

Jonsen House
 43 Commercial Road
 Poole BH14 0HU
 Date 14/07/2017 15:00
 File JB-3336 - A3 SW Storage 1-100+4...

JB-3338
 Former ICL Pvt Ground - Area 3
 SW Atteunationn Volum 1:100+40
 Designed by GEB
 Checked by GEB
 Source Control 2017.1



Model Details

Storage is Online Cover Level (m) 9.050

Cellular Storage Structure

Invert Level (m) 7.600 Safety Factor 5.0
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
 Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	460.0	460.0	0.800	460.0	528.6	0.801	0.0	528.7

Hydro-Brake® Optimum Outflow Control

Unit Reference MD-SHE-0165-1290-0850-1290
 Design Head (m) 0.850
 Design Flow (l/s) 12.9
 Flush-Flo™ Calculated
 Objective Minimise upstream storage
 Application Surface
 Sump Available Yes
 Diameter (mm) 165
 Invert Level (m) 7.550
 Minimum Outlet Pipe Diameter (mm) 225
 Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.850	12.9	Kick-Flo®	0.608	11.0
Flush-Flo™	0.285	12.8	Mean Flow over Head Range	-	10.8

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.9	0.800	12.5	2.000	19.4	4.000	27.0	7.000	35.4
0.200	12.6	1.000	13.9	2.200	20.3	4.500	28.6	7.500	36.6
0.300	12.8	1.200	15.2	2.400	21.1	5.000	30.1	8.000	37.7
0.400	12.6	1.400	16.3	2.600	22.0	5.500	31.5	8.500	38.8
0.500	12.2	1.600	17.4	3.000	23.5	6.000	32.8	9.000	39.8
0.600	11.2	1.800	18.4	3.500	25.3	6.500	34.1	9.500	40.9

Appendix G

Completed Appendix I from London Borough of Richmond Upon Thames Planning Guidance Document

Treatment – Improving the quality of water by physical, chemical and/or biological means.

Watercourse – A term including all rivers, streams, ditches, drains, cuts, culverts, dykes, sluices, and passages through which water flows.

Water table (or groundwater table) – The point where the surface of groundwater can be detected. The water table may change with the seasons and the annual rainfall.

APPENDIX I:

DESIGN ASSESSMENT CHECKLIST: SCHEME

Table 1: Scheme Design Assessment Checklist

Requirements			
Site ID	Former ICL Private Ground, Teddington		
Site Location and co-ordinates	ICL Private Ground on Udney Park Road, Teddington, London, TW11 9BB - TQ 16437 70857 (E = 516437, N = 170857).		
Site description	Former ICL Private Ground	Drawing Reference(s)	JB-3336
Date of assessment	July 2017	Specification Reference	JB-3336
Type of development	Mixed Use	Site Area	5.2 ha

	SuDS Manual Page Ref*	Y	N	Summary of details	Comments / Remedial actions
PRINCIPLES					
Is the runoff managed at or close to its source, wherever possible? If not, give reasons.		X		On-site attenuation and infiltration measures used	
Is the runoff managed at or close to the surface, wherever possible? If not, give reasons e.g. infiltration systems are being used to manage the runoff.		X		Swales, ponds and drainage ditches used in addition to permeable paving	
Where the drainage system serves more than one property, is public space used and integrated with the drainage system in an appropriate and beneficial way? If not, give reasons.		X		Public spaces are used to form attenuation measures, swales, ponds and permeable surfaces	
Have the opportunities afforded by the drainage system in terms of green infrastructure, biodiversity, urban design, climate adaptation and amenity provision been maximised?		X		In addition to SUDS measures, climate change has been addressed in the design up to 1:100y +40%	
Has an appropriate SuDS Management train been provided?		X		SW drainage managed and treated appropriately	
Are the operating and maintenance requirements of the drainage system adequately defined?		X		See Management and Maintenance statement	
Is operation and maintenance achievable at an acceptable cost?		X		Costs have been minimised	
POINT OF DISCHARGE					
Does the design meet the following discharge hierarchy 1. Infiltration is preferred where it is safe and acceptable to do so; 2. If infiltration is not possible discharge to water course; 3. Discharge to sewer as last resort.		X		The drainage design does meet this hierarchy	
If infiltration is used: Confirm that an acceptable infiltration assessment has been undertaken and submitted?		X		Low permeability was found on-site, however no rate could be obtained	

	SuDS Manual Page Ref*	Y	N	Summary of details	Comments / Remedial actions
If discharge is to sewer, rather than a surface water body, provide justification.		X		No Watercourse available Flows restricted to GFR	
If discharge to a sewerage asset is proposed, has evidence been provided that the design criteria have been agreed with the sewerage undertaker and that an appropriate connection detail has been agreed?		X		3 No. Outfalls from the site to the public surface water sewers as agreed with Thames Water. (Each flow restricted)	
Have adequate and appropriate exceedance routes been provided and are they protected from future development?		X		Refer to 'Drainage Strategy Plan - JB-3336-003'	
INTERCEPTION					
Does the scheme design demonstrate on-site retention of approximately the first 5mm of runoff from impermeable surfaces for most events? How is Interception to be delivered (e.g. infiltration, green roofs, permeable pavements, vegetated surfaces, bespoke design - provide details)?		X		The drainage safely retains the first 5mm of run-off. Interception is provided by gullies, catchpits, swales, ponds and permeable surfaces.	
PEAK FLOW RATE CONTROL					
Does the design demonstrate control of the 1 year, critical duration site event to the equivalent 1 year greenfield peak flow rate or below?			X	Q1y GFR Rate = 8.0 l/s Total prop off-site flow for 1:1y+0% = 17.6 l/s	
Does the design demonstrate control of the 100 year, critical duration site event to the equivalent 100 year greenfield peak flow rate or below?		X		Q100y GFR Rate = 28.2 l/s Total prop off-site flow for 1:100y+40% = 20.5 l/s	
Do the design calculations take account of future development (urban creep) and climate change?		X		Yes up to 1:100y + 40% CC	
VOLUMETRIC CONTROL (FOR THE 100 YEAR, 6 HOUR EVENT)					
Does the design demonstrate that, for the 100 year 6 hour event: <i>Either:</i> The discharged site runoff volume is not greater than the equivalent greenfield runoff volume? <i>Or:</i> The discharged site runoff volume over and above the equivalent greenfield runoff volume (i.e. the Long Term Storage Volume) is discharged at a rate < 2 l/s/ha (or another rate that is considered acceptable in not negatively impacting flood risk of the receiving water body) <i>Or:</i> Peak flow rates from the site are restricted to 2 l/s/ha or Qbar, whichever is the greater ha (or another rate that is considered acceptable in not negatively impacting flood risk of the receiving water body).		X		Discharge rates from the proposed 3 No. outfalls have been set by Thames Water. These rates have been based on the 1:30y GFR rates and are not exceeded during any storm event up to a peak 1:100y+40% storm	
WATER QUALITY TREATMENT					
Is the receiving water body (surface or groundwater) environmentally sensitive (E.g. Groundwater Source Protection Zone)? What is its designation? Are any implications for drainage design clearly defined?			X	No issues identified for this development	

	SuDS Manual Page Ref*	Y	N	Summary of details	Comments / Remedial actions
Does the design include an appropriate treatment strategy that ensures: 1. Sediment is trapped and retained on site in accessible and maintainable areas? 2. Has a sufficient number of drainage components been provided in series prior to discharge? 3. Suitable pollution removal capability e.g. % TSS removal (where this is a requirement of the SAB)		X		Source control provided to external parking areas by permeable paving. Catchpits and sump units used where necessary. Inspection and access duct included within the design of the attenuation tank.	
FUNCTIONALITY					
Are the design features sufficiently durable to ensure structural integrity over the system design life (residential 100 years and commercial 60 years), with reasonable maintenance requirements?		X		The durability and maintenance of the drainage system has been maximised accordingly	
Are all parts of the SuDS system outside any areas of flood risk? If not, provide justification and evidence that performance will not be adversely affected.		X		No flood risk areas located on-site	
Is pumping a requirement for operation of the system? If yes, provide justification and set out operation and maintenance/adoption arrangements.		X		Pumping is required due to levels. Ref to maintenance statement for info	
Has runoff and flooding from all sources (both on and off site) been considered and taken into account in the design?		X		Exceedance routes have been addressed for storms above 1:100y +40%	
Are 1 in 30 year flows fully conveyed within the SuD system ?		X		Yes - Attenuation tanks	
Are 1 in 100 year flows contained or stored on-site within safe exceedance storage areas and flow paths? Note some approving authorities may require greater return periods.		X		Yes - Flows above the 1:30y+20% level are attenuated within swales, ponds and ditches	
CONSTRUCTABILITY					
Has an acceptable construction method statement been submitted and approved?			X	Done by contractor when appointed, post planning	
MAINTAINABILITY					
Has an acceptable Maintenance Plan been submitted and approved?			X	Detailed maintenance plan to be sub, post planning	
INFORMATION PROVISION					
Do the design proposals include sufficient provision for community engagement and awareness raising?		X		A public consultation process has been used	

(*) to be added on completion of SuDS Manual update

SYSTEM DESIGN ACCEPTABILITY	Summary details including any changes required	Acceptable (Y/N)	Date changes made
Acceptable: Minor changes required: Major changes required / re-design:			