



SURFACE WATER DRAINAGE SUMMARY & DESIGN DATA

SURFACE WATER OVERVIEW

Following the hierarchical approach as described in Building Regulations Part H3 (3) storm water drainage shall discharge to one of the following, listed in order of priority:

- An adequate soakaway or some other adequate infiltration system; or where that is not reasonably practical
- A watercourse; or where that is not reasonably practical
- A public sewer.

The site investigation report by Kevin Armstrong dated May 2016 Ref 4488/16 confirms the soils to be clay substrata across the site and as such unsuitable for infiltration techniques.

A substantial Main River watercourse known as Redwither Brook lies to the east of the site which is considered to be the most appropriate receptor for surface water discharge from the site.

SURFACE WATER PROPOSAL

The surface water drainage strategy will comprise of a single outfall pipe from the site to discharge into the Redwither Brook the drainage system will take cognisance of the following requirements:

- *For Greenfield developments the peak runoff rate from the development to any highway drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event must not exceed the peak Greenfield runoff rate for the same event.*
- *Development should be designed so that there is no flooding to the development in a 1 in 30 year event and so that there is no property flooding in a 1 in 100 year plus climate change event.*
- *Provision of a SUDs drainage system*



SUDs Drainage System

The mean annual Greenfield peak flow (Qbar) has been calculated at 16.8 litres/second and as such the peak flow off site will be restricted to this rate by means of a vortex flow control device.

As infiltration techniques are not suitable for the site and a storage pond cannot be provided due to ecology issues, a geocellular crate system will be provided to act as a storage facility to control and manage surface water runoff. The below ground attenuation system has been designed to accommodate the 1 in 30 year rainfall event, plus an additional 20% to cater for climatic change, and has a storage capacity of 1375 cubic metres.

Flows generated during storm events up to and including the 1 in 100 year rainfall event, plus 20% to cater for climatic change, will be stored above ground and within the low lying dock leveller areas which are some 1.26m below finished floor level. The two dock leveller areas will store the additional volume of 528m³ generated by the 1 in 100 year storm event. It should be noted that these areas will only flood to a maximum depth of around 370mm which is some 890mm below finished floor level.

All linear drainage channels and gullies will incorporate trapped outfalls, and catchpits will be provided prior to discharge into the geocellular crate system to trap silt deposits and enhance water quality.

Computer modelling has demonstrated that silt accumulation actually occurs in most on line geocellular crate systems which is a good thing as this is removing pollutions from the runoff which is better than letting it flush through the system to damage rivers and streams, so in essence the attenuation tanks are doing exactly what they are supposed to do. In addition a small amount of sediment within a system has some benefits as it traps hydro-carbons.

The geocellular crate system will be designed to ensure that silt deposits can be readily removed, the system can be cleaned using high pressure jetting techniques, and CCTV cameras can be utilised for internal inspection procedures.

A maintenance regime will be set up which the Village Bakery will adopt for the management and maintenance of the surface water system as set out below:



STORM WATER / SUDs MAINTENANCE PLAN

1. Site Drainage Components

In order for any surface water drainage system to operate as originally intended, it is necessary to ensure that it is adequately maintained throughout its lifetime which is considered to be 75 years for this commercial development. Therefore, over the lifetime of a development there is a strong possibility that the system could either fail or its performance be reduced if it is not correctly maintained.

This is even more important when SUDs form part of the SWMS compared with traditional piped networks. The surface water drainage scheme will be installed and fully operational before occupation of the site occurs.

The site drainage network is shown on Tier Consult's drawings Reference Nos T/15/1688 CL(19)01 & 02.

The main drainage components are:-

1. Roof water from the building is collected in a gravity pipework system and routed through to the geocellular storage tank.

The tank requires periodic inspection and de-silting as required

2. Surface water runoff from external paved areas is collected by trapped gullies and linear drainage channels (incorporating trapped sump units) and discharged into the piped network which conveys flows to the storage tank.

Gullies and channels require periodic inspection and de-silting.



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The pavement areas roads and car parks require periodic sweeping as this will remove silt and contaminants directly from the paved surfaces before they become mobilised during rainfall events and are transported into the drainage system.

3. The surface water from the geocellular storage tank discharges flows at a restricted rate into a Class 1 full retention petrol/oil separator. The full retention interceptor removes oil and other hydrocarbons which have entered the drainage system, the unit also incorporates an inbuilt silt retention chamber. The interceptor will be fitted with a visual and audible alarm to warn when the system requires maintenance/cleaning.

The interceptor requires routine inspection to remove oil and other contaminants from the unit.

4. The storage tank is formed with a geocellular crate system wrapped with an impermeable membrane to prevent escape of water and ingress of soil particles. The storage tank requires periodic inspection and de-silting if required.

5. The vortex flow control unit limits the discharge of surface water to the receiving drain at a predetermined rate.

The chamber housing the control unit requires periodic inspection to check for any siltation and the vortex flow control unit should be checked for any blockages.

2. Maintenance Schedule

The drainage system will be fully maintained by the Village Bakery and they will bear all costs associated with the servicing, maintenance and regular inspections as required.

The rate of build up of silt and debris within a drainage system varies from site to site and is dependent upon individual site characteristics. Therefore the frequency of actions below should be adopted as a minimum standard for a period of 24 months after the completion of the development. This period will be sufficient to assess the system performance over 2 complete seasonal cycles after which the maintenance activity schedule may be reviewed and adjusted accordingly.



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Date: 28/09/2016

Village Bakery – Wrexham

Action	Frequency
Clear external areas of litter including bin and recycling enclosures	Monthly
Clear guttering of leaves and debris.	Twice yearly. Spring and Autumn after leaf fall
Petrol/oil Separator	Inspect bi-annually and as also when alerted by the audible/visual alarms. Remove oil and contaminants
Inspect all manholes chambers for siltation and debris	6 monthly and after every major storm event. Remove debris/silt as encountered
Vortex Flow Control Unit	3 monthly inspect and remove debris
Catchpits immediately upstream from storage tank	Minimum 6 monthly and after every major storm event. Remove debris/silt as encountered
Pumping station	Set up a preventative maintenance service contract to regularly inspect and maintain the equipment and control panel to ensure the facility operates efficiently. Minimum 2 visits per year
Storage Tank	6 monthly to check for blockages and after every main storm event. The tank can be inspected via the access points and CCTV cameras and high pressure jetting equipment can be deployed if required.