INTRODUCTION

The Phase 2 and Phase 3 site at Bowland Meadow, Longridge is to be developed by Barratt Homes with residential properties. The construction of approximately 198 No. residential properties is proposed during the second and third phases of works, featuring in the eastern half of the overall site. The redevelopment of the entire site will ultimately comprise approximately 322 No. residential properties in total. This surface water management plan has been prepared to provide a strategy to manage surface water and silt issues that may occur across the combined Phase 2 and Phase 3 site, and sits alongside the plan for the Phase 1 site. This is intended as a working/live document to be reviewed and amended as the site progresses.

SITE PERSONNEL AND DOCUMENTATION

The following measures are to be implemented to increase awareness and bring existing site documentation up to date:

- Ensure all subcontractors undertaking groundworks consider silt minimisation and management within their RAMS for the works.
- Undertake detailed site-based awareness training (toolbox talk) on surface water and silt management issues, for all site ground-working staff.
- Include a section relating to silt minimisation and protection within site induction folder.
- Undertake weekly site surface water checks throughout works and obtain support from the appointed environmental consultant if or when required.

SITE DESCRIPTION

The site is located off Chipping Lane in Longridge, at National Grid reference 360429, 437936. This plan refers to Phases 2 and 3 of the development, easterly adjacent to the Phase 1 development area. Prior to development, the site comprised agricultural grassland. Off the southern boundary of the site are residential properties, a garage/car wash and a supermarket.

The site slopes gently toward the west and toward the unnamed streams running through the site centre and along the northern boundary of the site.

The Geo-environmental Assessment undertaken on the site indicates the underlying geology to comprise predominantly clay soils.

NEARBY SURFACE WATERS

An unnamed stream runs through the centre of the eastern portion of Phase 2/3 (flowing north-westward), before turning sharply to the south-west and intersecting with an adjoining unnamed stream that runs along the north-western boundary of Phase 2/3 (flowing north-eastward). At the point of confluence, the stream then continues north-westward along the northern boundary of the

Phase 1 site and discharges further downstream via the culvert beneath the neighbouring Cricket Club. The stream then flows to the north and beyond to Higgin Brook.

Two drainage ditches are also present, one located along the north-eastern boundary of the Phases 2/3 site and a second located to the south of the central stream, both of which appear to contain water on occasion and drain toward the stream running through Phases 2/3.

PROPOSED DRAINAGE

The proposed site drainage layout (drawing number 459/ED/105 rev L, dated October 2021, Barratt Homes Manchester) indicates that surface water drainage will outfall into the unnamed stream at two locations. Plots situated to the east of the stream that runs through Phases 2/3 (eastern end of Roads 10, 12, 13, 17 and 18) will outfall via the northern boundary, immediately downstream of the Road 17 stream crossing (adjacent to Detention Basin 3). The outfall will be fitted with a flow control device (manhole S414) and attenuation storage has been provided in oversize drainage pipes and an offline pond (Detention Basin 3 – volume 160m^3). Plots to the west of the stream (majority of the Phases 2/3 development) will outfall in the north-western corner of Phases 2/3, at a location centered between Detention Basin 2A and Detention Basin 2B. The outfall will be again fitted with a flow control device (manhole S324) and attenuation storage has been provided in oversize drainage pipes and via two offline ponds (Detention Basins 2A and 2B – volume 115m^3 and 190m^3 respectively). Plots to the south-west of the site (south of Road 10) will discharge surface water into the existing Phase 1 surface water sewer system at a location along the southern boundary along Road 9 (via manhole S27), situated toward the south-western corner of the Phases 2/3 development site. A flow control device (manhole S110) will again be fitted at the proposed discharge location.

EXPECTED RUNOFF

The combined Phase 2 and Phase 3 site gently slopes in a general westerly direction, and so surface water run-off will be likely be in the same direction, apart from where governed by local earthworks and/or determined by local topography. Runoff is expected to pool on site in places and will also flow toward the streams/ditches across and around the site, but also drain locally to the various road gullies of the proposed drainage system. Local flows are therefore expected to run downgradient to the west, toward the neighboring Phase 1 development site. Expected surface water flow directions are shown on the attached Figure 1.

Soils at the site comprise predominantly clay. Where clay soils are exposed at the surface it would be expected that infiltration will be limited, and water will flow across the surface. Such soils would have a high potential for the mobilisation of silt if disturbed when wet.

Owing to the presence of clay deposits at shallow depth, the development platform is considered to be clay rich and will likely contain a significant proportion of clay, with a particle size of between <0.002mm and silt (0.002-0.06mm size). These particle sizes readily mobilise to surface water when disturbed and can remain suspended within the water column for long durations.

Suspended clay/silt can therefore migrate significant distances in these types of ground conditions and are difficult to settle from the water column without the application of control measures.

Given the presence of clay soils groundwater entry into excavations is unlikely to be significant.

Field drains may be present across the site (as they were in Phase 1) and if encountered within excavations these could provide pathways for runoff from work areas to surface waters on and around the site. Encountering field drains could also result in water entry into excavations.

SENSITIVE RECEPTORS TO SILT

At this site, the receptors sensitive to silt include the following:

On-site:

- the future gullies, surface water drainage and foul water sewers proposed at the site
- residents in completed properties within the Phases 2/3 site
- unnamed stream running through the Phases 2/3 site

Off-site:

- unnamed stream running along northern boundary of Phase 1 and downstream reaches (Higgin Brook)
- cricket club to the west of the overall development site
- residents in completed properties within the Phase 1 area.

PROTECTION MEASURES WITHIN ACTIVE DEVELOPMENT AREA

The following protection measures will be implemented during development works to reduce the risks of silty runoff leaving site.

Initial Phase of Enabling/Preparatory Earthworks

1. adoption of a strip and build approach minimising the amount of topsoil and vegetation removed and the area of exposed soils.
2. where possible, retention of a thin strip of vegetation and topsoil adjacent to the stream on site.
3. phasing of the works to ensure surface water drainage works are prioritised to be undertaken as soon as practicable.
4. earthworks will be temporarily suspended during particularly wet weather.
5. provision of a road sweeper on site and adjacent road network. Frequency and duration of sweeper visits to be continually assessed by site management and increased during times of more frequent vehicle movements (e.g. muckshifts) and periods of inclement weather.

6. any grips dug to drain surface water from work areas will have silt mitigation installed so that the water cannot drain freely. Sandbags, straw bales and silt mats will be used (as appropriate) to slow and pool water and provide silt containment.
7. monitoring of the discharge when dewatering excavations to ensure it is visually free of silt. If silt is entrained, pumping will be via a settlement tank.
8. installation of silt protection measures (using a combination of silt matting, straw bales, silt wattles or similar) within outfall headwalls and the stream itself (subject to LLFA consent), to improve condition of the water by promoting silt settlement prior to discharging from site (see possible locations in Figure 1).
9. if necessary, installation of soil bunds or silt fencing to prevent surface flows to the stream and drainage ditches from surrounding work areas.
10. placement of stockpiled soils within a designated area away from surface watercourses, site boundaries and ditches.
11. as much as possible, minimising the movement of plant or other traffic in unsurfaced areas. Early installation of tarmac roads to provide clean access routes and use of physical barriers to restrict off-road access where necessary.
12. on site storage/availability of silt fencing (c. 100m - 1 roll), wooden stakes (or other method of fastening), silt matting (c. 5 per site), sandbags and a 50mm submersible pump to enable deployment at short notice if required (i.e. during inclement weather) and to facilitate on-going maintenance of potential installations.

Construction Phase

1. any temporary surface water discharge undertaken during the construction phase should comply with any discharge permit (gained from the Environment Agency EA) or discharge consent (gained from the lead local flood authority LLFA) and may be subject to be undertaken under a bespoke EA permit application.
2. the site may temporarily discharge dewatering waters under the appropriate EA Regulatory Positional Statement (RPS) for a period of 3 months subject to the strict conditions of the EA positional statement. Any unconsented discharge or discharge not meeting the requirements of the EA RPS may be liable to enforcement action.
3. over-pumping into the constructed surface water drainage system i.e., any on-site temporary attenuation basin, or surface water sewer (when constructed). Adequate protection measures should be implemented (potentially comprising, but not limited to; use of filter bags on any pump inlet and outlet and passing water through either a settlement tank or silt capture system) to prevent discharge of silt into the constructed surface water drainage system and subsequently off-site. The implemented measures should be frequently monitored and maintained to prevent discharge of silt into the drainage system
4. any proposed pumping to ditches or water courses will need to be conducted under an EA RPS – https://www.gov.uk/government/publications/temporary-dewatering-from-excavations-to-surface-water. Following commencement of pumping the RPS is applicable for a period of 3 months and careful treatment of the water MUST occur to ensure the requirements of the Positional Statement are met. Records should be maintained to demonstrate compliance.

Non-compliance and/or discharge of silt water is likely to result in enforcement action being undertaken.

5. the placement of gully protection (straw) in all gullies in the construction and active development area, and to be inspected and replaced/cleaned when necessary
6. avoid tracking or washing out next to any drains/gullies
7. minimise the movement of plant on and off roads (including the roadside areas) to prevent the tracking of excess soil onto roads on site (planning of working day).
8. storage of materials in locations that have stoned or surfaced access. Provision of a temporary tarmac surface to storage, compound and car park areas.
9. the installation of hardstanding areas to the front of all plots to enable 'clean' forklift access and installation of hardstanding to other access routes as required during construction. Where practicable, clean stone used in preference to recycled aggregates (which tend to contain clay soils).
10. when dewatering excavations, monitoring of the discharge to ensure it is visually free of silt. If silt is entrained, it will be pumped via a settlement tank.
11. placement of stockpiled soils within designated areas as far as practicably possible from surface watercourses, ditches and drains/gullies. If required, the placement of a silt fence at the base of the stockpile to control runoff, seeding or turfing topsoil at the earliest opportunity to control surface run-off from completed areas.
12. regular scraping and sweeping of roads at the site, with the option to increase sweeping when necessary, such as during bulk earth movement and / or inclement weather.
13. maintain vigilance for unexpected contamination of soils and contain associated runoff or groundwater.
14. installation of silt protection measures (using a combination of silt matting, straw bales, silt wattles or similar) within outfall headwalls and the stream itself (subject to LLFA consent), to improve condition of the water by promoting silt settlement prior to discharging from site (see possible locations in Figure 1).
15. on site storage/availability of silt fencing (c. 100m - 1 roll), wooden stakes (or other method of fastening), silt matting (c. 5 per site), sandbags and a 50mm submersible pump to enable deployment at short notice if required (i.e. during inclement weather) and to facilitate on-going maintenance of potential installations.
16. general good housekeeping of the site with organised storage and waste/surplus materials removed quickly.

PROTECTION MEASURES WITHIN NON-ACTIVE DEVELOPMENT AREAS

1. Leaving topsoil and vegetation in place in areas not imminently due for development.
2. prevent the unnecessary movement of any plant within non-active development areas of the site, as this may cause soil disturbance and silt mobilisation. Use tape or barriers to restrict unnecessary access to areas of the site not undergoing development.
3. minimise movement of any plant into completed Phase 1 area to avoid tracking mud into developed, occupied areas.

4. seeding of any exposed soil and stockpiles in areas not scheduled for development in the near future to control surface run-off from completed areas.

MONITORING PROCEDURES AND RECORDS

The following monitoring procedures should be carried out on a weekly basis, or daily where specified, by the site team to enable continuous review of the measures listed above. A comprehensive record of the effectiveness of the system should be maintained to enable further review by any parties attending site:

1. inspection of all gullies to monitor for silty runoff entering the drainage network (a gulley inspection checklist is included in Appendix C)
2. maintenance, cleaning and replacement of gully protection and silt fences and silt matting as required
3. monitoring and inspection of the outfall in the north-west of the Phases 2/3 site (located between the proposed Detention Basins 2A and 2B) for any silty water flowing from the drainage outfall or within the stream
4. monitoring and inspection of the outfall where it discharges into the stream in the north of the Phases 2/3 site (located downstream of the Road 17 stream crossing) for any silty water flowing from the drainage outfall or within the stream
5. monitoring the condition of the identified receptors at strategic locations on a weekly basis and daily during periods of heavy rainfall, as identified in Figure 1
6. keeping a photographic log and the completion of a site inspection form (Appendix C) on a weekly basis, which will assist in documenting any changes on site and identifying any changes needed to the protection systems as the development progresses
7. calls to the appointed Environmental Consultant **(Arkaash Bennett - 07718 525 522)** will be made in the event of silty runoff breaching protective measures.

CONTACT DETAILS (to be used for support and advice)

RSK Environment Ltd	Arkaash Bennett	07718 525 522
RSK Environment Ltd	Neil Coyne	07880 312 400

Document Control			Document ref.
Date issued	07/03/2024	[redacted]	322495-R02 (00)
Date of rev 1		Summary of rev 1	
Date of rev 2		Summary of rev 2	
Date of rev 3		Summary of rev 3	

DO NOT SCALE FROM THIS DRAWING

N

Phase 1

Firwood Cl

Redwood Drive

Redwood Dr

Hazel Grove

Crumpax

M1 M2 M3 M4 M5 M6

Monitoring Location Rationale:

M1: Monitor the condition of the constructed site roads and gullies

M2: To monitor the condition of the installed silt mitigation measures and drainage flows from the Phase 2 site at the location of the proposed outfalls into the stream

M3: Monitor the condition of the water in the stream flowing off-site toward Phase 1

M4: Monitor the condition of the dam/weir in the stream

M5: Monitor the condition of the water in the stream as enters the site

M6: Monitor the condition of the water contained within the existing ditch

LEGEND

- Site boundary
- Detention Basins
- Ditches / Surface watercourses
- M1 Monitoring location
- Silt protection measures installed at outfall locations.
- Check dam/weir in stream
- Surface water drainage
- Foul water drainage
- Recommended line of silt fencing
- Anticipated direction of surface water runoff based on topography

Notes:

Base plan provided by Client
Drawing Ref.: Barret Homes- 459-ED-105_
Drainage Layout_AFU_Section 104

Rev	Date	Amendment	Drawn	Chkd	Appd
C01	07.03.2024	First Issue	BS	AB	AB

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Web: www.rsk.co.uk

Client: Barratt Homes

Project Name: Bowland Meadow, Longridge

Description: Surface Water Management Plan - Phase 2 & 3

Project ID	Drawing no.	Revision
322495	27601	C01

File name: 322495-HE-276-SS-D-C-27601-C01

Dimensions	Scale	Size
m	NTS	A1

APPENDIX A
INSTALLATION EXAMPLES

Retention of a wide vegetated buffer adjacent to a surface watercourse. Includes ‘step up’ from stripped to undisturbed ground which will help retain runoff and cause it to pool.

Placement of stone to the front of plots to create clean forklift access

APPENDIX A
INSTALLATION EXAMPLES

Installation of silt fencing to control run-off from an unsurfaced area

Placement of silt matting to capture settled silt downgradient within a surface watercourse (image courtesy of Frog Environmental)

APPENDIX A
INSTALLATION EXAMPLES

Silt matting installed along the base of an unsurfaced swale to capture settled suspended solids prior to discharge into a surface watercourse

APPENDIX A
INSTALLATION EXAMPLES

Silt Wattles utilised to separate clean and silty water within a watercourse
(image courtesy of Frog Environmental)

Silt Wattles utilised to intercept silt laden run-off on a road
(image courtesy of Frog Environmental)

APPENDIX A
INSTALLATION EXAMPLES

Silt Wattles utilised to intercept silt laden run-off from an unsurfaced slope
(image courtesy of Frog Environmental)

Silt fencing and straw bales installed across an inlet headwall within an attenuation basin, to promote settlement of silt within the concrete apron (where it can more easily be removed) prior to discharge into the attenuation basin. Coarse stone installed to dissipate flow and prevent scouring, and further promote settlement at the headwall.

APPENDIX A
INSTALLATION EXAMPLES

Silt fencing and straw bales installed across an outlet headwall within an attenuation basin, to promote settlement of silt within the basin prior to discharge into the surface watercourse

APPENDIX B
EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

Product:	Application	Manufacturer and product
Gulley Protection	Prevent construction debris and reduce silt entering the drainage system and blocking gully pots. Proprietary products often yield superior results to straw and terram and require less maintenance.	• Forest Group – Gully Guard • Hy-Tex – Ultra drain guards
Silt Fencing	Contain and attenuate water on site to promote settlement of silt within overland run-off.	• Frog Environmental – Silt Fence • Hy-Tex – Terrastop Silt Fence • Siltbuster – Silt Fence
Silt Matting	Capture settled silt as it naturally falls from suspension within watercourses, swales, attenuation basins to prevent its resuspension.	• Frog Environmental – Silt Mat • Hy-Tex – SediMat
Flocculant Treated Silt Matting	Capture settled silt within watercourses, swales, attenuation basins to prevent its resuspension. The addition of flocculant treatment encourages silt to settle out of suspension more readily. The Environment Agency must be consulted prior to utilisation of flocculants, and an environmental permit gained where required.	• Frog Environmental – Floc Mat
Silt Wattle	Used as check dams within watercourses / swales slowing the flow of water to promote settlement of silt. Typically used in conjunction with silt matting (or flocculant coated silt matting) to capture sediment that was caused to settle. Can also be used to separate silty and clear water (i.e. within attenuation basins, or watercourses), on slopes to reduce erosion from overland run-off or to divert silty water to collection areas (i.e. on roads to divert silty run-off away from gullies).	• Frog Environmental – Silt Wattle • Hy-Tex – Ultra Erosion Guard (suitable for use as a check dam to control erosion only, due to its different construction to the Frog Environmental Silt Wattle).
Filter socks/bags	Fitted to hose end during dewatering of excavations to collect sediment. Socks capable of dealing with smaller temporary volumes and lower flow rates and bags for larger flows and longer-term installations. Additional control measure only – unlikely to significantly reduce silt content.	• Hy-Tex – Pro-Tex Pipe Socks • Murlac – Silt Sock • Dirtbags UK – Utility Bag • Siltbuster – Siltstoppa Dewatering Bag
		•
Settlement Tanks	Settlement and capture of suspended solids during dewatering / over pumping works. Minimum practicable pump speeds should be used The unit required is dependent on the grain size of suspended particles, how quickly these settle from suspension, and the required flow rate. Liaison with the supplier is best undertaken to ensure a suitable product is selected. Can be used in conjunction with flocculants and coagulants to promote settlement, however the Environment Agency must be consulted prior to their utilisation, and an environmental permit gained where required.	• Siltbuster – wide range of settlement units available • Andrew Sykes Group – settlement tanks / Silt Away. • Dirtbags UK – Dirtbox

APPENDIX B
EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

GULLEY PROTECTION

The Gully Guard

Installation guide

1. Lever open gully grid. Gully Guard is designed to fit all size gullies.

2. Hold handles at top of the Gully Guard, work beads to top and insert base into water filled gully pot.

3. Lower the Gully Guard into the pot. The beads will fall freely into the void within the pot.

4. Tuck the holding handles to the side of the Gully Guard.

5. Close gully grid.

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Stardens Works, Tewkesbury Road,
Newent, Gloucestershire GL18 1LG
Tel: 01531 828960 Fax: 01531 828969
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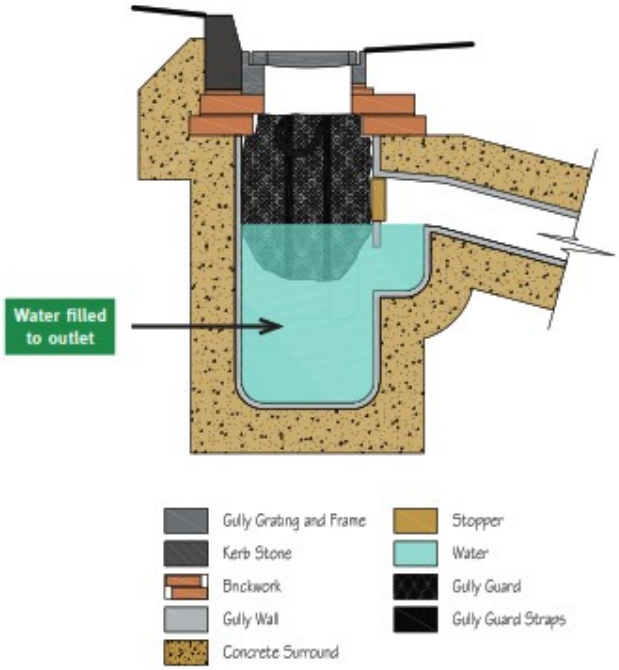
Patent no. 2472690

The Forest Group
High performance, versatile solutions

APPENDIX B
EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

The Gully Guard

Installation diagram



Maintenance

The Company (Forest Drainage Products) would recommend that an inspection procedure be put in place for the product by the organisation on a 3–4 months basis depending on site conditions.

Maintenance would simply involve the removal of the Product and power hose off in a bund to contain and manage silt and any contaminants prior to reinsertion back into the gully pot.

Without prior knowledge of the type and concentration of the contaminants that each Gully Guard has been subjected to, the Company cannot advise on appropriate disposal. The Company advises that an environmental risk assessment is conducted on an individual case-by-case basis to fully evaluate the nature of contaminants. In order to determine the appropriate method of disposal the Company would recommend that you follow your organisation's environmental waste disposal policy.

Forest Drainage Products Limited (the "Company")

Forest Drainage Products Ltd, Stardens Works,
Tewkesbury Road, Newent, Gloucestershire GL18 1LG
Tel: 01531 828960 Email: info@forestgroupuk.co.uk
www.forestgroupuk.co.uk

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High performance, versatile solutions

2019 / 69145

APPENDIX B
EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

SILT FENCING

frog environmental

product information sheet
Silt Fence
temporary silt control barrier

frog environmental supply Silt Fence and quarter cut 1.2 metre posts, ideal for providing support

Silt Fence is inexpensive to buy and install, but it must be correctly positioned and maintained for it to be an effective pollution control measure.

Each line of Silt Fence should be inspected on a regular basis, especially after rainfall.

If stakes are broken or gaps appear between the fence and the ground, then the fence should be re-trenched. Accumulated silt must be removed regularly from Silt Fence, typically when it reaches a third of the way up the fence.

Multiple smaller runs of silt fence are usually more effective at controlling pollution than longer lines.

Applications

- Silt Fence is deployed on construction sites to help prevent silt pollution in water bodies or from impacting public highways.
- Silt Fence provides a 'ponding' function; it allows silt laden water to collect behind it and for silt to drop out of suspension while the water slowly drains away or evaporates.
- Silt Fence is usually deployed in conjunction with other silt pollution control measures, especially on sites with clayey soils.

frog environmental Silt Fence is made from high specification geo-textile material and has medium porosity, making it suitable for use on most construction sites.

Poorly installed Silt Fence can cause erosion underneath or around the edges of fencing. This can lead to an increased silt pollution risk.

APPENDIX B
EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

Technical information — Silt Fence

Dimensions: 100 metres x 0.9 metres (single roll)

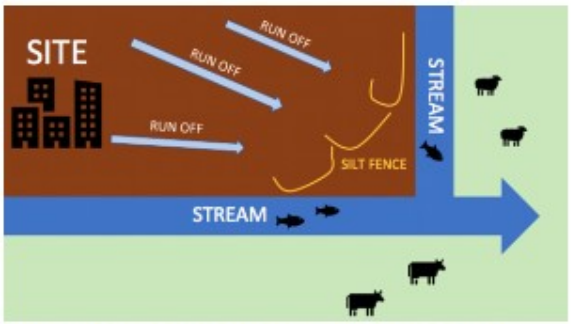
Dry Weight p/m: 110 g/m2 (9.9 kg single roll)

Permeability: 7 (l/m2 /sec)

Material used: tear resistant polypropylene geotextile, PFSC timber stakes (cable ties or staples/ nails to fix)

Function: creates a temporary fence to provide a pooling function that allows silt to drop from suspension

Disposal: all materials fully reusable or recyclable



Shorter J shaped runs of silt fence typically provide more effective pollution control than longer runs

Silt Fence can be used as a temporary measure to prevent muddy water escaping from construction sites

10 TIPS for successful Silt Fence deployments:

- Fence posts should be spaced a maximum of 1.5m apart
- Silt Fence should be trenched a minimum of 20cm into the ground and compacted
- Shorter 'J shaped' installations of Silt Fence act like mini-retention areas and are typically more effective than longer runs (as shown in the diagram above)
- Longer runs of silt fence will concentrate water in the lowest point, where the fence can become weakened and water can undercut or overflow the fence avoid these where possible
- Water flowing around the edges of silt fence can cause erosion and add to the pollution loading from site
- The lower part of the end of each run of silt fence should ideally be above the top of the middle section of the run
- Removal of accumulated silt and regular inspection are key maintenance activity for silt fence. A named individual should be responsible for this action on site
- Silt fences are not designed to handle continuous high volume flows and will not be an effective stand-alone control in these circumstances
- Factors such as soil type, slope angle and slope length are key factors in determining how much silt fence is needed on site
- If ground conditions are clayey Silt Fence alone is unlikely to be an effective pollution control

for technical support and sales of Silt Fence contact frog environmental

0345 057 4040

info@frogenvironmental.co.uk

www.frogenvironmental.co.uk

@frogenv

Wales: Llanwrda, Dyfed SA19 8NA

Midlands: The Byre, Blakenhall Park, Barton Under Needwood, Staffordshire, DE13 8AJ

APPENDIX B
EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

SILT MATTING

frog environmental

product information sheet
SiltMat
silt capture mat

SiltMat is a fully biodegradable mat that captures and prevents sediment resuspension.

The mats can be placed in natural or artificial channels, ditches or directly on land to trap suspended sediments.

SiltMat can be orientated sideways or lengthways and fits into all channel types.

SiltMats are used to manage sediment release to watercourses from construction sites and for capturing silts suspended by in channel or works on river banks.

Applications

- Silt control from construction sites
- Silt control from river or bank works
- Deployed in rivers, streams and ditches
- Deployed in Silt Capture Channels
- Used in forestry and agricultural applications

SiltMat is proven in the field to reduce downstream levels of suspended solids

APPENDIX B
EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

Technical information — SiltMat

Dimensions: 2 x 1 x 0.12 metres

Dry Weight: 12kg per mat

Material used: coir (80%) jute (20%)

Function: Captures and prevents resuspension of silt

Performance: Single mat captures up to 40kg of silt

Disposal: Fully biodegradable, with correct permissions used mats can be disposed ofland.

four step guide to using SiltMats

Use our reference table (below) to judge optimal placement. As a rule of thumb, SiltMat is best placed in areas where stream energy is reduced and natural deposition takes place.

SiltMat is unfolded and orientated to cover the width of the channel. The edges of silt mat can be overlaid without gaps. Mats are staked in place or weighted with local material.

SiltMat will trap large amounts of sediment. Stakes or weights are removed and the mats rolled up ready for disposal.

With correct permission SiltMat can be seeded and left on site, creating an environmental enhancement and avoiding disposal costs.

Reference table showing the distance that different particle sizes travel at differing water velocities

Particle Size	Water Speed (m/s)				
	0.2	0.4	0.6	0.8	1
Fine Gravel	20 cm	40 cm	60 cm	80 cm	1 m
Sand	70 cm	1.4 m	2.1 m	2.8 m	3.5 m
Fine Sand	8 m	17 m	25 m	33 m	40 m
Silt	228 m	456 m	683 m	911 m	1139 m

for technical support and sales of
Silt Wattle contact frog environmental
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Wales: Llanwrda, Dyfed SA19 8NA
Midlands: The Byre, Blakenhall Park, Barton Under Needwood, Staffordshire, DE13 8AJ

APPENDIX B
EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

FLOCCULANT TREATED SILT MATTING

frog environmental

product information sheet
Floc Mat™
water treatment mat

Floc Mat™ is a versatile silt control device

A mat created to treat and capture fine silts and suspended particles in construction site run off.

The main function of the mat is to flocculate very fine particles, making them easier to separate from water.

Floc Mats can be laid flat out in dispersion fields, used with Silt Wattles or silt fence and deployed in the frog environmental Silt Capture Channel as part of a versatile water treatment process to remove silt from construction site run off.

Applications

- In a Silt Capture Channel
- With Silt Wattles and SiltMats
- In site ditches and low flow channels
- In combination with silt fence
- On natural dispersion fields
- In combination with dewatering bags and silt socks

- **Floc Mat™ is a fully biodegradable water treatment and silt capture mat that treats muddy water and helps prevent silt pollution**
- **They are a cost effective way of treating water in ditches and channels, without the need for pumps – saving energy and CO_2**

APPENDIX B
EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

Technical information — FlocMat™

Dimensions: 2x1 x 0.10m

Variants: FM1 (30g/m2), FM2 (100g/m2) FM0(untreated)

Active ingredient: Water Lynx™

Dry Weight: 12 kg per mat

Material used: coir fibres, coir netting, coir rope, anionic flocculant, water

Function: Water treatment – aids solid water separation. Can be used to segregate low flow channel to in bankside works.

Performance: Single mat captures up to 50kg of silt in live test

Disposal: Fully biodegradable, suitable for re-use on site (with correct permit).

Waste classification and disposal legislation must be followed at all times. Always liaise with the regulator before deploying a product containing flocculant. If in doubt contact frog environmental on 0345 0574040 for further information and advice.

Close up FlocMat showing accretion of silt

Deployed in Silt Capture Channels with Silt Wattles

100% sustainably sourced natural fibres are used to create Floc Mat, this ensures the mats are biodegradable and suitable for use as backfill material once used, reducing waste disposal costs. Floc Mat is available in treated and untreated forms.

The fibres of the treated version of Floc Mat are coated with Water Lynx™, a non-hazardous, non-toxic, synthetic anionic polymer which contains no coagulants, cations or metals such as Al and Fe that are ecotoxic.

When deployed in a Silt Capture Channel the Floc Mat provides a safe, low carbon and easy solution to support the removal of suspended solids and associated pollutants from construction site run off.

Deployed to treat muddy excavation water

for technical support and sales of
Silt Wattle contact frog environmental
0345 057 4040
info@frogenvironmental.co.uk
www.frogenvironmental.co.uk
@frogenv

Wales: Llanwrda, Dyfed SA19 8NA
Midlands: The Byre, Blakenhall Park, Barton Under Needwood, Staffordshire, DE13 8AJ

APPENDIX B
EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

SILT WATTLE

frog environmental

product information sheet
Silt Wattle
silt control sausage

Silt Wattles are a versatile silt control device.

They are deployed on building sites to control movement of suspended silt and in ditches, channels and streams to slow the flow and naturally capture silt.

Silt Wattles are often deployed with frog environmental SiltMats and FlocMats as part of a silt pollution prevention strategy.

Applications

- Silt Wattles can be used to reduce silt release into watercourses from construction sites and deployed directly in channel to reduce movement of suspended silts.
- The tough exterior netting means they can be left for months on site with out degradation, whilst the biodegradable treated wood fibre continues to slow the flow and trap silt particles.
- Silt Wattles mould to the shape of the river bed or ground and can be joined end on end or pyramided to help clean dirty water.
- Wattles are highly versatile and can be weighted or staked in position depending on bed/ground conditions and flows.
- Silt Wattles can be joined end of end to create temp low flow channel and protect rivers from pollution arising from bank works.

Silt Wattles are a versatile product suitable for use in a wide range of silt control applications on construction sites and in river works

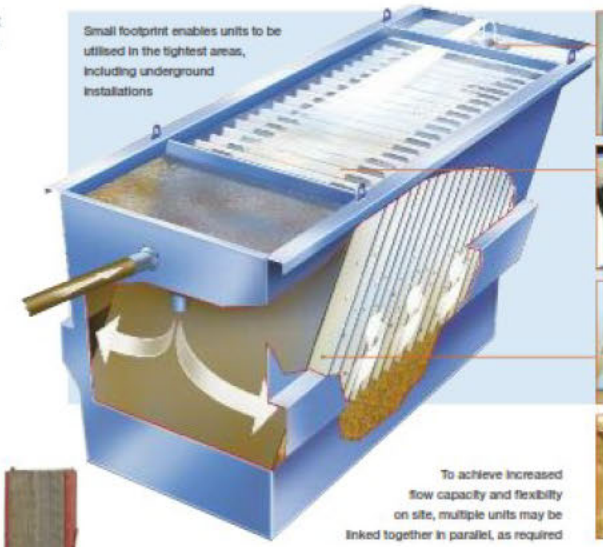
SETTLEMENT TANKS

Siltbuster®

Gravity Settlement ▸ Siltbuster Settlement Units & Water Clarifiers

Siltbuster is the UK's leading provider of mobile settlement units and Lamella Clarifiers. Each unit in the extensive range is specifically designed to remove suspended solids and settleable matter from silt and solids laden surface run-off and groundwater.

Effective gravity based solid/liquid separation requires the largest possible settlement area and optimum hydraulic flow. Siltbuster Clarifiers utilise lamella plate technology to maintain ideal settlement conditions within each unit, thereby, ensuring maximum particle settlement and minimum unit footprint.



Small footprint enables units to be utilised in the tightest areas, including underground installations

To achieve increased flow capacity and flexibility on site, multiple units may be linked together in parallel, as required

Innovative outlet design maintains flow even when the unit is not exactly level

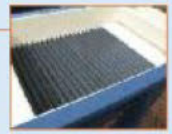
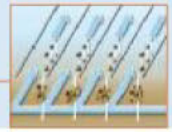


Plate technology and configuration hugely increases settlement area. Plates are designed for easy handling



Flow distribution has been designed to meet the rigours of the modern construction site

Emptying can be achieved by a range of methods, e.g. via drain ports & valves, vacuum tanker or by manual or mechanical means

Siltbuster mobile clarifiers are robust; skid-mounted; compact and lightweight, making them simple to transport, install and operate. They are ideal for sites with limited access, restricted spaces and temporary projects.
Hopper bottomed units can be fitted (on request) with an automatic sludge removal system making their operation virtually maintenance-free.

Typical applications

Construction

- Pumping & de-watering
- Groundwater treatment
- Site run-off treatment
- Drilling, piling & coffer dams
- In-river & near-river works
- De-silting & dredging
- Roads, pipelines & other linear projects
- Plant, vehicle & wheel washing
- Site water management

Silt Management

www.siltbuster.com

The Siltbuster Mobile Range

Siltbuster offers a range of various sized units to provide customers with flexibility and the opportunity to hire or purchase a tailored, yet off the shelf, solution.

The Mobile Range, Size Comparison

					
	FB50	**HB10**	**HB20**	**HB40R**	**HB50**
	Flat-bottomed, skid-mounted unit. The Construction Industry's favourite	Hopper-bottomed, skid-mounted unit	Enlarged version of HB10. Increased flow rate and sludge storage. Batch or continuous sludge draw-off	Hopper-bottomed, skid-mounted unit	Performance of the FB50 but with twin hoppers for larger capacity, primary thickening applications and batch or continuous sludge draw-off
	Height: 1.9m	Height: 2.1m	Height: 2.6m	Height: 3.1m	Height: 3.1m
	Length: 3.7m	Length: 1.9m	Length: 2.5m	Length: 3m	Length: 3.7m
	Width: 1.45m	Width: 0.9m	Width: 1.2m	Width: 2.2m	Width: 1.7m
	Effective Settlement Area: 50m²	Effective Settlement Area: 10m²	Effective Settlement Area: 20m²	Effective Settlement Area: 40m²	Effective Settlement Area: 50m²
	Dry Weight: 1,960kg	Dry Weight: 510kg	Dry Weight: 1,120kg	Dry Weight: 2,480kg	Dry Weight: 2,370kg
	Inlet: 4" bauer	Inlet: 2" bauer	Inlet: 3" bauer	Inlet: 4" bauer	Inlet: 4" bauer
	Outlet: 6" bauer	Outlet: 3" bauer	Outlet: 4" bauer	Outlet: 6" bauer	Outlet: 6" bauer
	Typical Operating Capacity: 1-50m³/hr	Typical Operating Capacity: 1-10m³/hr	Typical Operating Capacity: 1-20m³/hr	Typical Operating Capacity: 1-40m³/hr	Typical Operating Capacity: 1-50m³/hr

The benefits

- Readily transportable, fast and simple to setup, easy to operate.
- Small footprint units with large settlement area
- Unique design enables rapid particle settlement and water clarification
- Up to 20 times more efficient than conventional settlement tanks and lagoons of the same plan area
- Choice of unit sizes and capabilities to suit most applications
- Units can be used individually or linked to accommodate a wide range of flows, pump sizes and particle charcteristics

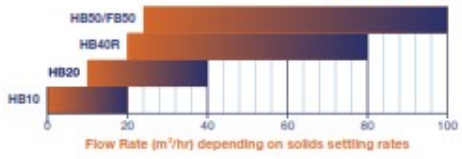
Options & Process Add-ons

Total Water Treatment Solutions

Siltbuster Clarifiers can be configured as single or multiple units for basic gravity separation and discharge-to-sewer applications. They can also be supplied as part of a complete, tailored, packaged treatment solution – including ancillary equipment, such as:

- Lids, covers, walkways & access platforms
- Flow splitter valves, flow meters & flanged ports
- Automatic, flow proportional, single or multi-stage chemical pre-treatment
- Fully containerised dosing systems
- Flash mixers
- Pipe flocculators or mixing/aging tanks
- Automatic desludging systems
- Sludge pumps & sludge storage tanks
- De-watering systems

Siltbuster Mobile Clarifier Operating Range



For hire, sales or more details call Siltbuster on 01600 772256

APPENDIX C
INSPECTION AND MONITORING PROFORMAS

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GULLEY INSPECTION CHECKLIST
SITE: Bowland Meadow, Longridge

Date	Gully no	Fit for purpose (yes/no)	(if no: action required, clean / replace?)	Comment	Signature

SITE INSPECTION CHECKLIST
SITE: Bowland Meadow, Longridge

Name of person undertaking inspection: .....
Date: .....
Current weather conditions: .....

Description	Comments	Action	Initial
1) What is the current condition of the gully protection measures within the active areas of the site? *Note any gullies requiring maintenance measures*			
2) Are site roads clean and relatively free of mud? Is the frequency of visits by the road sweeper adequate? *Consider whether additional visits should be scheduled.*			
3) Are there currently unsurfaced areas being trafficked which may be causing silt to enter the site drainage? *Note if additional measures are required to reduce the run-off from these unsurfaced areas.*			
5) Are control measures in place to prevent silt run-off from unsurfaced areas and soil stockpiles? *Note if the control measures are adequate and whether the increased runoff requires an increase in the frequency of inspection of any control measures.*			

6) What is the current condition of water within the on-site swales? *Note any discolouration of the water or obvious sign of sediment within the water.*			
7) What is the current water condition of the discharge flowing off-site via the culvert beneath Formby Bypass? *Note any discolouration of the water or obvious sign of sediment within the water.*			
8) Is any off-site run-off occurring? *Note whether any run-off is occurring – considered most likely to occur at the southern and western boundaries.* *Note any control measures in place.*			
9) Is there any dewatering of excavations taking place on site? *Note what activities are taking part and their location.* *Note any control measures in place.*			

Notes and actions to be taken:

Completed by	Name	Signature	Date
Site Manager			

MONITORING POINT INSPECTION RECORD
SITE: Bowland Meadow, Longridge

Name of person undertaking inspection: .....

Date: .....

Current weather conditions: .....

Monitoring Location	Monitoring Location Rationale	Inspection Record	Action required	Initial
M1	Monitor the condition of the constructed site roads and gullies			
M2	To monitor the condition of the installed silt mitigation measures and drainage flows from the Phase 2 site at the location of the proposed outfalls into the stream			
M3	Monitor the condition of the water in the stream flowing off-site toward Phase 1			
M4	Monitor the condition of the dam/weir in the stream			
M5	Monitor the condition of the water in the stream as enters the site			
M6	Monitor the condition of the water contained within the existing drainage ditch on-site			

Completed by	Name	Signature	Date
Site Manager			