CELLARHEAD BESS LIMITED

CELLARHEAD
BESS LTD

MAINTENANCE PLAN FOR THE DRAINAGE SCHEME AT CELLARHEAD BATTERY ENERGY STORAGE SYSTEM (BESS)

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Purpose

This document was prepared as a maintenance schedule for the drainage system that shall be constructed as part of the Cellarhead Battery Energy Storage System (BESS) development on behalf of Cellarhead BESS Limited. This document shall provide details on the required maintenance to ensure the performance of the system is maintained.

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1 SITE/DRAINAGE SYSTEM DESCRIPTION

The following section shall describe how the surface water scheme shall work and what its purpose is. It will include the details of the SuDS components, catchments, and surface water disposal locations.

The surface water drainage system has been designed to collect runoff from any areas where there is an increase in impermeable surfacing/change in runoff characteristics. This is then released into the underlying strata of the development due to the natural in-situ geology being receptive to infiltration.

The drainage system shall comprise of; the areas covered by permeable gravel surfacing in and around the substation area, northern field and southern field (where the geology is sand) shall drain through the base of the gravel layer into the underlying strata. The gravel shall act as a permeable pavement. The impermeable areas within the substation shall drain either via a filter drain or carrier pipework round to an infiltration basin in the northern western corner of the development. In the southern field the area in the south eastern corner shall drain to a filter drain where this will be conveyed to a below ground infiltration structure in the south western corner.

The scheme has not only been designed to provide controls on the quantity and quality of the surface water runoff generated, but it is designed to provide additional biodiversity benefits as well. As a result of this the maintenance of the scheme shall ensure that the biodiversity benefits are not compromised by inappropriate maintenance.

2 MANAGING THE DRAINAGE SYSTEM

The drainage features for Cellarhead BESS have been designed for easy maintenance to comprise;

i) Regular day to day care – collection of any litter that may have blown into the swales and infiltration basin, checking of the inlets and outlets of any carrier pipework, regular visual inspections of the drainage features.

ii) Occasional works – managing the vegetation filter drains, permeable paving and infiltration basin and removal of any silt and sediment build up within the drainage features; and

iii) Remedial Works – Repairing any damage to the drainage features features when required.

3 CELLARHEAD BESS DRAINAGE SYSTEM MANAGEMENT

The drainage system sequence for the BESS compound is spilt into 3 distinct areas. The first area being the substation, the second being the northern field, where some of the BESS containers are situated, and then finally the southern field where further BESS containers are placed.

<u>Actions</u>

- Monitor the permeable paving to assess for debris build up and remove as necessary.
- Monitor the performance of the paving to ensure this is draining sufficiently.

Water leaves the carrier pipework and filter drain/permeable paving and flows to the infiltration basin in the north west or soakaway in the south of the development.

<u>Actions</u>

- Monitor infiltration basin vegetation and cut 30% of the edge at 100 mm each year, if necessary, during September–November, removing cuttings.
- Occasionally remove dense vegetation from infiltration basin if it spreads across the pond by hand clearing or raking.
- Monitor vegetation within the infiltration basins and cut 30% of edge at 100 mm each year, if necessary, during September–November, removing cuttings.
- Inspect the drawdown of water during a storm event to ensure the performance of the infiltration basin and soakaway structure.

4 MAINTANENCE SPECIFICATION

The following sections detail the specification requirement for the maintenance that needs to be undertaken on the various SuDS components which form part of the drainage network. The drainage network has been designed to involve minimal maintenance, however as with all drainage systems, some maintenance from time to time shall be required to ensure that the system continues to perform as designed. The maintenance required is to comprise the following as a minimum;

- Regular maintenance – for example, litter collection, grass cutting and inspection of drainage features etc;
- Occasional maintenance – managing vegetation and removing any silt and sediment accumulations;
- Remedial works – repairing any damage, when and where deemed necessary; and
- Monitoring – Visual inspections of the surface water network

The tables below documents the maintenance requirements for each part of the system. The maintenance requirements have been listed in accordance with the requirements stated in the Sustainable Drainage Systems (SuDS) manual (Ciria C753) and other relevant documents.

During the maintenance of the SuDS components the use of weed killers and pesticides should be avoided to prevent chemical pollution.

4.1 Permeable Paving

The gravelled areas around the BESS development shall collect rainfall which falls on these areas and convey and infiltrate this into the underlying strata.

Table 1 below shows the maintenance requirements for the gravel surfaces (permeable pavement) located around the BESS development.

Table 1 – Maintenance Requirements for Permeable Paving		
Maintenance Schedule	**Required Action**	**Typical Frequency**
Regular Maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging
Occasional Maintenance	Removal of weeds or management using glyphospate applied directly into the weeds by an applicator rather than spraying	As Required – minimum once per year
Remedial Actions	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	As Required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 years or as required (if performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth – if required, take remedial action	Three-monthly and 48 hours after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually

4.2 Infiltration Basin/Soakaways

Table 2 below shows the maintenance requirements for the infiltration basin/soakaway to ensure that the hydraulic performance is retained.

Table 2 – Maintenance Requirements for Infiltration Basin/Soakaway		
Maintenance Schedule	**Required Action**	**Typical Frequency**
Regular Maintenance	Remove litter and debris	As Required (Inspect Weekly while site is operational)
	Inspect soakaways performance to ensure it is emptying and inspect soakaway for sediment build up	Every 6 months
Occasional Maintenance	Remove build-up of silts and sediments that have accumulated with the soakaway	As required based on inspections
Remedial Actions	Reconstruct soakaway if performance continues to deteriorate or failure occurs	As required

4.3 Filter Drains

Filter drains are employed around the perimeter of the BESS compound and are part of the drainage network. The filter drains will be maintained regularly to ensure that they are free of debris and sediment accumulation, that could impede the flow of water, reducing the capacity within the filter drains.

Table 3 below shows the maintenance requirements for the filter drains.

Table 3 – Maintenance Requirements for Filter Drains		
Maintenance Schedule	**Required Action**	**Typical Frequency**
Regular Maintenance	Remove litter (including leaf litter) and debris from filter drain surface and access chambers.	Monthly
	Inspect filter drain surface, inlet/outlet pipework and control systems for blockages, clogging, standing water and structural damage.	Monthly
	Inspect inlets and perforated pipework for silt accumulation, and establish appropriate silt removal frequencies.	Six monthly
Occasional Maintenance	Remove or control tree roots where they are encroaching the sides of the filter drain, using recommended methods (eg NJUG, 2007 or BS 3998:2010).	As required
	If high sediment rates are encountered, remove surface geotextile and replace, and wash or replace overlying filter medium.	Five yearly (minimum)
	Clear perforated pipework of blockages.	As required

4.4 Inlets, Outlets, Controls and Manhole Chambers

The inlets and outlets generally comprise conveyance pipes with headwalls. These need to be kept free of obstructions at all times. Manhole chambers are located where there is a change of pipe direction but have been kept to an absolute minimum within the scheme.

Table 4 below shows the maintenance requirements for the inlets and outlets.

Table 4 – Maintenance Requirements for Inlets, Outlets, Controls and Manhole Chambers

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Remove litter and debris	Monthly
	Inspect inlet and outlet location to culverts for blockages and silt accumulations and remove as necessary.	Monthly
	Remove cover and inspect chambers, ensuring that water is flowing freely and that the exit route for water is unobstructed. Remove debris and silt. Undertake inspection after leaf fall in autumn	Annually
Occasional Maintenance	Check finished levels are 20 mm above edges of chambers to avoid mower damage and to reduce trip hazards.	As Required
Remedial Actions	Repair erosion damage followed by reseeding to the original design levels.	As Required

4.5 Linear Drainage Channels

Table 5 below shows the maintenance requirements for the linear drainage channels.

Table 5 – Maintenance Requirements for Linear Drainage Channels		
Maintenance Schedule	**Required Action**	**Typical Frequency**
Regular Maintenance	Visual inspection of linear drainage channels and associated gratings.	Monthly (or as required)
	Removal of litter and debris that may have entered into the linear drainage channels.	Monthly (or as required)
Occasional Maintenance	Removal of any silt accumulation within linear drainage channels and associated outlet gully pot. Channels shall be cleaned in accordance with manufacturers recommendations.	Six monthly or following significant intensity rainfall event
	Check and remove any large vegetation growth near linear drainage channels.	6 monthly
Remedial Actions	Any damage noted during visual inspections shall be remediated. High risk failures shall be remediated immediately, with low risk failures managed and monitored.	As Required

4.6 Pumping System Maintenance

The pumping sump and the pump that will be installed will serve the deep excavation for the substation which is approximately 9m below ground level, hence the requirement for the pumps. The pumps and associated sump will require regular maintenance to ensure they maintain the required performance.

The pumps and sump will remain the responsibility of the developer. It is recommended that the developer enters into an agreements with a pump maintenance company. The developer is also responsible for the implementation of any emergency measures should the pump fail.

The pumping system shall have a duty and standby pump to ensure there is resilience should one of the pumps fail and these should be serviced at a minimum frequency of annually unless a greater frequency is recommended by the pump supplier.

Maintenance of these will involve removal of the pumps and carrying out any routine maintenance or repairs to the pumps.

Control systems and alarms shall be checked regularly to ensure they are in fully working order.

All pumps should be connected to a monitoring/telemetry system which activates an alarm upon failure, pump running issues and high water level.

The sump shall be emptied of any silt accumulations that may have built up. The sump shall be inspected every six months. Any silt removed shall be disposed of offsite at a licenced facility.

An emergency back-up pumping plan should be documented, covering access, operation, storage and maintenance of the assets. The enactment of the emergency pumping plan should be "dry run" and disseminated and practiced throughout the operational lifetime. Portable submersible pumps will be used in an emergency event.

4.7 Spillages

Small spillages on site do not pose a serious risk to the environment as they will enter the drainage system in a slow and controlled manner with retention time available within the SuDS features and vegetated overland flow routes. Any small spillages should be removed as soon as possible using soak mats and spill kits with the residual allowed to bioremediate within the SuDS features.

Where a serious spillage occurs, either a large volume or unknown compound, the drainage system should be isolated to prevent any discharge from the development. The spillage could be isolated with soil or turf with the outlet pipe from any headwalls or chambers downstream of the spillage blocked with a bung. A bung can be made with wrapping soil or turf in a plastic sheet or finely woven fabric. The Environment Agency should be notified immediately.

4.8 Access

It is likely that both vehicular and pedestrian access shall be required at some point in and around the SuDS features. As part of the maintenance requirements pedestrian access routes shall be maintained around the infiltration basin to allow for pedestrian access when required. Around the SuDS features there are either access track or large areas which shall allow for vehicular access when required.

4.9 Responsibilities

The maintenance requirements listed in this document are to be carried out by the operator of the site. The maintenance requirements shall be undertaken by the developer (specific contact details below) and shall be undertaken in accordance with requirements document in this maintenance plan specifically Tables 1, 2, 3 and 4 to ensure the SuDS features continues to work as designed and continue to provide surface water control and biodiversity benefits to the development.

4.9.1 Contact Details

Named Body Responsible – Developer (Cellarhead BESS Limited)

5 QUERIES ABOUT A SUDS DESIGN FEATURE

During the maintenance should a query or concern arise about any of the installed SuDS design features please contact:

Sirius Environmental Limited, 4245 Park Approach, Thorpe Park, Leeds, LS15 8GB.

Telephone – 0113 264 9960

Email – Jack.Davies@thesiriusgroup.com