SUDS
Maintenance Plan

SR12 The Meadows
SR12A Mid Meadows
Top Meadows

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Revision
D

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1.0 Surface water drainage overview

Surface water is discharged through a piped network from Mid Meadows and Top Meadows at the north of the development site, to The Meadows at the south. Surface water then discharges to a watercourse located at the southern boundary of The Meadows. Flows are attenuated by means of a flow control at the southern boundary of the Meadows to a maximum discharge rate of 32.0 l/s for all events up to and including the 100-year event with a 50% allowance for climate change. There are also flow controls located at the southern boundary of Mid Meadows and Top Meadows. Attenuated flows are stored within the piped network and cellular storage systems.

Additionally a man-made mill race is diverted around the western site boundary via a combination of swales and pipes.

The nominated maintenance contractor is responsible for the maintenance of SuDS features coloured green on the enclosed plans.

Please note, cellular storage units do not form part of the contractors responsibility and instead are maintained by homeowners.

The following text sets out the required maintenance for the SuDS features.

2.0 Operation and Maintenance

Regular inspection and maintenance is key to the effective operation of the SuDS features. Maintenance responsibility for the features will be placed with a responsible organisation and in this case a nominated management company. The on-going maintenance costs will be paid for by the management company, attributed by a monthly cost to the home owners.

Regular grass cutting and weed control in and around key areas such as access routes to the inlet and outlet structures will be undertaken. All other areas are to be managed as meadows in order to promote the long term development of wildlife.

Adequate and an appropriate informal access will be provided to the SuDS features and the operation and maintenance requirements are set out in Table 1 on page 7.

The majority of the maintenance activities for the features can be undertaken as part of the site wide landscape maintenance and as such this plan will be integrated within the Landscape Maintenance Plan.

3.00 SUDS Feature Maintenance Plan

This schedule is a live document and should be updated whenever appropriate.

3.01 Regular Maintenance: Swales and Diverted Mill Race

Inspections & Reporting
Regular SUDS scheme inspections will:

- Determine and therefore inform optimum future maintenance activities;
- Confirm and measure hydraulic, water quality, amenity and ecological/bio-diversity value and performance; and
- Identify potential system failures such as blockages, poor water quality, lack of ecological/biodiversity.

Inspections are required at monthly site visits (e.g. for grass cutting) for little additional cost, and will be integrated into regular maintenance requirements. During the first year of operation, inspections will be carried out after every major storm event to ensure the designed system works as intended. Typical routine inspection questions that will inform when occasional or remedial maintenance activities are required, and/or when water quality requires investigation include:

- Is the outlet blocking/blocked?
- Is the stone adjacent to the headwall in adequate condition?
- Have flood routes developed that are not intended within the design?
- Is the vegetation healthy?
- Is there evidence of poor water quality (e.g. algae, oils, milky froth, odour, unusual colourings)?
- Is there evidence of sediment build-up?
- Is there evidence of swale volumes being exceeded?
- Is there any evidence of structural damage to the inlet/outlet structures that requires repair?
- Are there areas of erosion or excess channelling over vegetated surfaces?
- Is there excessive silt deposition in the silt trap manhole?

An annual maintenance register will be prepared by the maintenance contractor which is to be retained within the owner's manual. A log of all maintenance activities shall be kept and reviewed on a three yearly basis. The register will be submitted to the LPA/LLFA annually/or available on request. The report will provide the following information:

- Observations resulting from inspections.
- Measured sediment depths (where appropriate).
- Monitoring results, if flow or water quality monitoring was undertaken.
- Maintenance and operation activities undertaken during the year.
- Based on the year passed inform a schedule of inspection and maintenance programme for the following year.

Litter/debris removal

This is an integral part of SUDS maintenance and reduces the risks of inlet and outlet blockages, retains amenity value and minimises pollution risks, and as such this will be as frequent as practicably possible.

Grass cutting

Grass cutting will be minimised around SUDS facilities. In general, allowing grass to grow improves water quality. Short grass around a wet system such as swale provides an ideal habitat for nuisance species; allowing the grass to grow is an effective means of discouraging them.

Grass cutting is an activity undertaken primarily to enhance the perceived aesthetics of the facility. The frequency of cutting depends upon surrounding land uses, and public requirements. Therefore, grass cutting should be done as infrequently as possible, mindful of the aesthetic concerns of local residents particularly those overlooking the features. However, grass around inlet and outlet infrastructure will be strimmed closely to reduce risks to system performance. It is the aspiration of these features to be of meadow type, which aim to maximise habitat and biodiversity potential.

Weed/invasive plant control

Weeds are generally defined as vegetation types that are unwanted in a particular area. For SuDS, weeds are often alien or invasive species, which do not enhance the technical performance or aesthetic value of the system, or non-native species and the spread of which is undesirable.

In some places, weeding has to be done by hand to prevent the destruction of surrounding vegetation (hand weeding will generally be required only during the first year, i.e. during plant establishment). However, over grassed surfaces, mowing to include grass collection is an effective management measure. The use of herbicides and pesticides will be prohibited since they cause water quality deterioration. The use of fertilisers will also be limited or prohibited to minimise nutrient loadings which are damaging to water bodies.

Shrub management

Shrubs tend to be densely planted and are likely to require weeding at the base, especially during the first year to ensure that they get enough water. Shrubs will be selected so they can grow to their maximum natural height without pruning.

3.02 Occasional Maintenance: Swales

Sediment Removal

To ensure long-term effectiveness, the sediment that accumulates in SuDS will be removed periodically. The required frequency of sediment removal is dependent upon several factors including:

- Design of the upstream drainage system;
- Type of drainage system;
- Design storage volume; and
- Characteristics of upstream catchment area (e.g. land use, level of imperviousness, upstream construction activities, erosion control management and effectiveness of upstream pre-treatment).

Sediment accumulation will typically be rapid for the entire construction period (including time required for the building, turfing/seeding and landscaping of all upstream development plots). Once a catchment is completely developed and all vegetation is well-established, sediment mobility and accumulation is likely to drop significantly.

Vegetation/plant replacement

Some replacement of plants will be required in the first 12 months after installation, especially after storm events. Dead or damaged plants will be removed and replaced to restore the prescribed number of living plants per hectare.

Drainage pipe blockage check

The drainage pipe between the outlet headwall and the downstream networks, inclusive of the piped sections of the diverted mill race, will be checked for blockages occasionally due to the nature of the type of material that could enter this pipe.

3.03 Remedial Maintenance: Swales

Re-seeding

Should excessive sediment removal have been necessary the excavated earth will require re-seeding. This will be carried out at the appropriate time of year in order to promote rapid regrowth.

Outlet Stone Rip-Rap

Over time the stone within these areas will require replacing or supplementing in order to retain their effective purpose.

3.04 Flow Control Chambers

Regular Maintenance (quarterly)

The flow control chambers will be the responsibility of United Utilities.

3.05 Construction Requirements

Setting out has been provided to enable the swales and drainage networks being constructed, reflect the design drawings as closely as practicable. The contractor will ensure that the side slopes do not exceed the designed gradients and the inlets/outlets are free from obstructions. Backfilling and stoned areas will require special care and attention to minimise settlement. The soils chosen for backfill will be suitable fertile, porous and of sufficient depth to promote healthy growth. Following construction of the inlet/outlet and then the base area construction activities/personnel will be limited to these areas to enable rapid vegetative growth.

3.06 Table 1 – Swale – Maintenance Schedule

Maintenance Schedule	Action Required	Frequency
Monitoring	Check inlet and outlet for blockages	Monthly
	Check grass heights	Monthly
	Check litter and aesthetic damage	Monthly
	Check for excessive scour	Quarterly
	Check condition of safety grill and check its secure	Quarterly
	Check flood levels	Quarterly
	Check stone backfill condition and extent	Annually
	Check structural integrity of inlet/outlet	Bi-annually
	Check water quality	Bi-annually
	Check sediment levels	Bi-annually
	Check silt trap manhole	Bi-annually
Regular Maintenance	Litter and unwanted items removed	Monthly
	Grass cutting of isolated access areas only	Monthly
	Weed and removed nuisance plants	Monthly
	Remove silt from silt trap manhole	Quarterly
Occasional Maintenance	Remove excessive sediment build up but limit excavation activities	Annually
	Reseed and replant	Annually
	Repair fencing	Annually
	Clean drainage pipe and diverted mill race	Annually
Remedial Actions	Reseed and replant	As required
	Stone backfill replacement	As required
	Repair or secure headwall safety grill	As required

4.00 References

The SUDS Manual – CIRIA 2007

Appendix A

The Meadows SR12

LEGEND

- UU SEWERS
- HIGHWAY DRAINAGE
- MANAGEMENT COMPANY
- MAINTAINED BY PLOT OWNERS

Issue	Date	Description	By	Chkd	Appd
P4	09-06-23	Drainage layout updated	RH	RH	PL
P3	15-05-23	Drainage layout updated	RH	RH	PL
P2	13-07-22	Filter drains removed	RH	RH	PL
P1	07-06-22	Prelminary Issue	RH	RH	PL

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Client: MR R.W. MULHOLLAND

Job Title: FLOSH MEADOWS SR12 CUMBRIA

Drawing Title: SUDS MAINTENANCE

Scale at A0: 1:250

Drawing Status: **PRELIMINARY**

Job No	Drawing No	Issue
1842	1011	P4

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A0

N
W E
S

St Mary's Church
Cemetery & 1927
Lourdes replica Grotto

Hawthorne Hedge infill

SHARED PRIVATE DRIVE

Mid Meadows

Top Meadows

SR13A

SR12

The Meadows

47 HOUSE TYPE D
46 HOUSE TYPE G
45 HOUSE TYPE A
44 HOUSE TYPE A
43 HOUSE TYPE B
42 HOUSE TYPE A
41 HOUSE TYPE C
40 HOUSE TYPE E
39 HOUSE TYPE A
38 HOUSE TYPE G
37 HOUSE TYPE A
36 HOUSE TYPE A
35 HOUSE TYPE F
34 HOUSE TYPE A
33 HOUSE TYPE D
32 HOUSE TYPE A
31 HOUSE TYPE A
30 HOUSE TYPE F
29 HOUSE TYPE G
28 HOUSE TYPE A
27 HOUSE TYPE E
26 HOUSE TYPE F
25 HOUSE TYPE G
24 HOUSE TYPE A
23 HOUSE TYPE A
22 HOUSE TYPE D
1 2 3 4 5 10 11

SWALE WIDENED LOCAL TO OUTFALL AND BASE CONSTRUCTED WITH 300mm STONE RIP RAP

SWALE TO INTERCEPT OVERLAND FLOWS AND CONVEY TO MILL RACE

DISCONNECT EXISTING MILL RACE AND DIVERT TO PROPOSED SWALE

OUTFALL TO PIPED NETWORK

SILT TRAP CL 64.95 IL 62.67 TRAP 62.60

SILT TRAP CL 64.95 IL 62.20 TRAP 62.95

SILT TRAP CL 64.95 IL 62.30 TRAP 62.00

CONNECT TO EXISTING NETWORK

FUTURE DEVELOPMENT: S10 FITTED WITH FLOW CONTROL REF HYDROBRAKE OPTIMUM MD-SHE-0107-4000-1575-4000 ORIFICE 107mm DH 1.575m DISCHARGE RATE 6.0 L/S

S5 FITTED WITH FLOW CONTROL REF HYDROBRAKE OPTIMUM MD-SHE-0107-3700-2119-7000 ORIFICE 107mm DH 2.119m DISCHARGE RATE 7.0 L/S

TABLE

FWMH2 CL 64.256 IL 62.406

SWMH8 CL 64.189 IL 62.743

Do not scale

LEGEND

- UU SEWERS
- HIGHWAY DRAINAGE
- MANAGEMENT COMPANY
- MAINTAINED BY PLOT OWNERS

Issue	Date	Description	By	Chkd	Appd
P3	09/06/23	DRAINAGE NETWORK UPDATED	RH	PL	PL
P2	15/05/23	DRAINAGE NETWORK UPDATED	RH	PL	PL
P1	07/06/22	PLANNING ISSUE	RH	PL	PL

Drawing Title

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Client: MR R.W. MULHOLLAND

Job Title: FLOSH MEADOWS CUMBRIA

Drawing Title: SR12A & TOP MEADOWS SUDS MAINTENANCE

Scale at A0: 1:250

Drawing Status: PLANNING

Job No: 1842

Drawing No: 1012

Issue: P3

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