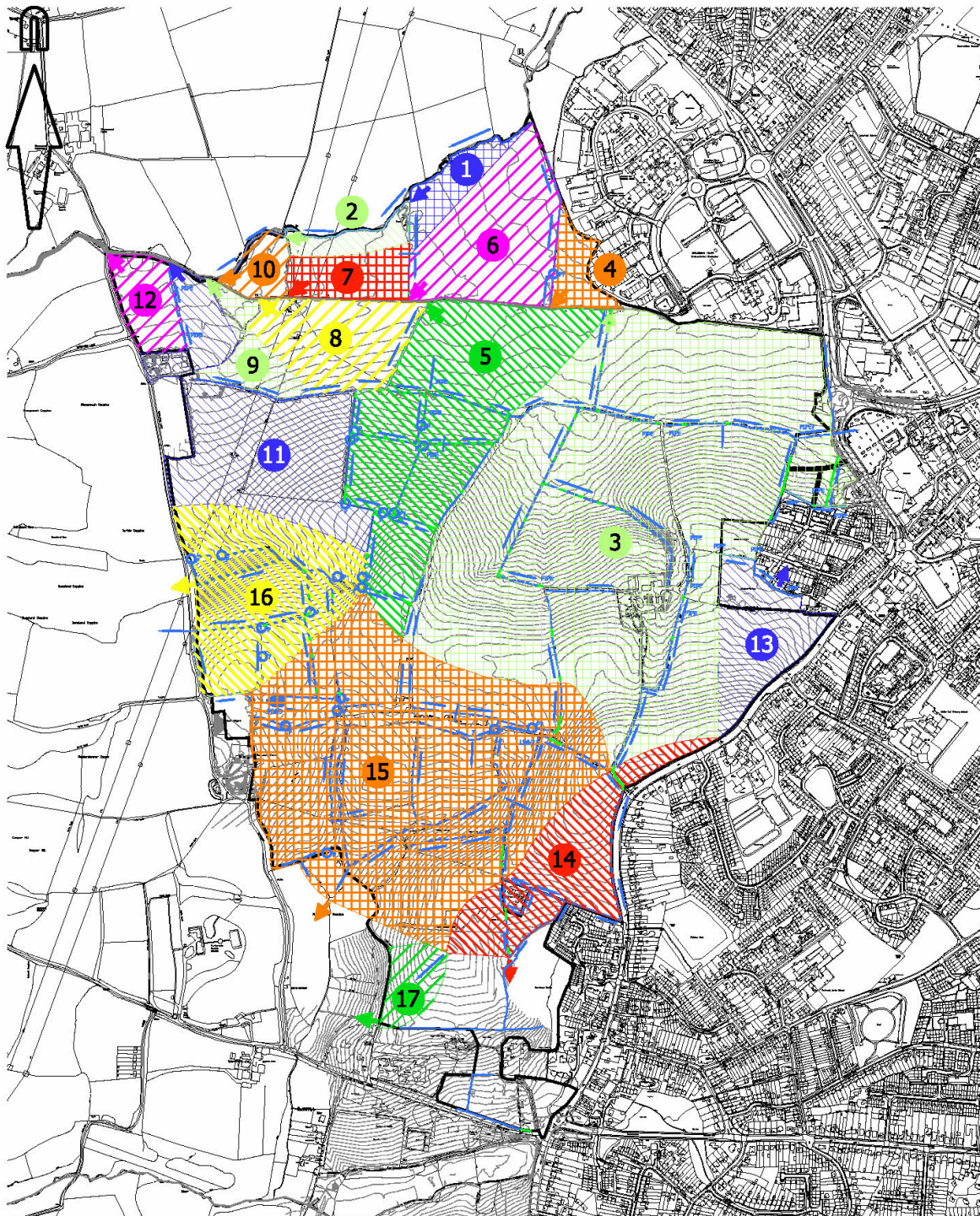


Figure 2.2 Existing Watercourses & Main Catchment Areas (Mayer Brown Ltd Ordnance Survey licence number 100002189)

3. EXISTING SITE RATES & VOLUMES OF RUN-OFF

- 3.1 The site is generally not suitable for infiltration drainage, as the predominant soil type is clay and groundwater levels over a seasonal period can be high in places. The existing site consists of approximately 209 hectares of fields and areas of woodland, which exhibits Greenfield run-off rates.
- 3.2 Greenfield run-off rates for the site are based on the Institute of Hydrology 124 Report (Ref. 2).
- 3.3 $QBAR = 0.00108 \cdot AREA^{0.89} \cdot SAAR^{1.17} \cdot SOIL^{2.17}$
- 3.4 $QBAR = 0.00108 \times 0.50^{0.89} \times 790^{1.17} \times 0.452^{2.17}$
- 3.5 Therefore, $QBAR = 0.253 \text{ m}^3/\text{s}$ or 253 l/s for 50 Ha.
- 3.6 This equates to 5.06 l/s/Ha .
- 3.7 Pro-rating this to the existing site area of 209 Ha results in a $QBAR = 1,057 \text{ l/s}$.
- 3.8 The above values of AREA and SAAR are taken from the FEH CD Rom (Ref. 3), whilst the value for SOIL is taken from The Wallingford Procedure for Europe (Ref. 4).

Return Period (Years)	Calculated Discharge Rate (l/s/Ha)	Calculated Site Discharge (l/s)
Calculated Mean Annual Flood (QBAR)	5.06	1,057
1 in 2	4.40	920
1 in 5	6.40	1,338
1 in 10	8.10	1,693
1 in 30	10.00	2,090
1 in 50	13.10	2,738
1 in 100	15.96	3,336

Table 3.1: Calculated Existing Site Greenfield Run-off Rates

- 3.9 This provides a 'Mean Annual Flood' to which a Flood Studies Report (Ref. 5) regional growth curve may be applied to derive the appropriate discharge for increasing return periods. The Greenfield run-off rates for varying return periods are outlined in **Table 3.1**

- 3.10 The SUDS surface water drainage strategy will be designed in accordance with CIRIA C697 – The SUDS Manual (**Ref. 6**). This requires that the SUDS strategy considers the run-off volume from the Proposed Development site. It suggests that the 6 hour 100 year storm event should be considered, with regard to providing long-term storage for the volume of surface water run-off, if the required growth curves are used as a basis for the design discharge rate.
- 3.11 Greenfield volume run-off for the 6 hour, 1 in 100 year event using the Fixed PR method.
- 3.12 Run-off Volume = Standard Percentage run-off (SPR) x AREA x Rainfall Depth.
- 3.13 Run-off Volume = $0.49 \times 209 \text{ Ha} \times 67.8 \text{ mm} = 69,434 \text{ m}^3$.
- 3.14 The above values of SPR and Rainfall depth are taken from the FEH CD Rom.
- 3.15 The difference between the calculated Greenfield run-off volume and the calculated development volume should be retained on site and either infiltrate to ground or be released at a rate no greater than 2.0 l/s/Ha. This is known as long-term storage.
- 3.16 However, CIRIA C697 permits an alternative, simpler approach, which is to attenuate all flows to the QBAR rate for all return periods up to 1 in 100 years. This is the approach to be taken at Newlands as it enables a more localised approach, which will be simpler to manage when development plots are sold on.

4. PROPOSED DEVELOPMENT

- 4.1 The Proposed Development land use plan layout is contained in **Figure 4.1** of this Report.
- 4.2 Assessment is being made of up to 2,650 no. residential dwellings (C3 Use Class) including affordable housing; land to provide for employment uses of up to 19.25Ha (B1, B2 and B8 Use Class); mixed uses including residential (incorporated above), retail (A1 Use Class), restaurant/takeaway (A3/A5 Use Class), a public house (A4 Use Class), community uses (D2 Use Class), and land for healthcare uses (D1 Use Class); land for two primary schools (D1 Use Class); land for allotments; land for a cemetery; open space; associated infrastructure; and access.

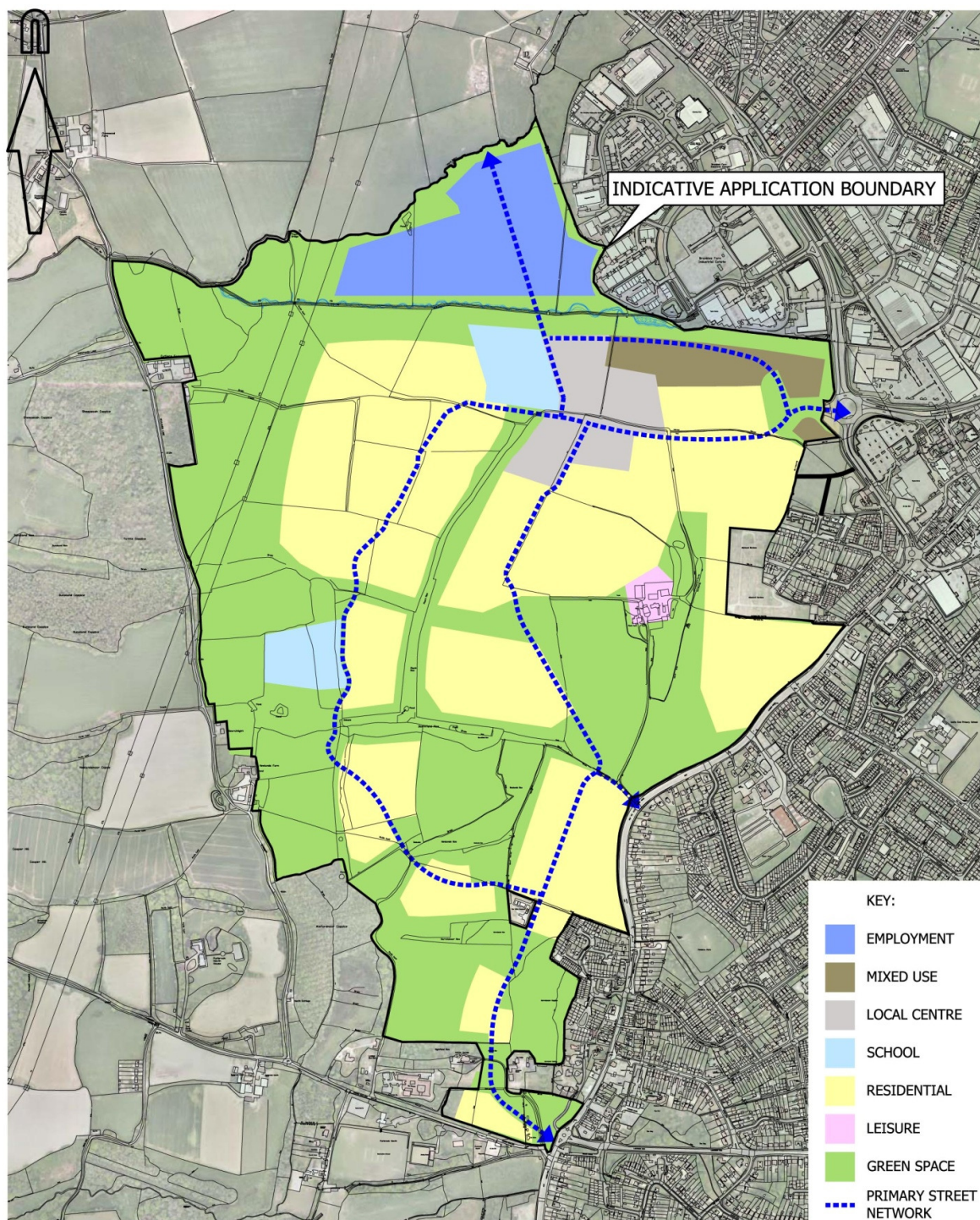


Figure 4.1 Proposed Development Land Use Plan (Mayer Brown Ltd Ordnance Survey licence number 100002189)

5. PROPOSED SURFACE WATER DRAINAGE STRATEGY

- 5.1 The existing site is predominantly farmland, with a rainfall run-off equivalent to 'Greenfield'. The proposed uses will incorporate a large proportion of impervious surface with high surface water drainage standards. Greenfield run-off rates have been calculated for various return periods using Institute of Hydrology Report 124 and Flood Studies Report regional growth curves (**Refs 3 & 5**).
- 5.2 The assumption being made currently for drainage system design purposes is that rainfall intensity will increase with climate change. The climate change value to be applied to this development has been discussed with and approved by the Environment Agency for the design of the surface water drainage system. For the purpose of modelling the outline SUDS strategy design, a sensitivity test that allows for a 30% increase in rainfall intensity has been assumed.
- 5.3 Attenuation of surface water will be required on-site to ensure that despite the increase in impermeable surfaces, the site discharge does not increase up to a design storm with a return period of 1 in 100 years plus 30% increase in rainfall intensity (not 30% increase in return period or storage volume). The site discharge rate for the 1 in 2 year return period must not exceed 4.40 l/s/ha. For all higher return periods up to the 1 in 100 year storm event, the discharge rate must not exceed 5.06 l/s/ha (QBAR).
- 5.4 The proposed drainage strategy will be designed to incorporate the principles of sustainable drainage at a site infrastructure level. This means that although the development plots will typically be traditionally drained, they will outfall to a SUDS system prior to outfall to the receiving waters. The measures currently under consideration include swales, attenuation basins, porous paving (with no significant infiltration to the underlying geology), ponds and wetlands.
- 5.5 The proposed development will be designed to current best practice for both piped drainage (Part H of the Building Regulations) (**Ref. 7**), adoptable sewers (Sewers for Adoption 6th Edition) (**Ref. 8**) and Sustainable Drainage (CIRIA C697 – The SUDS Manual) (**Ref. 6**), and any subsequent revisions or further publications of best practice.
- 5.6 Based on the infiltration tests carried out in the ground investigation, the site is generally not suitable for infiltration drainage, as the predominant soil type is clay and groundwater levels over a seasonal period can be high in places.
- 5.7 The principal aims of SUDS are to limit the hydrological impact of the development and provide opportunities for amenity. This is achieved by designing the drainage system to

mimic as far as practical the response to rainfall of the pre-development situation. The SUDS system at Newlands will:

- Limit the rainfall run-off rate of the development;
- Limit the rainfall volume of the development;
- Ensure a good water quality of rainfall run-off from the development;
- Provide opportunities for ecological enhancement, leisure and amenity.

Principles:

- 5.8 There are layers of SUDS providing different functions which are selected to be appropriate to the geology on site and will vary across the site depending on topography and character. The incorporation of SUDS is integral to the design process, and should be considered by Developers and their Consultants from the very first concept sketches.

Source Controls

- 5.9 The first level of SUDS is aimed at providing initial pollution treatment and limiting run-off from the first 5mm of rainfall. This is referred to as 'interception storage' and should ideally be as close to the 'source' of the run-off as practical. These serve roofs, paved areas, car parking and roads.

Roofs:

- 5.10 Roofs can be treated by substituting traditional roof coverings with 'green' or 'brown' roof coverings. These are particularly well suited to apartments and non-residential roofs. Where traditional roof coverings are used, there should be a purpose designed SUDS feature between the roof and the main conveyance system. This could be a rubble drain or the sub-base of a pervious pavement. In addition, downpipes should be fitted with a proprietary low maintenance filter, 3P Rainus or similar, to exclude moss and leaves above ground.

Drives and private paved areas:

- 5.11 Wherever practical, these areas should be of pervious pavement construction with no direct infiltration to the sub-grade, such as pervious block paving, porous asphalt, decking laid with gaps between the boards of no fines aggregates. Where this is not practical, pervious areas should drain to a gravel trench, pervious pavement sub-base or bio-retention area, following any appropriate pre-treatment. The use of gullies and

channels are discouraged, unless no alternative is possible, where these are used, they should drain to a gravel trench, pervious pavement sub-base or bio-retention area.

Car Parking and Roads:

- 5.12 Car Parking and roads are the principal sources of diffuse pollution on a residential development. These derive from automotive fluids, car washing dirt and detergents, road salts and exhaust pollutants. As such the interception storage provision for these areas is of great importance. The precise treatment will depend on area usage, adoptability requirements, area character and topography. At house plot level, all uncovered car standing areas should be of pervious pavement construction. Wherever practical, car parking areas should be of pervious pavement construction. Where not practical, the surface should drain to swales, bio-retention areas or filter drains, following any appropriate pre-treatment. Gullies and channels should be avoided wherever possible, with surface run-off being direct to these areas. Roads should also drain to bio-retention areas, swales or filter drains, in some instances pervious pavements will be permitted in adoptable roads. The designers will need to take account of adoption requirements where appropriate.
- 5.13 Run-off from the car parking areas will be attenuated within areas of porous pavements where possible. These areas of permeable paving will have no direct infiltration to the sub-grade.
- 5.14 Permeable paving with no infiltration to the sub-grade allows for the complete capture of the water using an impermeable, flexible membrane placed on top of the formation level and up the sides of the sub-base. A series of perforated pipes or fin-drains are placed on top of the impermeable membrane to transmit the water to the drainage network.
- 5.15 A permeable pavement is an effective SUDS method of providing a structural pavement suitable for pedestrians and vehicular traffic whilst allowing water to pass straight through the surface into the pavement construction for temporary storage, storm attenuation and dispersal to the ground, or collection. In this case the surface water for these roof areas and private car parking areas would be conveyed towards the above ground localised SUDS attenuation features.
- 5.16 Permeable paving would be beneficial as it allows for a reduction of the occurrence of runoff flooding. Permeable paving would also improve water quality by filtration through the pavement as they are an effective 'first flush' method of removing total suspended solids, heavy metals and hydrocarbons from runoff.

- 5.17 It is assumed that the primary roads will be adopted. Permeable paving for primary roads is not considered to be appropriate by Hampshire County Council. Therefore, the primary roads for the proposed development are proposed to be constructed using impermeable construction methods. Surface water run-off from these adoptable carriageway areas will be discussed with the Highways Authority during the Section 38 negotiations.
- 5.18 However, lower trafficked residential streets within the Proposed Development can be constructed using permeable paving construction methods, as Hampshire County Council are willing to adopt permeable paving on these highway areas. Hampshire County Council requires the use of permeable blocks rather than porous asphalt. These areas of pervious pavement construction will have no direct infiltration to the sub-grade.
- 5.19 Swales are proposed adjacent to some of the proposed internal highways. Swales are linear vegetated drainage features in which surface water can be stored or conveyed.
- 5.20 Due to the gradient of the existing topography along the proposed horizontal alignment of some of the swale features, it may be necessary to provide check dams at regular intervals along the swale alignment. Check dams will help to achieve the shallow gradients that are preferable in swale design. This will also increase the storage capacity of the swale and promote low velocities to allow much of the suspended particulate load in the storm water to settle out, thus providing effective pollutant removal.

Strategic SUDS

- 5.21 This refers to the principal landscaped SUDS features, which provide the bulk of the attenuation, ecology, amenity and leisure functions.
- 5.22 The SUDS strategy will split the Proposed Development into smaller catchment areas, relative to the proposed plot areas. Each of these catchment areas will be treated separately, with its own treatment train and localised attenuation feature. Flow control devices will be incorporated into each attenuation feature, which will restrict discharge rates to existing Greenfield run-off rates. Where possible these attenuation features will be located outside the plot areas, in adjacent landscaped areas.
- 5.23 Discharge rates from these localised attenuation SUDS features will be restricted to annual Greenfield run-off rates (QBAR). Overflow features will be provided within these localised attenuation features.

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- 5.24 'Site Controls' will typically serve development areas 2Ha to 5Ha in size. On Newlands these will typically take the form of ponds, landscaped basins and wetlands. Some features will be large enough to mix elements of these. The form of these and principal functions may vary depending on the character areas.
- 5.25 'Regional Controls' will be sited prior to the final discharge point serving multiple development areas greater than 5Ha; these will provide the final pollution treatment and buffering of the discharge from entire catchment areas.
- 5.26 Wetlands are proposed as the secondary SUDS features for the final downstream catchment areas of the site.
- 5.27 Wetlands provide both storm water attenuation and treatment. They comprise marshy areas, covered almost entirely in aquatic vegetation. Wetlands detain flows for an extended period to allow sediments to settle, and remove contaminants by facilitating adhesion to vegetation and aerobic decomposition. They also provide significant ecological benefits. Final discharge rates from these wetland areas will not exceed the annual Greenfield run-off rate (QBAR), up to the 1 in 100 year storm event, allowing for the detrimental effects of climate change.
- 5.28 The proposed outline SUDS drainage design will also be designed in accordance with the recommended guidance outlined in the Code for Sustainable Homes (**Ref. 9**) document. However, rainwater harvesting is only currently proposed for the irrigation of proposed allotment areas and not for household purposes.
- 5.29 The proposed outline SUDS strategy is proposed as a hybrid application of the detailed drainage design of Phase One of the development, and an outline design for the remainder of the Proposed Development site. Further detailed surface water drainage designs will be provided for each of the proposed phases, and they will be based on the detailed drainage design principles of Phase One. These detailed drainage designs will be provided relative to the build out rate of future phases of development.
- 5.30 **Appendix A** outlines a plan of the location of proposed attenuation features, for the outline SUDS drainage strategy for the Proposed Development site (large size copy of this figure can be found in **Appendix A**; please refer to drawing GTWVILLE2/DR/0001).
- 5.31 This figure outlines the indicative layout of the proposed attenuation features and conveyance swales (proposed highway swales are not shown). This layout is indicative and attenuation sizes and shapes are subject to change depending on the detailed design of each phase of future development.
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- 5.32 The outline strategy indicates approximate indicative size and location of SUDS features, based on the topography and a rule of thumb size of 8% of development, which is based on previous detailed calculations.
- 5.33 The SUDS strategy does not attempt to show areas of permanent water, which will be determined during the detailed design of each development phase.
- 5.34 The SUDS will generally be designed to provide biodiversity and accessibility. However, the ecological mitigation for the site is not reliant on the SUDS as additional specific features will be provided, as described by the Ecologists in the Environment Agency.
- 5.35 Catchment areas and flow arrows are also shown, which illustrate the current proposed catchment plot areas that drain to the corresponding proposed attenuation features. These catchment areas define the area of attenuation required, with the attenuation areas ideally located in the low area of the catchment plot, to achieve gravity flows.
- 5.36 Therefore, the proposed attenuation areas are mainly constraint by existing topographical levels, the extent of available public open space areas within the master plan and available outfalls from the proposed attenuation areas to existing watercourses, proposed conveyance sales or proposed surface water manholes.
- 5.37 Catchment areas are also subject to change to facilitate future development plots in the detailed design stage, depending on the above location constraints.
- 5.38 Some catchment plots are currently shown as having adjacent open space SUDS areas that are less than the 8% of the catchment plot areas, where attenuation features are likely to be located. In these circumstances, downstream attenuation features will be made larger to accommodate the overflow from the upstream attenuation feature. These features will be linked in a cascading manner.
- 5.39 Extensive, formal liaison has taken place since inception of the project, in the form of SUDS 'Working' and 'Steering' groups. The working group meetings take place on a regular basis and include technical representatives of Grainger Plc, Mayer Brown, the EA, Southern Water, Winchester City Council, Havant Borough Council and Hampshire County Council. These meetings are used to develop acceptable drainage strategies which incorporate the ideologies of SUDS.
- 5.40 In this way, the surface water drainage design for the site has been developed in accordance with all relevant standards and guidelines.
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- 5.41 The steering group has also provided a forum to discuss the adoption issues of SUDS. The adoption mechanism for SUDS on the site has been approved in principle with the Local Authorities. However, the new Flood and Water Management Act 2010 (**Ref. 10**) will provide guidance on the adoption mechanism and maintenance of SUDS.
- 5.42 Public sewers will be the responsibility of Southern Water. Sustainable drainage features in public areas will be the future responsibility of an approving body as defined in Schedule 3, Paragraph 6 of the Flood and Water Management Act 2010, published in April 2010. This currently makes Hampshire County Council responsible for the future adoption and maintenance of public SUDS.
- 5.43 Private SUDS within individual property curtilages will be the responsibility of the property owner. Shared private SUDS, such as shared pervious drives, will be designed such that areas demised to individual properties can be maintained by those properties.

APPENDIX A: DRAWING GTWVILLE2/DR/0001 – SUDS CONCEPT LAYOUT

Mayer Brown Limited				Page 1	
Lion House Oriental Road Woking GU22 8AP		Berewood Development Western Network Pond 3A			
Date 22/01/2019 File Cascade Phase 3B and 8...		Designed by A May Checked by RHA			
Micro Drainage		Source Control 2017.1.2			
<u>Cascade Summary of Results for Source Control Phase 3A 1 in 30.srcx</u>					
Upstream Structures		Outflow To		Overflow To	
Phase 8 Source Control Pond 8D 1 in 30.srcx		Swale 3B-1 1 in 30.srcx		Swale 3B-1 1 in 30.srcx	
Phase 8 Source Control Pond 8C 1 in 30.srcx					
Phase 8 Source Control Pond 8B 1 in 30.srcx					
Phase 8 Source Control Pond 8A 1 in 30.srcx					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	47.722	0.222	2.6	134.6	O K
30 min Summer	47.778	0.278	2.6	172.8	O K
60 min Summer	47.843	0.343	2.6	220.8	O K
120 min Summer	47.920	0.420	2.6	280.1	O K
180 min Summer	47.969	0.469	2.6	320.4	O K
240 min Summer	48.005	0.505	2.6	351.6	O K
360 min Summer	48.059	0.559	2.6	398.8	O K
480 min Summer	48.098	0.598	2.6	434.4	O K
600 min Summer	48.128	0.628	2.6	463.1	O K
720 min Summer	48.153	0.653	2.6	487.2	O K
960 min Summer	48.160	0.660	2.6	493.4	O K
1440 min Summer	48.156	0.656	2.6	489.7	O K
2160 min Summer	48.131	0.631	2.6	465.8	O K
2880 min Summer	48.106	0.606	2.6	442.0	O K
4320 min Summer	48.085	0.585	2.6	422.9	O K
5760 min Summer	48.060	0.560	2.6	399.9	O K
7200 min Summer	48.033	0.533	2.6	375.7	O K
8640 min Summer	48.005	0.505	2.6	350.9	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
15 min Summer	63.289	0.0	125.2	23	
30 min Summer	40.885	0.0	160.7	38	
60 min Summer	26.412	0.0	222.0	68	
120 min Summer	17.062	0.0	286.5	128	
180 min Summer	13.214	0.0	331.5	188	
240 min Summer	11.023	0.0	366.1	246	
360 min Summer	8.536	0.0	411.0	366	
480 min Summer	7.121	0.0	419.3	486	
600 min Summer	6.186	0.0	410.9	606	
720 min Summer	5.515	0.0	398.6	726	
960 min Summer	4.378	0.0	386.0	966	
1440 min Summer	3.162	0.0	365.9	1444	
2160 min Summer	2.284	0.0	697.2	1884	
2880 min Summer	1.813	0.0	730.1	2200	
4320 min Summer	1.357	0.0	718.9	2988	
5760 min Summer	1.104	0.0	911.5	3800	
7200 min Summer	0.941	0.0	970.9	4608	
8640 min Summer	0.826	0.0	1022.0	5368	
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Lion House Oriental Road Woking GU22 8AP			Berewood Development Western Network Pond 3A			
Date 22/01/2019 File Cascade Phase 3B and 8...			Designed by A May Checked by RHA			
Micro Drainage			Source Control 2017.1.2			
<u>Cascade Summary of Results for Source Control Phase 3A 1 in 30.srcx</u>						
	Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
	10080 min Summer	47.976	0.476	2.6	326.6	O K
	15 min Winter	47.746	0.246	2.6	150.9	O K
	30 min Winter	47.807	0.307	2.6	193.8	O K
	60 min Winter	47.879	0.379	2.6	247.9	O K
	120 min Winter	47.963	0.463	2.6	315.2	O K
	180 min Winter	48.017	0.517	2.6	361.3	O K
	240 min Winter	48.057	0.557	2.6	397.2	O K
	360 min Winter	48.117	0.617	2.6	452.2	O K
	480 min Winter	48.161	0.661	2.6	494.5	O K
	600 min Winter	48.194	0.694	2.6	528.0	O K
	720 min Winter	48.221	0.721	2.6	555.3	O K
	960 min Winter	48.231	0.731	2.6	564.9	O K
	1440 min Winter	48.232	0.732	2.6	566.4	O K
	2160 min Winter	48.214	0.714	2.6	548.0	O K
	2880 min Winter	48.186	0.686	2.6	519.3	O K
	4320 min Winter	48.158	0.658	2.6	492.0	O K
	5760 min Winter	48.117	0.617	2.6	452.3	O K
	7200 min Winter	48.070	0.570	2.6	408.8	O K
	8640 min Winter	48.022	0.522	2.6	365.7	O K
	10080 min Winter	47.974	0.474	2.6	324.5	O K
	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
	10080 min Summer	0.740	0.0	1066.0	6152	
	15 min Winter	63.289	0.0	140.1	23	
	30 min Winter	40.885	0.0	178.2	37	
	60 min Winter	26.412	0.0	248.6	66	
	120 min Winter	17.062	0.0	320.1	126	
	180 min Winter	13.214	0.0	368.7	184	
	240 min Winter	11.023	0.0	402.6	244	
	360 min Winter	8.536	0.0	421.1	362	
	480 min Winter	7.121	0.0	407.5	480	
	600 min Winter	6.186	0.0	393.7	598	
	720 min Winter	5.515	0.0	383.0	712	
	960 min Winter	4.378	0.0	372.4	946	
	1440 min Winter	3.162	0.0	357.0	1402	
	2160 min Winter	2.284	0.0	761.7	2056	
	2880 min Winter	1.813	0.0	754.2	2628	
	4320 min Winter	1.357	0.0	699.8	3292	
	5760 min Winter	1.104	0.0	1020.7	4208	
	7200 min Winter	0.941	0.0	1087.2	5040	
	8640 min Winter	0.826	0.0	1144.4	5872	
	10080 min Winter	0.740	0.0	1194.0	6656	
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Lion House Oriental Road Woking GU22 8AP			Berewood Development Western Network Pond 3B-1				
Date 22/01/2019 File Cascade Phase 3B and 8...			Designed by A May Checked by RHA				
Micro Drainage				Source Control 2017.1.2			
<u>Cascade Summary of Results for Swale 3B-1 1 in 30.srcx</u>							
Upstream Structures				Outflow To		Overflow To	
Source Control Phase 3A 1 in 30.srcx				(None)		Swale 3B-2 1 in 30.srcx	
Phase 8 Source Control Pond 8D 1 in 30.srcx							
Phase 8 Source Control Pond 8C 1 in 30.srcx							
Phase 8 Source Control Pond 8B 1 in 30.srcx							
Phase 8 Source Control Pond 8A 1 in 30.srcx							
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	44.951	0.818	18.3	0.0	18.3	20.0	O K
30 min Summer	44.968	0.835	18.5	0.0	18.5	21.0	O K
60 min Summer	45.021	0.888	19.1	0.0	19.1	24.5	O K
120 min Summer	45.086	0.953	19.8	0.0	19.8	29.0	O K
180 min Summer	45.122	0.989	20.2	0.0	20.2	31.8	O K
240 min Summer	45.144	1.011	20.5	0.0	20.5	33.5	Flood Risk
360 min Summer	45.166	1.033	20.7	0.0	20.7	35.3	Flood Risk
480 min Summer	45.172	1.039	20.8	0.0	20.8	35.8	Flood Risk
600 min Summer	45.170	1.037	20.7	0.0	20.7	35.6	Flood Risk
720 min Summer	45.165	1.032	20.7	0.0	20.7	35.2	Flood Risk
960 min Summer	45.139	1.006	20.4	0.0	20.4	33.1	Flood Risk
1440 min Summer	45.116	0.983	20.2	0.0	20.2	31.3	O K
2160 min Summer	45.103	0.970	20.0	0.0	20.0	30.3	O K
2880 min Summer	45.094	0.961	19.9	0.0	19.9	29.7	O K
4320 min Summer	45.085	0.952	19.8	0.0	19.8	29.0	O K
5760 min Summer	45.078	0.945	19.7	0.0	19.7	28.5	O K
7200 min Summer	45.071	0.938	19.7	0.0	19.7	28.0	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)		
15 min Summer	63.289	0.0	594.4	0.0	214		
30 min Summer	40.885	0.0	767.0	0.0	322		
60 min Summer	26.412	0.0	1006.0	0.0	64		
120 min Summer	17.062	0.0	1299.6	0.0	92		
180 min Summer	13.214	0.0	1508.6	0.0	124		
240 min Summer	11.023	0.0	1675.1	0.0	158		
360 min Summer	8.536	0.0	1931.8	0.0	226		
480 min Summer	7.121	0.0	2095.8	0.0	294		
600 min Summer	6.186	0.0	2178.6	0.0	358		
720 min Summer	5.515	0.0	2250.0	0.0	422		
960 min Summer	4.378	0.0	2313.5	0.0	524		
1440 min Summer	3.162	0.0	2401.5	0.0	746		
2160 min Summer	2.284	0.0	3139.8	0.0	1112		
2880 min Summer	1.813	0.0	3314.8	0.0	1492		
4320 min Summer	1.357	0.0	3620.3	0.0	2256		
5760 min Summer	1.104	0.0	4059.7	0.0	3064		
7200 min Summer	0.941	0.0	4326.5	0.0	3960		
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File Cascade Phase 3B and 8...

Berewood Development

Western Network

Pond 3B-1

Designed by A May

Checked by RHA

Micro Drainage

Source Control 2017.1.2

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Cascade Summary of Results for Swale 3B-1 1 in 30.srcx

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max E Outflow (l/s)	Max Volume (m³)	Status
8640 min Summer	45.041	0.908	19.3	0.0	19.3	25.8	O K
10080 min Summer	44.989	0.856	18.7	0.0	18.7	22.3	O K
15 min Winter	44.960	0.827	18.4	0.0	18.4	20.5	O K
30 min Winter	44.983	0.850	18.7	0.0	18.7	22.0	O K
60 min Winter	45.057	0.924	19.5	0.0	19.5	26.9	O K
120 min Winter	45.120	0.987	20.2	0.0	20.2	31.6	O K
180 min Winter	45.154	1.021	20.6	0.0	20.6	34.3	Flood Risk
240 min Winter	45.173	1.040	20.8	0.0	20.8	35.8	Flood Risk
360 min Winter	45.186	1.053	20.9	0.0	20.9	36.9	Flood Risk
480 min Winter	45.185	1.052	20.9	0.0	20.9	36.9	Flood Risk
600 min Winter	45.178	1.045	20.8	0.0	20.8	36.3	Flood Risk
720 min Winter	45.168	1.035	20.7	0.0	20.7	35.4	Flood Risk
960 min Winter	45.126	0.993	20.3	0.0	20.3	32.1	O K
1440 min Winter	45.102	0.969	20.0	0.0	20.0	30.2	O K
2160 min Winter	45.092	0.959	19.9	0.0	19.9	29.5	O K
2880 min Winter	45.088	0.955	19.9	0.0	19.9	29.2	O K
4320 min Winter	45.086	0.953	19.8	0.0	19.8	29.1	O K
5760 min Winter	45.070	0.937	19.7	0.0	19.7	27.9	O K
7200 min Winter	44.983	0.850	18.7	0.0	18.7	21.9	O K
8640 min Winter	44.879	0.746	17.4	0.0	17.4	15.8	O K
10080 min Winter	44.791	0.658	16.3	0.0	16.3	11.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
8640 min Summer	0.826	0.0	4556.8	0.0	4664
10080 min Summer	0.740	0.0	4758.9	0.0	5336
15 min Winter	63.289	0.0	665.5	0.0	253
30 min Winter	40.885	0.0	857.2	0.0	36
60 min Winter	26.412	0.0	1126.8	0.0	64
120 min Winter	17.062	0.0	1455.0	0.0	98
180 min Winter	13.214	0.0	1687.3	0.0	138
240 min Winter	11.023	0.0	1868.9	0.0	176
360 min Winter	8.536	0.0	2106.8	0.0	252
480 min Winter	7.121	0.0	2215.0	0.0	324
600 min Winter	6.186	0.0	2311.4	0.0	396
720 min Winter	5.515	0.0	2399.4	0.0	468
960 min Winter	4.378	0.0	2471.5	0.0	600
1440 min Winter	3.162	0.0	2572.5	0.0	716
2160 min Winter	2.284	0.0	3497.6	0.0	1088
2880 min Winter	1.813	0.0	3649.9	0.0	1492
4320 min Winter	1.357	0.0	3870.2	0.0	2372
5760 min Winter	1.104	0.0	4547.9	0.0	3296
7200 min Winter	0.941	0.0	4845.7	0.0	3960
8640 min Winter	0.826	0.0	5101.8	0.0	4592
10080 min Winter	0.740	0.0	5329.2	0.0	5248

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Lion House Oriental Road Woking GU22 8AP							
Date 22/01/2019 22:59 File Cascade Phase 3B and 8...	Designed by rakerman Checked by						
Micro Drainage	Source Control 2017.1.2						
<u>Cascade Summary of Results for Swale 3B-2 1 in 30.srcx</u>							
Upstream Structures	Outflow To	Overflow To					
Swale 3B-1 1 in 30.srcx Source Control Phase 3A 1 in 30.srcx Phase 8 Source Control Pond 8D 1 in 30.srcx Phase 8 Source Control Pond 8C 1 in 30.srcx Phase 8 Source Control Pond 8B 1 in 30.srcx Phase 8 Source Control Pond 8A 1 in 30.srcx	(None)	Swale 3B-3 1 in 30.srcx					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max E Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	43.935	0.521	14.3	0.0	14.3	6.3	O K
30 min Summer	43.927	0.513	14.2	0.0	14.2	6.1	O K
60 min Summer	43.884	0.470	13.5	0.0	13.5	4.9	O K
120 min Summer	43.802	0.388	12.1	0.0	12.1	3.0	O K
180 min Summer	43.736	0.322	10.9	0.0	10.9	1.9	O K
240 min Summer	43.685	0.271	9.8	0.0	9.8	1.3	O K
360 min Summer	43.617	0.203	8.2	0.0	8.2	0.6	O K
480 min Summer	43.576	0.162	7.0	0.0	7.0	0.4	O K
600 min Summer	43.553	0.139	6.1	0.0	6.1	0.2	O K
720 min Summer	43.542	0.128	5.5	0.0	5.5	0.2	O K
960 min Summer	43.524	0.110	4.3	0.0	4.3	0.1	O K
1440 min Summer	43.504	0.090	3.1	0.0	3.1	0.1	O K
2160 min Summer	43.487	0.073	2.3	0.0	2.3	0.0	O K
2880 min Summer	43.476	0.062	1.8	0.0	1.8	0.0	O K
4320 min Summer	43.468	0.054	1.4	0.0	1.4	0.0	O K
5760 min Summer	43.464	0.050	1.2	0.0	1.2	0.0	O K
7200 min Summer	43.460	0.046	1.0	0.0	1.0	0.0	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)		
15 min Summer	63.289	0.0	14.4	0.0	17		
30 min Summer	40.885	0.0	18.6	0.0	25		
60 min Summer	26.412	0.0	24.0	0.0	40		
120 min Summer	17.062	0.0	31.0	0.0	72		
180 min Summer	13.214	0.0	36.0	0.0	100		
240 min Summer	11.023	0.0	40.0	0.0	130		
360 min Summer	8.536	0.0	46.5	0.0	190		
480 min Summer	7.121	0.0	51.7	0.0	248		
600 min Summer	6.186	0.0	56.1	0.0	310		
720 min Summer	5.515	0.0	60.1	0.0	368		
960 min Summer	4.378	0.0	63.6	0.0	492		
1440 min Summer	3.162	0.0	68.9	0.0	732		
2160 min Summer	2.284	0.0	74.6	0.0	1072		
2880 min Summer	1.813	0.0	79.0	0.0	1464		
4320 min Summer	1.357	0.0	88.6	0.0	2180		
5760 min Summer	1.104	0.0	96.1	0.0	2896		
7200 min Summer	0.941	0.0	102.4	0.0	3568		
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Lion House Oriental Road Woking GU22 8AP		
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Micro Drainage		Source Control 2017.1.2

<u>Cascade Summary of Results for Swale 3B-2 1 in 30.srcx</u>								
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Outflow (l/s)	Max Volume (m³)	Status	
8640 min Summer	43.457	0.043	0.9	0.0	0.9	0.0	O K	
10080 min Summer	43.455	0.041	0.8	0.0	0.8	0.0	O K	
15 min Winter	43.965	0.551	14.8	0.0	14.8	7.3	O K	
30 min Winter	43.941	0.527	14.4	0.0	14.4	6.5	O K	
60 min Winter	43.867	0.453	13.3	0.0	13.3	4.4	O K	
120 min Winter	43.739	0.325	11.0	0.0	11.0	2.0	O K	
180 min Winter	43.655	0.241	9.1	0.0	9.1	0.9	O K	
240 min Winter	43.603	0.189	7.8	0.0	7.8	0.5	O K	
360 min Winter	43.553	0.139	6.1	0.0	6.1	0.2	O K	
480 min Winter	43.536	0.122	5.1	0.0	5.1	0.2	O K	
600 min Winter	43.525	0.111	4.4	0.0	4.4	0.1	O K	
720 min Winter	43.517	0.103	3.9	0.0	3.9	0.1	O K	
960 min Winter	43.504	0.090	3.1	0.0	3.1	0.1	O K	
1440 min Winter	43.487	0.073	2.3	0.0	2.3	0.0	O K	
2160 min Winter	43.472	0.058	1.6	0.0	1.6	0.0	O K	
2880 min Winter	43.467	0.053	1.3	0.0	1.3	0.0	O K	
4320 min Winter	43.461	0.047	1.0	0.0	1.0	0.0	O K	
5760 min Winter	43.456	0.042	0.8	0.0	0.8	0.0	O K	
7200 min Winter	43.452	0.038	0.7	0.0	0.7	0.0	O K	
8640 min Winter	43.450	0.036	0.6	0.0	0.6	0.0	O K	
10080 min Winter	43.448	0.034	0.6	0.0	0.6	0.0	O K	

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
8640 min Summer	0.826	0.0	107.8	0.0	4352
10080 min Summer	0.740	0.0	112.6	0.0	5104
15 min Winter	63.289	0.0	16.1	0.0	17
30 min Winter	40.885	0.0	20.8	0.0	26
60 min Winter	26.412	0.0	26.8	0.0	42
120 min Winter	17.062	0.0	34.7	0.0	72
180 min Winter	13.214	0.0	40.3	0.0	100
240 min Winter	11.023	0.0	44.8	0.0	130
360 min Winter	8.536	0.0	52.1	0.0	186
480 min Winter	7.121	0.0	57.9	0.0	248
600 min Winter	6.186	0.0	62.9	0.0	306
720 min Winter	5.515	0.0	67.3	0.0	364
960 min Winter	4.378	0.0	71.2	0.0	488
1440 min Winter	3.162	0.0	77.1	0.0	738
2160 min Winter	2.284	0.0	83.6	0.0	1120
2880 min Winter	1.813	0.0	88.5	0.0	1508
4320 min Winter	1.357	0.0	99.3	0.0	2148
5760 min Winter	1.104	0.0	107.7	0.0	2816
7200 min Winter	0.941	0.0	114.7	0.0	3680
8640 min Winter	0.826	0.0	120.8	0.0	4304
10080 min Winter	0.740	0.0	126.2	0.0	4944

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Lion House Oriental Road Woking GU22 8AP		Berewood Development Wetsern Network Pond 3B-3			
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Micro Drainage		Source Control 2017.1.2			
<u>Cascade Summary of Results for Swale 3B-3 1 in 30.srcx</u>					
Upstream Structures		Outflow To Overflow To			
Swale 3B-2 1 in 30.srcx		(None)		(None)	
Swale 3B-1 1 in 30.srcx					
Source Control Phase 3A 1 in 30.srcx					
Phase 8 Source Control Pond 8D 1 in 30.srcx					
Phase 8 Source Control Pond 8C 1 in 30.srcx					
Phase 8 Source Control Pond 8B 1 in 30.srcx					
Phase 8 Source Control Pond 8A 1 in 30.srcx					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	42.793	0.317	29.3	1.8	O K
30 min Summer	42.737	0.261	28.4	1.1	O K
60 min Summer	42.672	0.196	22.5	0.6	O K
120 min Summer	42.631	0.155	16.1	0.3	O K
180 min Summer	42.611	0.135	12.8	0.2	O K
240 min Summer	42.598	0.122	10.9	0.2	O K
360 min Summer	42.582	0.106	8.5	0.1	O K
480 min Summer	42.572	0.096	7.1	0.1	O K
600 min Summer	42.565	0.089	6.2	0.1	O K
720 min Summer	42.559	0.083	5.5	0.1	O K
960 min Summer	42.550	0.074	4.4	0.0	O K
1440 min Summer	42.538	0.062	3.2	0.0	O K
2160 min Summer	42.529	0.053	2.3	0.0	O K
2880 min Summer	42.523	0.047	1.8	0.0	O K
4320 min Summer	42.517	0.041	1.4	0.0	O K
5760 min Summer	42.514	0.038	1.2	0.0	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
15 min Summer	63.289	0.0	14.4	15	
30 min Summer	40.885	0.0	18.6	22	
60 min Summer	26.412	0.0	24.0	36	
120 min Summer	17.062	0.0	31.0	66	
180 min Summer	13.214	0.0	36.0	96	
240 min Summer	11.023	0.0	40.0	126	
360 min Summer	8.536	0.0	46.5	186	
480 min Summer	7.121	0.0	51.7	246	
600 min Summer	6.186	0.0	56.1	304	
720 min Summer	5.515	0.0	60.1	364	
960 min Summer	4.378	0.0	63.6	492	
1440 min Summer	3.162	0.0	68.9	734	
2160 min Summer	2.284	0.0	74.6	1076	
2880 min Summer	1.813	0.0	78.9	1420	
4320 min Summer	1.357	0.0	88.6	2176	
5760 min Summer	1.104	0.0	96.1	2920	
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Lion House Oriental Road Woking GU22 8AP		Berewood Development Wetsern Network Pond 3B-3				
Date 22/01/2019 File Cascade Phase 3B and 8...		Designed by A May Checked by RHA				
Micro Drainage		Source Control 2017.1.2				
<u>Cascade Summary of Results for Swale 3B-3 1 in 30.srcx</u>						
Storm Event		Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
7200 min Summer		42.510	0.034	1.0	0.0	O K
8640 min Summer		42.507	0.031	0.8	0.0	O K
10080 min Summer		42.506	0.030	0.8	0.0	O K
15 min Winter		42.801	0.325	29.3	1.9	O K
30 min Winter		42.704	0.228	26.7	0.8	O K
60 min Winter		42.645	0.169	18.3	0.4	O K
120 min Winter		42.606	0.130	12.1	0.2	O K
180 min Winter		42.589	0.113	9.5	0.1	O K
240 min Winter		42.578	0.102	7.9	0.1	O K
360 min Winter		42.564	0.088	6.1	0.1	O K
480 min Winter		42.556	0.080	5.1	0.1	O K
600 min Winter		42.550	0.074	4.4	0.0	O K
720 min Winter		42.546	0.070	3.9	0.0	O K
960 min Winter		42.538	0.062	3.2	0.0	O K
1440 min Winter		42.529	0.053	2.3	0.0	O K
2160 min Winter		42.520	0.044	1.7	0.0	O K
2880 min Winter		42.516	0.040	1.3	0.0	O K
4320 min Winter		42.510	0.034	1.0	0.0	O K
5760 min Winter		42.507	0.031	0.8	0.0	O K
7200 min Winter		42.505	0.029	0.7	0.0	O K
8640 min Winter		42.503	0.027	0.6	0.0	O K
10080 min Winter		42.501	0.025	0.6	0.0	O K
Storm Event		Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
7200 min Summer		0.941	0.0	102.3	3536	
8640 min Summer		0.826	0.0	107.8	4480	
10080 min Summer		0.740	0.0	112.5	5112	
15 min Winter		63.289	0.0	16.1	15	
30 min Winter		40.885	0.0	20.8	22	
60 min Winter		26.412	0.0	26.8	36	
120 min Winter		17.062	0.0	34.7	68	
180 min Winter		13.214	0.0	40.3	96	
240 min Winter		11.023	0.0	44.8	124	
360 min Winter		8.536	0.0	52.1	188	
480 min Winter		7.121	0.0	57.9	250	
600 min Winter		6.186	0.0	62.9	302	
720 min Winter		5.515	0.0	67.3	364	
960 min Winter		4.378	0.0	71.2	494	
1440 min Winter		3.162	0.0	77.1	702	
2160 min Winter		2.284	0.0	83.5	1032	
2880 min Winter		1.813	0.0	88.4	1468	
4320 min Winter		1.357	0.0	99.1	2232	
5760 min Winter		1.104	0.0	107.6	3168	
7200 min Winter		0.941	0.0	114.5	3600	
8640 min Winter		0.826	0.0	120.7	4128	
10080 min Winter		0.740	0.0	126.0	5056	
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Lion House Oriental Road Woking GU22 8AP		Berewood Development Eastern Network Pond 3C			
Date 22/01/2018		Designed by A May			
File Source Control Phase 3...		Checked by RHA			
Micro Drainage		Source Control 2017.1.2			
<u>Summary of Results for 100 year Return Period (+40%)</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Summer	42.513	0.813	5.1	594.3	O K
120 min Summer	42.658	0.958	5.1	740.8	O K
180 min Summer	42.748	1.048	5.1	838.6	O K
240 min Summer	42.814	1.114	5.1	913.0	O K
360 min Summer	42.908	1.208	5.1	1023.7	Flood Risk
480 min Summer	42.973	1.273	5.1	1105.0	Flood Risk
600 min Summer	43.023	1.323	5.1	1168.2	Flood Risk
720 min Summer	43.062	1.362	5.1	1219.1	Flood Risk
960 min Summer	43.066	1.366	5.1	1224.8	Flood Risk
1440 min Summer	43.050	1.350	5.1	1203.7	Flood Risk
2160 min Summer	43.001	1.301	5.1	1140.6	Flood Risk
2880 min Summer	42.956	1.256	5.1	1083.7	Flood Risk
60 min Winter	42.587	0.887	5.1	667.5	O K
120 min Winter	42.743	1.043	5.1	832.8	O K
180 min Winter	42.841	1.141	5.1	943.8	O K
240 min Winter	42.912	1.212	5.1	1028.9	Flood Risk
360 min Winter	43.014	1.314	5.1	1156.6	Flood Risk
480 min Winter	43.086	1.386	5.1	1251.3	Flood Risk
600 min Winter	43.141	1.441	5.1	1326.0	Flood Risk
720 min Winter	43.185	1.485	5.2	1387.0	Flood Risk
960 min Winter	43.195	1.495	5.2	1400.8	Flood Risk
1440 min Winter	43.188	1.488	5.2	1391.7	Flood Risk
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
60 min Summer	53.513	0.0	600.9	68	
120 min Summer	33.792	0.0	748.6	128	
180 min Summer	25.824	0.0	799.2	188	
240 min Summer	21.339	0.0	793.3	248	
360 min Summer	16.307	0.0	776.6	366	
480 min Summer	13.475	0.0	768.1	486	
600 min Summer	11.621	0.0	766.6	606	
720 min Summer	10.298	0.0	771.4	726	
960 min Summer	8.098	0.0	774.9	966	
1440 min Summer	5.772	0.0	772.8	1444	
2160 min Summer	4.114	0.0	1557.6	1928	
2880 min Summer	3.235	0.0	1511.1	2284	
60 min Winter	53.513	0.0	671.0	68	
120 min Winter	33.792	0.0	799.3	126	
180 min Winter	25.824	0.0	793.9	186	
240 min Winter	21.339	0.0	782.8	244	
360 min Winter	16.307	0.0	772.4	362	
480 min Winter	13.475	0.0	775.3	480	
600 min Winter	11.621	0.0	789.1	598	
720 min Winter	10.298	0.0	803.1	714	
960 min Winter	8.098	0.0	806.5	946	
1440 min Winter	5.772	0.0	801.8	1402	
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Lion House Oriental Road Woking GU22 8AP		Berewood Development Eastern Network Pond 3C			
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<u>Summary of Results for 100 year Return Period (+40%)</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
2160 min Winter	43.149	1.449	5.1	1336.4	Flood Risk
2880 min Winter	43.095	1.395	5.1	1262.9	Flood Risk
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
2160 min Winter	4.114	0.0	1571.9	2056	
2880 min Winter	3.235	0.0	1531.7	2600	
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Date 22/01/2018 File Source Control Phase 3...		Designed by A May Checked by RHA			
Micro Drainage		Source Control 2017.1.2			
<u>Summary of Results for 30 year Return Period</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Summer	42.156	0.456	5.1	287.2	O K
120 min Summer	42.250	0.550	5.1	361.1	O K
180 min Summer	42.309	0.609	5.1	409.8	O K
240 min Summer	42.351	0.651	5.1	446.1	O K
360 min Summer	42.411	0.711	5.1	498.6	O K
480 min Summer	42.451	0.751	5.1	535.6	O K
600 min Summer	42.481	0.781	5.1	563.3	O K
720 min Summer	42.503	0.803	5.1	584.7	O K
960 min Summer	42.491	0.791	5.1	573.2	O K
1440 min Summer	42.461	0.761	5.1	545.2	O K
2160 min Summer	42.418	0.718	5.1	505.6	O K
2880 min Summer	42.377	0.677	5.1	468.1	O K
60 min Winter	42.202	0.502	5.1	323.0	O K
120 min Winter	42.306	0.606	5.1	407.3	O K
180 min Winter	42.371	0.671	5.1	463.5	O K
240 min Winter	42.419	0.719	5.1	506.0	O K
360 min Winter	42.487	0.787	5.1	568.9	O K
480 min Winter	42.534	0.834	5.1	614.8	O K
600 min Winter	42.570	0.870	5.1	650.6	O K
720 min Winter	42.599	0.899	5.1	679.5	O K
960 min Winter	42.595	0.895	5.1	675.4	O K
1440 min Winter	42.563	0.863	5.1	643.3	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
60 min Summer	26.412	0.0	296.7	68	
120 min Summer	17.062	0.0	383.8	126	
180 min Summer	13.214	0.0	445.9	186	
240 min Summer	11.023	0.0	495.8	246	
360 min Summer	8.536	0.0	575.1	366	
480 min Summer	7.121	0.0	638.2	486	
600 min Summer	6.186	0.0	690.3	606	
720 min Summer	5.515	0.0	733.2	724	
960 min Summer	4.378	0.0	763.3	938	
1440 min Summer	3.162	0.0	763.3	1144	
2160 min Summer	2.284	0.0	932.1	1516	
2880 min Summer	1.813	0.0	986.2	1908	
60 min Winter	26.412	0.0	332.5	66	
120 min Winter	17.062	0.0	429.9	126	
180 min Winter	13.214	0.0	499.3	184	
240 min Winter	11.023	0.0	554.9	242	
360 min Winter	8.536	0.0	642.8	360	
480 min Winter	7.121	0.0	710.8	476	
600 min Winter	6.186	0.0	761.5	592	
720 min Winter	5.515	0.0	783.9	708	
960 min Winter	4.378	0.0	777.4	936	
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From: 0	To: 4 0.000	From: 4	To: 8 1.517																																									
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Lion House Oriental Road Woking GU22 8AP		Berewood Development Eastern Network Pond 3C																																																																																																													
Date 22/01/2018		Designed by A May																																																																																																													
File Source Control Phase 3...		Checked by RHA																																																																																																													
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Model Details Storage is Online Cover Level (m) 43.200 Tank or Pond Structure Invert Level (m) 41.700 <table><tr><td>Depth (m)</td><td>Area (m²)</td><td>Depth (m)</td><td>Area (m²)</td><td>Depth (m)</td><td>Area (m²)</td><td>Depth (m)</td><td>Area (m²)</td></tr><tr><td>0.000</td><td>511.0</td><td>0.500</td><td>783.1</td><td>1.000</td><td>1082.1</td><td>1.500</td><td>1417.4</td></tr></table> Hydro-Brake® Optimum Outflow Control Unit Reference MD-SHE-0100-5200-1500-5200 Design Head (m) 1.500 Design Flow (l/s) 5.2 Flush-Flo™ Calculated Objective Minimise upstream storage Application Surface Sump Available Yes Diameter (mm) 100 Invert Level (m) 41.700 Minimum Outlet Pipe Diameter (mm) 150 Suggested Manhole Diameter (mm) 1200 <table><tr><td>Control Points</td><td>Head (m)</td><td>Flow (l/s)</td><td>Control Points</td><td>Head (m)</td><td>Flow (l/s)</td></tr><tr><td>Design Point (Calculated)</td><td>1.500</td><td>5.2</td><td>Kick-Flo®</td><td>0.894</td><td>4.1</td></tr><tr><td>Flush-Flo™</td><td>0.439</td><td>5.1</td><td>Mean Flow over Head Range</td><td>-</td><td>4.5</td></tr></table> The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated <table><tr><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td></tr><tr><td>0.100</td><td>3.3</td><td>1.200</td><td>4.7</td><td>3.000</td><td>7.2</td><td>7.000</td><td>10.7</td></tr><tr><td>0.200</td><td>4.6</td><td>1.400</td><td>5.0</td><td>3.500</td><td>7.7</td><td>7.500</td><td>11.1</td></tr><tr><td>0.300</td><td>5.0</td><td>1.600</td><td>5.4</td><td>4.000</td><td>8.2</td><td>8.000</td><td>11.4</td></tr><tr><td>0.400</td><td>5.1</td><td>1.800</td><td>5.7</td><td>4.500</td><td>8.7</td><td>8.500</td><td>11.8</td></tr><tr><td>0.500</td><td>5.1</td><td>2.000</td><td>5.9</td><td>5.000</td><td>9.1</td><td>9.000</td><td>12.1</td></tr><tr><td>0.600</td><td>5.0</td><td>2.200</td><td>6.2</td><td>5.500</td><td>9.6</td><td>9.500</td><td>12.4</td></tr><tr><td>0.800</td><td>4.6</td><td>2.400</td><td>6.5</td><td>6.000</td><td>10.0</td><td></td><td></td></tr><tr><td>1.000</td><td>4.3</td><td>2.600</td><td>6.7</td><td>6.500</td><td>10.4</td><td></td><td></td></tr></table>						Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	0.000	511.0	0.500	783.1	1.000	1082.1	1.500	1417.4	Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)	Design Point (Calculated)	1.500	5.2	Kick-Flo®	0.894	4.1	Flush-Flo™	0.439	5.1	Mean Flow over Head Range	-	4.5	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	0.100	3.3	1.200	4.7	3.000	7.2	7.000	10.7	0.200	4.6	1.400	5.0	3.500	7.7	7.500	11.1	0.300	5.0	1.600	5.4	4.000	8.2	8.000	11.4	0.400	5.1	1.800	5.7	4.500	8.7	8.500	11.8	0.500	5.1	2.000	5.9	5.000	9.1	9.000	12.1	0.600	5.0	2.200	6.2	5.500	9.6	9.500	12.4	0.800	4.6	2.400	6.5	6.000	10.0			1.000	4.3	2.600	6.7	6.500	10.4		
Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)																																																																																																								
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0.400	5.1	1.800	5.7	4.500	8.7	8.500	11.8																																																																																																								
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Lion House Oriental Road Woking GU22 8AP				Berewood Development Western Network Pond 8A				
Date 22/01/2019 File Cascade Phase 3B and 8...				Designed by A May Checked by RHA				
Micro Drainage				Source Control 2017.1.2				
<u>Cascade Summary of Results for Phase 8 Source Control Pond 8A 1 in 30.srcx</u>								
Upstream Structures		Outflow To			Overflow To			
(None) Swale 3B-1 1 in 30.srcx Phase 8 Source Control Pond 8B 1 in 30.srcx								
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Outflow (l/s)	Max Volume (m³)	Status	
15 min Summer	52.914	0.514	4.3	0.0	4.3	91.3	O K	
30 min Summer	53.017	0.617	4.3	0.0	4.3	116.1	O K	
60 min Summer	53.129	0.729	4.3	0.0	4.3	145.8	O K	
120 min Summer	53.249	0.849	4.3	0.0	4.3	180.7	O K	
180 min Summer	53.316	0.916	4.3	0.0	4.3	201.9	O K	
240 min Summer	53.360	0.960	4.3	0.0	4.3	216.2	O K	
360 min Summer	53.413	1.013	4.3	0.0	4.3	234.0	O K	
480 min Summer	53.440	1.040	4.3	0.0	4.3	243.5	O K	
600 min Summer	53.456	1.056	4.3	0.0	4.3	249.0	O K	
720 min Summer	53.467	1.067	4.3	0.0	4.3	253.1	O K	
960 min Summer	53.434	1.034	4.3	0.0	4.3	241.5	O K	
1440 min Summer	53.376	0.976	4.3	0.0	4.3	221.4	O K	
2160 min Summer	53.290	0.890	4.3	0.0	4.3	193.6	O K	
2880 min Summer	53.192	0.792	4.3	0.0	4.3	163.8	O K	
4320 min Summer	53.042	0.642	4.3	0.0	4.3	122.6	O K	
5760 min Summer	52.908	0.508	4.3	0.0	4.3	90.0	O K	
7200 min Summer	52.797	0.397	4.3	0.0	4.3	65.7	O K	
8640 min Summer	52.711	0.311	4.2	0.0	4.2	48.8	O K	
10080 min Summer	52.646	0.246	4.1	0.0	4.1	37.2	O K	
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)			
15 min Summer	63.289	0.0	94.2	0.0	23			
30 min Summer	40.885	0.0	121.8	0.0	37			
60 min Summer	26.412	0.0	157.9	0.0	66			
120 min Summer	17.062	0.0	204.0	0.0	126			
180 min Summer	13.214	0.0	237.0	0.0	186			
240 min Summer	11.023	0.0	263.6	0.0	246			
360 min Summer	8.536	0.0	306.2	0.0	364			
480 min Summer	7.121	0.0	340.6	0.0	484			
600 min Summer	6.186	0.0	369.9	0.0	542			
720 min Summer	5.515	0.0	395.6	0.0	610			
960 min Summer	4.378	0.0	418.7	0.0	734			
1440 min Summer	3.162	0.0	453.5	0.0	1000			
2160 min Summer	2.284	0.0	492.0	0.0	1412			
2880 min Summer	1.813	0.0	520.7	0.0	1820			
4320 min Summer	1.357	0.0	584.3	0.0	2556			
5760 min Summer	1.104	0.0	634.4	0.0	3232			
7200 min Summer	0.941	0.0	676.0	0.0	3960			
8640 min Summer	0.826	0.0	712.0	0.0	4584			
10080 min Summer	0.740	0.0	743.7	0.0	5248			
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Lion House Oriental Road Woking GU22 8AP			Berewood Development Western Network Pond 8B				
Date 22/01/2019 File Cascade Phase 3B and 8...			Designed by A May Checked by RHA				
Micro Drainage			Source Control 2017.1.2				
Cascade Summary of Results for Phase 8 Source Control Pond 8B 1 in 30.srcx							
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Outflow (l/s)	Max Volume (m³)	Status
15 min Winter	51.732	0.732	4.1	0.0	4.1	92.8	O K
30 min Winter	51.851	0.851	4.1	0.0	4.1	118.2	O K
60 min Winter	51.977	0.977	4.1	0.0	4.1	148.5	O K
120 min Winter	52.103	1.103	4.1	0.0	4.1	183.0	O K
180 min Winter	52.173	1.173	4.1	0.0	4.1	203.8	O K
240 min Winter	52.218	1.218	4.1	0.0	4.1	218.0	O K
360 min Winter	52.273	1.273	4.1	0.0	4.1	235.6	O K
480 min Winter	52.301	1.301	4.1	0.0	4.1	245.2	O K
600 min Winter	52.316	1.316	4.1	0.0	4.1	250.1	O K
720 min Winter	52.322	1.322	4.1	0.0	4.1	252.3	O K
960 min Winter	52.281	1.281	4.1	0.0	4.1	238.3	O K
1440 min Winter	52.200	1.200	4.1	0.0	4.1	212.1	O K
2160 min Winter	52.072	1.072	4.1	0.0	4.1	174.3	O K
2880 min Winter	51.935	0.935	4.1	0.0	4.1	138.0	O K
4320 min Winter	51.618	0.618	4.1	0.0	4.1	71.5	O K
5760 min Winter	51.356	0.356	4.1	0.0	4.1	32.7	O K
7200 min Winter	51.210	0.210	3.9	0.0	3.9	16.7	O K
8640 min Winter	51.140	0.140	3.5	0.0	3.5	10.4	O K
10080 min Winter	51.111	0.111	3.2	0.0	3.2	8.0	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)		
15 min Winter	63.289	0.0	96.1	0.0	22		
30 min Winter	40.885	0.0	124.2	0.0	37		
60 min Winter	26.412	0.0	160.6	0.0	66		
120 min Winter	17.062	0.0	207.5	0.0	124		
180 min Winter	13.214	0.0	241.0	0.0	182		
240 min Winter	11.023	0.0	268.1	0.0	240		
360 min Winter	8.536	0.0	311.4	0.0	352		
480 min Winter	7.121	0.0	346.4	0.0	462		
600 min Winter	6.186	0.0	376.1	0.0	566		
720 min Winter	5.515	0.0	402.3	0.0	654		
960 min Winter	4.378	0.0	425.9	0.0	746		
1440 min Winter	3.162	0.0	461.4	0.0	1056		
2160 min Winter	2.284	0.0	500.0	0.0	1500		
2880 min Winter	1.813	0.0	529.3	0.0	1936		
4320 min Winter	1.357	0.0	594.0	0.0	2640		
5760 min Winter	1.104	0.0	644.7	0.0	3224		
7200 min Winter	0.941	0.0	687.0	0.0	3816		
8640 min Winter	0.826	0.0	723.6	0.0	4488		
10080 min Winter	0.740	0.0	756.0	0.0	5120		
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Micro Drainage

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Micro Drainage

Source Control 2017.1.2

Cascade Summary of Results for Phase 8 Source Control Pond 8C 1 in 30.srcx

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Outflow (l/s)	Max Volume (m³)	Status
10080 min Summer	50.722	0.722	4.1	0.0	4.1	349.1	O K
15 min Winter	50.472	0.472	4.1	0.0	4.1	211.3	O K
30 min Winter	50.584	0.584	4.1	0.0	4.1	270.7	O K
60 min Winter	50.714	0.714	4.1	0.0	4.1	344.9	O K
120 min Winter	50.864	0.864	4.2	0.0	4.2	436.1	O K
180 min Winter	50.957	0.957	4.3	0.0	4.3	496.7	O K
240 min Winter	51.026	1.026	4.4	0.0	4.4	542.6	O K
360 min Winter	51.122	1.122	4.5	0.0	4.5	610.0	O K
480 min Winter	51.188	1.188	4.6	0.0	4.6	658.4	O K
600 min Winter	51.237	1.237	4.7	0.0	4.7	695.0	O K
720 min Winter	51.275	1.275	4.7	0.0	4.7	723.6	O K
960 min Winter	51.268	1.268	4.7	0.0	4.7	718.5	O K
1440 min Winter	51.226	1.226	4.7	0.0	4.7	686.3	O K
2160 min Winter	51.152	1.152	4.6	0.0	4.6	631.6	O K
2880 min Winter	51.096	1.096	4.5	0.0	4.5	591.8	O K
4320 min Winter	51.028	1.028	4.4	0.0	4.4	544.2	O K
5760 min Winter	50.949	0.949	4.3	0.0	4.3	490.8	O K
7200 min Winter	50.866	0.866	4.2	0.0	4.2	437.3	O K
8640 min Winter	50.782	0.782	4.1	0.0	4.1	385.2	O K
10080 min Winter	50.698	0.698	4.1	0.0	4.1	335.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
10080 min Summer	0.740	0.0	1511.6	0.0	6056
15 min Winter	63.289	0.0	215.2	0.0	23
30 min Winter	40.885	0.0	278.1	0.0	37
60 min Winter	26.412	0.0	359.3	0.0	66
120 min Winter	17.062	0.0	464.5	0.0	126
180 min Winter	13.214	0.0	539.8	0.0	184
240 min Winter	11.023	0.0	600.1	0.0	244
360 min Winter	8.536	0.0	679.7	0.0	360
480 min Winter	7.121	0.0	688.6	0.0	476
600 min Winter	6.186	0.0	702.6	0.0	592
720 min Winter	5.515	0.0	716.7	0.0	706
960 min Winter	4.378	0.0	723.5	0.0	928
1440 min Winter	3.162	0.0	725.4	0.0	1358
2160 min Winter	2.284	0.0	1120.0	0.0	1688
2880 min Winter	1.813	0.0	1185.3	0.0	2140
4320 min Winter	1.357	0.0	1251.2	0.0	3072
5760 min Winter	1.104	0.0	1443.4	0.0	3968
7200 min Winter	0.941	0.0	1538.2	0.0	4824
8640 min Winter	0.826	0.0	1618.9	0.0	5624
10080 min Winter	0.740	0.0	1692.1	0.0	6456

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Micro Drainage Source Control 2017.1.2

Cascade Summary of Results for Phase 8 Source Control Pond 8D 1 in 30.srcx

Upstream Structures	Outflow To	Overflow To
Phase 8 Source Control Pond 8C 1 in 30.srcx	Swale 3B-1 1 in 30.srcx	Source Control Phase 3A 1 in 30.srcx
Phase 8 Source Control Pond 8B 1 in 30.srcx		
Phase 8 Source Control Pond 8A 1 in 30.srcx		

Storm Event	Max Level (m)	Max Depth (m)	Max Control (1/s)	Max Overflow (1/s)	Max Outflow (1/s)	Max Volume (m ³)	Status
15 min Summer	49.636	0.636	4.1	0.0	4.1	79.3	O K
30 min Summer	49.746	0.746	4.1	0.0	4.1	100.6	O K
60 min Summer	49.864	0.864	4.1	0.0	4.1	126.2	O K
120 min Summer	49.980	0.980	4.1	0.0	4.1	154.4	O K
180 min Summer	50.042	1.042	4.1	0.0	4.1	170.7	O K
240 min Summer	50.080	1.080	4.1	0.0	4.1	181.2	O K
360 min Summer	50.122	1.122	4.1	0.0	4.1	193.2	O K
480 min Summer	50.142	1.142	4.1	0.0	4.1	199.0	O K
600 min Summer	50.155	1.155	4.1	0.0	4.1	202.9	O K
720 min Summer	50.164	1.164	4.1	0.0	4.1	205.5	O K
960 min Summer	50.128	1.128	4.1	0.0	4.1	194.9	O K
1440 min Summer	50.063	1.063	4.1	0.0	4.1	176.6	O K
2160 min Summer	49.968	0.968	4.1	0.0	4.1	151.5	O K
2880 min Summer	49.869	0.869	4.1	0.0	4.1	127.4	O K
4320 min Summer	49.674	0.674	4.1	0.0	4.1	86.3	O K
5760 min Summer	49.504	0.504	4.1	0.0	4.1	56.9	O K
7200 min Summer	49.370	0.370	4.1	0.0	4.1	37.5	O K
8640 min Summer	49.275	0.275	4.0	0.0	4.0	25.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m ³)	Overflow Volume (m ³)	Time-Peak (mins)
15 min Summer	63.289	0.0	82.6	0.0	22
30 min Summer	40.885	0.0	106.7	0.0	37
60 min Summer	26.412	0.0	138.0	0.0	66
120 min Summer	17.062	0.0	178.3	0.0	126
180 min Summer	13.214	0.0	207.2	0.0	186
240 min Summer	11.023	0.0	230.4	0.0	246
360 min Summer	8.536	0.0	267.7	0.0	364
480 min Summer	7.121	0.0	297.7	0.0	434
600 min Summer	6.186	0.0	323.3	0.0	500
720 min Summer	5.515	0.0	345.8	0.0	568
960 min Summer	4.378	0.0	366.0	0.0	696
1440 min Summer	3.162	0.0	396.5	0.0	970
2160 min Summer	2.284	0.0	429.8	0.0	1388
2880 min Summer	1.813	0.0	454.9	0.0	1792
4320 min Summer	1.357	0.0	510.5	0.0	2512
5760 min Summer	1.104	0.0	554.1	0.0	3176
7200 min Summer	0.941	0.0	590.5	0.0	3824
8640 min Summer	0.826	0.0	621.9	0.0	4504

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Lion House Oriental Road Woking GU22 8AP								
Date 22/01/2019 22:58 File Cascade Phase 3B and 8...								
			Designed by rakerman Checked by					
Micro Drainage			Source Control 2017.1.2					
<u>Cascade Summary of Results for Phase 8 Source Control Pond 8D 1 in 30.srcx</u>								
Storm Event		Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Outflow (l/s)	Max Volume (m³)	Status
10080 min	Summer	49.208	0.208	3.9	0.0	3.9	18.4	O K
15 min	Winter	49.689	0.689	4.1	0.0	4.1	89.2	O K
30 min	Winter	49.808	0.808	4.1	0.0	4.1	113.6	O K
60 min	Winter	49.934	0.934	4.1	0.0	4.1	142.8	O K
120 min	Winter	50.060	1.060	4.1	0.0	4.1	175.7	O K
180 min	Winter	50.130	1.130	4.1	0.0	4.1	195.5	O K
240 min	Winter	50.175	1.175	4.1	0.0	4.1	208.9	O K
360 min	Winter	50.229	1.229	4.1	0.0	4.1	225.4	O K
480 min	Winter	50.256	1.256	4.1	0.0	4.1	234.1	O K
600 min	Winter	50.270	1.270	4.1	0.0	4.1	238.5	O K
720 min	Winter	50.276	1.276	4.1	0.0	4.1	240.4	O K
960 min	Winter	50.233	1.233	4.1	0.0	4.1	226.8	O K
1440 min	Winter	50.148	1.148	4.1	0.0	4.1	200.7	O K
2160 min	Winter	50.013	1.013	4.1	0.0	4.1	163.0	O K
2880 min	Winter	49.860	0.860	4.1	0.0	4.1	125.4	O K
4320 min	Winter	49.532	0.532	4.1	0.0	4.1	61.4	O K
5760 min	Winter	49.301	0.301	4.1	0.0	4.1	28.8	O K
7200 min	Winter	49.182	0.182	3.7	0.0	3.7	15.7	O K
8640 min	Winter	49.125	0.125	3.4	0.0	3.4	10.2	O K
10080 min	Winter	49.106	0.106	3.0	0.0	3.0	8.6	O K
Storm Event		Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)		
10080 min	Summer	0.740	0.0	649.8	0.0	5152		
15 min	Winter	63.289	0.0	92.5	0.0	22		
30 min	Winter	40.885	0.0	119.5	0.0	37		
60 min	Winter	26.412	0.0	154.6	0.0	66		
120 min	Winter	17.062	0.0	199.7	0.0	124		
180 min	Winter	13.214	0.0	232.0	0.0	182		
240 min	Winter	11.023	0.0	258.1	0.0	240		
360 min	Winter	8.536	0.0	299.8	0.0	352		
480 min	Winter	7.121	0.0	333.4	0.0	462		
600 min	Winter	6.186	0.0	362.1	0.0	564		
720 min	Winter	5.515	0.0	387.3	0.0	600		
960 min	Winter	4.378	0.0	410.0	0.0	744		
1440 min	Winter	3.162	0.0	444.1	0.0	1054		
2160 min	Winter	2.284	0.0	481.4	0.0	1496		
2880 min	Winter	1.813	0.0	509.5	0.0	1936		
4320 min	Winter	1.357	0.0	571.8	0.0	2596		
5760 min	Winter	1.104	0.0	620.7	0.0	3176		
7200 min	Winter	0.941	0.0	661.3	0.0	3816		
8640 min	Winter	0.826	0.0	696.6	0.0	4416		
10080 min	Winter	0.740	0.0	727.8	0.0	5136		
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Lion House Oriental Road Woking GU22 8AP		Berewood Development Western Network Pond 3A			
Date 22/01/2019 File Cascade Phase 3B and 8...		Designed by A May Checked by RHA			
Micro Drainage		Source Control 2017.1.2			
<u>Cascade Summary of Results for Source Control Phase 3A.SRCX</u>					
Upstream Structures		Outflow To		Overflow To	
Phase 8 Source Control Pond 8D.SRCX		Swale 3B-1.SRCX		(None)	
Phase 8 Source Control Pond 8C.SRCX					
Phase 8 Source Control Pond 8B.SRCX					
Phase 8 Source Control Pond 8A.SRCX					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	47.928	0.428	2.6	287.1	O K
30 min Summer	48.017	0.517	2.6	361.3	O K
60 min Summer	48.118	0.618	2.6	453.9	O K
120 min Summer	48.234	0.734	2.6	568.1	O K
180 min Summer	48.307	0.807	2.6	645.7	O K
240 min Summer	48.361	0.861	2.6	705.7	O K
360 min Summer	48.439	0.939	2.6	797.1	O K
480 min Summer	48.495	0.995	2.6	866.2	O K
600 min Summer	48.539	1.039	2.6	921.8	O K
720 min Summer	48.574	1.074	2.6	968.1	O K
960 min Summer	48.588	1.088	2.6	986.9	O K
1440 min Summer	48.596	1.096	2.6	998.6	O K
2160 min Summer	48.586	1.086	2.6	984.5	O K
2880 min Summer	48.562	1.062	2.6	952.9	O K
4320 min Summer	48.547	1.047	2.6	932.5	O K
5760 min Summer	48.529	1.029	2.6	909.3	O K
7200 min Summer	48.511	1.011	2.6	886.0	O K
8640 min Summer	48.492	0.992	2.6	862.6	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
15 min Summer	134.198	0.0	222.0	23	
30 min Summer	84.742	0.0	221.8	38	
60 min Summer	53.513	0.0	422.3	68	
120 min Summer	33.792	0.0	404.7	128	
180 min Summer	25.824	0.0	388.5	188	
240 min Summer	21.339	0.0	381.2	248	
360 min Summer	16.307	0.0	382.9	368	
480 min Summer	13.475	0.0	394.9	488	
600 min Summer	11.621	0.0	403.9	606	
720 min Summer	10.298	0.0	410.6	726	
960 min Summer	8.098	0.0	412.5	966	
1440 min Summer	5.772	0.0	410.8	1446	
2160 min Summer	4.114	0.0	795.5	2164	
2880 min Summer	3.235	0.0	792.9	2804	
4320 min Summer	2.389	0.0	779.1	3504	
5760 min Summer	1.926	0.0	1555.7	4272	
7200 min Summer	1.630	0.0	1507.7	5048	
8640 min Summer	1.422	0.0	1439.9	5888	
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Micro Drainage		Source Control 2017.1.2			
<u>Cascade Summary of Results for Source Control Phase 3A.SRCX</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
10080 min Summer	48.473	0.973	2.6	838.8	O K
15 min Winter	47.970	0.470	2.6	321.7	O K
30 min Winter	48.066	0.566	2.6	405.1	O K
60 min Winter	48.176	0.676	2.6	509.3	O K
120 min Winter	48.299	0.799	2.6	637.7	O K
180 min Winter	48.378	0.878	2.6	725.5	O K
240 min Winter	48.436	0.936	2.6	793.6	O K
360 min Winter	48.520	1.020	2.6	897.9	O K
480 min Winter	48.580	1.080	2.6	977.3	O K
600 min Winter	48.665	1.165	2.7	1096.0	O K
720 min Winter	48.772	1.272	2.8	1261.6	Flood Risk
960 min Winter	48.776	1.276	2.8	1266.8	Flood Risk
1440 min Winter	48.732	1.232	2.7	1198.0	Flood Risk
2160 min Winter	48.693	1.193	2.7	1137.7	O K
2880 min Winter	48.676	1.176	2.7	1113.3	O K
4320 min Winter	48.661	1.161	2.7	1091.2	O K
5760 min Winter	48.639	1.139	2.6	1059.5	O K
7200 min Winter	48.616	1.116	2.6	1026.8	O K
8640 min Winter	48.591	1.091	2.6	991.3	O K
10080 min Winter	48.563	1.063	2.6	954.2	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
10080 min Summer	1.267	0.0	1379.4	6760	
15 min Winter	134.198	0.0	223.8	23	
30 min Winter	84.742	0.0	217.3	38	
60 min Winter	53.513	0.0	420.0	68	
120 min Winter	33.792	0.0	391.7	126	
180 min Winter	25.824	0.0	381.6	186	
240 min Winter	21.339	0.0	382.5	246	
360 min Winter	16.307	0.0	399.0	364	
480 min Winter	13.475	0.0	411.1	482	
600 min Winter	11.621	0.0	426.9	652	
720 min Winter	10.298	0.0	443.1	772	
960 min Winter	8.098	0.0	439.9	982	
1440 min Winter	5.772	0.0	427.0	1428	
2160 min Winter	4.114	0.0	829.4	2100	
2880 min Winter	3.235	0.0	825.0	2768	
4320 min Winter	2.389	0.0	809.6	3984	
5760 min Winter	1.926	0.0	1596.2	4504	
7200 min Winter	1.630	0.0	1547.7	5472	
8640 min Winter	1.422	0.0	1507.0	6392	
10080 min Winter	1.267	0.0	1470.9	7272	
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Micro Drainage		Source Control 2017.1.2				
<u>Cascade Summary of Results for Swale 3B-1.SRCX</u>						
Upstream Structures		Outflow To		Overflow To		
Phase 8 Source Control Pond 8A.SRCX Swale 3B-2.SRCX Swale 3B-2.SRCX						
Phase 8 Source Control Pond 8B.SRCX						
Phase 8 Source Control Pond 8C.SRCX						
Phase 8 Source Control Pond 8D.SRCX						
Source Control Phase 3A.SRCX						
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Σ Outflow (l/s)	Max Volume (m³) Status
15 min Summer	45.103	0.970	20.0	0.0	20.0	30.3 O K
30 min Summer	45.197	1.064	21.0	0.0	21.0	37.9 Flood Risk
60 min Summer	45.292	1.159	22.0	0.0	22.0	46.4 Flood Risk
120 min Summer	45.341	1.208	22.5	4.2	26.6	51.1 Flood Risk
180 min Summer	45.346	1.213	22.5	8.8	31.3	51.6 Flood Risk
240 min Summer	45.347	1.214	22.5	9.9	32.4	51.6 Flood Risk
360 min Summer	45.346	1.213	22.5	8.8	31.3	51.5 Flood Risk
480 min Summer	45.345	1.212	22.5	7.8	30.3	51.4 Flood Risk
600 min Summer	45.344	1.211	22.5	6.8	29.3	51.3 Flood Risk
720 min Summer	45.343	1.210	22.5	6.4	28.8	51.3 Flood Risk
960 min Summer	45.341	1.208	22.5	4.2	26.6	51.0 Flood Risk
1440 min Summer	45.338	1.205	22.4	2.0	24.4	50.7 Flood Risk
2160 min Summer	45.334	1.201	22.4	0.3	22.7	50.4 Flood Risk
2880 min Summer	45.290	1.157	22.0	0.0	22.0	46.2 Flood Risk
4320 min Summer	45.235	1.102	21.4	0.0	21.4	41.2 Flood Risk
5760 min Summer	45.183	1.050	20.9	0.0	20.9	36.7 Flood Risk
7200 min Summer	45.131	0.998	20.3	0.0	20.3	32.5 O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)	
15 min Summer	134.198	0.0	1127.9	0.0	22	
30 min Summer	84.742	0.0	1301.1	0.0	37	
60 min Summer	53.513	0.0	2011.4	0.0	66	
120 min Summer	33.792	0.0	2299.8	4.7	86	
180 min Summer	25.824	0.0	2492.3	11.0	112	
240 min Summer	21.339	0.0	2648.4	15.9	140	
360 min Summer	16.307	0.0	2902.6	23.5	200	
480 min Summer	13.475	0.0	3110.1	29.6	260	
600 min Summer	11.621	0.0	3278.9	35.0	320	
720 min Summer	10.298	0.0	3402.0	40.0	382	
960 min Summer	8.098	0.0	3460.4	35.2	516	
1440 min Summer	5.772	0.0	3419.1	18.7	824	
2160 min Summer	4.114	0.0	4977.5	1.2	1344	
2880 min Summer	3.235	0.0	5100.0	0.0	1848	
4320 min Summer	2.389	0.0	5333.2	0.0	2728	
5760 min Summer	1.926	0.0	7049.4	0.0	3568	
7200 min Summer	1.630	0.0	7317.8	0.0	4392	
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File Cascade Phase 3B and 8...

Berewood Development

Western Network

Pond 3B-1

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Checked by RHA

Micro Drainage

Source Control 2017.1.2

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Cascade Summary of Results for Swale 3B-1.SRCX

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max E Outflow (l/s)	Max Volume (m³)	Status
8640 min Summer	45.099	0.966	20.0	0.0	20.0	30.1	O K
10080 min Summer	45.100	0.967	20.0	0.0	20.0	30.1	O K
15 min Winter	45.148	1.015	20.5	0.0	20.5	33.9	Flood Risk
30 min Winter	45.247	1.114	21.5	0.0	21.5	42.3	Flood Risk
60 min Winter	45.339	1.206	22.4	3.0	25.5	50.9	Flood Risk
120 min Winter	45.348	1.215	22.5	11.0	33.5	51.7	Flood Risk
180 min Winter	45.348	1.215	22.5	11.6	34.1	51.8	Flood Risk
240 min Winter	45.347	1.214	22.5	10.4	33.0	51.7	Flood Risk
360 min Winter	45.345	1.212	22.5	8.3	30.8	51.5	Flood Risk
480 min Winter	45.344	1.211	22.5	6.8	29.3	51.3	Flood Risk
600 min Winter	45.343	1.210	22.5	5.9	28.4	51.2	Flood Risk
720 min Winter	45.342	1.209	22.5	5.5	27.9	51.2	Flood Risk
960 min Winter	45.340	1.207	22.5	3.8	26.2	51.0	Flood Risk
1440 min Winter	45.338	1.205	22.4	2.3	24.8	50.8	Flood Risk
2160 min Winter	45.337	1.204	22.4	1.4	23.8	50.6	Flood Risk
2880 min Winter	45.335	1.202	22.4	0.7	23.1	50.5	Flood Risk
4320 min Winter	45.294	1.161	22.0	0.0	22.0	46.6	Flood Risk
5760 min Winter	45.219	1.086	21.2	0.0	21.2	39.8	Flood Risk
7200 min Winter	45.142	1.009	20.4	0.0	20.4	33.4	Flood Risk
8640 min Winter	45.096	0.963	19.9	0.0	19.9	29.8	O K
10080 min Winter	45.093	0.960	19.9	0.0	19.9	29.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
8640 min Summer	1.422	0.0	7522.5	0.0	4200
10080 min Summer	1.267	0.0	7638.6	0.0	4968
15 min Winter	134.198	0.0	1207.3	0.0	22
30 min Winter	84.742	0.0	1397.0	0.0	36
60 min Winter	53.513	0.0	2163.7	1.0	62
120 min Winter	33.792	0.0	2459.6	12.5	82
180 min Winter	25.824	0.0	2680.1	20.4	112
240 min Winter	21.339	0.0	2860.8	26.7	144
360 min Winter	16.307	0.0	3154.8	37.1	202
480 min Winter	13.475	0.0	3361.8	47.2	274
600 min Winter	11.621	0.0	3503.8	57.8	328
720 min Winter	10.298	0.0	3560.2	66.8	398
960 min Winter	8.098	0.0	3571.4	66.4	552
1440 min Winter	5.772	0.0	3565.6	59.0	870
2160 min Winter	4.114	0.0	5452.6	35.5	1316
2880 min Winter	3.235	0.0	5527.0	8.0	1860
4320 min Winter	2.389	0.0	5793.5	0.0	2984
5760 min Winter	1.926	0.0	7748.2	0.0	3856
7200 min Winter	1.630	0.0	8056.0	0.0	4688
8640 min Winter	1.422	0.0	8313.7	0.0	4096
10080 min Winter	1.267	0.0	8355.5	0.0	4896

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Micro Drainage	Source Control 2017.1.2						
<u>Cascade Summary of Results for Swale 3B-2.SRCX</u>							
Upstream Structures Outflow To Overflow To							
Swale 3B-1.SRCXSwale 3B-3.SRCXSwale 3B-3.SRCX Phase 8 Source Control Pond 8A.SRCX Phase 8 Source Control Pond 8B.SRCX Phase 8 Source Control Pond 8C.SRCX Phase 8 Source Control Pond 8D.SRCX Source Control Phase 3A.SRCX							
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	44.387	0.973	20.1	0.0	20.1	30.6	O K
30 min Summer	44.489	1.075	21.1	0.0	21.1	38.8	Flood Risk
60 min Summer	44.604	1.190	22.3	0.0	22.3	49.4	Flood Risk
120 min Summer	44.629	1.215	22.5	11.6	34.1	51.8	Flood Risk
180 min Summer	44.637	1.223	22.6	21.0	43.7	52.5	Flood Risk
240 min Summer	44.637	1.223	22.6	21.7	44.4	52.6	Flood Risk
360 min Summer	44.637	1.223	22.6	21.0	43.7	52.5	Flood Risk
480 min Summer	44.635	1.221	22.6	18.3	40.9	52.4	Flood Risk
600 min Summer	44.633	1.219	22.6	16.4	39.0	52.2	Flood Risk
720 min Summer	44.632	1.218	22.6	15.1	37.7	52.0	Flood Risk
960 min Summer	44.628	1.214	22.5	10.4	33.0	51.7	Flood Risk
1440 min Summer	44.623	1.209	22.5	5.5	27.9	51.2	Flood Risk
2160 min Summer	44.620	1.206	22.4	2.7	25.1	50.8	Flood Risk
2880 min Summer	44.617	1.203	22.4	1.1	23.6	50.6	Flood Risk
4320 min Summer	44.602	1.188	22.3	0.0	22.3	49.1	Flood Risk
5760 min Summer	44.535	1.121	21.6	0.0	21.6	42.8	Flood Risk
7200 min Summer	44.490	1.076	21.1	0.0	21.1	38.9	Flood Risk
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)		
15 min Summer	134.198	0.0	1158.1	0.0	23		
30 min Summer	84.742	0.0	1339.3	0.0	38		
60 min Summer	53.513	0.0	2060.0	0.0	68		
120 min Summer	33.792	0.0	2360.9	17.8	86		
180 min Summer	25.824	0.0	2562.4	34.1	112		
240 min Summer	21.339	0.0	2725.6	46.9	142		
360 min Summer	16.307	0.0	2991.1	66.6	200		
480 min Summer	13.475	0.0	3207.6	81.7	260		
600 min Summer	11.621	0.0	3383.9	94.0	320		
720 min Summer	10.298	0.0	3512.1	104.5	380		
960 min Summer	8.098	0.0	3562.1	101.9	514		
1440 min Summer	5.772	0.0	3523.5	84.2	800		
2160 min Summer	4.114	0.0	5111.6	48.2	1120		
2880 min Summer	3.235	0.0	5240.7	20.3	1504		
4320 min Summer	2.389	0.0	5488.9	0.0	2640		
5760 min Summer	1.926	0.0	7217.2	0.0	3464		
7200 min Summer	1.630	0.0	7495.2	0.0	3584		
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Cascade Summary of Results for Swale 3B-2.SRCX								
Storm Event		Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max E Outflow (l/s)	Max Volume (m³)	Status
8640 min Summer		44.484	1.070	21.1	0.0	21.1	38.4	Flood Risk
10080 min Summer		44.478	1.064	21.0	0.0	21.0	37.9	Flood Risk
15 min Winter		44.433	1.019	20.5	0.0	20.5	34.2	Flood Risk
30 min Winter		44.540	1.126	21.7	0.0	21.7	43.3	Flood Risk
60 min Winter		44.626	1.212	22.5	8.3	30.8	51.5	Flood Risk
120 min Winter		44.639	1.225	22.6	23.9	46.5	52.7	Flood Risk
180 min Winter		44.640	1.226	22.6	25.3	48.0	52.9	Flood Risk
240 min Winter		44.638	1.224	22.6	23.2	45.8	52.7	Flood Risk
360 min Winter		44.635	1.221	22.6	19.0	41.6	52.4	Flood Risk
480 min Winter		44.633	1.219	22.6	15.7	38.3	52.1	Flood Risk
600 min Winter		44.631	1.217	22.6	13.9	36.4	52.0	Flood Risk
720 min Winter		44.630	1.216	22.5	12.1	34.7	51.9	Flood Risk
960 min Winter		44.627	1.213	22.5	9.4	31.9	51.6	Flood Risk
1440 min Winter		44.624	1.210	22.5	5.9	28.4	51.2	Flood Risk
2160 min Winter		44.621	1.207	22.4	3.4	25.9	51.0	Flood Risk
2880 min Winter		44.619	1.205	22.4	2.0	24.4	50.7	Flood Risk
4320 min Winter		44.616	1.202	22.4	0.4	22.9	50.5	Flood Risk
5760 min Winter		44.566	1.152	21.9	0.0	21.9	45.7	Flood Risk
7200 min Winter		44.482	1.068	21.1	0.0	21.1	38.2	Flood Risk
8640 min Winter		44.460	1.046	20.8	0.0	20.8	36.4	Flood Risk
10080 min Winter		44.451	1.037	20.7	0.0	20.7	35.6	Flood Risk
Storm Event		Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)		
8640 min Summer		1.422	0.0	7708.3	0.0	4320		
10080 min Summer		1.267	0.0	7831.5	0.0	5072		
15 min Winter		134.198	0.0	1241.1	0.0	23		
30 min Winter		84.742	0.0	1439.8	0.0	38		
60 min Winter		53.513	0.0	2217.8	5.7	62		
120 min Winter		33.792	0.0	2528.1	32.5	84		
180 min Winter		25.824	0.0	2758.6	51.3	112		
240 min Winter		21.339	0.0	2947.3	66.2	142		
360 min Winter		16.307	0.0	3254.0	89.8	200		
480 min Winter		13.475	0.0	3470.4	109.8	260		
600 min Winter		11.621	0.0	3614.2	128.1	330		
720 min Winter		10.298	0.0	3666.9	143.2	382		
960 min Winter		8.098	0.0	3681.5	144.9	528		
1440 min Winter		5.772	0.0	3681.8	134.9	824		
2160 min Winter		4.114	0.0	5602.9	100.3	1296		
2880 min Winter		3.235	0.0	5684.5	54.3	1844		
4320 min Winter		2.389	0.0	5967.9	9.6	2744		
5760 min Winter		1.926	0.0	7936.1	0.0	3808		
7200 min Winter		1.630	0.0	8254.7	0.0	4680		
8640 min Winter		1.422	0.0	8521.5	0.0	4224		
10080 min Winter		1.267	0.0	8571.6	0.0	5088		
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Lion House Oriental Road Woking GU22 8AP		Berewood Development Wetsern Network Pond 3B-3			
Date 22/01/2019 File Cascade Phase 3B and 8...		Designed by A May Checked by RHA			
Micro Drainage		Source Control 2017.1.2			
<u>Cascade Summary of Results for Swale 3B-3.SRCX</u>					
Upstream Structures		Outflow To Overflow To			
Swale 3B-2.SRCX		(None)		(None)	
Swale 3B-1.SRCX					
Phase 8 Source Control Pond 8A.SRCX					
Phase 8 Source Control Pond 8B.SRCX					
Phase 8 Source Control Pond 8C.SRCX					
Phase 8 Source Control Pond 8D.SRCX					
Source Control Phase 3A.SRCX					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	43.296	0.820	30.0	20.3	O K
30 min Summer	43.323	0.847	30.0	22.1	O K
60 min Summer	43.338	0.862	30.0	23.2	O K
120 min Summer	43.560	1.084	30.0	42.2	O K
180 min Summer	43.670	1.194	30.0	53.9	O K
240 min Summer	43.722	1.246	30.0	60.0	Flood Risk
360 min Summer	43.790	1.314	30.0	68.4	Flood Risk
480 min Summer	43.827	1.351	30.0	73.3	Flood Risk
600 min Summer	43.846	1.370	30.0	75.8	Flood Risk
720 min Summer	43.852	1.376	30.0	76.7	Flood Risk
960 min Summer	43.763	1.287	30.0	65.0	Flood Risk
1440 min Summer	43.274	0.798	30.0	18.9	O K
2160 min Summer	42.760	0.284	28.8	1.4	O K
2880 min Summer	42.701	0.225	26.3	0.8	O K
4320 min Summer	42.683	0.207	24.0	0.7	O K
5760 min Summer	42.677	0.201	23.2	0.6	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
15 min Summer	134.198	0.0	1188.5	20	
30 min Summer	84.742	0.0	1377.7	34	
60 min Summer	53.513	0.0	2108.5	54	
120 min Summer	33.792	0.0	2422.2	126	
180 min Summer	25.824	0.0	2632.6	184	
240 min Summer	21.339	0.0	2803.0	212	
360 min Summer	16.307	0.0	3079.8	270	
480 min Summer	13.475	0.0	3305.4	340	
600 min Summer	11.621	0.0	3489.3	412	
720 min Summer	10.298	0.0	3624.1	482	
960 min Summer	8.098	0.0	3679.3	624	
1440 min Summer	5.772	0.0	3648.8	870	
2160 min Summer	4.114	0.0	5246.0	1108	
2880 min Summer	3.235	0.0	5381.6	1500	
4320 min Summer	2.389	0.0	5644.9	2204	
5760 min Summer	1.926	0.0	7385.0	2848	
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Lion House Oriental Road Woking GU22 8AP		Berewood Development Wetsern Network Pond 3B-3			
Date 22/01/2019 File Cascade Phase 3B and 8...		Designed by A May Checked by RHA			
Micro Drainage		Source Control 2017.1.2			
<u>Cascade Summary of Results for Swale 3B-3.SRCX</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
7200 min Summer	42.674	0.198	22.8	0.6	O K
8640 min Summer	42.672	0.196	22.5	0.6	O K
10080 min Summer	42.671	0.195	22.3	0.6	O K
15 min Winter	43.351	0.875	30.0	24.1	O K
30 min Winter	43.390	0.914	30.0	27.0	O K
60 min Winter	43.477	1.001	30.0	34.3	O K
120 min Winter	43.720	1.244	30.0	59.7	Flood Risk
180 min Winter	43.813	1.337	30.0	71.4	Flood Risk
240 min Winter	43.861	1.385	30.0	77.8	Flood Risk
360 min Winter	43.916	1.440	30.0	85.7	Flood Risk
480 min Winter	43.947	1.471	30.0	90.2	Flood Risk
600 min Winter	43.958	1.482	30.0	91.8	Flood Risk
720 min Winter	43.956	1.480	30.0	91.5	Flood Risk
960 min Winter	43.843	1.367	30.0	75.4	Flood Risk
1440 min Winter	43.115	0.639	30.0	10.6	O K
2160 min Winter	42.717	0.241	28.0	0.9	O K
2880 min Winter	42.697	0.221	25.8	0.8	O K
4320 min Winter	42.683	0.207	24.0	0.7	O K
5760 min Winter	42.674	0.198	22.8	0.6	O K
7200 min Winter	42.669	0.193	22.1	0.6	O K
8640 min Winter	42.668	0.192	21.9	0.5	O K
10080 min Winter	42.667	0.191	21.8	0.5	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
7200 min Summer	1.630	0.0	7672.7	3616	
8640 min Summer	1.422	0.0	7894.1	4328	
10080 min Summer	1.267	0.0	8024.6	5040	
15 min Winter	134.198	0.0	1275.2	21	
30 min Winter	84.742	0.0	1482.8	35	
60 min Winter	53.513	0.0	2272.1	68	
120 min Winter	33.792	0.0	2596.7	124	
180 min Winter	25.824	0.0	2837.3	180	
240 min Winter	21.339	0.0	3034.0	232	
360 min Winter	16.307	0.0	3353.4	288	
480 min Winter	13.475	0.0	3579.8	366	
600 min Winter	11.621	0.0	3732.0	446	
720 min Winter	10.298	0.0	3792.1	524	
960 min Winter	8.098	0.0	3812.8	684	
1440 min Winter	5.772	0.0	3822.2	916	
2160 min Winter	4.114	0.0	5753.4	1300	
2880 min Winter	3.235	0.0	5842.3	1848	
4320 min Winter	2.389	0.0	6142.6	2676	
5760 min Winter	1.926	0.0	8124.0	3760	
7200 min Winter	1.630	0.0	8453.5	3424	
8640 min Winter	1.422	0.0	8729.6	4264	
10080 min Winter	1.267	0.0	8788.0	4888	
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Lion House Oriental Road Woking GU22 8AP			Berewood Development Western Network Pond 8A				
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Micro Drainage			Source Control 2017.1.2				
<u>Cascade Summary of Results for Phase 8 Source Control Pond 8A.SRCX</u>							
Upstream Structures		Outflow To		Overflow To			
(None) Swale 3B-1.SRCX Phase 8 Source Control Pond 8B.SRCX							
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max E Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	53.302	0.902	4.3	0.0	4.3	197.4	O K
30 min Summer	53.450	1.050	4.3	0.0	4.3	247.0	O K
60 min Summer	53.610	1.210	4.3	0.0	4.3	306.9	O K
120 min Summer	53.779	1.379	4.3	0.0	4.3	376.9	O K
180 min Summer	53.878	1.478	4.4	0.0	4.4	421.6	O K
240 min Summer	53.946	1.546	4.5	0.0	4.5	453.9	O K
360 min Summer	54.035	1.635	4.7	0.0	4.7	498.6	O K
480 min Summer	54.089	1.689	4.7	0.0	4.7	527.9	Flood Risk
600 min Summer	54.125	1.725	4.8	0.0	4.8	547.7	Flood Risk
720 min Summer	54.149	1.749	4.8	0.0	4.8	561.4	Flood Risk
960 min Summer	54.113	1.713	4.8	0.0	4.8	540.9	Flood Risk
1440 min Summer	54.045	1.645	4.7	0.0	4.7	504.0	O K
2160 min Summer	53.960	1.560	4.6	0.0	4.6	460.9	O K
2880 min Summer	53.887	1.487	4.5	0.0	4.5	425.5	O K
4320 min Summer	53.799	1.399	4.3	0.0	4.3	385.6	O K
5760 min Summer	53.708	1.308	4.3	0.0	4.3	346.4	O K
7200 min Summer	53.616	1.216	4.3	0.0	4.3	309.0	O K
8640 min Summer	53.524	1.124	4.3	0.0	4.3	274.0	O K
10080 min Summer	53.432	1.032	4.3	0.0	4.3	240.7	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)		
15 min Summer	134.198	0.0	200.0	0.0	23		
30 min Summer	84.742	0.0	252.3	0.0	38		
60 min Summer	53.513	0.0	320.0	0.0	68		
120 min Summer	33.792	0.0	404.1	0.0	128		
180 min Summer	25.824	0.0	463.2	0.0	186		
240 min Summer	21.339	0.0	510.2	0.0	246		
360 min Summer	16.307	0.0	584.6	0.0	366		
480 min Summer	13.475	0.0	643.5	0.0	486		
600 min Summer	11.621	0.0	691.2	0.0	604		
720 min Summer	10.298	0.0	713.8	0.0	724		
960 min Summer	8.098	0.0	708.7	0.0	900		
1440 min Summer	5.772	0.0	690.6	0.0	1128		
2160 min Summer	4.114	0.0	886.1	0.0	1516		
2880 min Summer	3.235	0.0	929.1	0.0	1932		
4320 min Summer	2.389	0.0	1028.5	0.0	2768		
5760 min Summer	1.926	0.0	1106.6	0.0	3576		
7200 min Summer	1.630	0.0	1170.5	0.0	4392		
8640 min Summer	1.422	0.0	1225.4	0.0	5184		
10080 min Summer	1.267	0.0	1273.8	0.0	5952		
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Lion House Oriental Road Woking GU22 8AP			Berewood Development Western Network Pond 8A					
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Micro Drainage			Source Control 2017.1.2					
<u>Cascade Summary of Results for Phase 8 Source Control Pond 8A.SRCX</u>								
Storm Event		Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max E Outflow (l/s)	Max Volume (m³)	Status
15 min Winter		53.376	0.976	4.3	0.0	4.3	221.4	O K
30 min Winter		53.533	1.133	4.3	0.0	4.3	277.4	O K
60 min Winter		53.705	1.305	4.3	0.0	4.3	345.3	O K
120 min Winter		53.887	1.487	4.5	0.0	4.5	425.6	O K
180 min Winter		53.994	1.594	4.6	0.0	4.6	477.5	O K
240 min Winter		54.067	1.667	4.7	0.0	4.7	515.6	Flood Risk
360 min Winter		54.163	1.763	4.8	0.0	4.8	569.6	Flood Risk
480 min Winter		54.225	1.825	4.9	0.0	4.9	606.3	Flood Risk
600 min Winter		54.262	1.862	5.0	2.1	7.0	628.9	Flood Risk
720 min Winter		54.267	1.867	5.0	3.3	8.3	631.9	Flood Risk
960 min Winter		54.260	1.860	5.0	1.5	6.4	627.6	Flood Risk
1440 min Winter		54.200	1.800	4.9	0.0	4.9	590.9	Flood Risk
2160 min Winter		54.103	1.703	4.8	0.0	4.8	535.7	Flood Risk
2880 min Winter		54.011	1.611	4.6	0.0	4.6	486.6	O K
4320 min Winter		53.882	1.482	4.5	0.0	4.5	423.6	O K
5760 min Winter		53.745	1.345	4.3	0.0	4.3	362.3	O K
7200 min Winter		53.605	1.205	4.3	0.0	4.3	304.9	O K
8640 min Winter		53.459	1.059	4.3	0.0	4.3	250.3	O K
10080 min Winter		53.286	0.886	4.3	0.0	4.3	192.1	O K
Storm Event		Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)		
15 min Winter		134.198	0.0	223.9	0.0	23		
30 min Winter		84.742	0.0	282.1	0.0	37		
60 min Winter		53.513	0.0	358.4	0.0	66		
120 min Winter		33.792	0.0	452.5	0.0	126		
180 min Winter		25.824	0.0	518.7	0.0	184		
240 min Winter		21.339	0.0	571.3	0.0	242		
360 min Winter		16.307	0.0	654.0	0.0	360		
480 min Winter		13.475	0.0	713.7	0.0	474		
600 min Winter		11.621	0.0	729.9	5.7	578		
720 min Winter		10.298	0.0	748.9	24.6	662		
960 min Winter		8.098	0.0	733.5	10.5	888		
1440 min Winter		5.772	0.0	721.2	0.0	1188		
2160 min Winter		4.114	0.0	992.4	0.0	1628		
2880 min Winter		3.235	0.0	1040.5	0.0	2080		
4320 min Winter		2.389	0.0	1151.5	0.0	2984		
5760 min Winter		1.926	0.0	1239.4	0.0	3856		
7200 min Winter		1.630	0.0	1311.0	0.0	4688		
8640 min Winter		1.422	0.0	1372.5	0.0	5536		
10080 min Winter		1.267	0.0	1426.7	0.0	6360		
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Micro Drainage			Source Control 2017.1.2				
<u>Cascade Summary of Results for Phase 8 Source Control Pond 8B.SRCX</u>							
Upstream Structures		Outflow To			Overflow To		
Phase 8 Source Control Pond 8A.SRCX Swale 3B-1.SRCX Phase 8 Source Control Pond 8C.SRCX							
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Outflow (l/s)	Max Volume (m³) Status	
15 min Summer	52.087	1.087	4.1	0.0	4.1	178.6 O K	
30 min Summer	52.234	1.234	4.1	0.0	4.1	223.1 O K	
60 min Summer	52.391	1.391	4.2	0.0	4.2	276.5 O K	
120 min Summer	52.551	1.551	4.4	0.0	4.4	338.4 O K	
180 min Summer	52.641	1.641	4.6	0.0	4.6	377.2 O K	
240 min Summer	52.701	1.701	4.6	0.0	4.6	405.0 O K	
360 min Summer	52.777	1.777	4.7	0.0	4.7	442.4 Flood Risk	
480 min Summer	52.822	1.822	4.8	0.0	4.8	465.8 Flood Risk	
600 min Summer	52.850	1.850	4.8	0.0	4.8	480.8 Flood Risk	
720 min Summer	52.867	1.867	4.8	0.0	4.8	490.2 Flood Risk	
960 min Summer	52.827	1.827	4.8	0.0	4.8	468.6 Flood Risk	
1440 min Summer	52.758	1.758	4.7	0.0	4.7	432.8 Flood Risk	
2160 min Summer	52.675	1.675	4.6	0.0	4.6	392.8 O K	
2880 min Summer	52.601	1.601	4.5	0.0	4.5	359.3 O K	
4320 min Summer	52.505	1.505	4.4	0.0	4.4	319.7 O K	
5760 min Summer	52.405	1.405	4.2	0.0	4.2	281.6 O K	
7200 min Summer	52.304	1.304	4.1	0.0	4.1	246.0 O K	
8640 min Summer	52.204	1.204	4.1	0.0	4.1	213.5 O K	
10080 min Summer	52.106	1.106	4.1	0.0	4.1	183.8 O K	
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)		
15 min Summer	134.198	0.0	182.0	0.0	23		
30 min Summer	84.742	0.0	229.8	0.0	38		
60 min Summer	53.513	0.0	290.5	0.0	68		
120 min Summer	33.792	0.0	366.9	0.0	126		
180 min Summer	25.824	0.0	420.6	0.0	186		
240 min Summer	21.339	0.0	463.4	0.0	246		
360 min Summer	16.307	0.0	531.1	0.0	366		
480 min Summer	13.475	0.0	585.1	0.0	486		
600 min Summer	11.621	0.0	630.7	0.0	604		
720 min Summer	10.298	0.0	670.3	0.0	724		
960 min Summer	8.098	0.0	700.9	0.0	834		
1440 min Summer	5.772	0.0	690.4	0.0	1074		
2160 min Summer	4.114	0.0	804.1	0.0	1476		
2880 min Summer	3.235	0.0	843.2	0.0	1880		
4320 min Summer	2.389	0.0	933.7	0.0	2724		
5760 min Summer	1.926	0.0	1004.0	0.0	3512		
7200 min Summer	1.630	0.0	1062.0	0.0	4320		
8640 min Summer	1.422	0.0	1111.9	0.0	5096		
10080 min Summer	1.267	0.0	1155.9	0.0	5848		
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Micro Drainage

Berewood Development
Western Network
Pond 8B

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Source Control 2017.1.2

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Cascade Summary of Results for Phase 8 Source Control Pond 8B.SRCX

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max E Outflow (l/s)	Max Volume (m³)	Status
15 min Winter	52.162	1.162	4.1	0.0	4.1	200.4	O K
30 min Winter	52.318	1.318	4.1	0.0	4.1	250.7	O K
60 min Winter	52.484	1.484	4.3	0.0	4.3	311.5	O K
120 min Winter	52.653	1.653	4.6	0.0	4.6	382.8	O K
180 min Winter	52.749	1.749	4.7	0.0	4.7	428.4	O K
240 min Winter	52.814	1.814	4.8	0.0	4.8	461.4	Flood Risk
360 min Winter	52.898	1.898	4.9	0.0	4.9	507.4	Flood Risk
480 min Winter	52.921	1.921	4.9	4.6	9.5	520.5	Flood Risk
600 min Winter	52.925	1.925	4.9	6.0	10.9	522.9	Flood Risk
720 min Winter	52.930	1.930	4.9	8.1	13.0	526.0	Flood Risk
960 min Winter	52.923	1.923	4.9	5.3	10.2	521.7	Flood Risk
1440 min Winter	52.900	1.900	4.9	0.0	4.9	508.9	Flood Risk
2160 min Winter	52.801	1.801	4.8	0.0	4.8	455.0	Flood Risk
2880 min Winter	52.707	1.707	4.6	0.0	4.6	407.7	O K
4320 min Winter	52.567	1.567	4.5	0.0	4.5	345.0	O K
5760 min Winter	52.418	1.418	4.3	0.0	4.3	286.5	O K
7200 min Winter	52.266	1.266	4.1	0.0	4.1	233.4	O K
8640 min Winter	52.109	1.109	4.1	0.0	4.1	184.8	O K
10080 min Winter	51.929	0.929	4.1	0.0	4.1	136.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
15 min Winter	134.198	0.0	203.8	0.0	23
30 min Winter	84.742	0.0	257.3	0.0	37
60 min Winter	53.513	0.0	325.4	0.0	66
120 min Winter	33.792	0.0	410.9	0.0	126
180 min Winter	25.824	0.0	471.0	0.0	184
240 min Winter	21.339	0.0	518.9	0.0	242
360 min Winter	16.307	0.0	594.8	0.0	358
480 min Winter	13.475	0.0	655.2	22.1	450
600 min Winter	11.621	0.0	711.9	48.1	468
720 min Winter	10.298	0.0	775.0	81.5	530
960 min Winter	8.098	0.0	768.0	50.8	706
1440 min Winter	5.772	0.0	718.2	0.0	1144
2160 min Winter	4.114	0.0	900.6	0.0	1604
2880 min Winter	3.235	0.0	944.3	0.0	2052
4320 min Winter	2.389	0.0	1045.7	0.0	2940
5760 min Winter	1.926	0.0	1124.5	0.0	3752
7200 min Winter	1.630	0.0	1189.5	0.0	4608
8640 min Winter	1.422	0.0	1245.3	0.0	5368
10080 min Winter	1.267	0.0	1294.6	0.0	6256

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Date 22/01/2019 18:38 File Cascade Phase 3B and 8...		Designed by rakerman Checked by					
Micro Drainage		Source Control 2017.1.2					
<u>Cascade Summary of Results for Phase 8 Source Control Pond 8C.SRCX</u>							
Upstream Structures		Outflow To		Overflow To			
Phase 8 Source Control Pond 8B.SRCX		Swale 3B-1.SRCX		Phase 8 Source Control Pond 8D.SRCX			
Phase 8 Source Control Pond 8A.SRCX							
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max E Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	50.812	0.812	4.1	0.0	4.1	403.5	O K
30 min Summer	50.973	0.973	4.3	0.0	4.3	507.0	O K
60 min Summer	51.156	1.156	4.6	0.0	4.6	635.0	O K
120 min Summer	51.360	1.360	4.8	0.0	4.8	790.3	O K
180 min Summer	51.488	1.488	5.0	0.0	5.0	894.5	O K
240 min Summer	51.580	1.580	5.1	0.0	5.1	974.0	O K
360 min Summer	51.709	1.709	5.2	0.0	5.2	1092.9	O K
480 min Summer	51.798	1.798	5.3	0.0	5.3	1180.2	Flood Risk
600 min Summer	51.864	1.864	5.4	0.0	5.4	1248.8	Flood Risk
720 min Summer	51.917	1.917	5.5	0.0	5.5	1304.2	Flood Risk
960 min Summer	51.923	1.923	5.5	0.0	5.5	1310.6	Flood Risk
1440 min Summer	51.900	1.900	5.4	0.0	5.4	1286.6	Flood Risk
2160 min Summer	51.829	1.829	5.4	0.0	5.4	1212.1	Flood Risk
2880 min Summer	51.759	1.759	5.3	0.0	5.3	1141.6	Flood Risk
4320 min Summer	51.712	1.712	5.2	0.0	5.2	1096.2	O K
5760 min Summer	51.669	1.669	5.2	0.0	5.2	1054.9	O K
7200 min Summer	51.624	1.624	5.1	0.0	5.1	1013.4	O K
8640 min Summer	51.577	1.577	5.1	0.0	5.1	971.4	O K
10080 min Summer	51.529	1.529	5.0	0.0	5.0	929.6	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)		
15 min Summer	134.198	0.0	318.6	0.0	23		
30 min Summer	84.742	0.0	337.9	0.0	38		
60 min Summer	53.513	0.0	650.4	0.0	68		
120 min Summer	33.792	0.0	709.9	0.0	128		
180 min Summer	25.824	0.0	745.2	0.0	188		
240 min Summer	21.339	0.0	770.4	0.0	248		
360 min Summer	16.307	0.0	804.1	0.0	366		
480 min Summer	13.475	0.0	825.9	0.0	486		
600 min Summer	11.621	0.0	840.9	0.0	606		
720 min Summer	10.298	0.0	851.6	0.0	726		
960 min Summer	8.098	0.0	852.0	0.0	966		
1440 min Summer	5.772	0.0	843.6	0.0	1444		
2160 min Summer	4.114	0.0	1583.4	0.0	1884		
2880 min Summer	3.235	0.0	1582.5	0.0	2252		
4320 min Summer	2.389	0.0	1537.1	0.0	3032		
5760 min Summer	1.926	0.0	2248.8	0.0	3864		
7200 min Summer	1.630	0.0	2377.6	0.0	4688		
8640 min Summer	1.422	0.0	2489.1	0.0	5528		
10080 min Summer	1.267	0.0	2523.8	0.0	6352		
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Micro Drainage				Source Control 2017.1.2			
<u>Cascade Summary of Results for Phase 8 Source Control Pond 8D.SRCX</u>							
Upstream Structures		Outflow To			Overflow To		
Phase 8 Source Control Pond 8C.SRCX		Swale 3B-1.SRCX			Source Control Phase 3A.SRCX		
Phase 8 Source Control Pond 8B.SRCX							
Phase 8 Source Control Pond 8A.SRCX							
Storm Event	Max Level (m)	Max Depth (m)	Max Control (1/s)	Max Overflow (1/s)	Max Outflow (1/s)	Max Volume (m³)	Status
15 min Summer	50.046	1.046	4.1	0.0	4.1	171.8	O K
30 min Summer	50.194	1.194	4.1	0.0	4.1	214.6	O K
60 min Summer	50.351	1.351	4.2	0.0	4.2	265.9	O K
120 min Summer	50.513	1.513	4.4	0.0	4.4	325.1	O K
180 min Summer	50.599	1.599	4.5	0.0	4.5	362.2	O K
240 min Summer	50.653	1.653	4.6	0.0	4.6	388.5	O K
360 min Summer	50.719	1.719	4.7	0.0	4.7	423.8	Flood Risk
480 min Summer	50.756	1.756	4.7	0.0	4.7	445.7	Flood Risk
600 min Summer	50.779	1.779	4.7	0.0	4.7	459.6	Flood Risk
720 min Summer	50.792	1.792	4.7	0.0	4.7	468.1	Flood Risk
960 min Summer	50.758	1.758	4.7	0.0	4.7	447.0	Flood Risk
1440 min Summer	50.698	1.698	4.6	0.0	4.6	412.4	O K
2160 min Summer	50.623	1.623	4.5	0.0	4.5	373.4	O K
2880 min Summer	50.551	1.551	4.4	0.0	4.4	340.6	O K
4320 min Summer	50.450	1.450	4.3	0.0	4.3	301.2	O K
5760 min Summer	50.345	1.345	4.2	0.0	4.2	263.7	O K
7200 min Summer	50.240	1.240	4.1	0.0	4.1	228.9	O K
8640 min Summer	50.135	1.135	4.1	0.0	4.1	197.1	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)		
15 min Summer	134.198	0.0	175.1	0.0	23		
30 min Summer	84.742	0.0	221.2	0.0	38		
60 min Summer	53.513	0.0	279.7	0.0	68		
120 min Summer	33.792	0.0	353.2	0.0	126		
180 min Summer	25.824	0.0	404.9	0.0	186		
240 min Summer	21.339	0.0	446.0	0.0	246		
360 min Summer	16.307	0.0	511.3	0.0	366		
480 min Summer	13.475	0.0	563.2	0.0	484		
600 min Summer	11.621	0.0	607.1	0.0	604		
720 min Summer	10.298	0.0	645.4	0.0	724		
960 min Summer	8.098	0.0	676.0	0.0	828		
1440 min Summer	5.772	0.0	681.4	0.0	1072		
2160 min Summer	4.114	0.0	774.1	0.0	1472		
2880 min Summer	3.235	0.0	811.7	0.0	1880		
4320 min Summer	2.389	0.0	898.9	0.0	2688		
5760 min Summer	1.926	0.0	966.6	0.0	3512		
7200 min Summer	1.630	0.0	1022.4	0.0	4320		
8640 min Summer	1.422	0.0	1070.4	0.0	5096		
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<u>Cascade Summary of Results for Phase 8 Source Control Pond 8D.SRCX</u>																																																																																																																																																																															
<table><tr><th>Storm Event</th><th>Max Level (m)</th><th>Max Depth (m)</th><th>Max Control (l/s)</th><th>Max Overflow (l/s)</th><th>Max E Outflow (l/s)</th><th>Max Volume (m³)</th><th>Status</th></tr><tr><td>10080 min Summer</td><td>50.031</td><td>1.031</td><td>4.1</td><td>0.0</td><td>4.1</td><td>167.9</td><td>O K</td></tr><tr><td>15 min Winter</td><td>50.121</td><td>1.121</td><td>4.1</td><td>0.0</td><td>4.1</td><td>192.8</td><td>O K</td></tr><tr><td>30 min Winter</td><td>50.278</td><td>1.278</td><td>4.1</td><td>0.0</td><td>4.1</td><td>241.3</td><td>O K</td></tr><tr><td>60 min Winter</td><td>50.446</td><td>1.446</td><td>4.3</td><td>0.0</td><td>4.3</td><td>299.6</td><td>O K</td></tr><tr><td>120 min Winter</td><td>50.611</td><td>1.611</td><td>4.5</td><td>0.0</td><td>4.5</td><td>367.8</td><td>O K</td></tr><tr><td>180 min Winter</td><td>50.696</td><td>1.696</td><td>4.6</td><td>0.0</td><td>4.6</td><td>411.4</td><td>O K</td></tr><tr><td>240 min Winter</td><td>50.751</td><td>1.751</td><td>4.7</td><td>0.0</td><td>4.7</td><td>442.9</td><td>Flood Risk</td></tr><tr><td>360 min Winter</td><td>50.820</td><td>1.820</td><td>4.8</td><td>0.0</td><td>4.8</td><td>486.5</td><td>Flood Risk</td></tr><tr><td>480 min Winter</td><td>50.864</td><td>1.864</td><td>4.8</td><td>0.0</td><td>4.8</td><td>516.7</td><td>Flood Risk</td></tr><tr><td>600 min Winter</td><td>50.943</td><td>1.943</td><td>4.9</td><td>13.8</td><td>18.7</td><td>576.4</td><td>Flood Risk</td></tr><tr><td>720 min Winter</td><td>50.955</td><td>1.955</td><td>4.9</td><td>19.6</td><td>24.6</td><td>585.5</td><td>Flood Risk</td></tr><tr><td>960 min Winter</td><td>50.942</td><td>1.942</td><td>4.9</td><td>13.3</td><td>18.2</td><td>575.4</td><td>Flood Risk</td></tr><tr><td>1440 min Winter</td><td>50.920</td><td>1.920</td><td>4.9</td><td>4.3</td><td>9.2</td><td>558.0</td><td>Flood Risk</td></tr><tr><td>2160 min Winter</td><td>50.810</td><td>1.810</td><td>4.8</td><td>0.0</td><td>4.8</td><td>479.5</td><td>Flood Risk</td></tr><tr><td>2880 min Winter</td><td>50.646</td><td>1.646</td><td>4.6</td><td>0.0</td><td>4.6</td><td>385.0</td><td>O K</td></tr><tr><td>4320 min Winter</td><td>50.507</td><td>1.507</td><td>4.4</td><td>0.0</td><td>4.4</td><td>322.9</td><td>O K</td></tr><tr><td>5760 min Winter</td><td>50.350</td><td>1.350</td><td>4.2</td><td>0.0</td><td>4.2</td><td>265.4</td><td>O K</td></tr><tr><td>7200 min Winter</td><td>50.189</td><td>1.189</td><td>4.1</td><td>0.0</td><td>4.1</td><td>213.2</td><td>O K</td></tr><tr><td>8640 min Winter</td><td>50.018</td><td>1.018</td><td>4.1</td><td>0.0</td><td>4.1</td><td>164.4</td><td>O K</td></tr><tr><td>10080 min Winter</td><td>49.736</td><td>0.736</td><td>4.1</td><td>0.0</td><td>4.1</td><td>98.5</td><td>O K</td></tr></table>								Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max E Outflow (l/s)	Max Volume (m³)	Status	10080 min Summer	50.031	1.031	4.1	0.0	4.1	167.9	O K	15 min Winter	50.121	1.121	4.1	0.0	4.1	192.8	O K	30 min Winter	50.278	1.278	4.1	0.0	4.1	241.3	O K	60 min Winter	50.446	1.446	4.3	0.0	4.3	299.6	O K	120 min Winter	50.611	1.611	4.5	0.0	4.5	367.8	O K	180 min Winter	50.696	1.696	4.6	0.0	4.6	411.4	O K	240 min Winter	50.751	1.751	4.7	0.0	4.7	442.9	Flood Risk	360 min Winter	50.820	1.820	4.8	0.0	4.8	486.5	Flood Risk	480 min Winter	50.864	1.864	4.8	0.0	4.8	516.7	Flood Risk	600 min Winter	50.943	1.943	4.9	13.8	18.7	576.4	Flood Risk	720 min Winter	50.955	1.955	4.9	19.6	24.6	585.5	Flood Risk	960 min Winter	50.942	1.942	4.9	13.3	18.2	575.4	Flood Risk	1440 min Winter	50.920	1.920	4.9	4.3	9.2	558.0	Flood Risk	2160 min Winter	50.810	1.810	4.8	0.0	4.8	479.5	Flood Risk	2880 min Winter	50.646	1.646	4.6	0.0	4.6	385.0	O K	4320 min Winter	50.507	1.507	4.4	0.0	4.4	322.9	O K	5760 min Winter	50.350	1.350	4.2	0.0	4.2	265.4	O K	7200 min Winter	50.189	1.189	4.1	0.0	4.1	213.2	O K	8640 min Winter	50.018	1.018	4.1	0.0	4.1	164.4	O K	10080 min Winter	49.736	0.736	4.1	0.0	4.1	98.5	O K
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max E Outflow (l/s)	Max Volume (m³)	Status																																																																																																																																																																								
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0 4	0.000	4 8	0.121																																													
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Lion House Oriental Road Woking GU22 8AP	Berewood Development Western Network Pond 3B-1	
Date 22/01/2019 File Swale 3B-1.SRCX	Designed by A May Checked by RHA	
Micro Drainage		Source Control 2017.1.2

Model Details

Storage is Online Cover Level (m) 45.433

Tank or Pond Structure

Invert Level (m) 44.133

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	0.0	0.400	20.2	0.800	59.3	1.200	97.8
0.100	3.0	0.500	28.6	0.900	69.0	1.300	107.5
0.200	7.3	0.600	38.5	1.000	78.6		
0.300	13.1	0.700	49.7	1.100	88.2		

Orifice Outflow Control

Diameter (m) 0.100 Discharge Coefficient 0.600 Invert Level (m) 44.133

Weir Overflow Control

Discharge Coef 0.544 Width (m) 3.600 Invert Level (m) 45.333

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Lion House Oriental Road Woking GU22 8AP	Berewood Development Western Network Pond 3B-2																																															
Date 22/01/2019 File Swale 3B-2.SRCX	Designed by A May Checked by RHA																																															
Micro Drainage		Source Control 2017.1.2																																														
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Micro Drainage Source Control 2017.1.2		

Model Details

Storage is Online Cover Level (m) 44.714

Tank or Pond Structure

Invert Level (m) 43.414

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	0.0	0.400	20.2	0.800	59.3	1.200	97.8
0.100	3.0	0.500	28.6	0.900	69.0	1.300	107.5
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Orifice Outflow Control

Diameter (m) 0.100 Discharge Coefficient 0.600 Invert Level (m) 43.414

Weir Overflow Control

Discharge Coef 0.544 Width (m) 3.600 Invert Level (m) 44.614

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Date 22/01/2019 File Swale 3B-3.SRCX	Designed by A May Checked by RHA																																															
Micro Drainage		Source Control 2017.1.2																																														
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Date 22/01/2019 File Swale 3B-3.SRCX	Designed by A May Checked by RHA	
Micro Drainage Source Control 2017.1.2		

Model Details

Storage is Online Cover Level (m) 43.976

Tank or Pond Structure

Invert Level (m) 42.476

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	0.0	0.400	20.2	0.800	62.3	1.200	114.5
0.100	3.0	0.500	28.6	0.900	76.3	1.300	127.1
0.200	7.3	0.600	38.5	1.000	89.3	1.400	139.8
0.300	13.1	0.700	49.7	1.100	101.9	1.500	152.4

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0230-3000-1500-3000
Design Head (m)	1.500
Design Flow (l/s)	30.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	230
Invert Level (m)	42.476
Minimum Outlet Pipe Diameter (mm)	300
Suggested Manhole Diameter (mm)	1800

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	30.0	Kick-Flo®	1.016	24.9
Flush-Flo™	0.462	30.0	Mean Flow over Head Range	-	25.7

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	7.7	1.200	27.0	3.000	41.9	7.000	63.1
0.200	23.1	1.400	29.0	3.500	45.1	7.500	65.2
0.300	29.0	1.600	30.9	4.000	48.1	8.000	67.3
0.400	29.9	1.800	32.7	4.500	50.9	8.500	69.3
0.500	29.9	2.000	34.4	5.000	53.6	9.000	71.3
0.600	29.6	2.200	36.0	5.500	56.1	9.500	73.2
0.800	28.5	2.400	37.6	6.000	58.5		
1.000	25.4	2.600	39.1	6.500	60.8		

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Date 22/01/2019	Designed by A May																																															
File Phase 8 Source Control...	Checked by RHA																																															
Micro Drainage		Source Control 2017.1.2																																														
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Date 22/01/2019	Designed by A May	
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Micro Drainage		Source Control 2017.1.2

Model Details

Storage is Online Cover Level (m) 54.350

Tank or Pond Structure

Invert Level (m) 52.400

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	129.0	1.000	342.0	1.950	663.0
0.500	228.0	1.500	470.0		

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0093-5000-1900-5000
Design Head (m)	1.900
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	93
Invert Level (m)	52.400
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.900	5.0	Kick-Flo®	0.830	3.4
Flush-Flo™	0.406	4.3	Mean Flow over Head Range	-	4.0

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.9	1.200	4.0	3.000	6.2	7.000	9.2
0.200	3.9	1.400	4.3	3.500	6.7	7.500	9.5
0.300	4.2	1.600	4.6	4.000	7.1	8.000	9.8
0.400	4.3	1.800	4.9	4.500	7.5	8.500	10.1
0.500	4.2	2.000	5.1	5.000	7.9	9.000	10.4
0.600	4.1	2.200	5.4	5.500	8.2	9.500	10.7
0.800	3.6	2.400	5.6	6.000	8.6		
1.000	3.7	2.600	5.8	6.500	8.9		

Weir Overflow Control

Discharge Coef 0.544 Width (m) 0.900 Invert Level (m) 54.250

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Lion House Oriental Road Woking GU22 8AP	Berewood Development Western Network Pond 8B																																															
Date 22/01/2019 File Phase 8 Source Control...	Designed by A May Checked by RHA																																															
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Date 22/01/2019	Designed by A May	
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Micro Drainage		Source Control 2017.1.2

Model Details

Storage is Online Cover Level (m) 53.050

Tank or Pond Structure

Invert Level (m) 51.000

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	64.3	1.000	263.6	2.050	640.0
0.500	151.0	1.500	393.1		

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0092-5000-2000-5000
Design Head (m)	2.000
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	92
Invert Level (m)	51.000
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.000	5.0	Kick-Flo®	0.816	3.3
Flush-Flo™	0.398	4.1	Mean Flow over Head Range	-	3.9

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.9	1.200	3.9	3.000	6.0	7.000	9.0
0.200	3.8	1.400	4.2	3.500	6.5	7.500	9.3
0.300	4.1	1.600	4.5	4.000	6.9	8.000	9.6
0.400	4.1	1.800	4.8	4.500	7.3	8.500	9.9
0.500	4.1	2.000	5.0	5.000	7.7	9.000	10.2
0.600	4.0	2.200	5.2	5.500	8.0	9.500	10.4
0.800	3.4	2.400	5.4	6.000	8.4		
1.000	3.6	2.600	5.6	6.500	8.7		

Weir Overflow Control

Discharge Coef 0.544 Width (m) 0.900 Invert Level (m) 52.900

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Lion House Oriental Road Woking GU22 8AP	Berewood Development Western Nertwork Pond 8C																																															
Date 22/01/2019	Designed by A May																																															
File Phase 8 Source Control...	Checked by RHA																																															
Micro Drainage		Source Control 2017.1.2																																														
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Lion House Oriental Road Woking GU22 8AP	Berewood Development Western Nertwork Pond 8C	
Date 22/01/2019	Designed by A May	
File Phase 8 Source Control...	Checked by RHA	
Micro Drainage		Source Control 2017.1.2

Model Details

Storage is Online Cover Level (m) 52.050

Tank or Pond Structure

Invert Level (m) 50.000

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	384.0	1.000	677.1	2.050	1156.0
0.500	523.4	1.500	844.9		

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0092-5000-2000-5000
Design Head (m)	2.000
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	92
Invert Level (m)	49.500
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.000	5.0	Kick-Flo®	0.816	3.3
Flush-Flo™	0.398	4.1	Mean Flow over Head Range	-	3.9

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.9	1.200	3.9	3.000	6.0	7.000	9.0
0.200	3.8	1.400	4.2	3.500	6.5	7.500	9.3
0.300	4.1	1.600	4.5	4.000	6.9	8.000	9.6
0.400	4.1	1.800	4.8	4.500	7.3	8.500	9.9
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1.000	3.6	2.600	5.6	6.500	8.7		

Weir Overflow Control

Discharge Coef 0.544 Width (m) 0.900 Invert Level (m) 51.950

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Lion House Oriental Road Woking GU22 8AP	Berewood Development Western Network Pond 8D	
Date 22/01/2019 File Phase 8 Source Control...	Designed by A May Checked by RHA	
Micro Drainage		Source Control 2017.1.2

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	GB 467450 109700 SU 67450 09700
C (1km)	-0.027
D1 (1km)	0.461
D2 (1km)	0.289
D3 (1km)	0.376
E (1km)	0.304
F (1km)	2.245
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.697

Time (mins)	Area	Time (mins)	Area
From:	To: (ha)	From:	To: (ha)
0	4 0.000	4	8 0.697

Time Area Diagram

Total Area (ha) 0.000

Time (mins)	Area
From:	To: (ha)
0	4 0.000

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Lion House Oriental Road Woking GU22 8AP	Berewood Development Western Network Pond 8D	
Date 22/01/2019	Designed by A May	
File Phase 8 Source Control...	Checked by RHA	
Micro Drainage		Source Control 2017.1.2

Model Details

Storage is Online Cover Level (m) 51.000

Tank or Pond Structure

Invert Level (m) 49.000

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	73.2	1.000	261.2	2.000	859.6
0.500	156.9	1.500	384.8		

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0092-5000-2000-5000
Design Head (m)	2.000
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
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Weir Overflow Control

Discharge Coef 0.544 Width (m) 0.900 Invert Level (m) 50.900

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Lion House Oriental Road Woking GU22 8AP	Berewood Development Western Network Pond 3A																																															
Date 22/01/2019	Designed by A May																																															
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Date 22/01/2019 File Swale 3B-1.SRCX	Designed by A May Checked by RHA	
Micro Drainage		Source Control 2017.1.2

Model Details

Storage is Online Cover Level (m) 45.433

Tank or Pond Structure

Invert Level (m) 44.133

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	0.0	0.400	20.2	0.800	59.3	1.200	97.8
0.100	3.0	0.500	28.6	0.900	69.0	1.300	107.5
0.200	7.3	0.600	38.5	1.000	78.6		
0.300	13.1	0.700	49.7	1.100	88.2		

Orifice Outflow Control

Diameter (m) 0.100 Discharge Coefficient 0.600 Invert Level (m) 44.133

Weir Overflow Control

Discharge Coef 0.544 Width (m) 3.600 Invert Level (m) 45.333

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Micro Drainage		Source Control 2017.1.2

Model Details

Storage is Online Cover Level (m) 44.714

Tank or Pond Structure

Invert Level (m) 43.414

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	0.0	0.400	20.2	0.800	59.3	1.200	97.8
0.100	3.0	0.500	28.6	0.900	69.0	1.300	107.5
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Orifice Outflow Control

Diameter (m) 0.100 Discharge Coefficient 0.600 Invert Level (m) 43.414

Weir Overflow Control

Discharge Coef 0.544 Width (m) 3.600 Invert Level (m) 44.614

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Micro Drainage Source Control 2017.1.2		

Model Details

Storage is Online Cover Level (m) 43.976

Tank or Pond Structure

Invert Level (m) 42.476

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	0.0	0.400	20.2	0.800	62.3	1.200	114.5
0.100	3.0	0.500	28.6	0.900	76.3	1.300	127.1
0.200	7.3	0.600	38.5	1.000	89.3	1.400	139.8
0.300	13.1	0.700	49.7	1.100	101.9	1.500	152.4

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0230-3000-1500-3000
Design Head (m)	1.500
Design Flow (l/s)	30.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	230
Invert Level (m)	42.476
Minimum Outlet Pipe Diameter (mm)	300
Suggested Manhole Diameter (mm)	1800

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	30.0	Kick-Flo®	1.016	24.9
Flush-Flo™	0.462	30.0	Mean Flow over Head Range	-	25.7

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	7.7	1.200	27.0	3.000	41.9	7.000	63.1
0.200	23.1	1.400	29.0	3.500	45.1	7.500	65.2
0.300	29.0	1.600	30.9	4.000	48.1	8.000	67.3
0.400	29.9	1.800	32.7	4.500	50.9	8.500	69.3
0.500	29.9	2.000	34.4	5.000	53.6	9.000	71.3
0.600	29.6	2.200	36.0	5.500	56.1	9.500	73.2
0.800	28.5	2.400	37.6	6.000	58.5		
1.000	25.4	2.600	39.1	6.500	60.8		

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Date 22/01/2019	Designed by A May	
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Micro Drainage		Source Control 2017.1.2

Model Details

Storage is Online Cover Level (m) 54.350

Tank or Pond Structure

Invert Level (m) 52.400

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	129.0	1.000	342.0	1.950	663.0
0.500	228.0	1.500	470.0		

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0093-5000-1900-5000
Design Head (m)	1.900
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	93
Invert Level (m)	52.400
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.900	5.0	Kick-Flo®	0.830	3.4
Flush-Flo™	0.406	4.3	Mean Flow over Head Range	-	4.0

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.9	1.200	4.0	3.000	6.2	7.000	9.2
0.200	3.9	1.400	4.3	3.500	6.7	7.500	9.5
0.300	4.2	1.600	4.6	4.000	7.1	8.000	9.8
0.400	4.3	1.800	4.9	4.500	7.5	8.500	10.1
0.500	4.2	2.000	5.1	5.000	7.9	9.000	10.4
0.600	4.1	2.200	5.4	5.500	8.2	9.500	10.7
0.800	3.6	2.400	5.6	6.000	8.6		
1.000	3.7	2.600	5.8	6.500	8.9		

Weir Overflow Control

Discharge Coef 0.544 Width (m) 0.900 Invert Level (m) 54.250

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Lion House Oriental Road Woking GU22 8AP	Berewood Development Western Network Pond 8B	
Date 22/01/2019	Designed by A May	
File Phase 8 Source Control...	Checked by RHA	
Micro Drainage		Source Control 2017.1.2

Model Details

Storage is Online Cover Level (m) 53.050

Tank or Pond Structure

Invert Level (m) 51.000

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	64.3	1.000	263.6	2.050	640.0
0.500	151.0	1.500	393.1		

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0092-5000-2000-5000
Design Head (m)	2.000
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	92
Invert Level (m)	51.000
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.000	5.0	Kick-Flo®	0.816	3.3
Flush-Flo™	0.398	4.1	Mean Flow over Head Range	-	3.9

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.9	1.200	3.9	3.000	6.0	7.000	9.0
0.200	3.8	1.400	4.2	3.500	6.5	7.500	9.3
0.300	4.1	1.600	4.5	4.000	6.9	8.000	9.6
0.400	4.1	1.800	4.8	4.500	7.3	8.500	9.9
0.500	4.1	2.000	5.0	5.000	7.7	9.000	10.2
0.600	4.0	2.200	5.2	5.500	8.0	9.500	10.4
0.800	3.4	2.400	5.4	6.000	8.4		
1.000	3.6	2.600	5.6	6.500	8.7		

Weir Overflow Control

Discharge Coef 0.544 Width (m) 0.900 Invert Level (m) 52.900

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Lion House Oriental Road Woking GU22 8AP	Berewood Development Western Nertwork Pond 8C																																															
Date 22/01/2019	Designed by A May																																															
File Phase 8 Source Control...	Checked by RHA																																															
Micro Drainage		Source Control 2017.1.2																																														
<u>Rainfall Details</u> <table> <tr> <td>Rainfall Model</td> <td>FEH</td> </tr> <tr> <td>Return Period (years)</td> <td>100</td> </tr> <tr> <td>FEH Rainfall Version</td> <td>1999</td> </tr> <tr> <td>Site Location</td> <td>GB 467450 109700 SU 67450 09700</td> </tr> <tr> <td>C (1km)</td> <td>-0.027</td> </tr> <tr> <td>D1 (1km)</td> <td>0.461</td> </tr> <tr> <td>D2 (1km)</td> <td>0.289</td> </tr> <tr> <td>D3 (1km)</td> <td>0.376</td> </tr> <tr> <td>E (1km)</td> <td>0.304</td> </tr> <tr> <td>F (1km)</td> <td>2.245</td> </tr> <tr> <td>Summer Storms</td> <td>Yes</td> </tr> <tr> <td>Winter Storms</td> <td>Yes</td> </tr> <tr> <td>Cv (Summer)</td> <td>0.750</td> </tr> <tr> <td>Cv (Winter)</td> <td>0.840</td> </tr> <tr> <td>Shortest Storm (mins)</td> <td>15</td> </tr> <tr> <td>Longest Storm (mins)</td> <td>10080</td> </tr> <tr> <td>Climate Change %</td> <td>+40</td> </tr> </table> <u>Time Area Diagram</u> Total Area (ha) 1.621 <table> <thead> <tr> <th>Time (mins)</th> <th>Area</th> <th>Time (mins)</th> <th>Area</th> </tr> <tr> <th>From: To:</th> <th>(ha)</th> <th>From: To:</th> <th>(ha)</th> </tr> </thead> <tbody> <tr> <td>0 4</td> <td>0.000</td> <td>4 8</td> <td>1.621</td> </tr> </tbody> </table>			Rainfall Model	FEH	Return Period (years)	100	FEH Rainfall Version	1999	Site Location	GB 467450 109700 SU 67450 09700	C (1km)	-0.027	D1 (1km)	0.461	D2 (1km)	0.289	D3 (1km)	0.376	E (1km)	0.304	F (1km)	2.245	Summer Storms	Yes	Winter Storms	Yes	Cv (Summer)	0.750	Cv (Winter)	0.840	Shortest Storm (mins)	15	Longest Storm (mins)	10080	Climate Change %	+40	Time (mins)	Area	Time (mins)	Area	From: To:	(ha)	From: To:	(ha)	0 4	0.000	4 8	1.621
Rainfall Model	FEH																																															
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Lion House Oriental Road Woking GU22 8AP	Berewood Development Western Nertwork Pond 8C	
Date 22/01/2019	Designed by A May	
File Phase 8 Source Control...	Checked by RHA	
Micro Drainage		Source Control 2017.1.2

Model Details

Storage is Online Cover Level (m) 52.050

Tank or Pond Structure

Invert Level (m) 50.000

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	384.0	1.000	677.1	2.050	1156.0
0.500	523.4	1.500	844.9		

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0092-5000-2000-5000
Design Head (m)	2.000
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	92
Invert Level (m)	49.500
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.000	5.0	Kick-Flo®	0.816	3.3
Flush-Flo™	0.398	4.1	Mean Flow over Head Range	-	3.9

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.9	1.200	3.9	3.000	6.0	7.000	9.0
0.200	3.8	1.400	4.2	3.500	6.5	7.500	9.3
0.300	4.1	1.600	4.5	4.000	6.9	8.000	9.6
0.400	4.1	1.800	4.8	4.500	7.3	8.500	9.9
0.500	4.1	2.000	5.0	5.000	7.7	9.000	10.2
0.600	4.0	2.200	5.2	5.500	8.0	9.500	10.4
0.800	3.4	2.400	5.4	6.000	8.4		
1.000	3.6	2.600	5.6	6.500	8.7		

Weir Overflow Control

Discharge Coef 0.544 Width (m) 0.900 Invert Level (m) 51.950

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Lion House Oriental Road Woking GU22 8AP	Berewood Development Western Network Pond 8D	
Date 22/01/2019	Designed by A May	
File Phase 8 Source Control...	Checked by RHA	
Micro Drainage		Source Control 2017.1.2

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	GB 467450 109700 SU 67450 09700
C (1km)	-0.027
D1 (1km)	0.461
D2 (1km)	0.289
D3 (1km)	0.376
E (1km)	0.304
F (1km)	2.245
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.697

Time (mins)	Area	Time (mins)	Area
From: To:	(ha)	From: To:	(ha)
0	4 0.000	4	8 0.697

Time Area Diagram

Total Area (ha) 0.000

Time (mins)	Area
From: To:	(ha)
0	4 0.000

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Lion House Oriental Road Woking GU22 8AP	Berewood Development Western Network Pond 8D	
Date 22/01/2019	Designed by A May	
File Phase 8 Source Control...	Checked by RHA	
Micro Drainage		Source Control 2017.1.2

Model Details

Storage is Online Cover Level (m) 51.000

Tank or Pond Structure

Invert Level (m) 49.000

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	73.2	1.000	261.2	2.000	859.6
0.500	156.9	1.500	384.8		

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0092-5000-2000-5000
Design Head (m)	2.000
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	92
Invert Level (m)	49.000
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.000	5.0	Kick-Flo®	0.816	3.3
Flush-Flo™	0.398	4.1	Mean Flow over Head Range	-	3.9

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.9	1.200	3.9	3.000	6.0	7.000	9.0
0.200	3.8	1.400	4.2	3.500	6.5	7.500	9.3
0.300	4.1	1.600	4.5	4.000	6.9	8.000	9.6
0.400	4.1	1.800	4.8	4.500	7.3	8.500	9.9
0.500	4.1	2.000	5.0	5.000	7.7	9.000	10.2
0.600	4.0	2.200	5.2	5.500	8.0	9.500	10.4
0.800	3.4	2.400	5.4	6.000	8.4		
1.000	3.6	2.600	5.6	6.500	8.7		

Weir Overflow Control

Discharge Coef 0.544 Width (m) 0.900 Invert Level (m) 50.900

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Lion House Oriental Road Woking GU22 8AP		Berewood Development Western Network Pond 3A			
Date 22/01/2019 File Cascade Phase 3B and 8...		Designed by A May Checked by RHA			
Micro Drainage		Source Control 2017.1.2			
<u>Cascade Summary of Results for Source Control Phase 3A 1 in 30.srcx</u>					
Upstream Structures		Outflow To		Overflow To	
Phase 8 Source Control Pond 8D 1 in 30.srcx		Swale 3B-1 1 in 30.srcx		Swale 3B-1 1 in 30.srcx	
Phase 8 Source Control Pond 8C 1 in 30.srcx					
Phase 8 Source Control Pond 8B 1 in 30.srcx					
Phase 8 Source Control Pond 8A 1 in 30.srcx					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	47.722	0.222	2.6	134.6	O K
30 min Summer	47.778	0.278	2.6	172.8	O K
60 min Summer	47.843	0.343	2.6	220.8	O K
120 min Summer	47.920	0.420	2.6	280.1	O K
180 min Summer	47.969	0.469	2.6	320.4	O K
240 min Summer	48.005	0.505	2.6	351.6	O K
360 min Summer	48.059	0.559	2.6	398.8	O K
480 min Summer	48.098	0.598	2.6	434.4	O K
600 min Summer	48.128	0.628	2.6	463.1	O K
720 min Summer	48.153	0.653	2.6	487.2	O K
960 min Summer	48.160	0.660	2.6	493.4	O K
1440 min Summer	48.156	0.656	2.6	489.7	O K
2160 min Summer	48.131	0.631	2.6	465.8	O K
2880 min Summer	48.106	0.606	2.6	442.0	O K
4320 min Summer	48.085	0.585	2.6	422.9	O K
5760 min Summer	48.060	0.560	2.6	399.9	O K
7200 min Summer	48.033	0.533	2.6	375.7	O K
8640 min Summer	48.005	0.505	2.6	350.9	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
15 min Summer	63.289	0.0	125.2	23	
30 min Summer	40.885	0.0	160.7	38	
60 min Summer	26.412	0.0	222.0	68	
120 min Summer	17.062	0.0	286.5	128	
180 min Summer	13.214	0.0	331.5	188	
240 min Summer	11.023	0.0	366.1	246	
360 min Summer	8.536	0.0	411.0	366	
480 min Summer	7.121	0.0	419.3	486	
600 min Summer	6.186	0.0	410.9	606	
720 min Summer	5.515	0.0	398.6	726	
960 min Summer	4.378	0.0	386.0	966	
1440 min Summer	3.162	0.0	365.9	1444	
2160 min Summer	2.284	0.0	697.2	1884	
2880 min Summer	1.813	0.0	730.1	2200	
4320 min Summer	1.357	0.0	718.9	2988	
5760 min Summer	1.104	0.0	911.5	3800	
7200 min Summer	0.941	0.0	970.9	4608	
8640 min Summer	0.826	0.0	1022.0	5368	
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Lion House Oriental Road Woking GU22 8AP			Berewood Development Western Network Pond 3A			
Date 22/01/2019 File Cascade Phase 3B and 8...			Designed by A May Checked by RHA			
Micro Drainage			Source Control 2017.1.2			
<u>Cascade Summary of Results for Source Control Phase 3A 1 in 30.srcx</u>						
	Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
	10080 min Summer	47.976	0.476	2.6	326.6	O K
	15 min Winter	47.746	0.246	2.6	150.9	O K
	30 min Winter	47.807	0.307	2.6	193.8	O K
	60 min Winter	47.879	0.379	2.6	247.9	O K
	120 min Winter	47.963	0.463	2.6	315.2	O K
	180 min Winter	48.017	0.517	2.6	361.3	O K
	240 min Winter	48.057	0.557	2.6	397.2	O K
	360 min Winter	48.117	0.617	2.6	452.2	O K
	480 min Winter	48.161	0.661	2.6	494.5	O K
	600 min Winter	48.194	0.694	2.6	528.0	O K
	720 min Winter	48.221	0.721	2.6	555.3	O K
	960 min Winter	48.231	0.731	2.6	564.9	O K
	1440 min Winter	48.232	0.732	2.6	566.4	O K
	2160 min Winter	48.214	0.714	2.6	548.0	O K
	2880 min Winter	48.186	0.686	2.6	519.3	O K
	4320 min Winter	48.158	0.658	2.6	492.0	O K
	5760 min Winter	48.117	0.617	2.6	452.3	O K
	7200 min Winter	48.070	0.570	2.6	408.8	O K
	8640 min Winter	48.022	0.522	2.6	365.7	O K
	10080 min Winter	47.974	0.474	2.6	324.5	O K
	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
	10080 min Summer	0.740	0.0	1066.0	6152	
	15 min Winter	63.289	0.0	140.1	23	
	30 min Winter	40.885	0.0	178.2	37	
	60 min Winter	26.412	0.0	248.6	66	
	120 min Winter	17.062	0.0	320.1	126	
	180 min Winter	13.214	0.0	368.7	184	
	240 min Winter	11.023	0.0	402.6	244	
	360 min Winter	8.536	0.0	421.1	362	
	480 min Winter	7.121	0.0	407.5	480	
	600 min Winter	6.186	0.0	393.7	598	
	720 min Winter	5.515	0.0	383.0	712	
	960 min Winter	4.378	0.0	372.4	946	
	1440 min Winter	3.162	0.0	357.0	1402	
	2160 min Winter	2.284	0.0	761.7	2056	
	2880 min Winter	1.813	0.0	754.2	2628	
	4320 min Winter	1.357	0.0	699.8	3292	
	5760 min Winter	1.104	0.0	1020.7	4208	
	7200 min Winter	0.941	0.0	1087.2	5040	
	8640 min Winter	0.826	0.0	1144.4	5872	
	10080 min Winter	0.740	0.0	1194.0	6656	
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Lion House Oriental Road Woking GU22 8AP			Berewood Development Western Network Pond 3B-1				
Date 22/01/2019 File Cascade Phase 3B and 8...			Designed by A May Checked by RHA				
Micro Drainage				Source Control 2017.1.2			
<u>Cascade Summary of Results for Swale 3B-1 1 in 30.srcx</u>							
Upstream Structures				Outflow To		Overflow To	
Source Control Phase 3A 1 in 30.srcx				(None)		Swale 3B-2 1 in 30.srcx	
Phase 8 Source Control Pond 8D 1 in 30.srcx							
Phase 8 Source Control Pond 8C 1 in 30.srcx							
Phase 8 Source Control Pond 8B 1 in 30.srcx							
Phase 8 Source Control Pond 8A 1 in 30.srcx							
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	44.951	0.818	18.3	0.0	18.3	20.0	O K
30 min Summer	44.968	0.835	18.5	0.0	18.5	21.0	O K
60 min Summer	45.021	0.888	19.1	0.0	19.1	24.5	O K
120 min Summer	45.086	0.953	19.8	0.0	19.8	29.0	O K
180 min Summer	45.122	0.989	20.2	0.0	20.2	31.8	O K
240 min Summer	45.144	1.011	20.5	0.0	20.5	33.5	Flood Risk
360 min Summer	45.166	1.033	20.7	0.0	20.7	35.3	Flood Risk
480 min Summer	45.172	1.039	20.8	0.0	20.8	35.8	Flood Risk
600 min Summer	45.170	1.037	20.7	0.0	20.7	35.6	Flood Risk
720 min Summer	45.165	1.032	20.7	0.0	20.7	35.2	Flood Risk
960 min Summer	45.139	1.006	20.4	0.0	20.4	33.1	Flood Risk
1440 min Summer	45.116	0.983	20.2	0.0	20.2	31.3	O K
2160 min Summer	45.103	0.970	20.0	0.0	20.0	30.3	O K
2880 min Summer	45.094	0.961	19.9	0.0	19.9	29.7	O K
4320 min Summer	45.085	0.952	19.8	0.0	19.8	29.0	O K
5760 min Summer	45.078	0.945	19.7	0.0	19.7	28.5	O K
7200 min Summer	45.071	0.938	19.7	0.0	19.7	28.0	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)		
15 min Summer	63.289	0.0	594.4	0.0	214		
30 min Summer	40.885	0.0	767.0	0.0	322		
60 min Summer	26.412	0.0	1006.0	0.0	64		
120 min Summer	17.062	0.0	1299.6	0.0	92		
180 min Summer	13.214	0.0	1508.6	0.0	124		
240 min Summer	11.023	0.0	1675.1	0.0	158		
360 min Summer	8.536	0.0	1931.8	0.0	226		
480 min Summer	7.121	0.0	2095.8	0.0	294		
600 min Summer	6.186	0.0	2178.6	0.0	358		
720 min Summer	5.515	0.0	2250.0	0.0	422		
960 min Summer	4.378	0.0	2313.5	0.0	524		
1440 min Summer	3.162	0.0	2401.5	0.0	746		
2160 min Summer	2.284	0.0	3139.8	0.0	1112		
2880 min Summer	1.813	0.0	3314.8	0.0	1492		
4320 min Summer	1.357	0.0	3620.3	0.0	2256		
5760 min Summer	1.104	0.0	4059.7	0.0	3064		
7200 min Summer	0.941	0.0	4326.5	0.0	3960		
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Woking GU22 8AP

Date 22/01/2019

File Cascade Phase 3B and 8...

Berewood Development

Western Network

Pond 3B-1

Designed by A May

Checked by RHA

Micro Drainage

Source Control 2017.1.2

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Cascade Summary of Results for Swale 3B-1 1 in 30.srcx

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max E Outflow (l/s)	Max Volume (m³)	Status
8640 min Summer	45.041	0.908	19.3	0.0	19.3	25.8	O K
10080 min Summer	44.989	0.856	18.7	0.0	18.7	22.3	O K
15 min Winter	44.960	0.827	18.4	0.0	18.4	20.5	O K
30 min Winter	44.983	0.850	18.7	0.0	18.7	22.0	O K
60 min Winter	45.057	0.924	19.5	0.0	19.5	26.9	O K
120 min Winter	45.120	0.987	20.2	0.0	20.2	31.6	O K
180 min Winter	45.154	1.021	20.6	0.0	20.6	34.3	Flood Risk
240 min Winter	45.173	1.040	20.8	0.0	20.8	35.8	Flood Risk
360 min Winter	45.186	1.053	20.9	0.0	20.9	36.9	Flood Risk
480 min Winter	45.185	1.052	20.9	0.0	20.9	36.9	Flood Risk
600 min Winter	45.178	1.045	20.8	0.0	20.8	36.3	Flood Risk
720 min Winter	45.168	1.035	20.7	0.0	20.7	35.4	Flood Risk
960 min Winter	45.126	0.993	20.3	0.0	20.3	32.1	O K
1440 min Winter	45.102	0.969	20.0	0.0	20.0	30.2	O K
2160 min Winter	45.092	0.959	19.9	0.0	19.9	29.5	O K
2880 min Winter	45.088	0.955	19.9	0.0	19.9	29.2	O K
4320 min Winter	45.086	0.953	19.8	0.0	19.8	29.1	O K
5760 min Winter	45.070	0.937	19.7	0.0	19.7	27.9	O K
7200 min Winter	44.983	0.850	18.7	0.0	18.7	21.9	O K
8640 min Winter	44.879	0.746	17.4	0.0	17.4	15.8	O K
10080 min Winter	44.791	0.658	16.3	0.0	16.3	11.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
8640 min Summer	0.826	0.0	4556.8	0.0	4664
10080 min Summer	0.740	0.0	4758.9	0.0	5336
15 min Winter	63.289	0.0	665.5	0.0	253
30 min Winter	40.885	0.0	857.2	0.0	36
60 min Winter	26.412	0.0	1126.8	0.0	64
120 min Winter	17.062	0.0	1455.0	0.0	98
180 min Winter	13.214	0.0	1687.3	0.0	138
240 min Winter	11.023	0.0	1868.9	0.0	176
360 min Winter	8.536	0.0	2106.8	0.0	252
480 min Winter	7.121	0.0	2215.0	0.0	324
600 min Winter	6.186	0.0	2311.4	0.0	396
720 min Winter	5.515	0.0	2399.4	0.0	468
960 min Winter	4.378	0.0	2471.5	0.0	600
1440 min Winter	3.162	0.0	2572.5	0.0	716
2160 min Winter	2.284	0.0	3497.6	0.0	1088
2880 min Winter	1.813	0.0	3649.9	0.0	1492
4320 min Winter	1.357	0.0	3870.2	0.0	2372
5760 min Winter	1.104	0.0	4547.9	0.0	3296
7200 min Winter	0.941	0.0	4845.7	0.0	3960
8640 min Winter	0.826	0.0	5101.8	0.0	4592
10080 min Winter	0.740	0.0	5329.2	0.0	5248

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Lion House Oriental Road Woking GU22 8AP							
Date 22/01/2019 22:59 File Cascade Phase 3B and 8...	Designed by rakerman Checked by						
Micro Drainage	Source Control 2017.1.2						
<u>Cascade Summary of Results for Swale 3B-2 1 in 30.srcx</u>							
Upstream Structures	Outflow To	Overflow To					
Swale 3B-1 1 in 30.srcx Source Control Phase 3A 1 in 30.srcx Phase 8 Source Control Pond 8D 1 in 30.srcx Phase 8 Source Control Pond 8C 1 in 30.srcx Phase 8 Source Control Pond 8B 1 in 30.srcx Phase 8 Source Control Pond 8A 1 in 30.srcx	(None)	Swale 3B-3 1 in 30.srcx					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max E Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	43.935	0.521	14.3	0.0	14.3	6.3	O K
30 min Summer	43.927	0.513	14.2	0.0	14.2	6.1	O K
60 min Summer	43.884	0.470	13.5	0.0	13.5	4.9	O K
120 min Summer	43.802	0.388	12.1	0.0	12.1	3.0	O K
180 min Summer	43.736	0.322	10.9	0.0	10.9	1.9	O K
240 min Summer	43.685	0.271	9.8	0.0	9.8	1.3	O K
360 min Summer	43.617	0.203	8.2	0.0	8.2	0.6	O K
480 min Summer	43.576	0.162	7.0	0.0	7.0	0.4	O K
600 min Summer	43.553	0.139	6.1	0.0	6.1	0.2	O K
720 min Summer	43.542	0.128	5.5	0.0	5.5	0.2	O K
960 min Summer	43.524	0.110	4.3	0.0	4.3	0.1	O K
1440 min Summer	43.504	0.090	3.1	0.0	3.1	0.1	O K
2160 min Summer	43.487	0.073	2.3	0.0	2.3	0.0	O K
2880 min Summer	43.476	0.062	1.8	0.0	1.8	0.0	O K
4320 min Summer	43.468	0.054	1.4	0.0	1.4	0.0	O K
5760 min Summer	43.464	0.050	1.2	0.0	1.2	0.0	O K
7200 min Summer	43.460	0.046	1.0	0.0	1.0	0.0	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)		
15 min Summer	63.289	0.0	14.4	0.0	17		
30 min Summer	40.885	0.0	18.6	0.0	25		
60 min Summer	26.412	0.0	24.0	0.0	40		
120 min Summer	17.062	0.0	31.0	0.0	72		
180 min Summer	13.214	0.0	36.0	0.0	100		
240 min Summer	11.023	0.0	40.0	0.0	130		
360 min Summer	8.536	0.0	46.5	0.0	190		
480 min Summer	7.121	0.0	51.7	0.0	248		
600 min Summer	6.186	0.0	56.1	0.0	310		
720 min Summer	5.515	0.0	60.1	0.0	368		
960 min Summer	4.378	0.0	63.6	0.0	492		
1440 min Summer	3.162	0.0	68.9	0.0	732		
2160 min Summer	2.284	0.0	74.6	0.0	1072		
2880 min Summer	1.813	0.0	79.0	0.0	1464		
4320 min Summer	1.357	0.0	88.6	0.0	2180		
5760 min Summer	1.104	0.0	96.1	0.0	2896		
7200 min Summer	0.941	0.0	102.4	0.0	3568		
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Lion House Oriental Road Woking GU22 8AP		
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Micro Drainage		Source Control 2017.1.2

<u>Cascade Summary of Results for Swale 3B-2 1 in 30.srcx</u>								
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Outflow (l/s)	Max Volume (m³)	Status	
8640 min Summer	43.457	0.043	0.9	0.0	0.9	0.0	O K	
10080 min Summer	43.455	0.041	0.8	0.0	0.8	0.0	O K	
15 min Winter	43.965	0.551	14.8	0.0	14.8	7.3	O K	
30 min Winter	43.941	0.527	14.4	0.0	14.4	6.5	O K	
60 min Winter	43.867	0.453	13.3	0.0	13.3	4.4	O K	
120 min Winter	43.739	0.325	11.0	0.0	11.0	2.0	O K	
180 min Winter	43.655	0.241	9.1	0.0	9.1	0.9	O K	
240 min Winter	43.603	0.189	7.8	0.0	7.8	0.5	O K	
360 min Winter	43.553	0.139	6.1	0.0	6.1	0.2	O K	
480 min Winter	43.536	0.122	5.1	0.0	5.1	0.2	O K	
600 min Winter	43.525	0.111	4.4	0.0	4.4	0.1	O K	
720 min Winter	43.517	0.103	3.9	0.0	3.9	0.1	O K	
960 min Winter	43.504	0.090	3.1	0.0	3.1	0.1	O K	
1440 min Winter	43.487	0.073	2.3	0.0	2.3	0.0	O K	
2160 min Winter	43.472	0.058	1.6	0.0	1.6	0.0	O K	
2880 min Winter	43.467	0.053	1.3	0.0	1.3	0.0	O K	
4320 min Winter	43.461	0.047	1.0	0.0	1.0	0.0	O K	
5760 min Winter	43.456	0.042	0.8	0.0	0.8	0.0	O K	
7200 min Winter	43.452	0.038	0.7	0.0	0.7	0.0	O K	
8640 min Winter	43.450	0.036	0.6	0.0	0.6	0.0	O K	
10080 min Winter	43.448	0.034	0.6	0.0	0.6	0.0	O K	

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
8640 min Summer	0.826	0.0	107.8	0.0	4352
10080 min Summer	0.740	0.0	112.6	0.0	5104
15 min Winter	63.289	0.0	16.1	0.0	17
30 min Winter	40.885	0.0	20.8	0.0	26
60 min Winter	26.412	0.0	26.8	0.0	42
120 min Winter	17.062	0.0	34.7	0.0	72
180 min Winter	13.214	0.0	40.3	0.0	100
240 min Winter	11.023	0.0	44.8	0.0	130
360 min Winter	8.536	0.0	52.1	0.0	186
480 min Winter	7.121	0.0	57.9	0.0	248
600 min Winter	6.186	0.0	62.9	0.0	306
720 min Winter	5.515	0.0	67.3	0.0	364
960 min Winter	4.378	0.0	71.2	0.0	488
1440 min Winter	3.162	0.0	77.1	0.0	738
2160 min Winter	2.284	0.0	83.6	0.0	1120
2880 min Winter	1.813	0.0	88.5	0.0	1508
4320 min Winter	1.357	0.0	99.3	0.0	2148
5760 min Winter	1.104	0.0	107.7	0.0	2816
7200 min Winter	0.941	0.0	114.7	0.0	3680
8640 min Winter	0.826	0.0	120.8	0.0	4304
10080 min Winter	0.740	0.0	126.2	0.0	4944

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Lion House Oriental Road Woking GU22 8AP		Berewood Development Wetsern Network Pond 3B-3			
Date 22/01/2019 File Cascade Phase 3B and 8...		Designed by A May Checked by RHA			
Micro Drainage		Source Control 2017.1.2			
<u>Cascade Summary of Results for Swale 3B-3 1 in 30.srcx</u>					
Upstream Structures		Outflow To Overflow To			
Swale 3B-2 1 in 30.srcx		(None)		(None)	
Swale 3B-1 1 in 30.srcx					
Source Control Phase 3A 1 in 30.srcx					
Phase 8 Source Control Pond 8D 1 in 30.srcx					
Phase 8 Source Control Pond 8C 1 in 30.srcx					
Phase 8 Source Control Pond 8B 1 in 30.srcx					
Phase 8 Source Control Pond 8A 1 in 30.srcx					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	42.793	0.317	29.3	1.8	O K
30 min Summer	42.737	0.261	28.4	1.1	O K
60 min Summer	42.672	0.196	22.5	0.6	O K
120 min Summer	42.631	0.155	16.1	0.3	O K
180 min Summer	42.611	0.135	12.8	0.2	O K
240 min Summer	42.598	0.122	10.9	0.2	O K
360 min Summer	42.582	0.106	8.5	0.1	O K
480 min Summer	42.572	0.096	7.1	0.1	O K
600 min Summer	42.565	0.089	6.2	0.1	O K
720 min Summer	42.559	0.083	5.5	0.1	O K
960 min Summer	42.550	0.074	4.4	0.0	O K
1440 min Summer	42.538	0.062	3.2	0.0	O K
2160 min Summer	42.529	0.053	2.3	0.0	O K
2880 min Summer	42.523	0.047	1.8	0.0	O K
4320 min Summer	42.517	0.041	1.4	0.0	O K
5760 min Summer	42.514	0.038	1.2	0.0	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
15 min Summer	63.289	0.0	14.4	15	
30 min Summer	40.885	0.0	18.6	22	
60 min Summer	26.412	0.0	24.0	36	
120 min Summer	17.062	0.0	31.0	66	
180 min Summer	13.214	0.0	36.0	96	
240 min Summer	11.023	0.0	40.0	126	
360 min Summer	8.536	0.0	46.5	186	
480 min Summer	7.121	0.0	51.7	246	
600 min Summer	6.186	0.0	56.1	304	
720 min Summer	5.515	0.0	60.1	364	
960 min Summer	4.378	0.0	63.6	492	
1440 min Summer	3.162	0.0	68.9	734	
2160 min Summer	2.284	0.0	74.6	1076	
2880 min Summer	1.813	0.0	78.9	1420	
4320 min Summer	1.357	0.0	88.6	2176	
5760 min Summer	1.104	0.0	96.1	2920	
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Lion House Oriental Road Woking GU22 8AP			Berewood Development Wetsern Network Pond 3B-3			
Date 22/01/2019 File Cascade Phase 3B and 8...			Designed by A May Checked by RHA			
Micro Drainage			Source Control 2017.1.2			
<u>Cascade Summary of Results for Swale 3B-3 1 in 30.srcx</u>						
	Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
	7200 min Summer	42.510	0.034	1.0	0.0	O K
	8640 min Summer	42.507	0.031	0.8	0.0	O K
	10080 min Summer	42.506	0.030	0.8	0.0	O K
	15 min Winter	42.801	0.325	29.3	1.9	O K
	30 min Winter	42.704	0.228	26.7	0.8	O K
	60 min Winter	42.645	0.169	18.3	0.4	O K
	120 min Winter	42.606	0.130	12.1	0.2	O K
	180 min Winter	42.589	0.113	9.5	0.1	O K
	240 min Winter	42.578	0.102	7.9	0.1	O K
	360 min Winter	42.564	0.088	6.1	0.1	O K
	480 min Winter	42.556	0.080	5.1	0.1	O K
	600 min Winter	42.550	0.074	4.4	0.0	O K
	720 min Winter	42.546	0.070	3.9	0.0	O K
	960 min Winter	42.538	0.062	3.2	0.0	O K
	1440 min Winter	42.529	0.053	2.3	0.0	O K
	2160 min Winter	42.520	0.044	1.7	0.0	O K
	2880 min Winter	42.516	0.040	1.3	0.0	O K
	4320 min Winter	42.510	0.034	1.0	0.0	O K
	5760 min Winter	42.507	0.031	0.8	0.0	O K
	7200 min Winter	42.505	0.029	0.7	0.0	O K
	8640 min Winter	42.503	0.027	0.6	0.0	O K
	10080 min Winter	42.501	0.025	0.6	0.0	O K
	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
	7200 min Summer	0.941	0.0	102.3	3536	
	8640 min Summer	0.826	0.0	107.8	4480	
	10080 min Summer	0.740	0.0	112.5	5112	
	15 min Winter	63.289	0.0	16.1	15	
	30 min Winter	40.885	0.0	20.8	22	
	60 min Winter	26.412	0.0	26.8	36	
	120 min Winter	17.062	0.0	34.7	68	
	180 min Winter	13.214	0.0	40.3	96	
	240 min Winter	11.023	0.0	44.8	124	
	360 min Winter	8.536	0.0	52.1	188	
	480 min Winter	7.121	0.0	57.9	250	
	600 min Winter	6.186	0.0	62.9	302	
	720 min Winter	5.515	0.0	67.3	364	
	960 min Winter	4.378	0.0	71.2	494	
	1440 min Winter	3.162	0.0	77.1	702	
	2160 min Winter	2.284	0.0	83.5	1032	
	2880 min Winter	1.813	0.0	88.4	1468	
	4320 min Winter	1.357	0.0	99.1	2232	
	5760 min Winter	1.104	0.0	107.6	3168	
	7200 min Winter	0.941	0.0	114.5	3600	
	8640 min Winter	0.826	0.0	120.7	4128	
	10080 min Winter	0.740	0.0	126.0	5056	
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Lion House Oriental Road Woking GU22 8AP		Berewood Development Eastern Network Pond 3C			
Date 22/01/2018 File Source Control Phase 3...		Designed by A May Checked by RHA			
Micro Drainage		Source Control 2017.1.2			
<u>Summary of Results for 30 year Return Period</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Summer	42.156	0.456	5.1	287.2	O K
120 min Summer	42.250	0.550	5.1	361.1	O K
180 min Summer	42.309	0.609	5.1	409.8	O K
240 min Summer	42.351	0.651	5.1	446.1	O K
360 min Summer	42.411	0.711	5.1	498.6	O K
480 min Summer	42.451	0.751	5.1	535.6	O K
600 min Summer	42.481	0.781	5.1	563.3	O K
720 min Summer	42.503	0.803	5.1	584.7	O K
960 min Summer	42.491	0.791	5.1	573.2	O K
1440 min Summer	42.461	0.761	5.1	545.2	O K
2160 min Summer	42.418	0.718	5.1	505.6	O K
2880 min Summer	42.377	0.677	5.1	468.1	O K
60 min Winter	42.202	0.502	5.1	323.0	O K
120 min Winter	42.306	0.606	5.1	407.3	O K
180 min Winter	42.371	0.671	5.1	463.5	O K
240 min Winter	42.419	0.719	5.1	506.0	O K
360 min Winter	42.487	0.787	5.1	568.9	O K
480 min Winter	42.534	0.834	5.1	614.8	O K
600 min Winter	42.570	0.870	5.1	650.6	O K
720 min Winter	42.599	0.899	5.1	679.5	O K
960 min Winter	42.595	0.895	5.1	675.4	O K
1440 min Winter	42.563	0.863	5.1	643.3	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
60 min Summer	26.412	0.0	296.7	68	
120 min Summer	17.062	0.0	383.8	126	
180 min Summer	13.214	0.0	445.9	186	
240 min Summer	11.023	0.0	495.8	246	
360 min Summer	8.536	0.0	575.1	366	
480 min Summer	7.121	0.0	638.2	486	
600 min Summer	6.186	0.0	690.3	606	
720 min Summer	5.515	0.0	733.2	724	
960 min Summer	4.378	0.0	763.3	938	
1440 min Summer	3.162	0.0	763.3	1144	
2160 min Summer	2.284	0.0	932.1	1516	
2880 min Summer	1.813	0.0	986.2	1908	
60 min Winter	26.412	0.0	332.5	66	
120 min Winter	17.062	0.0	429.9	126	
180 min Winter	13.214	0.0	499.3	184	
240 min Winter	11.023	0.0	554.9	242	
360 min Winter	8.536	0.0	642.8	360	
480 min Winter	7.121	0.0	710.8	476	
600 min Winter	6.186	0.0	761.5	592	
720 min Winter	5.515	0.0	783.9	708	
960 min Winter	4.378	0.0	777.4	936	
1440 min Winter	3.162	0.0	754.3	1358	
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<u>Summary of Results for 100 year Return Period (+40%)</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Summer	42.513	0.813	5.1	594.3	O K
120 min Summer	42.658	0.958	5.1	740.8	O K
180 min Summer	42.748	1.048	5.1	838.6	O K
240 min Summer	42.814	1.114	5.1	913.0	O K
360 min Summer	42.908	1.208	5.1	1023.7	Flood Risk
480 min Summer	42.973	1.273	5.1	1105.0	Flood Risk
600 min Summer	43.023	1.323	5.1	1168.2	Flood Risk
720 min Summer	43.062	1.362	5.1	1219.1	Flood Risk
960 min Summer	43.066	1.366	5.1	1224.8	Flood Risk
1440 min Summer	43.050	1.350	5.1	1203.7	Flood Risk
2160 min Summer	43.001	1.301	5.1	1140.6	Flood Risk
2880 min Summer	42.956	1.256	5.1	1083.7	Flood Risk
60 min Winter	42.587	0.887	5.1	667.5	O K
120 min Winter	42.743	1.043	5.1	832.8	O K
180 min Winter	42.841	1.141	5.1	943.8	O K
240 min Winter	42.912	1.212	5.1	1028.9	Flood Risk
360 min Winter	43.014	1.314	5.1	1156.6	Flood Risk
480 min Winter	43.086	1.386	5.1	1251.3	Flood Risk
600 min Winter	43.141	1.441	5.1	1326.0	Flood Risk
720 min Winter	43.185	1.485	5.2	1387.0	Flood Risk
960 min Winter	43.195	1.495	5.2	1400.8	Flood Risk
1440 min Winter	43.188	1.488	5.2	1391.7	Flood Risk
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
60 min Summer	53.513	0.0	600.9	68	
120 min Summer	33.792	0.0	748.6	128	
180 min Summer	25.824	0.0	799.2	188	
240 min Summer	21.339	0.0	793.3	248	
360 min Summer	16.307	0.0	776.6	366	
480 min Summer	13.475	0.0	768.1	486	
600 min Summer	11.621	0.0	766.6	606	
720 min Summer	10.298	0.0	771.4	726	
960 min Summer	8.098	0.0	774.9	966	
1440 min Summer	5.772	0.0	772.8	1444	
2160 min Summer	4.114	0.0	1557.6	1928	
2880 min Summer	3.235	0.0	1511.1	2284	
60 min Winter	53.513	0.0	671.0	68	
120 min Winter	33.792	0.0	799.3	126	
180 min Winter	25.824	0.0	793.9	186	
240 min Winter	21.339	0.0	782.8	244	
360 min Winter	16.307	0.0	772.4	362	
480 min Winter	13.475	0.0	775.3	480	
600 min Winter	11.621	0.0	789.1	598	
720 min Winter	10.298	0.0	803.1	714	
960 min Winter	8.098	0.0	806.5	946	
1440 min Winter	5.772	0.0	801.8	1402	
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<u>Summary of Results for 100 year Return Period (+40%)</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
2160 min Winter	43.149	1.449	5.1	1336.4	Flood Risk
2880 min Winter	43.095	1.395	5.1	1262.9	Flood Risk
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
2160 min Winter	4.114	0.0	1571.9	2056	
2880 min Winter	3.235	0.0	1531.7	2600	
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Model Details Storage is Online Cover Level (m) 43.200 Tank or Pond Structure Invert Level (m) 41.700 <table><thead><tr><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th></tr></thead><tbody><tr><td>0.000</td><td>511.0</td><td>0.500</td><td>783.1</td><td>1.000</td><td>1082.1</td><td>1.500</td><td>1417.4</td></tr></tbody></table> Hydro-Brake® Optimum Outflow Control Unit Reference MD-SHE-0100-5200-1500-5200 Design Head (m) 1.500 Design Flow (l/s) 5.2 Flush-Flo™ Calculated Objective Minimise upstream storage Application Surface Sump Available Yes Diameter (mm) 100 Invert Level (m) 41.700 Minimum Outlet Pipe Diameter (mm) 150 Suggested Manhole Diameter (mm) 1200 <table><thead><tr><th>Control Points</th><th>Head (m)</th><th>Flow (l/s)</th><th>Control Points</th><th>Head (m)</th><th>Flow (l/s)</th></tr></thead><tbody><tr><td>Design Point (Calculated)</td><td>1.500</td><td>5.2</td><td>Kick-Flo®</td><td>0.894</td><td>4.1</td></tr><tr><td>Flush-Flo™</td><td>0.439</td><td>5.1</td><td>Mean Flow over Head Range</td><td>-</td><td>4.5</td></tr></tbody></table> The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated <table><thead><tr><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th></tr></thead><tbody><tr><td>0.100</td><td>3.3</td><td>1.200</td><td>4.7</td><td>3.000</td><td>7.2</td><td>7.000</td><td>10.7</td></tr><tr><td>0.200</td><td>4.6</td><td>1.400</td><td>5.0</td><td>3.500</td><td>7.7</td><td>7.500</td><td>11.1</td></tr><tr><td>0.300</td><td>5.0</td><td>1.600</td><td>5.4</td><td>4.000</td><td>8.2</td><td>8.000</td><td>11.4</td></tr><tr><td>0.400</td><td>5.1</td><td>1.800</td><td>5.7</td><td>4.500</td><td>8.7</td><td>8.500</td><td>11.8</td></tr><tr><td>0.500</td><td>5.1</td><td>2.000</td><td>5.9</td><td>5.000</td><td>9.1</td><td>9.000</td><td>12.1</td></tr><tr><td>0.600</td><td>5.0</td><td>2.200</td><td>6.2</td><td>5.500</td><td>9.6</td><td>9.500</td><td>12.4</td></tr><tr><td>0.800</td><td>4.6</td><td>2.400</td><td>6.5</td><td>6.000</td><td>10.0</td><td></td><td></td></tr><tr><td>1.000</td><td>4.3</td><td>2.600</td><td>6.7</td><td>6.500</td><td>10.4</td><td></td><td></td></tr></tbody></table>						Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	0.000	511.0	0.500	783.1	1.000	1082.1	1.500	1417.4	Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)	Design Point (Calculated)	1.500	5.2	Kick-Flo®	0.894	4.1	Flush-Flo™	0.439	5.1	Mean Flow over Head Range	-	4.5	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	0.100	3.3	1.200	4.7	3.000	7.2	7.000	10.7	0.200	4.6	1.400	5.0	3.500	7.7	7.500	11.1	0.300	5.0	1.600	5.4	4.000	8.2	8.000	11.4	0.400	5.1	1.800	5.7	4.500	8.7	8.500	11.8	0.500	5.1	2.000	5.9	5.000	9.1	9.000	12.1	0.600	5.0	2.200	6.2	5.500	9.6	9.500	12.4	0.800	4.6	2.400	6.5	6.000	10.0			1.000	4.3	2.600	6.7	6.500	10.4		
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Lion House Oriental Road Woking GU22 8AP				Berewood Development Western Network Pond 8A			
Date 22/01/2019 File Cascade Phase 3B and 8...				Designed by A May Checked by RHA			
Micro Drainage				Source Control 2017.1.2			
<u>Cascade Summary of Results for Phase 8 Source Control Pond 8A 1 in 30.srcx</u>							
Upstream Structures		Outflow To		Overflow To			
(None) Swale 3B-1 1 in 30.srcx Phase 8 Source Control Pond 8B 1 in 30.srcx							
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	52.914	0.514	4.3	0.0	4.3	91.3	O K
30 min Summer	53.017	0.617	4.3	0.0	4.3	116.1	O K
60 min Summer	53.129	0.729	4.3	0.0	4.3	145.8	O K
120 min Summer	53.249	0.849	4.3	0.0	4.3	180.7	O K
180 min Summer	53.316	0.916	4.3	0.0	4.3	201.9	O K
240 min Summer	53.360	0.960	4.3	0.0	4.3	216.2	O K
360 min Summer	53.413	1.013	4.3	0.0	4.3	234.0	O K
480 min Summer	53.440	1.040	4.3	0.0	4.3	243.5	O K
600 min Summer	53.456	1.056	4.3	0.0	4.3	249.0	O K
720 min Summer	53.467	1.067	4.3	0.0	4.3	253.1	O K
960 min Summer	53.434	1.034	4.3	0.0	4.3	241.5	O K
1440 min Summer	53.376	0.976	4.3	0.0	4.3	221.4	O K
2160 min Summer	53.290	0.890	4.3	0.0	4.3	193.6	O K
2880 min Summer	53.192	0.792	4.3	0.0	4.3	163.8	O K
4320 min Summer	53.042	0.642	4.3	0.0	4.3	122.6	O K
5760 min Summer	52.908	0.508	4.3	0.0	4.3	90.0	O K
7200 min Summer	52.797	0.397	4.3	0.0	4.3	65.7	O K
8640 min Summer	52.711	0.311	4.2	0.0	4.2	48.8	O K
10080 min Summer	52.646	0.246	4.1	0.0	4.1	37.2	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)		
15 min Summer	63.289	0.0	94.2	0.0	23		
30 min Summer	40.885	0.0	121.8	0.0	37		
60 min Summer	26.412	0.0	157.9	0.0	66		
120 min Summer	17.062	0.0	204.0	0.0	126		
180 min Summer	13.214	0.0	237.0	0.0	186		
240 min Summer	11.023	0.0	263.6	0.0	246		
360 min Summer	8.536	0.0	306.2	0.0	364		
480 min Summer	7.121	0.0	340.6	0.0	484		
600 min Summer	6.186	0.0	369.9	0.0	542		
720 min Summer	5.515	0.0	395.6	0.0	610		
960 min Summer	4.378	0.0	418.7	0.0	734		
1440 min Summer	3.162	0.0	453.5	0.0	1000		
2160 min Summer	2.284	0.0	492.0	0.0	1412		
2880 min Summer	1.813	0.0	520.7	0.0	1820		
4320 min Summer	1.357	0.0	584.3	0.0	2556		
5760 min Summer	1.104	0.0	634.4	0.0	3232		
7200 min Summer	0.941	0.0	676.0	0.0	3960		
8640 min Summer	0.826	0.0	712.0	0.0	4584		
10080 min Summer	0.740	0.0	743.7	0.0	5248		
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Lion House Oriental Road Woking GU22 8AP			Berewood Development Western Network Pond 8B				
Date 22/01/2019 File Cascade Phase 3B and 8...			Designed by A May Checked by RHA				
Micro Drainage			Source Control 2017.1.2				
<u>Cascade Summary of Results for Phase 8 Source Control Pond 8B 1 in 30.srcx</u>							
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Outflow (l/s)	Max Volume (m³)	Status
15 min Winter	51.732	0.732	4.1	0.0	4.1	92.8	O K
30 min Winter	51.851	0.851	4.1	0.0	4.1	118.2	O K
60 min Winter	51.977	0.977	4.1	0.0	4.1	148.5	O K
120 min Winter	52.103	1.103	4.1	0.0	4.1	183.0	O K
180 min Winter	52.173	1.173	4.1	0.0	4.1	203.8	O K
240 min Winter	52.218	1.218	4.1	0.0	4.1	218.0	O K
360 min Winter	52.273	1.273	4.1	0.0	4.1	235.6	O K
480 min Winter	52.301	1.301	4.1	0.0	4.1	245.2	O K
600 min Winter	52.316	1.316	4.1	0.0	4.1	250.1	O K
720 min Winter	52.322	1.322	4.1	0.0	4.1	252.3	O K
960 min Winter	52.281	1.281	4.1	0.0	4.1	238.3	O K
1440 min Winter	52.200	1.200	4.1	0.0	4.1	212.1	O K
2160 min Winter	52.072	1.072	4.1	0.0	4.1	174.3	O K
2880 min Winter	51.935	0.935	4.1	0.0	4.1	138.0	O K
4320 min Winter	51.618	0.618	4.1	0.0	4.1	71.5	O K
5760 min Winter	51.356	0.356	4.1	0.0	4.1	32.7	O K
7200 min Winter	51.210	0.210	3.9	0.0	3.9	16.7	O K
8640 min Winter	51.140	0.140	3.5	0.0	3.5	10.4	O K
10080 min Winter	51.111	0.111	3.2	0.0	3.2	8.0	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)		
15 min Winter	63.289	0.0	96.1	0.0	22		
30 min Winter	40.885	0.0	124.2	0.0	37		
60 min Winter	26.412	0.0	160.6	0.0	66		
120 min Winter	17.062	0.0	207.5	0.0	124		
180 min Winter	13.214	0.0	241.0	0.0	182		
240 min Winter	11.023	0.0	268.1	0.0	240		
360 min Winter	8.536	0.0	311.4	0.0	352		
480 min Winter	7.121	0.0	346.4	0.0	462		
600 min Winter	6.186	0.0	376.1	0.0	566		
720 min Winter	5.515	0.0	402.3	0.0	654		
960 min Winter	4.378	0.0	425.9	0.0	746		
1440 min Winter	3.162	0.0	461.4	0.0	1056		
2160 min Winter	2.284	0.0	500.0	0.0	1500		
2880 min Winter	1.813	0.0	529.3	0.0	1936		
4320 min Winter	1.357	0.0	594.0	0.0	2640		
5760 min Winter	1.104	0.0	644.7	0.0	3224		
7200 min Winter	0.941	0.0	687.0	0.0	3816		
8640 min Winter	0.826	0.0	723.6	0.0	4488		
10080 min Winter	0.740	0.0	756.0	0.0	5120		
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Source Control 2017.1.2

Cascade Summary of Results for Phase 8 Source Control Pond 8C 1 in 30.srcx

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Outflow (l/s)	Max Volume (m³)	Status
10080 min Summer	50.722	0.722	4.1	0.0	4.1	349.1	O K
15 min Winter	50.472	0.472	4.1	0.0	4.1	211.3	O K
30 min Winter	50.584	0.584	4.1	0.0	4.1	270.7	O K
60 min Winter	50.714	0.714	4.1	0.0	4.1	344.9	O K
120 min Winter	50.864	0.864	4.2	0.0	4.2	436.1	O K
180 min Winter	50.957	0.957	4.3	0.0	4.3	496.7	O K
240 min Winter	51.026	1.026	4.4	0.0	4.4	542.6	O K
360 min Winter	51.122	1.122	4.5	0.0	4.5	610.0	O K
480 min Winter	51.188	1.188	4.6	0.0	4.6	658.4	O K
600 min Winter	51.237	1.237	4.7	0.0	4.7	695.0	O K
720 min Winter	51.275	1.275	4.7	0.0	4.7	723.6	O K
960 min Winter	51.268	1.268	4.7	0.0	4.7	718.5	O K
1440 min Winter	51.226	1.226	4.7	0.0	4.7	686.3	O K
2160 min Winter	51.152	1.152	4.6	0.0	4.6	631.6	O K
2880 min Winter	51.096	1.096	4.5	0.0	4.5	591.8	O K
4320 min Winter	51.028	1.028	4.4	0.0	4.4	544.2	O K
5760 min Winter	50.949	0.949	4.3	0.0	4.3	490.8	O K
7200 min Winter	50.866	0.866	4.2	0.0	4.2	437.3	O K
8640 min Winter	50.782	0.782	4.1	0.0	4.1	385.2	O K
10080 min Winter	50.698	0.698	4.1	0.0	4.1	335.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
10080 min Summer	0.740	0.0	1511.6	0.0	6056
15 min Winter	63.289	0.0	215.2	0.0	23
30 min Winter	40.885	0.0	278.1	0.0	37
60 min Winter	26.412	0.0	359.3	0.0	66
120 min Winter	17.062	0.0	464.5	0.0	126
180 min Winter	13.214	0.0	539.8	0.0	184
240 min Winter	11.023	0.0	600.1	0.0	244
360 min Winter	8.536	0.0	679.7	0.0	360
480 min Winter	7.121	0.0	688.6	0.0	476
600 min Winter	6.186	0.0	702.6	0.0	592
720 min Winter	5.515	0.0	716.7	0.0	706
960 min Winter	4.378	0.0	723.5	0.0	928
1440 min Winter	3.162	0.0	725.4	0.0	1358
2160 min Winter	2.284	0.0	1120.0	0.0	1688
2880 min Winter	1.813	0.0	1185.3	0.0	2140
4320 min Winter	1.357	0.0	1251.2	0.0	3072
5760 min Winter	1.104	0.0	1443.4	0.0	3968
7200 min Winter	0.941	0.0	1538.2	0.0	4824
8640 min Winter	0.826	0.0	1618.9	0.0	5624
10080 min Winter	0.740	0.0	1692.1	0.0	6456

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Cascade Summary of Results for Phase 8 Source Control Pond 8D 1 in 30.srcx

Upstream Structures	Outflow To	Overflow To
Phase 8 Source Control Pond 8C 1 in 30.srcx	Swale 3B-1 1 in 30.srcx	Source Control Phase 3A 1 in 30.srcx
Phase 8 Source Control Pond 8B 1 in 30.srcx		
Phase 8 Source Control Pond 8A 1 in 30.srcx		

Storm Event	Max Level (m)	Max Depth (m)	Max Control (1/s)	Max Overflow (1/s)	Max Outflow (1/s)	Max Volume (m ³)	Status
15 min Summer	49.636	0.636	4.1	0.0	4.1	79.3	O K
30 min Summer	49.746	0.746	4.1	0.0	4.1	100.6	O K
60 min Summer	49.864	0.864	4.1	0.0	4.1	126.2	O K
120 min Summer	49.980	0.980	4.1	0.0	4.1	154.4	O K
180 min Summer	50.042	1.042	4.1	0.0	4.1	170.7	O K
240 min Summer	50.080	1.080	4.1	0.0	4.1	181.2	O K
360 min Summer	50.122	1.122	4.1	0.0	4.1	193.2	O K
480 min Summer	50.142	1.142	4.1	0.0	4.1	199.0	O K
600 min Summer	50.155	1.155	4.1	0.0	4.1	202.9	O K
720 min Summer	50.164	1.164	4.1	0.0	4.1	205.5	O K
960 min Summer	50.128	1.128	4.1	0.0	4.1	194.9	O K
1440 min Summer	50.063	1.063	4.1	0.0	4.1	176.6	O K
2160 min Summer	49.968	0.968	4.1	0.0	4.1	151.5	O K
2880 min Summer	49.869	0.869	4.1	0.0	4.1	127.4	O K
4320 min Summer	49.674	0.674	4.1	0.0	4.1	86.3	O K
5760 min Summer	49.504	0.504	4.1	0.0	4.1	56.9	O K
7200 min Summer	49.370	0.370	4.1	0.0	4.1	37.5	O K
8640 min Summer	49.275	0.275	4.0	0.0	4.0	25.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m ³)	Overflow Volume (m ³)	Time-Peak (mins)
15 min Summer	63.289	0.0	82.6	0.0	22
30 min Summer	40.885	0.0	106.7	0.0	37
60 min Summer	26.412	0.0	138.0	0.0	66
120 min Summer	17.062	0.0	178.3	0.0	126
180 min Summer	13.214	0.0	207.2	0.0	186
240 min Summer	11.023	0.0	230.4	0.0	246
360 min Summer	8.536	0.0	267.7	0.0	364
480 min Summer	7.121	0.0	297.7	0.0	434
600 min Summer	6.186	0.0	323.3	0.0	500
720 min Summer	5.515	0.0	345.8	0.0	568
960 min Summer	4.378	0.0	366.0	0.0	696
1440 min Summer	3.162	0.0	396.5	0.0	970
2160 min Summer	2.284	0.0	429.8	0.0	1388
2880 min Summer	1.813	0.0	454.9	0.0	1792
4320 min Summer	1.357	0.0	510.5	0.0	2512
5760 min Summer	1.104	0.0	554.1	0.0	3176
7200 min Summer	0.941	0.0	590.5	0.0	3824
8640 min Summer	0.826	0.0	621.9	0.0	4504

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Micro Drainage			Source Control 2017.1.2					
<u>Cascade Summary of Results for Phase 8 Source Control Pond 8D 1 in 30.srcx</u>								
Storm Event		Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Outflow (l/s)	Max Volume (m³)	Status
10080 min	Summer	49.208	0.208	3.9	0.0	3.9	18.4	O K
15 min	Winter	49.689	0.689	4.1	0.0	4.1	89.2	O K
30 min	Winter	49.808	0.808	4.1	0.0	4.1	113.6	O K
60 min	Winter	49.934	0.934	4.1	0.0	4.1	142.8	O K
120 min	Winter	50.060	1.060	4.1	0.0	4.1	175.7	O K
180 min	Winter	50.130	1.130	4.1	0.0	4.1	195.5	O K
240 min	Winter	50.175	1.175	4.1	0.0	4.1	208.9	O K
360 min	Winter	50.229	1.229	4.1	0.0	4.1	225.4	O K
480 min	Winter	50.256	1.256	4.1	0.0	4.1	234.1	O K
600 min	Winter	50.270	1.270	4.1	0.0	4.1	238.5	O K
720 min	Winter	50.276	1.276	4.1	0.0	4.1	240.4	O K
960 min	Winter	50.233	1.233	4.1	0.0	4.1	226.8	O K
1440 min	Winter	50.148	1.148	4.1	0.0	4.1	200.7	O K
2160 min	Winter	50.013	1.013	4.1	0.0	4.1	163.0	O K
2880 min	Winter	49.860	0.860	4.1	0.0	4.1	125.4	O K
4320 min	Winter	49.532	0.532	4.1	0.0	4.1	61.4	O K
5760 min	Winter	49.301	0.301	4.1	0.0	4.1	28.8	O K
7200 min	Winter	49.182	0.182	3.7	0.0	3.7	15.7	O K
8640 min	Winter	49.125	0.125	3.4	0.0	3.4	10.2	O K
10080 min	Winter	49.106	0.106	3.0	0.0	3.0	8.6	O K
Storm Event		Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)		
10080 min	Summer	0.740	0.0	649.8	0.0	5152		
15 min	Winter	63.289	0.0	92.5	0.0	22		
30 min	Winter	40.885	0.0	119.5	0.0	37		
60 min	Winter	26.412	0.0	154.6	0.0	66		
120 min	Winter	17.062	0.0	199.7	0.0	124		
180 min	Winter	13.214	0.0	232.0	0.0	182		
240 min	Winter	11.023	0.0	258.1	0.0	240		
360 min	Winter	8.536	0.0	299.8	0.0	352		
480 min	Winter	7.121	0.0	333.4	0.0	462		
600 min	Winter	6.186	0.0	362.1	0.0	564		
720 min	Winter	5.515	0.0	387.3	0.0	600		
960 min	Winter	4.378	0.0	410.0	0.0	744		
1440 min	Winter	3.162	0.0	444.1	0.0	1054		
2160 min	Winter	2.284	0.0	481.4	0.0	1496		
2880 min	Winter	1.813	0.0	509.5	0.0	1936		
4320 min	Winter	1.357	0.0	571.8	0.0	2596		
5760 min	Winter	1.104	0.0	620.7	0.0	3176		
7200 min	Winter	0.941	0.0	661.3	0.0	3816		
8640 min	Winter	0.826	0.0	696.6	0.0	4416		
10080 min	Winter	0.740	0.0	727.8	0.0	5136		
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Lion House Oriental Road Woking GU22 8AP		Berewood Development Western Network Pond 3A			
Date 22/01/2019 File Cascade Phase 3B and 8...		Designed by A May Checked by RHA			
Micro Drainage		Source Control 2017.1.2			
<u>Cascade Summary of Results for Source Control Phase 3A.SRCX</u>					
Upstream Structures		Outflow To	Overflow To		
Phase 8 Source Control Pond 8D.SRCX		Swale 3B-1.SRCX	(None)		
Phase 8 Source Control Pond 8C.SRCX					
Phase 8 Source Control Pond 8B.SRCX					
Phase 8 Source Control Pond 8A.SRCX					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	47.928	0.428	2.6	287.1	O K
30 min Summer	48.017	0.517	2.6	361.3	O K
60 min Summer	48.118	0.618	2.6	453.9	O K
120 min Summer	48.234	0.734	2.6	568.1	O K
180 min Summer	48.307	0.807	2.6	645.7	O K
240 min Summer	48.361	0.861	2.6	705.7	O K
360 min Summer	48.439	0.939	2.6	797.1	O K
480 min Summer	48.495	0.995	2.6	866.2	O K
600 min Summer	48.539	1.039	2.6	921.8	O K
720 min Summer	48.574	1.074	2.6	968.1	O K
960 min Summer	48.588	1.088	2.6	986.9	O K
1440 min Summer	48.596	1.096	2.6	998.6	O K
2160 min Summer	48.586	1.086	2.6	984.5	O K
2880 min Summer	48.562	1.062	2.6	952.9	O K
4320 min Summer	48.547	1.047	2.6	932.5	O K
5760 min Summer	48.529	1.029	2.6	909.3	O K
7200 min Summer	48.511	1.011	2.6	886.0	O K
8640 min Summer	48.492	0.992	2.6	862.6	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
15 min Summer	134.198	0.0	222.0	23	
30 min Summer	84.742	0.0	221.8	38	
60 min Summer	53.513	0.0	422.3	68	
120 min Summer	33.792	0.0	404.7	128	
180 min Summer	25.824	0.0	388.5	188	
240 min Summer	21.339	0.0	381.2	248	
360 min Summer	16.307	0.0	382.9	368	
480 min Summer	13.475	0.0	394.9	488	
600 min Summer	11.621	0.0	403.9	606	
720 min Summer	10.298	0.0	410.6	726	
960 min Summer	8.098	0.0	412.5	966	
1440 min Summer	5.772	0.0	410.8	1446	
2160 min Summer	4.114	0.0	795.5	2164	
2880 min Summer	3.235	0.0	792.9	2804	
4320 min Summer	2.389	0.0	779.1	3504	
5760 min Summer	1.926	0.0	1555.7	4272	
7200 min Summer	1.630	0.0	1507.7	5048	
8640 min Summer	1.422	0.0	1439.9	5888	
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Lion House Oriental Road Woking GU22 8AP		Berewood Development Western Network Pond 3A			
Date 22/01/2019 File Cascade Phase 3B and 8...		Designed by A May Checked by RHA			
Micro Drainage		Source Control 2017.1.2			
<u>Cascade Summary of Results for Source Control Phase 3A.SRCX</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
10080 min Summer	48.473	0.973	2.6	838.8	O K
15 min Winter	47.970	0.470	2.6	321.7	O K
30 min Winter	48.066	0.566	2.6	405.1	O K
60 min Winter	48.176	0.676	2.6	509.3	O K
120 min Winter	48.299	0.799	2.6	637.7	O K
180 min Winter	48.378	0.878	2.6	725.5	O K
240 min Winter	48.436	0.936	2.6	793.6	O K
360 min Winter	48.520	1.020	2.6	897.9	O K
480 min Winter	48.580	1.080	2.6	977.3	O K
600 min Winter	48.665	1.165	2.7	1096.0	O K
720 min Winter	48.772	1.272	2.8	1261.6	Flood Risk
960 min Winter	48.776	1.276	2.8	1266.8	Flood Risk
1440 min Winter	48.732	1.232	2.7	1198.0	Flood Risk
2160 min Winter	48.693	1.193	2.7	1137.7	O K
2880 min Winter	48.676	1.176	2.7	1113.3	O K
4320 min Winter	48.661	1.161	2.7	1091.2	O K
5760 min Winter	48.639	1.139	2.6	1059.5	O K
7200 min Winter	48.616	1.116	2.6	1026.8	O K
8640 min Winter	48.591	1.091	2.6	991.3	O K
10080 min Winter	48.563	1.063	2.6	954.2	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
10080 min Summer	1.267	0.0	1379.4	6760	
15 min Winter	134.198	0.0	223.8	23	
30 min Winter	84.742	0.0	217.3	38	
60 min Winter	53.513	0.0	420.0	68	
120 min Winter	33.792	0.0	391.7	126	
180 min Winter	25.824	0.0	381.6	186	
240 min Winter	21.339	0.0	382.5	246	
360 min Winter	16.307	0.0	399.0	364	
480 min Winter	13.475	0.0	411.1	482	
600 min Winter	11.621	0.0	426.9	652	
720 min Winter	10.298	0.0	443.1	772	
960 min Winter	8.098	0.0	439.9	982	
1440 min Winter	5.772	0.0	427.0	1428	
2160 min Winter	4.114	0.0	829.4	2100	
2880 min Winter	3.235	0.0	825.0	2768	
4320 min Winter	2.389	0.0	809.6	3984	
5760 min Winter	1.926	0.0	1596.2	4504	
7200 min Winter	1.630	0.0	1547.7	5472	
8640 min Winter	1.422	0.0	1507.0	6392	
10080 min Winter	1.267	0.0	1470.9	7272	
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Lion House Oriental Road Woking GU22 8AP		Berewood Development Western Network Pond 3B-1				
Date 22/01/2019 File Cascade Phase 3B and 8...		Designed by A May Checked by RHA				
Micro Drainage		Source Control 2017.1.2				
<u>Cascade Summary of Results for Swale 3B-1.SRCX</u>						
Upstream Structures		Outflow To		Overflow To		
Phase 8 Source Control Pond 8A.SRCX Swale 3B-2.SRCX Swale 3B-2.SRCX						
Phase 8 Source Control Pond 8B.SRCX						
Phase 8 Source Control Pond 8C.SRCX						
Phase 8 Source Control Pond 8D.SRCX						
Source Control Phase 3A.SRCX						
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Σ Outflow (l/s)	Max Volume (m³) Status
15 min Summer	45.103	0.970	20.0	0.0	20.0	30.3 O K
30 min Summer	45.197	1.064	21.0	0.0	21.0	37.9 Flood Risk
60 min Summer	45.292	1.159	22.0	0.0	22.0	46.4 Flood Risk
120 min Summer	45.341	1.208	22.5	4.2	26.6	51.1 Flood Risk
180 min Summer	45.346	1.213	22.5	8.8	31.3	51.6 Flood Risk
240 min Summer	45.347	1.214	22.5	9.9	32.4	51.6 Flood Risk
360 min Summer	45.346	1.213	22.5	8.8	31.3	51.5 Flood Risk
480 min Summer	45.345	1.212	22.5	7.8	30.3	51.4 Flood Risk
600 min Summer	45.344	1.211	22.5	6.8	29.3	51.3 Flood Risk
720 min Summer	45.343	1.210	22.5	6.4	28.8	51.3 Flood Risk
960 min Summer	45.341	1.208	22.5	4.2	26.6	51.0 Flood Risk
1440 min Summer	45.338	1.205	22.4	2.0	24.4	50.7 Flood Risk
2160 min Summer	45.334	1.201	22.4	0.3	22.7	50.4 Flood Risk
2880 min Summer	45.290	1.157	22.0	0.0	22.0	46.2 Flood Risk
4320 min Summer	45.235	1.102	21.4	0.0	21.4	41.2 Flood Risk
5760 min Summer	45.183	1.050	20.9	0.0	20.9	36.7 Flood Risk
7200 min Summer	45.131	0.998	20.3	0.0	20.3	32.5 O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)	
15 min Summer	134.198	0.0	1127.9	0.0	22	
30 min Summer	84.742	0.0	1301.1	0.0	37	
60 min Summer	53.513	0.0	2011.4	0.0	66	
120 min Summer	33.792	0.0	2299.8	4.7	86	
180 min Summer	25.824	0.0	2492.3	11.0	112	
240 min Summer	21.339	0.0	2648.4	15.9	140	
360 min Summer	16.307	0.0	2902.6	23.5	200	
480 min Summer	13.475	0.0	3110.1	29.6	260	
600 min Summer	11.621	0.0	3278.9	35.0	320	
720 min Summer	10.298	0.0	3402.0	40.0	382	
960 min Summer	8.098	0.0	3460.4	35.2	516	
1440 min Summer	5.772	0.0	3419.1	18.7	824	
2160 min Summer	4.114	0.0	4977.5	1.2	1344	
2880 min Summer	3.235	0.0	5100.0	0.0	1848	
4320 min Summer	2.389	0.0	5333.2	0.0	2728	
5760 min Summer	1.926	0.0	7049.4	0.0	3568	
7200 min Summer	1.630	0.0	7317.8	0.0	4392	
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File Cascade Phase 3B and 8...

Berewood Development

Western Network

Pond 3B-1

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Checked by RHA

Micro Drainage

Source Control 2017.1.2

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Cascade Summary of Results for Swale 3B-1.SRCX

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max E Outflow (l/s)	Max Volume (m³)	Status
8640 min Summer	45.099	0.966	20.0	0.0	20.0	30.1	O K
10080 min Summer	45.100	0.967	20.0	0.0	20.0	30.1	O K
15 min Winter	45.148	1.015	20.5	0.0	20.5	33.9	Flood Risk
30 min Winter	45.247	1.114	21.5	0.0	21.5	42.3	Flood Risk
60 min Winter	45.339	1.206	22.4	3.0	25.5	50.9	Flood Risk
120 min Winter	45.348	1.215	22.5	11.0	33.5	51.7	Flood Risk
180 min Winter	45.348	1.215	22.5	11.6	34.1	51.8	Flood Risk
240 min Winter	45.347	1.214	22.5	10.4	33.0	51.7	Flood Risk
360 min Winter	45.345	1.212	22.5	8.3	30.8	51.5	Flood Risk
480 min Winter	45.344	1.211	22.5	6.8	29.3	51.3	Flood Risk
600 min Winter	45.343	1.210	22.5	5.9	28.4	51.2	Flood Risk
720 min Winter	45.342	1.209	22.5	5.5	27.9	51.2	Flood Risk
960 min Winter	45.340	1.207	22.5	3.8	26.2	51.0	Flood Risk
1440 min Winter	45.338	1.205	22.4	2.3	24.8	50.8	Flood Risk
2160 min Winter	45.337	1.204	22.4	1.4	23.8	50.6	Flood Risk
2880 min Winter	45.335	1.202	22.4	0.7	23.1	50.5	Flood Risk
4320 min Winter	45.294	1.161	22.0	0.0	22.0	46.6	Flood Risk
5760 min Winter	45.219	1.086	21.2	0.0	21.2	39.8	Flood Risk
7200 min Winter	45.142	1.009	20.4	0.0	20.4	33.4	Flood Risk
8640 min Winter	45.096	0.963	19.9	0.0	19.9	29.8	O K
10080 min Winter	45.093	0.960	19.9	0.0	19.9	29.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
8640 min Summer	1.422	0.0	7522.5	0.0	4200
10080 min Summer	1.267	0.0	7638.6	0.0	4968
15 min Winter	134.198	0.0	1207.3	0.0	22
30 min Winter	84.742	0.0	1397.0	0.0	36
60 min Winter	53.513	0.0	2163.7	1.0	62
120 min Winter	33.792	0.0	2459.6	12.5	82
180 min Winter	25.824	0.0	2680.1	20.4	112
240 min Winter	21.339	0.0	2860.8	26.7	144
360 min Winter	16.307	0.0	3154.8	37.1	202
480 min Winter	13.475	0.0	3361.8	47.2	274
600 min Winter	11.621	0.0	3503.8	57.8	328
720 min Winter	10.298	0.0	3560.2	66.8	398
960 min Winter	8.098	0.0	3571.4	66.4	552
1440 min Winter	5.772	0.0	3565.6	59.0	870
2160 min Winter	4.114	0.0	5452.6	35.5	1316
2880 min Winter	3.235	0.0	5527.0	8.0	1860
4320 min Winter	2.389	0.0	5793.5	0.0	2984
5760 min Winter	1.926	0.0	7748.2	0.0	3856
7200 min Winter	1.630	0.0	8056.0	0.0	4688
8640 min Winter	1.422	0.0	8313.7	0.0	4096
10080 min Winter	1.267	0.0	8355.5	0.0	4896

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Date 22/01/2019 18:26 File Cascade Phase 3B and 8...	Designed by rakerman Checked by																																																																																																																																																	
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Upstream Structures Swale 3B-1.SRCX Swale 3B-3.SRCX Swale 3B-3.SRCX Phase 8 Source Control Pond 8A.SRCX Phase 8 Source Control Pond 8B.SRCX Phase 8 Source Control Pond 8C.SRCX Phase 8 Source Control Pond 8D.SRCX Source Control Phase 3A.SRCX																																																																																																																																																		
<table><tr><th>Storm Event</th><th>Max Level (m)</th><th>Max Depth (m)</th><th>Max Control (l/s)</th><th>Max Overflow (l/s)</th><th>Max Outflow (l/s)</th><th>Max Volume (m³)</th><th>Status</th></tr><tr><td>15 min Summer</td><td>44.387</td><td>0.973</td><td>20.1</td><td>0.0</td><td>20.1</td><td>30.6</td><td>O K</td></tr><tr><td>30 min Summer</td><td>44.489</td><td>1.075</td><td>21.1</td><td>0.0</td><td>21.1</td><td>38.8</td><td>Flood Risk</td></tr><tr><td>60 min Summer</td><td>44.604</td><td>1.190</td><td>22.3</td><td>0.0</td><td>22.3</td><td>49.4</td><td>Flood Risk</td></tr><tr><td>120 min Summer</td><td>44.629</td><td>1.215</td><td>22.5</td><td>11.6</td><td>34.1</td><td>51.8</td><td>Flood Risk</td></tr><tr><td>180 min Summer</td><td>44.637</td><td>1.223</td><td>22.6</td><td>21.0</td><td>43.7</td><td>52.5</td><td>Flood Risk</td></tr><tr><td>240 min Summer</td><td>44.637</td><td>1.223</td><td>22.6</td><td>21.7</td><td>44.4</td><td>52.6</td><td>Flood Risk</td></tr><tr><td>360 min Summer</td><td>44.637</td><td>1.223</td><td>22.6</td><td>21.0</td><td>43.7</td><td>52.5</td><td>Flood Risk</td></tr><tr><td>480 min Summer</td><td>44.635</td><td>1.221</td><td>22.6</td><td>18.3</td><td>40.9</td><td>52.4</td><td>Flood Risk</td></tr><tr><td>600 min Summer</td><td>44.633</td><td>1.219</td><td>22.6</td><td>16.4</td><td>39.0</td><td>52.2</td><td>Flood Risk</td></tr><tr><td>720 min Summer</td><td>44.632</td><td>1.218</td><td>22.6</td><td>15.1</td><td>37.7</td><td>52.0</td><td>Flood Risk</td></tr><tr><td>960 min Summer</td><td>44.628</td><td>1.214</td><td>22.5</td><td>10.4</td><td>33.0</td><td>51.7</td><td>Flood Risk</td></tr><tr><td>1440 min Summer</td><td>44.623</td><td>1.209</td><td>22.5</td><td>5.5</td><td>27.9</td><td>51.2</td><td>Flood Risk</td></tr><tr><td>2160 min Summer</td><td>44.620</td><td>1.206</td><td>22.4</td><td>2.7</td><td>25.1</td><td>50.8</td><td>Flood Risk</td></tr><tr><td>2880 min Summer</td><td>44.617</td><td>1.203</td><td>22.4</td><td>1.1</td><td>23.6</td><td>50.6</td><td>Flood Risk</td></tr><tr><td>4320 min Summer</td><td>44.602</td><td>1.188</td><td>22.3</td><td>0.0</td><td>22.3</td><td>49.1</td><td>Flood Risk</td></tr><tr><td>5760 min Summer</td><td>44.535</td><td>1.121</td><td>21.6</td><td>0.0</td><td>21.6</td><td>42.8</td><td>Flood Risk</td></tr><tr><td>7200 min Summer</td><td>44.490</td><td>1.076</td><td>21.1</td><td>0.0</td><td>21.1</td><td>38.9</td><td>Flood Risk</td></tr></table>			Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Outflow (l/s)	Max Volume (m³)	Status	15 min Summer	44.387	0.973	20.1	0.0	20.1	30.6	O K	30 min Summer	44.489	1.075	21.1	0.0	21.1	38.8	Flood Risk	60 min Summer	44.604	1.190	22.3	0.0	22.3	49.4	Flood Risk	120 min Summer	44.629	1.215	22.5	11.6	34.1	51.8	Flood Risk	180 min Summer	44.637	1.223	22.6	21.0	43.7	52.5	Flood Risk	240 min Summer	44.637	1.223	22.6	21.7	44.4	52.6	Flood Risk	360 min Summer	44.637	1.223	22.6	21.0	43.7	52.5	Flood Risk	480 min Summer	44.635	1.221	22.6	18.3	40.9	52.4	Flood Risk	600 min Summer	44.633	1.219	22.6	16.4	39.0	52.2	Flood Risk	720 min Summer	44.632	1.218	22.6	15.1	37.7	52.0	Flood Risk	960 min Summer	44.628	1.214	22.5	10.4	33.0	51.7	Flood Risk	1440 min Summer	44.623	1.209	22.5	5.5	27.9	51.2	Flood Risk	2160 min Summer	44.620	1.206	22.4	2.7	25.1	50.8	Flood Risk	2880 min Summer	44.617	1.203	22.4	1.1	23.6	50.6	Flood Risk	4320 min Summer	44.602	1.188	22.3	0.0	22.3	49.1	Flood Risk	5760 min Summer	44.535	1.121	21.6	0.0	21.6	42.8	Flood Risk	7200 min Summer	44.490	1.076	21.1	0.0	21.1	38.9	Flood Risk
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Outflow (l/s)	Max Volume (m³)	Status																																																																																																																																											
15 min Summer	44.387	0.973	20.1	0.0	20.1	30.6	O K																																																																																																																																											
30 min Summer	44.489	1.075	21.1	0.0	21.1	38.8	Flood Risk																																																																																																																																											
60 min Summer	44.604	1.190	22.3	0.0	22.3	49.4	Flood Risk																																																																																																																																											
120 min Summer	44.629	1.215	22.5	11.6	34.1	51.8	Flood Risk																																																																																																																																											
180 min Summer	44.637	1.223	22.6	21.0	43.7	52.5	Flood Risk																																																																																																																																											
240 min Summer	44.637	1.223	22.6	21.7	44.4	52.6	Flood Risk																																																																																																																																											
360 min Summer	44.637	1.223	22.6	21.0	43.7	52.5	Flood Risk																																																																																																																																											
480 min Summer	44.635	1.221	22.6	18.3	40.9	52.4	Flood Risk																																																																																																																																											
600 min Summer	44.633	1.219	22.6	16.4	39.0	52.2	Flood Risk																																																																																																																																											
720 min Summer	44.632	1.218	22.6	15.1	37.7	52.0	Flood Risk																																																																																																																																											
960 min Summer	44.628	1.214	22.5	10.4	33.0	51.7	Flood Risk																																																																																																																																											
1440 min Summer	44.623	1.209	22.5	5.5	27.9	51.2	Flood Risk																																																																																																																																											
2160 min Summer	44.620	1.206	22.4	2.7	25.1	50.8	Flood Risk																																																																																																																																											
2880 min Summer	44.617	1.203	22.4	1.1	23.6	50.6	Flood Risk																																																																																																																																											
4320 min Summer	44.602	1.188	22.3	0.0	22.3	49.1	Flood Risk																																																																																																																																											
5760 min Summer	44.535	1.121	21.6	0.0	21.6	42.8	Flood Risk																																																																																																																																											
7200 min Summer	44.490	1.076	21.1	0.0	21.1	38.9	Flood Risk																																																																																																																																											
<table><tr><th>Storm Event</th><th>Rain (mm/hr)</th><th>Flooded Volume (m³)</th><th>Discharge Volume (m³)</th><th>Overflow Volume (m³)</th><th>Time-Peak (mins)</th></tr><tr><td>15 min Summer</td><td>134.198</td><td>0.0</td><td>1158.1</td><td>0.0</td><td>23</td></tr><tr><td>30 min Summer</td><td>84.742</td><td>0.0</td><td>1339.3</td><td>0.0</td><td>38</td></tr><tr><td>60 min Summer</td><td>53.513</td><td>0.0</td><td>2060.0</td><td>0.0</td><td>68</td></tr><tr><td>120 min Summer</td><td>33.792</td><td>0.0</td><td>2360.9</td><td>17.8</td><td>86</td></tr><tr><td>180 min Summer</td><td>25.824</td><td>0.0</td><td>2562.4</td><td>34.1</td><td>112</td></tr><tr><td>240 min Summer</td><td>21.339</td><td>0.0</td><td>2725.6</td><td>46.9</td><td>142</td></tr><tr><td>360 min Summer</td><td>16.307</td><td>0.0</td><td>2991.1</td><td>66.6</td><td>200</td></tr><tr><td>480 min Summer</td><td>13.475</td><td>0.0</td><td>3207.6</td><td>81.7</td><td>260</td></tr><tr><td>600 min Summer</td><td>11.621</td><td>0.0</td><td>3383.9</td><td>94.0</td><td>320</td></tr><tr><td>720 min Summer</td><td>10.298</td><td>0.0</td><td>3512.1</td><td>104.5</td><td>380</td></tr><tr><td>960 min Summer</td><td>8.098</td><td>0.0</td><td>3562.1</td><td>101.9</td><td>514</td></tr><tr><td>1440 min Summer</td><td>5.772</td><td>0.0</td><td>3523.5</td><td>84.2</td><td>800</td></tr><tr><td>2160 min Summer</td><td>4.114</td><td>0.0</td><td>5111.6</td><td>48.2</td><td>1120</td></tr><tr><td>2880 min Summer</td><td>3.235</td><td>0.0</td><td>5240.7</td><td>20.3</td><td>1504</td></tr><tr><td>4320 min Summer</td><td>2.389</td><td>0.0</td><td>5488.9</td><td>0.0</td><td>2640</td></tr><tr><td>5760 min Summer</td><td>1.926</td><td>0.0</td><td>7217.2</td><td>0.0</td><td>3464</td></tr><tr><td>7200 min Summer</td><td>1.630</td><td>0.0</td><td>7495.2</td><td>0.0</td><td>3584</td></tr></table>			Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)	15 min Summer	134.198	0.0	1158.1	0.0	23	30 min Summer	84.742	0.0	1339.3	0.0	38	60 min Summer	53.513	0.0	2060.0	0.0	68	120 min Summer	33.792	0.0	2360.9	17.8	86	180 min Summer	25.824	0.0	2562.4	34.1	112	240 min Summer	21.339	0.0	2725.6	46.9	142	360 min Summer	16.307	0.0	2991.1	66.6	200	480 min Summer	13.475	0.0	3207.6	81.7	260	600 min Summer	11.621	0.0	3383.9	94.0	320	720 min Summer	10.298	0.0	3512.1	104.5	380	960 min Summer	8.098	0.0	3562.1	101.9	514	1440 min Summer	5.772	0.0	3523.5	84.2	800	2160 min Summer	4.114	0.0	5111.6	48.2	1120	2880 min Summer	3.235	0.0	5240.7	20.3	1504	4320 min Summer	2.389	0.0	5488.9	0.0	2640	5760 min Summer	1.926	0.0	7217.2	0.0	3464	7200 min Summer	1.630	0.0	7495.2	0.0	3584																																				
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)																																																																																																																																													
15 min Summer	134.198	0.0	1158.1	0.0	23																																																																																																																																													
30 min Summer	84.742	0.0	1339.3	0.0	38																																																																																																																																													
60 min Summer	53.513	0.0	2060.0	0.0	68																																																																																																																																													
120 min Summer	33.792	0.0	2360.9	17.8	86																																																																																																																																													
180 min Summer	25.824	0.0	2562.4	34.1	112																																																																																																																																													
240 min Summer	21.339	0.0	2725.6	46.9	142																																																																																																																																													
360 min Summer	16.307	0.0	2991.1	66.6	200																																																																																																																																													
480 min Summer	13.475	0.0	3207.6	81.7	260																																																																																																																																													
600 min Summer	11.621	0.0	3383.9	94.0	320																																																																																																																																													
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960 min Summer	8.098	0.0	3562.1	101.9	514																																																																																																																																													
1440 min Summer	5.772	0.0	3523.5	84.2	800																																																																																																																																													
2160 min Summer	4.114	0.0	5111.6	48.2	1120																																																																																																																																													
2880 min Summer	3.235	0.0	5240.7	20.3	1504																																																																																																																																													
4320 min Summer	2.389	0.0	5488.9	0.0	2640																																																																																																																																													
5760 min Summer	1.926	0.0	7217.2	0.0	3464																																																																																																																																													
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Lion House Oriental Road Woking GU22 8AP								
Date 22/01/2019 18:26 File Cascade Phase 3B and 8...				Designed by rakerman Checked by				
Micro Drainage				Source Control 2017.1.2				
<u>Cascade Summary of Results for Swale 3B-2.SRCX</u>								
Storm Event		Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max E Outflow (l/s)	Max Volume (m³)	Status
8640 min Summer		44.484	1.070	21.1	0.0	21.1	38.4	Flood Risk
10080 min Summer		44.478	1.064	21.0	0.0	21.0	37.9	Flood Risk
15 min Winter		44.433	1.019	20.5	0.0	20.5	34.2	Flood Risk
30 min Winter		44.540	1.126	21.7	0.0	21.7	43.3	Flood Risk
60 min Winter		44.626	1.212	22.5	8.3	30.8	51.5	Flood Risk
120 min Winter		44.639	1.225	22.6	23.9	46.5	52.7	Flood Risk
180 min Winter		44.640	1.226	22.6	25.3	48.0	52.9	Flood Risk
240 min Winter		44.638	1.224	22.6	23.2	45.8	52.7	Flood Risk
360 min Winter		44.635	1.221	22.6	19.0	41.6	52.4	Flood Risk
480 min Winter		44.633	1.219	22.6	15.7	38.3	52.1	Flood Risk
600 min Winter		44.631	1.217	22.6	13.9	36.4	52.0	Flood Risk
720 min Winter		44.630	1.216	22.5	12.1	34.7	51.9	Flood Risk
960 min Winter		44.627	1.213	22.5	9.4	31.9	51.6	Flood Risk
1440 min Winter		44.624	1.210	22.5	5.9	28.4	51.2	Flood Risk
2160 min Winter		44.621	1.207	22.4	3.4	25.9	51.0	Flood Risk
2880 min Winter		44.619	1.205	22.4	2.0	24.4	50.7	Flood Risk
4320 min Winter		44.616	1.202	22.4	0.4	22.9	50.5	Flood Risk
5760 min Winter		44.566	1.152	21.9	0.0	21.9	45.7	Flood Risk
7200 min Winter		44.482	1.068	21.1	0.0	21.1	38.2	Flood Risk
8640 min Winter		44.460	1.046	20.8	0.0	20.8	36.4	Flood Risk
10080 min Winter		44.451	1.037	20.7	0.0	20.7	35.6	Flood Risk
Storm Event		Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)		
8640 min Summer		1.422	0.0	7708.3	0.0	4320		
10080 min Summer		1.267	0.0	7831.5	0.0	5072		
15 min Winter		134.198	0.0	1241.1	0.0	23		
30 min Winter		84.742	0.0	1439.8	0.0	38		
60 min Winter		53.513	0.0	2217.8	5.7	62		
120 min Winter		33.792	0.0	2528.1	32.5	84		
180 min Winter		25.824	0.0	2758.6	51.3	112		
240 min Winter		21.339	0.0	2947.3	66.2	142		
360 min Winter		16.307	0.0	3254.0	89.8	200		
480 min Winter		13.475	0.0	3470.4	109.8	260		
600 min Winter		11.621	0.0	3614.2	128.1	330		
720 min Winter		10.298	0.0	3666.9	143.2	382		
960 min Winter		8.098	0.0	3681.5	144.9	528		
1440 min Winter		5.772	0.0	3681.8	134.9	824		
2160 min Winter		4.114	0.0	5602.9	100.3	1296		
2880 min Winter		3.235	0.0	5684.5	54.3	1844		
4320 min Winter		2.389	0.0	5967.9	9.6	2744		
5760 min Winter		1.926	0.0	7936.1	0.0	3808		
7200 min Winter		1.630	0.0	8254.7	0.0	4680		
8640 min Winter		1.422	0.0	8521.5	0.0	4224		
10080 min Winter		1.267	0.0	8571.6	0.0	5088		
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Lion House Oriental Road Woking GU22 8AP		Berewood Development Wetsern Network Pond 3B-3			
Date 22/01/2019 File Cascade Phase 3B and 8...		Designed by A May Checked by RHA			
Micro Drainage		Source Control 2017.1.2			
<u>Cascade Summary of Results for Swale 3B-3.SRCX</u>					
Upstream Structures		Outflow To Overflow To			
Swale 3B-2.SRCX		(None)		(None)	
Swale 3B-1.SRCX					
Phase 8 Source Control Pond 8A.SRCX					
Phase 8 Source Control Pond 8B.SRCX					
Phase 8 Source Control Pond 8C.SRCX					
Phase 8 Source Control Pond 8D.SRCX					
Source Control Phase 3A.SRCX					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	43.296	0.820	30.0	20.3	O K
30 min Summer	43.323	0.847	30.0	22.1	O K
60 min Summer	43.338	0.862	30.0	23.2	O K
120 min Summer	43.560	1.084	30.0	42.2	O K
180 min Summer	43.670	1.194	30.0	53.9	O K
240 min Summer	43.722	1.246	30.0	60.0	Flood Risk
360 min Summer	43.790	1.314	30.0	68.4	Flood Risk
480 min Summer	43.827	1.351	30.0	73.3	Flood Risk
600 min Summer	43.846	1.370	30.0	75.8	Flood Risk
720 min Summer	43.852	1.376	30.0	76.7	Flood Risk
960 min Summer	43.763	1.287	30.0	65.0	Flood Risk
1440 min Summer	43.274	0.798	30.0	18.9	O K
2160 min Summer	42.760	0.284	28.8	1.4	O K
2880 min Summer	42.701	0.225	26.3	0.8	O K
4320 min Summer	42.683	0.207	24.0	0.7	O K
5760 min Summer	42.677	0.201	23.2	0.6	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
15 min Summer	134.198	0.0	1188.5	20	
30 min Summer	84.742	0.0	1377.7	34	
60 min Summer	53.513	0.0	2108.5	54	
120 min Summer	33.792	0.0	2422.2	126	
180 min Summer	25.824	0.0	2632.6	184	
240 min Summer	21.339	0.0	2803.0	212	
360 min Summer	16.307	0.0	3079.8	270	
480 min Summer	13.475	0.0	3305.4	340	
600 min Summer	11.621	0.0	3489.3	412	
720 min Summer	10.298	0.0	3624.1	482	
960 min Summer	8.098	0.0	3679.3	624	
1440 min Summer	5.772	0.0	3648.8	870	
2160 min Summer	4.114	0.0	5246.0	1108	
2880 min Summer	3.235	0.0	5381.6	1500	
4320 min Summer	2.389	0.0	5644.9	2204	
5760 min Summer	1.926	0.0	7385.0	2848	
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Lion House Oriental Road Woking GU22 8AP		Berewood Development Wetsern Network Pond 3B-3			
Date 22/01/2019 File Cascade Phase 3B and 8...		Designed by A May Checked by RHA			
Micro Drainage		Source Control 2017.1.2			
<u>Cascade Summary of Results for Swale 3B-3.SRCX</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
7200 min Summer	42.674	0.198	22.8	0.6	O K
8640 min Summer	42.672	0.196	22.5	0.6	O K
10080 min Summer	42.671	0.195	22.3	0.6	O K
15 min Winter	43.351	0.875	30.0	24.1	O K
30 min Winter	43.390	0.914	30.0	27.0	O K
60 min Winter	43.477	1.001	30.0	34.3	O K
120 min Winter	43.720	1.244	30.0	59.7	Flood Risk
180 min Winter	43.813	1.337	30.0	71.4	Flood Risk
240 min Winter	43.861	1.385	30.0	77.8	Flood Risk
360 min Winter	43.916	1.440	30.0	85.7	Flood Risk
480 min Winter	43.947	1.471	30.0	90.2	Flood Risk
600 min Winter	43.958	1.482	30.0	91.8	Flood Risk
720 min Winter	43.956	1.480	30.0	91.5	Flood Risk
960 min Winter	43.843	1.367	30.0	75.4	Flood Risk
1440 min Winter	43.115	0.639	30.0	10.6	O K
2160 min Winter	42.717	0.241	28.0	0.9	O K
2880 min Winter	42.697	0.221	25.8	0.8	O K
4320 min Winter	42.683	0.207	24.0	0.7	O K
5760 min Winter	42.674	0.198	22.8	0.6	O K
7200 min Winter	42.669	0.193	22.1	0.6	O K
8640 min Winter	42.668	0.192	21.9	0.5	O K
10080 min Winter	42.667	0.191	21.8	0.5	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
7200 min Summer	1.630	0.0	7672.7	3616	
8640 min Summer	1.422	0.0	7894.1	4328	
10080 min Summer	1.267	0.0	8024.6	5040	
15 min Winter	134.198	0.0	1275.2	21	
30 min Winter	84.742	0.0	1482.8	35	
60 min Winter	53.513	0.0	2272.1	68	
120 min Winter	33.792	0.0	2596.7	124	
180 min Winter	25.824	0.0	2837.3	180	
240 min Winter	21.339	0.0	3034.0	232	
360 min Winter	16.307	0.0	3353.4	288	
480 min Winter	13.475	0.0	3579.8	366	
600 min Winter	11.621	0.0	3732.0	446	
720 min Winter	10.298	0.0	3792.1	524	
960 min Winter	8.098	0.0	3812.8	684	
1440 min Winter	5.772	0.0	3822.2	916	
2160 min Winter	4.114	0.0	5753.4	1300	
2880 min Winter	3.235	0.0	5842.3	1848	
4320 min Winter	2.389	0.0	6142.6	2676	
5760 min Winter	1.926	0.0	8124.0	3760	
7200 min Winter	1.630	0.0	8453.5	3424	
8640 min Winter	1.422	0.0	8729.6	4264	
10080 min Winter	1.267	0.0	8788.0	4888	
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Lion House Oriental Road Woking GU22 8AP			Berewood Development Western Network Pond 8A				
Date 22/01/2019 File Cascade Phase 3B and 8...			Designed by A May Checked by RHA				
Micro Drainage			Source Control 2017.1.2				
<u>Cascade Summary of Results for Phase 8 Source Control Pond 8A.SRCX</u>							
Upstream Structures		Outflow To		Overflow To			
(None) Swale 3B-1.SRCX Phase 8 Source Control Pond 8B.SRCX							
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max E Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	53.302	0.902	4.3	0.0	4.3	197.4	O K
30 min Summer	53.450	1.050	4.3	0.0	4.3	247.0	O K
60 min Summer	53.610	1.210	4.3	0.0	4.3	306.9	O K
120 min Summer	53.779	1.379	4.3	0.0	4.3	376.9	O K
180 min Summer	53.878	1.478	4.4	0.0	4.4	421.6	O K
240 min Summer	53.946	1.546	4.5	0.0	4.5	453.9	O K
360 min Summer	54.035	1.635	4.7	0.0	4.7	498.6	O K
480 min Summer	54.089	1.689	4.7	0.0	4.7	527.9	Flood Risk
600 min Summer	54.125	1.725	4.8	0.0	4.8	547.7	Flood Risk
720 min Summer	54.149	1.749	4.8	0.0	4.8	561.4	Flood Risk
960 min Summer	54.113	1.713	4.8	0.0	4.8	540.9	Flood Risk
1440 min Summer	54.045	1.645	4.7	0.0	4.7	504.0	O K
2160 min Summer	53.960	1.560	4.6	0.0	4.6	460.9	O K
2880 min Summer	53.887	1.487	4.5	0.0	4.5	425.5	O K
4320 min Summer	53.799	1.399	4.3	0.0	4.3	385.6	O K
5760 min Summer	53.708	1.308	4.3	0.0	4.3	346.4	O K
7200 min Summer	53.616	1.216	4.3	0.0	4.3	309.0	O K
8640 min Summer	53.524	1.124	4.3	0.0	4.3	274.0	O K
10080 min Summer	53.432	1.032	4.3	0.0	4.3	240.7	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)		
15 min Summer	134.198	0.0	200.0	0.0	23		
30 min Summer	84.742	0.0	252.3	0.0	38		
60 min Summer	53.513	0.0	320.0	0.0	68		
120 min Summer	33.792	0.0	404.1	0.0	128		
180 min Summer	25.824	0.0	463.2	0.0	186		
240 min Summer	21.339	0.0	510.2	0.0	246		
360 min Summer	16.307	0.0	584.6	0.0	366		
480 min Summer	13.475	0.0	643.5	0.0	486		
600 min Summer	11.621	0.0	691.2	0.0	604		
720 min Summer	10.298	0.0	713.8	0.0	724		
960 min Summer	8.098	0.0	708.7	0.0	900		
1440 min Summer	5.772	0.0	690.6	0.0	1128		
2160 min Summer	4.114	0.0	886.1	0.0	1516		
2880 min Summer	3.235	0.0	929.1	0.0	1932		
4320 min Summer	2.389	0.0	1028.5	0.0	2768		
5760 min Summer	1.926	0.0	1106.6	0.0	3576		
7200 min Summer	1.630	0.0	1170.5	0.0	4392		
8640 min Summer	1.422	0.0	1225.4	0.0	5184		
10080 min Summer	1.267	0.0	1273.8	0.0	5952		
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Lion House Oriental Road Woking GU22 8AP			Berewood Development Western Network Pond 8A																																																																																																																																																																				
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Micro Drainage			Source Control 2017.1.2			

Cascade Summary of Results for Phase 8 Source Control Pond 8B.SRCX

Upstream Structures		Outflow To		Overflow To			
Phase 8 Source Control Pond 8A.SRCX Swale 3B-1.SRCX Phase 8 Source Control Pond 8C.SRCX							
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	52.087	1.087	4.1	0.0	4.1	178.6	O K
30 min Summer	52.234	1.234	4.1	0.0	4.1	223.1	O K
60 min Summer	52.391	1.391	4.2	0.0	4.2	276.5	O K
120 min Summer	52.551	1.551	4.4	0.0	4.4	338.4	O K
180 min Summer	52.641	1.641	4.6	0.0	4.6	377.2	O K
240 min Summer	52.701	1.701	4.6	0.0	4.6	405.0	O K
360 min Summer	52.777	1.777	4.7	0.0	4.7	442.4	Flood Risk
480 min Summer	52.822	1.822	4.8	0.0	4.8	465.8	Flood Risk
600 min Summer	52.850	1.850	4.8	0.0	4.8	480.8	Flood Risk
720 min Summer	52.867	1.867	4.8	0.0	4.8	490.2	Flood Risk
960 min Summer	52.827	1.827	4.8	0.0	4.8	468.6	Flood Risk
1440 min Summer	52.758	1.758	4.7	0.0	4.7	432.8	Flood Risk
2160 min Summer	52.675	1.675	4.6	0.0	4.6	392.8	O K
2880 min Summer	52.601	1.601	4.5	0.0	4.5	359.3	O K
4320 min Summer	52.505	1.505	4.4	0.0	4.4	319.7	O K
5760 min Summer	52.405	1.405	4.2	0.0	4.2	281.6	O K
7200 min Summer	52.304	1.304	4.1	0.0	4.1	246.0	O K
8640 min Summer	52.204	1.204	4.1	0.0	4.1	213.5	O K
10080 min Summer	52.106	1.106	4.1	0.0	4.1	183.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
15 min Summer	134.198	0.0	182.0	0.0	23
30 min Summer	84.742	0.0	229.8	0.0	38
60 min Summer	53.513	0.0	290.5	0.0	68
120 min Summer	33.792	0.0	366.9	0.0	126
180 min Summer	25.824	0.0	420.6	0.0	186
240 min Summer	21.339	0.0	463.4	0.0	246
360 min Summer	16.307	0.0	531.1	0.0	366
480 min Summer	13.475	0.0	585.1	0.0	486
600 min Summer	11.621	0.0	630.7	0.0	604
720 min Summer	10.298	0.0	670.3	0.0	724
960 min Summer	8.098	0.0	700.9	0.0	834
1440 min Summer	5.772	0.0	690.4	0.0	1074
2160 min Summer	4.114	0.0	804.1	0.0	1476
2880 min Summer	3.235	0.0	843.2	0.0	1880
4320 min Summer	2.389	0.0	933.7	0.0	2724
5760 min Summer	1.926	0.0	1004.0	0.0	3512
7200 min Summer	1.630	0.0	1062.0	0.0	4320
8640 min Summer	1.422	0.0	1111.9	0.0	5096
10080 min Summer	1.267	0.0	1155.9	0.0	5848

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Micro Drainage		Source Control 2017.1.2

Cascade Summary of Results for Phase 8 Source Control Pond 8B.SRCX

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max E Outflow (l/s)	Max Volume (m³)	Status
15 min Winter	52.162	1.162	4.1	0.0	4.1	200.4	O K
30 min Winter	52.318	1.318	4.1	0.0	4.1	250.7	O K
60 min Winter	52.484	1.484	4.3	0.0	4.3	311.5	O K
120 min Winter	52.653	1.653	4.6	0.0	4.6	382.8	O K
180 min Winter	52.749	1.749	4.7	0.0	4.7	428.4	O K
240 min Winter	52.814	1.814	4.8	0.0	4.8	461.4	Flood Risk
360 min Winter	52.898	1.898	4.9	0.0	4.9	507.4	Flood Risk
480 min Winter	52.921	1.921	4.9	4.6	9.5	520.5	Flood Risk
600 min Winter	52.925	1.925	4.9	6.0	10.9	522.9	Flood Risk
720 min Winter	52.930	1.930	4.9	8.1	13.0	526.0	Flood Risk
960 min Winter	52.923	1.923	4.9	5.3	10.2	521.7	Flood Risk
1440 min Winter	52.900	1.900	4.9	0.0	4.9	508.9	Flood Risk
2160 min Winter	52.801	1.801	4.8	0.0	4.8	455.0	Flood Risk
2880 min Winter	52.707	1.707	4.6	0.0	4.6	407.7	O K
4320 min Winter	52.567	1.567	4.5	0.0	4.5	345.0	O K
5760 min Winter	52.418	1.418	4.3	0.0	4.3	286.5	O K
7200 min Winter	52.266	1.266	4.1	0.0	4.1	233.4	O K
8640 min Winter	52.109	1.109	4.1	0.0	4.1	184.8	O K
10080 min Winter	51.929	0.929	4.1	0.0	4.1	136.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
15 min Winter	134.198	0.0	203.8	0.0	23
30 min Winter	84.742	0.0	257.3	0.0	37
60 min Winter	53.513	0.0	325.4	0.0	66
120 min Winter	33.792	0.0	410.9	0.0	126
180 min Winter	25.824	0.0	471.0	0.0	184
240 min Winter	21.339	0.0	518.9	0.0	242
360 min Winter	16.307	0.0	594.8	0.0	358
480 min Winter	13.475	0.0	655.2	22.1	450
600 min Winter	11.621	0.0	711.9	48.1	468
720 min Winter	10.298	0.0	775.0	81.5	530
960 min Winter	8.098	0.0	768.0	50.8	706
1440 min Winter	5.772	0.0	718.2	0.0	1144
2160 min Winter	4.114	0.0	900.6	0.0	1604
2880 min Winter	3.235	0.0	944.3	0.0	2052
4320 min Winter	2.389	0.0	1045.7	0.0	2940
5760 min Winter	1.926	0.0	1124.5	0.0	3752
7200 min Winter	1.630	0.0	1189.5	0.0	4608
8640 min Winter	1.422	0.0	1245.3	0.0	5368
10080 min Winter	1.267	0.0	1294.6	0.0	6256

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Cascade Summary of Results for Phase 8 Source Control Pond 8C.SRCX

	Storm	Max	Max	Max	Max	Max	Max	Status	
	Event	Level	Depth	Control	Overflow	Σ	Outflow		
		(m)	(m)	(l/s)	(l/s)		(l/s)		
	15 min Winter	50.889	0.889	4.2	0.0		4.2	452.4	O K
	30 min Winter	51.063	1.063	4.5	0.0		4.5	568.8	O K
	60 min Winter	51.261	1.261	4.7	0.0		4.7	712.8	O K
	120 min Winter	51.481	1.481	5.0	0.0		5.0	888.7	O K
	180 min Winter	51.617	1.617	5.1	0.0		5.1	1007.4	O K
	240 min Winter	51.714	1.714	5.2	0.0		5.2	1098.3	O K
	360 min Winter	51.851	1.851	5.4	0.0		5.4	1235.2	Flood Risk
	480 min Winter	51.964	1.964	5.5	2.5		8.0	1355.7	Flood Risk
	600 min Winter	51.997	1.997	5.5	15.5		21.0	1392.2	Flood Risk
	720 min Winter	52.001	2.001	5.5	17.8		23.3	1397.3	Flood Risk
	960 min Winter	51.996	1.996	5.5	15.0		20.5	1391.5	Flood Risk
	1440 min Winter	51.983	1.983	5.5	9.1		14.6	1376.4	Flood Risk
	2160 min Winter	51.972	1.972	5.5	4.9		10.4	1364.6	Flood Risk
	2880 min Winter	51.956	1.956	5.5	0.8		6.3	1347.1	Flood Risk
	4320 min Winter	51.895	1.895	5.4	0.0		5.4	1281.2	Flood Risk
	5760 min Winter	51.836	1.836	5.4	0.0		5.4	1219.7	Flood Risk
	7200 min Winter	51.771	1.771	5.3	0.0		5.3	1154.0	Flood Risk
	8640 min Winter	51.702	1.702	5.2	0.0		5.2	1086.5	O K
	10080 min Winter	51.631	1.631	5.1	0.0		5.1	1019.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
15 min Winter	134.198	0.0	325.8	0.0	23
30 min Winter	84.742	0.0	349.9	0.0	38
60 min Winter	53.513	0.0	692.6	0.0	68
120 min Winter	33.792	0.0	740.4	0.0	126
180 min Winter	25.824	0.0	776.9	0.0	186
240 min Winter	21.339	0.0	802.0	0.0	244
360 min Winter	16.307	0.0	835.3	0.0	362
480 min Winter	13.475	0.0	864.5	4.9	480
600 min Winter	11.621	0.0	961.8	98.9	570
720 min Winter	10.298	0.0	1062.4	198.8	594
960 min Winter	8.098	0.0	1051.9	190.7	746
1440 min Winter	5.772	0.0	993.3	141.2	1072
2160 min Winter	4.114	0.0	1712.9	87.8	1604
2880 min Winter	3.235	0.0	1650.5	10.2	2256
4320 min Winter	2.389	0.0	1605.7	0.0	3284
5760 min Winter	1.926	0.0	2517.8	0.0	4208
7200 min Winter	1.630	0.0	2663.9	0.0	5112
8640 min Winter	1.422	0.0	2782.0	0.0	5968
10080 min Winter	1.267	0.0	2700.9	0.0	6856

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<u>Cascade Summary of Results for Phase 8 Source Control Pond 8D.SRCX</u>							
Upstream Structures		Outflow To		Overflow To			
Phase 8 Source Control Pond 8C.SRCX Swale 3B-1.SRCX Source Control Phase 3A.SRCX							
Phase 8 Source Control Pond 8B.SRCX							
Phase 8 Source Control Pond 8A.SRCX							
Storm Event	Max Level (m)	Max Depth (m)	Max Control (1/s)	Max Overflow (1/s)	Max Outflow (1/s)	Max Volume (m³) Status	
15 min Summer	50.046	1.046	4.1	0.0	4.1	171.8 O K	
30 min Summer	50.194	1.194	4.1	0.0	4.1	214.6 O K	
60 min Summer	50.351	1.351	4.2	0.0	4.2	265.9 O K	
120 min Summer	50.513	1.513	4.4	0.0	4.4	325.1 O K	
180 min Summer	50.599	1.599	4.5	0.0	4.5	362.2 O K	
240 min Summer	50.653	1.653	4.6	0.0	4.6	388.5 O K	
360 min Summer	50.719	1.719	4.7	0.0	4.7	423.8 Flood Risk	
480 min Summer	50.756	1.756	4.7	0.0	4.7	445.7 Flood Risk	
600 min Summer	50.779	1.779	4.7	0.0	4.7	459.6 Flood Risk	
720 min Summer	50.792	1.792	4.7	0.0	4.7	468.1 Flood Risk	
960 min Summer	50.758	1.758	4.7	0.0	4.7	447.0 Flood Risk	
1440 min Summer	50.698	1.698	4.6	0.0	4.6	412.4 O K	
2160 min Summer	50.623	1.623	4.5	0.0	4.5	373.4 O K	
2880 min Summer	50.551	1.551	4.4	0.0	4.4	340.6 O K	
4320 min Summer	50.450	1.450	4.3	0.0	4.3	301.2 O K	
5760 min Summer	50.345	1.345	4.2	0.0	4.2	263.7 O K	
7200 min Summer	50.240	1.240	4.1	0.0	4.1	228.9 O K	
8640 min Summer	50.135	1.135	4.1	0.0	4.1	197.1 O K	
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)		
15 min Summer	134.198	0.0	175.1	0.0	23		
30 min Summer	84.742	0.0	221.2	0.0	38		
60 min Summer	53.513	0.0	279.7	0.0	68		
120 min Summer	33.792	0.0	353.2	0.0	126		
180 min Summer	25.824	0.0	404.9	0.0	186		
240 min Summer	21.339	0.0	446.0	0.0	246		
360 min Summer	16.307	0.0	511.3	0.0	366		
480 min Summer	13.475	0.0	563.2	0.0	484		
600 min Summer	11.621	0.0	607.1	0.0	604		
720 min Summer	10.298	0.0	645.4	0.0	724		
960 min Summer	8.098	0.0	676.0	0.0	828		
1440 min Summer	5.772	0.0	681.4	0.0	1072		
2160 min Summer	4.114	0.0	774.1	0.0	1472		
2880 min Summer	3.235	0.0	811.7	0.0	1880		
4320 min Summer	2.389	0.0	898.9	0.0	2688		
5760 min Summer	1.926	0.0	966.6	0.0	3512		
7200 min Summer	1.630	0.0	1022.4	0.0	4320		
8640 min Summer	1.422	0.0	1070.4	0.0	5096		
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Cascade Summary of Results for Phase 8 Source Control Pond 8D.SRCX

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Outflow (l/s)	Max Volume (m³)	Status
10080 min Summer	50.031	1.031	4.1	0.0	4.1	167.9	O K
15 min Winter	50.121	1.121	4.1	0.0	4.1	192.8	O K
30 min Winter	50.278	1.278	4.1	0.0	4.1	241.3	O K
60 min Winter	50.446	1.446	4.3	0.0	4.3	299.6	O K
120 min Winter	50.611	1.611	4.5	0.0	4.5	367.8	O K
180 min Winter	50.696	1.696	4.6	0.0	4.6	411.4	O K
240 min Winter	50.751	1.751	4.7	0.0	4.7	442.9	Flood Risk
360 min Winter	50.820	1.820	4.8	0.0	4.8	486.5	Flood Risk
480 min Winter	50.864	1.864	4.8	0.0	4.8	516.7	Flood Risk
600 min Winter	50.943	1.943	4.9	13.8	18.7	576.4	Flood Risk
720 min Winter	50.955	1.955	4.9	19.6	24.6	585.5	Flood Risk
960 min Winter	50.942	1.942	4.9	13.3	18.2	575.4	Flood Risk
1440 min Winter	50.920	1.920	4.9	4.3	9.2	558.0	Flood Risk
2160 min Winter	50.810	1.810	4.8	0.0	4.8	479.5	Flood Risk
2880 min Winter	50.646	1.646	4.6	0.0	4.6	385.0	O K
4320 min Winter	50.507	1.507	4.4	0.0	4.4	322.9	O K
5760 min Winter	50.350	1.350	4.2	0.0	4.2	265.4	O K
7200 min Winter	50.189	1.189	4.1	0.0	4.1	213.2	O K
8640 min Winter	50.018	1.018	4.1	0.0	4.1	164.4	O K
10080 min Winter	49.736	0.736	4.1	0.0	4.1	98.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
10080 min Summer	1.267	0.0	1112.7	0.0	5848
15 min Winter	134.198	0.0	196.1	0.0	23
30 min Winter	84.742	0.0	247.6	0.0	37
60 min Winter	53.513	0.0	313.2	0.0	66
120 min Winter	33.792	0.0	395.6	0.0	126
180 min Winter	25.824	0.0	453.4	0.0	184
240 min Winter	21.339	0.0	499.5	0.0	242
360 min Winter	16.307	0.0	572.6	0.0	358
480 min Winter	13.475	0.0	635.6	0.0	480
600 min Winter	11.621	0.0	776.5	64.4	588
720 min Winter	10.298	0.0	900.2	176.8	668
960 min Winter	8.098	0.0	875.1	153.1	806
1440 min Winter	5.772	0.0	785.6	57.5	1224
2160 min Winter	4.114	0.0	954.8	0.0	1852
2880 min Winter	3.235	0.0	919.3	0.0	2048
4320 min Winter	2.389	0.0	1006.7	0.0	2904
5760 min Winter	1.926	0.0	1082.5	0.0	3752
7200 min Winter	1.630	0.0	1145.1	0.0	4608
8640 min Winter	1.422	0.0	1198.9	0.0	5440
10080 min Winter	1.267	0.0	1246.3	0.0	6056

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