JACKSON CONSULTING ENGINEERS

Drainage Maintenance Plan

Project:

Residential Development, Land off Station Road, Bluntisham

Client:

Seagate Homes Ltd

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Introduction

Jackson Consulting Engineers have been appointed by Seagate Homes Ltd to produce a drainage design for land off Station Road, Bluntisham. The drainage design extends on the general principles of the preliminary strategy submitted as part of the initial planning permission.

This document accompanies these designs and outlines the maintenance requirements of the drainage features within the site.

SuDS Maintenance

The purpose of this section is to set out the basis of the development SuDS Maintenance Plan and to ensure that the adopting management company/owner is entrusted with a robust inspection and maintenance programme, ensuring the optimum operation of the surface water drainage network is continually maintained for the lifetime of the development and to prevent the increased risk of flooding both on and off site in accordance with the National Planning Policy Framework (NPPF).

The activities listed in this document are generic to the relative SuDS types and represent the minimum maintenance and inspection requirements, however additional tasks or varied maintenance frequency may be instructed by the maintenance company/owner as required. Specific maintenance needs of the SuDS elements should be monitored and maintenance schedules adjusted to suit requirements and ongoing performance.

All those responsible for maintenance should follow relevant Health and Safety legislation (Health and Safety at Work Regulations, 1999) for all activities listed within this report including lone working, if relevant) and risk assessments should always be undertaken.

Any contractor employed by the Management Company shall carry out periodic maintenance of all such SuDS in accordance with the schedules listed in this report. Inspection checks shall be carried out by a qualified and competent person, at the minimum intervals listed within the schedules and the appropriate work carried out.

SuDS and Drainage Features at Station Road

The SuDS and overall drainage system are designed to prevent flooding of the new development of Station road, and its surroundings, and control the flow of water into the existing drainage network. The site is a greenfield site, and the proposed drainage provisions aim to mimic the existing greenfield scenario, and indeed offer improvements to the higher intensity storms.

The storm water drainage strategy for the proposed development utilises SuDS features to intercept and convey all pluvial surface water runoff. The design of the system aims to attenuate and cleanse runoff.

Given the various planning comments, the scheme has been developed to meet national and local policies, and has the general approval of the Lead Local Flood Authority, although the scheme is still subject to conditional discharge. A summary of the drainage scheme is:

- Flows are restricted to a peak discharge of 2.4l/s for all storms up to and including the 1 in 100 year + 40% climate change events.
- Domestic roof water generally drains via. traditional pipework, before passing through the attenuation basin and then ultimately being restricted via. a Hydrobrake manhole.

- The private and shared drives typically drain via. gullies or channel drainage before passing through the attenuation basin and then ultimately being restricted via. a Hydrobrake manhole.
- There is a small area of the site which utilises porous paving to provide water quality improvements, this is in accordance with the strategy developed through planning.
- The proposed adoptable road drains to traditional gullies – this is in accordance with CCC's policy. The gullies connect into the proposed AW sewers before passing through the attenuation basin and then ultimately being restricted via. a Hydrobrake manhole.
- There is a section of road that cannot flow through the basin – to accommodate this a downstream defender is being used to ensure that all of the site's water is treated.
- The roof drainage will have leaf guards to protect from the ingress of leaves into the below ground system.
- The water quality from the site is achieved via. the attenuation basin and downstream defender.
- The flow is controlled via. an Hydrobrake manhole, before connecting into a riparian culvert.

Managing the SuDS

There are three categories of maintenance activities referred to in this report:

- **Regular maintenance (including inspections and monitoring)**
  Litter collection, grass cutting and checking the inlets and outlets where water enters or leaves a SuDS feature.
- **Occasional tasks**
  Comprises tasks that are likely to be required periodically, but on a much less frequent and predictable basis than the routine tasks (sediment removal is an example).
- **Remedial maintenance**
  Comprises intermittent tasks that may be required to rectify faults associated with the system, although the likelihood of faults can be minimised by good design. Where remedial work is found to be necessary, it is likely to be due to site-specific characteristics or unforeseen events, and as such timings are difficult to predict.

Station Road SuDS Management

The development maintained by different parties. The responsibilities of the different areas are shown on JCE drawing 0322-JCE-00-SI-DR-C-8030.

The highways will be responsible for cleaning the gullies and the laterals into the AW Sewer.

Anglian Water will be responsible for the main adopted sewers, the attenuation basin, downstream defender and Hydrobrake.

The management company will be responsible for the private sewers, shared parking areas, attenuation tank and existing culvert pipework.

The homeowners/renters/tenets will be responsible for their own private drains, porous paving and channel drains/gullies where applicable.

Station Road will remain under the ownership of Accent Homemade Ltd, with the maintenance being undertaken by themselves. All drainage features will be maintained by the above and the full contact details are:

Head Office: Accent

Charlestown House
Acorn Park Industrial Estate
Charlestown
Shipley West Yorkshire
BD17 7SW

VAT Reg Number: 500163411

SuDS Features Checklist

SuDS techniques include paving features and control structures to manage runoff as it flows to site outfalls. The following lists the features which may be found on a site:

- Permeable surfaces through the surface percolate through the surface into underlying drainage layers.
- Attenuation basin to attenuate and treat the surface water.
- Surface drainage features such as channel drains and gullies to drain surfaces.
- Inlets and outlets structures are often conveyance pipes protected with mesh guards. They must be free from obstruction at all times to allow free flow through the SuDS.
- SuDS flow control structures are small orifices in the control chamber. For this site they are in a shallow chamber so are accessible and easy to maintain.
- Inspection Chambers and rodding eyes are used on bends or where pipes come together. They allow cleaning of the system if necessary.
- Flood routes (exceedance routes) allow water volumes exceeding the capacity of the SuDS system to escape from the site without causing damage to property. This route must be clear of obstructions at all times.

SuDS Maintenance Specification

General Requirements

Maintenance activities comprise • **Regular Maintenance** • **Occasional Tasks** • **Remedial Work**	**Frequency**
Generally **Litter** Collect all litter or other debris and remove from site at each site visit.	Monthly

- Avoid use of weedkillers and pesticides to prevent chemical pollution as a blanket approach (targeting dosing is acceptable)
- Avoid de-icing agents wherever possible to allow bio-remediation of pollutants in permeable surfaces.
- Protect all permeable, porous and infiltration surfaces from silt, sand, mulch and other fine particles.

Permeable Surfaces

Permeable surfaces that allow rain to percolate through the surface into underlying drainage layers. They must be protected from silt, sand, compost, mulch, etc. Key maintenance requirements include:

- Regular inspection of surface layer to ensure that silt buildup is manageable and water is dispersed.
- Check for structural defects.
- Observe and ponding/pooling after rainfall.

Permeable surfaces including permeable block paving, that allow rain to percolate through the surface into underlying drainage layers. They must be protected from silt, sand, compost, mulch, etc. Permeable block paving can be cleaned by suction brushing.

PERMEABLE AND POROUS SURFACES	
Regular Maintenance	**Frequency**
Brush regularly and remove sweepings from all hard surfaces Remove litter and detritus from surface. Check for erosion at down pipe position replace as necessary. Check for ponding	Monthly As required After rainfall
Occasional Tasks	**Frequency**
Brush and vacuum surface once a year to prevent silt blockage and enhance design life. Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying	Annually As required – once per year on less frequently used pavements
Remedial Work	**Frequency**
Inspect for evidence of poor operation and/or weed growth – if required, take remedial action Monitor effectiveness of permeable pavement and when water does not infiltrate immediately advise Client of possible need for reinstatement of top layers or specialist cleaning. Rehabilitation of surface and upper substructure by remedial sweeping. Recent experience suggests jet washing and suction cleaning will substantially reinstate pavement to 90% efficiency. Remediate any landscape which, through vegetation maintenance or soil slip, has been raised to within 50mm of the level of the paving. Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material. Rehabilitation of surface and upper substructure through replacement	As required <

Access is available directly from the top of the surface. The areas the porous surfacing is located is within domestic access, so alternative parking arrangements will need to be made during remedial works.

Attenuation Tanks

Attenuation tank provided to slow the water into the existing system and create the necessary betterment. Key maintenance requirements include:

- Regular inspection of silt traps, manholes, pipework and pre-treatment devices, with removal of sediment and debris as required.
- Regular inspection and maintenance is required to ensure the effective long-term operation of below ground attenuation tank.

Attenuation Tanks	
Regular Maintenance	**Frequency**
Check for signs of water near device (could indicate failure) Check for depression (could indicate failure) Other maintenance as 'Inlets, Outlets, Controls and Inspection Chambers'	After Rainfall Annually or as required
Occasional Tasks	**Frequency**
Inspect/check all inlets, outlets, vents and overflows to ensure that they are in food condition and operating as designed. Undertake a CCTV inspection to monitor the condition of the tank Jetter the tank and remove silt build up if identified in the CCTV report	Annually Every 5 years or as required
Remedial Work	**Frequency**
Jetting of the attenuation tanks after review of CCTV Replacement of device if the structure is failing, again after review of CCTV	As required

Access

The majority of the maintenance of this structure will be undertaken through the catchpit downstream of the attenuation tank.

In the unlikely event that the device did fail, then this is a significant operation and parts of domestic car parking and shrubs will need to be removed. Accent will have control over the land so this will be possible.

Attenuation Basin

- Basins are depressions in the ground that store water. Water levels rise after rain and then drop to the normal level via. evapotranspiration or is released slowly to the culverted drain.
- Basins are usually dry.

Basins	
Regular Maintenance	**Frequency**
Remove litter and debris	Monthly
Remove nuisance plants	Monthly or as required
Inspect banksides, structures, pipework, etc. for signs of physical damage.	
Mow grass access paths and verges surrounding basins at 35mm-50mm minimum and 75mm maximum or as specified to provide a cared for appearance and allow pedestrian access.	As required 4-6 times annually
Mow rough grass areas for occasional access or habitat reasons at 100mm and maximum 150mm with cuttings removed to wildlife piles	Annually or as required
Grass areas not required for access may be managed for wildlife interest and to reduce costs.	
2 cuts in July and September or 1 cut annually in September or October as specified and cuttings removed to wildlife piles.	
Occasional Tasks	**Frequency**
Where silt accumulates on apron or area in front of inlet or outlet then remove and land apply within design profile of SuDS	Annually or every 3 years as required
Where silt accumulates more than 50mm in base of basin undertake a phased removal of silt subject to Client approval.	
Confirm whether a liner is present to hold water or prevent pollution of groundwater.	
Remove silt as instructed but not more than 30% of basin area at any one time and to an agreed depth but not subsoil layer.	
Retain as much representative existing vegetation as possible to ensure rapid re-colonisation of open areas.	
Stack excavated material adjacent to basin to allow de-watering of silt.	
Undertake silt removal during September-October to minimise damage to wildlife and ensure re-growth of vegetation before winter.	
Spread excavated material on site above SUDS design profile, e.g. top of banks, in accordance with E.A. Waste Exemption Guidance.	
Remedial Work	**Frequency**
Repair erosion or other damage by reseeding or re-turfing	As required

Repair/rehabilitation of inlets, outlets and overflows Repair uneven surface and reinstate design levels	

Access

The main maintenance activities will be performed using hand tools, and access is available to enter. If large areas of silt requires removal (occasional task), then a mini excavator will be used – this will be lifted into the base of the basin, and removed the same way.

There is 2m available around the top of the basin, this is a requirement of AW and has been accepted through S104 approval.

Inlets, Outlets, Controls and Inspection Chambers

- **Inlets and outlets structures** may be surface structures or conveyance pipes with guards or diffuser boxes/filters. They must be free from obstruction at all times.
- **SuDS flow control structures** can be protected orifices, slots weirs or other controls at or near the surface to be accessible and easy to maintain. They may be in baskets, in small chambers or in the open.
- **Inspection Chambers** and rodding eyes are used on bends or where pipes come together and allow cleaning of the system if necessary. They should be designed out of the system where possible.

INLETS, OUTLETS, CONTROLS AND INSPECTION CHAMBERS	
Regular Maintenance	**Frequency**
Inlets, outlets and surface control structures Inspect surface structures removing obstructions and silt as necessary. Check there is no physical damage. Strim vegetation 1m min. surround to structures and keep hard aprons free from silt and debris	Monthly Monthly
Inspection chambers and below ground control chambers Remove cover and inspect ensuring water is flowing freely and that the exit route for water is unobstructed. Remove debris and silt from catchpits. Check the bypass on the flow control device. Undertake inspection after leaf fall in autumn	6 months Annually
Occasional Maintenance	
Jet and camera the system (jetting must be prevent from discharging into porous paving sub-base). Repair any items identified by the CCTV survey.	Every 5 years
Remedial work	**Frequency**
Repair any items identified by the CCTV survey.	As required

Additionally, Hydro International, who supply the Hydrobrake, have their own maintenance of the control device, this is:

Maintenance

Normally, little maintenance is required as there are no moving parts within the Flow Control. Experience has shown that if blockages occur they do so at the intake, and the cause on such occasions has been due to a lack of attention to engineering detail such as approach velocities being too low, inadequate benching, or the use of units below the minimum recommended size. The Flow Control (where applicable) is fitted with a pivoting bypass door, which allows the manhole chamber to be drained down should blockage occur. The smaller conical units, below the minimum recommended size, are also supplied with rodding facilities or vortex suppressor pipes as standard.

Following installation of the Flow Control it is vitally important that any extraneous material i.e. building materials are removed from the unit and the chamber. After the system is made live, and assuming that the chamber design is satisfactory, it is recommended that each unit be inspected monthly for three months and thereafter at six monthly intervals with hose down if required. If problems are experienced, please do not hesitate to contact the company so that an investigation may be made.

All Flow Control units are typically manufactured from grade 304 Stainless Steel, and if required they can also be manufactured in grade 316 Stainless Steel. Both materials have an estimated life span in excess of the design life of drainage systems.

Access

Access to these items will be directly though the access points. Traffic management may be required for the vehicle access areas.

Downstream Defender

We are currently waiting for a final specification of this device, but generlaly the maintenance requirements are as follows.

Downstream Defender	
Regular Maintenance	**Frequency**
Remove litter and debris and inspect for sediment, oil and grease accumulation	Six monthly
Change the filter media	As recommended by manufacturer
Remove sediment, oil, grease and floatables	As necessary – indicated by system inspections or immediately following significant spill
Occasional Maintenance	
Inspect for evidence of poor operation	Six monthly
Inspect filter media and establish appropriate replacement frequencies	
Inspect accumulation rates and establish appropriate removal frequencies	Monthly during first half year of operation, then every six months
Remedial work	**Frequency**

Replace malfunctioning parts or structures	As required

Access

Access to these items will be directly though the access points. Traffic management may be required for the vehicle access areas.

Adopted Highway Gullies

The gullies and associate lateral will be adopted by Cambridgeshire County Council and will have their own maintenance requirements.

Flood Routes

- Flood routes (exceedance routes) allow water volumes that exceed the capacity of the SuDS system to pass through or round the site without causing damage to property. These routes must be clear of obstructions at all times.

OVERFLOWS AND FLOOD ROUTES	
Regular Maintenance	**Frequency**
Flood Routes. Make visual inspection. Check route is not blocked by new fences, walls, soil or other rubbish. Remove as necessary.	Monthly