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CONSULTING CIVIL & STRUCTURAL ENGINEERS

**ALDI DEVELOPMENT
A525 (LON
GWERNYDD)
RUTHIN**

Drainage Philosophy Report

Date: April 2019

8536-SWF-XX-XX-RP-D-0201

S2: Suitable for Information

Version: P2

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REVISION HISTORY

VERSION	DATE	SUITABILITY	REVISIONS
P1	23/04/19	S2: Suitable for Information	Issued For Information
P2	24/04/19	S2: Suitable for Information	Title sheet amended to show A525 (Lon Gwernydd)

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1. Development Details

The proposed development is to be built on an undeveloped plot of land adjacent the A525 and the Cattle Market.

It is intended that the development will include the proposed Aldi store together with a private estate road that will facilitate future development of subsequent plots. The full site is indicated on the Google Map extract below.





The proposed plan for the site is shown below:



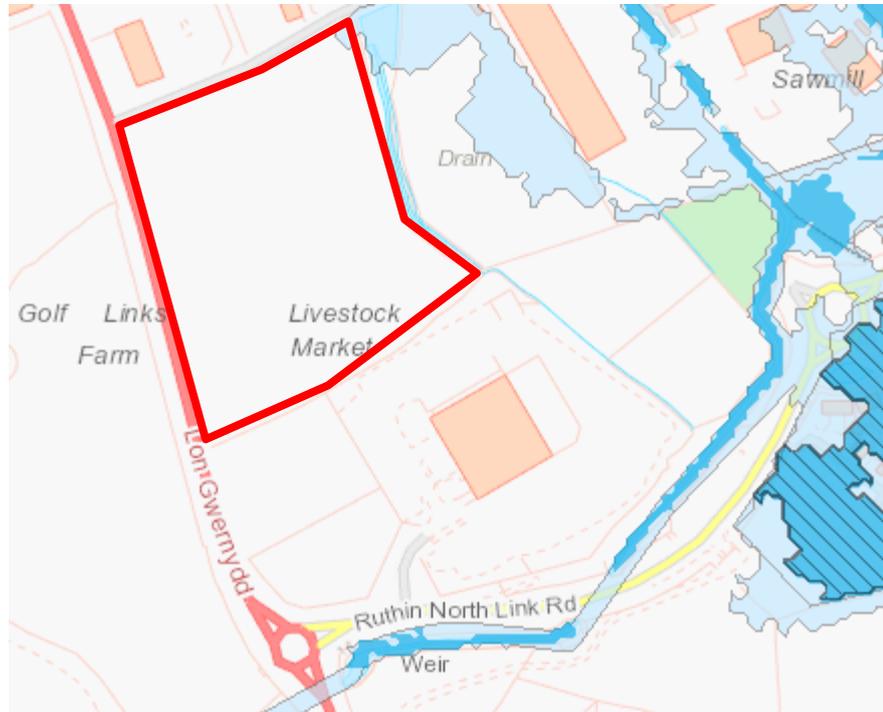
This drainage philosophy document covers the proposals for Phase 1 of the scheme and touches on the requirements for the other phases that will be constructed in the future.

2. Flood Zone Classification

The Natural Resources Wales maps have been consulted as part of the Flood Consequences Assessment undertaken by JBA Consulting. This shows that 98% of the proposed site is within Flood Zone A and therefore has little or no risk of fluvial or tidal/ coastal flooding.

The FCA has also confirmed that the site:

- has a low risk of flooding from groundwater
- is not affected by canals
- lies outside the zone of influence from reservoir flooding.
- has not suffered from historical flooding



The consequences of the flood zone classification are discussed within the FCA document and it is suggested that this report is read alongside the JBA Consulting document but, for ease of reference the flood zone map is reproduced above from the Natural Resources Wales development advice maps.

3. Climate Change Allowance

The current guidance indicates that the change in the UK climate could result in significant changes to storm profiles and intensities and therefore an allowance should be made for this within the designs.

The latest industry guidance suggests that a 20% increase for climate change should be allowed for the 100 year storm event and this will be applied to the site.

In addition, the requirements of the Building Regulations will be met in that no surface flooding will be accepted for the 1 in 30 year storm event and no surface water shall escape the site boundary for the 100 year event.

4. Discussion on SuDS measures

Under the Welsh Government requirements the development will be subject to a separate SAB application to Denbighshire County Council to agree the proposed drainage scheme. However, it is intended to follow the hierarchical approach to drainage design looking to utilise the discharge to ground if possible.

Initial ground investigations, undertaken in September 2017, suggest the ground would accept soakaway drainage given the presence of dense sands and gravels across the site. As part of the investigation some initial soakaway testing was undertaken in accordance with the BRE Digest 365 which revealed infiltration rates of around 1.00×10^{-5} to 2.00×10^{-5} m/s.

Further more detailed soakaway testing has been requested as a result of this initial work and this was commissioned in early April 2019. At the time of writing this report the findings were not available although it is expected to confirm infiltration techniques can be used.



Given the expanse of customer parking areas and a dedicated service yard area it is expected that porous macadam can be used to the customer parking areas with a suitable depth of 4-20mm clean stone to act as the attenuation prior to infiltration.

Given the intention to use porous surfacing it is not expected to use an oil separator to deal with occasional oil spillage but rather rely on a geotextile within the car park build up to reduce the risk of contamination to the ground water.

The estate road cannot be constructed using permeable materials and therefore this will seek to use underground attenuation tanks, acting as soakaways, to control the surface water on the site. In a similar manner, the impermeable service yard will also need a soakaway to be formed.

Given the small demand for grey water within an Aldi store it is not anticipated that rainwater harvesting will be financially viable for the scheme and therefore surface water from the roof of the store will discharge to an attenuation tank acting as a soakaway.

5. Proposed Drainage Scheme

In the preceding sections it has been discussed that the site is a green field and will be utilising infiltration drainage techniques, subject to the results of the soakaway testing.

The main customer car park area will utilise permeable macadam to provide the infiltration with the roof and service yard discharging to attenuation tanks acting a soakaways.

It is anticipated that the surface drainage on the service yard will be via ACO channels with silt traps to prevent the build-up of silt within the attenuation tank. It is expected that the ACO channel will be designed for the 100 year storm event to give additional storage within the drainage network when it comes to final design.

The estate road will require the use of attenuation tanks to control the volume of water prior to soakaway discharge and is likely to be drained using conventional road gullies to the kerbline.

The attenuation tanks are likely to be ESS Versavoid tanks which are capable of CCTV camera entry and jet/ vacuum cleaning via inspection points directly over the tanks.

Initial sizing of the attenuation tanks is contained within appendix C at the end of this report.

A schematic drawing showing the proposed drainage for the development can be found in appendix D at the rear of the report.

6. Foul Drainage

The Dwr Cymru sewer records have been consulted for the area, see appendix b, and these do not show foul sewers in the immediate vicinity of the site. The nearest sewer is located on Denbigh Road and is approximately one third of a mile from the site.

It is highly likely that this would require the construction of a foul water pumping station for the site with high costs for the development as a result.

It is therefore proposed that the foul water will discharge into a packaged sewage treatment unit and then discharge to the ground via a network of perforated pipes. The nature of the effluent is domestic content with the proposed store having 3 WCs and associated wash hand basins and a small staff kitchen.

Advice is to be sought from a specialist over the exact specification of the treatment unit, together with any requirements for sampling locations. However, it is expected that the unit will be sited within the service yard area of the site to keep it away from the public when servicing works are required.



7. Drainage to future plots

All future development plots, including the Phase 2 area, are expected to be drainage via infiltration methods with permeable surfacing or underground storage being provided to give the required attenuation volumes.

Foul water for all phases are expected to be domestic in content and therefore are likely to be able to use packaged treatment works.

8. Future Maintenance

Given the drainage installation is a gravity fed system the requirements for maintenance are similar to any typical installation.

It is recommend that any road gullies are cleared of silt build up on an annual basis to prevent the build-up of silts within the below ground drainage network. In addition, the roads should be swept of debris, particularly around the autumn months to reduce the ingress of leaf litter.

The estate road will not be offered for adoption and therefore the drainage maintenance will be the responsibility of Aldi Stores. It is understood that a service charge will be made to all other users of the road to ensure cleaning and the general up-keep of the drainage system can be maintained.

In a similar manner, the ACO channels to the service yard area should be cleared on an annual basis ensuring that the proprietary silt traps are cleaned as necessary.

The permeable macadam product is requires the maintenance to be undertaken by a sweeper fitted with water jetting and vacuuming equipment. It is therefore recommended that the whole car park area is swept twice a year with particular emphasis with one clean in early autumn to prevent the degradation of leaf litter blocking the porous structure.

The storage tanks, within the development, are likely to be specified as ESS Versavoid tanks. These are capable of jet cleaning and vacuuming as with any conventional drainage pipe with access points either directly over the tank or at the upstream end. Immediately upstream of the soakaway storage tanks are silt trap manholes and these need to be emptied, at least annually, to prevent any silts entering the soakaway tanks.

There are two storage tanks within the developed and both have been specified as ESS Versavoid tanks. These are capable of jet cleaning and vacuuming as with any conventional drainage pipe with access points either directly over the tank or at the upstream end.

As with any drainage system is it recommended that jet clearing of the system is undertaken on a 5 yearly basis. This should check for defects in the pipework and allow for the removal of any debris

The packaged sewage treatment unit is likely to be a proprietary product such as a Klargestor BioDisc. These are controlled units with automatic dosing systems to ensure effluent being treated does not breach acceptable limits. The system is expected to be alarmed back to the store managers office where the operational and maintenance manual for the scheme will advise on the best course of action. Typically this will require contacting the specialist installer.

Regular inspections of the treatment unit are expected to be required to begin with allowing for water sampling to check the chemical analysis of the water. This will be undertaken by the specialist.

9. Responsible Person

Each Aldi region has designated Property Managers who are based with the distribution centre that serves their store. The drainage maintenance falls under their remit with works sub-contracted as necessary to complete the requirement.



At the time of writing the report Liz Bagnall is the Property Manager for the Neston West region and can be contacted at:

Aldi Distribution Centre
Chester High Road
Neston
CH64 3TS 0151 353 2271

The maintenance contractor is David Ratcliff of Calder Construction. Their details are as follows:

Unit 15, Brearley La
Halifax
West Yorkshire
HX2 6HU 01422 886870

APPENDIX A

Greenfield Run Off Calculation



The screenshot shows the 'Rural Runoff Calculator' software interface. The main window is titled 'ICP SUDS' and contains several input fields and a results table.

ICP SUDS Input (FSR Method)

- Return Period (Years): 100
- Area (ha): 1.158
- SAAR (mm): 788
- Soil: 0.450
- Growth Curve: (None)
- Partly Urbanised Catchment (QBAR):
 - Urban: 0.000
 - Region: Region 9

Results

- QBAR rural (l/s): 5.8
- QBAR urban (l/s): 5.8

Return Period Flood

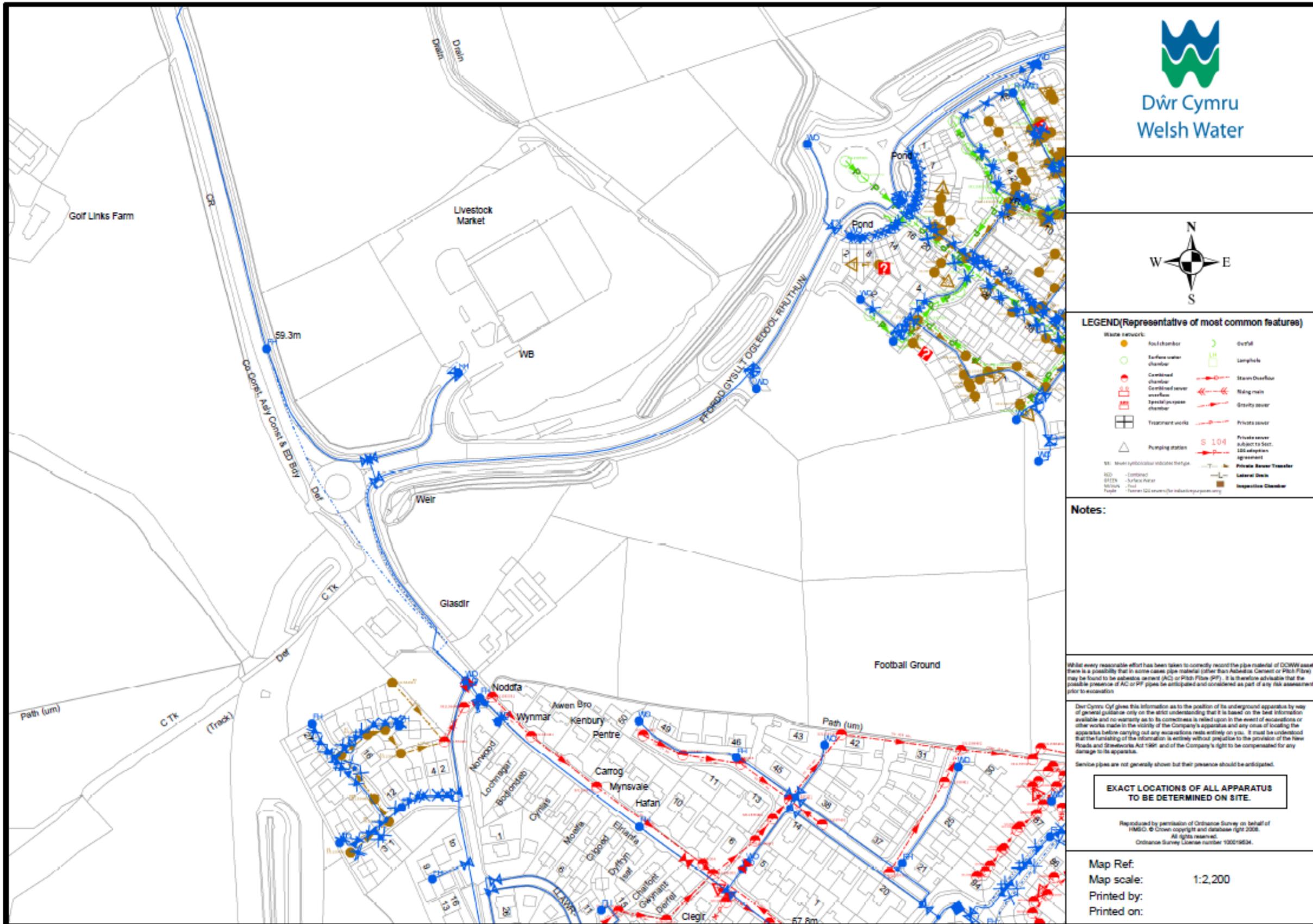
Region	QBAR (l/s)	Q (100yrs) (l/s)	Q (1 yrs) (l/s)	Q (30 yrs) (l/s)	Q (100 yrs) (l/s)
Region 1	5.8	14.5	5.0	11.0	14.5
Region 2	5.8	15.4	5.1	11.1	15.4
Region 3	5.8	12.2	5.0	10.3	12.2
Region 4	5.8	15.0	4.8	11.4	15.0
Region 5	5.8	20.8	5.1	14.0	20.8
Region 6/Region 7	5.8	18.6	5.0	13.2	18.6
Region 8	5.8	14.1	4.6	11.1	14.1
Region 9	5.8	12.7	5.1	10.3	12.7
Region 10	5.8	12.2	5.1	9.9	12.2

Buttons: OK, Cancel, Help

Footer: Enter Return Period between 1 and 1000

APPENDIX B

Sewer Record



LEGEND (Representative of most common features)

Manhole	Surface water chamber	Combined chamber	Combined sewer overflow	Special purpose chamber	Treatment works	Pumping station	Soil chamber	Surface water chamber	Overfall	Lamp hole	Storm overflow	Rising main	Gravity sewer	Private sewer	Private sewer subject to Sect. 184 agreement	Private Sewer Transfer	Lateral Disks	Inspection Chamber
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Notes:

While every reasonable effort has been taken to correctly record the pipe material of Dŵr Cymru assets there is a possibility that in some cases pipe material (other than Asbestos Cement or Pitch Fibre) may be found to be asbestos cement (AC) or Pitch Fibre (PF). It is therefore advisable that the possible presence of AC or PF pipes be anticipated and considered as part of any risk assessment prior to excavation.

Dŵr Cymru Cyl gives this information as to the position of its underground apparatus by way of general guidance only on the strict understanding that it is based on the best information available and no warranty as to its correctness is relied upon in the event of excavations or other works made in the vicinity of the Company's apparatus and any cause of loading the apparatus before carrying out any excavations rests entirely on you. It must be understood that the furnishing of the information is entirely without prejudice to the provision of the New Roads and Streetworks Act 1991, and of the Company's right to be compensated for any damage to its apparatus.

Service pipes are not generally shown but their presence should be anticipated.

EXACT LOCATIONS OF ALL APPARATUS TO BE DETERMINED ON SITE.

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Map Ref:
Map scale: 1:2,200
Printed by:
Printed on:

APPENDIX C

Quick Storage Estimation (Based on the entire site area)



2 YEAR EVENT:

 Variables Results Design Overview 2D Overview 3D Vt	Variables			
	FSR Rainfall		Cv (Summer)	0.750
	Return Period (years)	2	Cv (Winter)	0.840
	Region	England and Wales	Impemeable Area (ha)	1.153
	Map	M5-60 (mm) 18.000	Maximum Allowable Discharge (l/s)	0.0
		Ratio R 0.330	Infiltration Coefficient (m/hr)	0.03600
		Safety Factor	2.0	
		Climate Change (%)	0	

Results

Global Variables require approximate storage of between 704 m³ and 704 m³.

With Infiltration storage is reduced to between 97 m³ and 336 m³.

These values are estimates only and should not be used for design purposes.

30 YEAR EVENT:

 Variables Results Design Overview 2D Overview 3D Vt	Variables			
	FSR Rainfall		Cv (Summer)	0.750
	Return Period (years)	30	Cv (Winter)	0.840
	Region	England and Wales	Impemeable Area (ha)	1.153
	Map	M5-60 (mm) 18.000	Maximum Allowable Discharge (l/s)	0.0
		Ratio R 0.330	Infiltration Coefficient (m/hr)	0.03600
		Safety Factor	2.0	
		Climate Change (%)	0	

Results

Global Variables require approximate storage of between 1077 m³ and 1077 m³.

With Infiltration storage is reduced to between 184 m³ and 554 m³.

These values are estimates only and should not be used for design purposes.

100 YEAR EVENT:



 Variables Results Design Overview 2D Overview 3D Vt	Variables	
	FSR Rainfall	<input type="text" value="0.750"/>
	Return Period (years)	<input type="text" value="100"/>
	Region	<input type="text" value="England and Wales"/>
	<input type="button" value="Map"/> M5-60 (mm)	<input type="text" value="18.000"/>
	Ratio R	<input type="text" value="0.330"/>
		<input type="text" value="0.03600"/>
	<input type="text" value="2.0"/>	
	<input type="text" value="20"/>	
	<input type="text" value="0.840"/>	
	<input type="text" value="1.153"/>	
	<input type="text" value="0.0"/>	
	<input type="text" value="0.03600"/>	
	<input type="text" value="2.0"/>	
	<input type="text" value="20"/>	

Results

Global Variables require approximate storage of between 1553 m³ and 1553 m³.

With Infiltration storage is reduced to between 290 m³ and 832 m³.

These values are estimates only and should not be used for design purposes.

APPENDIX D

Proposed Drainage Scheme

