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Sustainable Drainage System (SuDS) Management Strategy

Land at Ayr Road (Phase 2), Cheadle
Project No. 882655

LUKE STEEDMAN

RSK LAND & ENGINEERING
14 Beecham Court, Wigan, WN3 6PR

**Sustainable Drainage System
(SuDS) Management Strategy
For Surface Water Drainage
System
Ayr Road (Phase 2), Cheadle**

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1.0 INTRODUCTION

The proposed housing development, located at Ayr Road, Cheadle is served mainly by a conventionally adopted surface water drainage system. However, the scheme does include a combination of sustainable drainage systems (SuDS), integrated into the conventional aspects.

The Persimmon Homes development will consist of 135 number residential plots, comprising a mixture of detached and semi-detached dwellings. These are highlighted on the Adoptable Drainage Layout, in Appendix 2.

2.0 SURFACE WATER DRAINAGE COMPONENTS

- Underground Oversized Pipes: a system of linked, oversized attenuation pipes is provided within the development, with flows restricted using vortex flow control. The pipes and associated manholes are located mainly but not exclusively, under the adopted estate roads and will be operated and maintained by Severn Trent (or other Sewerage Undertaker) under a S104 Agreement.
- Permeable Surfacing (Private Drives / Shared Driveways): Permeable surfacing is to be utilised site wide in both private and shared driveways. Flows collected from the permeable systems will connect into the private drainage system. In the case of permeable surfacing failing, lateral drains/gullies are shown. Private driveways are to be block paved with shared drives asphalt. The maintenance responsibilities for both private driveways and shared driveways are to be that of the homeowner. See Persimmon drawing ARCH/MDP/PH2 Rev W for further information.
- Off-line Attenuation Basin (Pond): a large off-line attenuation basin is proposed in the open space in the East of the development. The basin is not proposed for adoption under a S104 Agreement and will be operated and maintained by an appointed Management Company. This will include the associated proposed inlet, which continues, until the adopted flow control device found at S23.
- Underground Off-Line Geo - Cellular Storage: There is a requirement for off-line cellular storage in addition to the attenuation stated above. Excess volumes in higher return period rainfall events (greater than 1 in 30-year return period) will be temporarily stored in off-line, underground cellular storage that will return flows to the wider drainage system when levels fall. The cellular storage does not have any other inlets and are not designed to accept flows from sources other than the adopted drainage network.

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3.0 SUDS OWNERSHIP RESPONSIBILITY

- As detailed above, all the underground, oversized pipes, manholes and flow controls will be adopted under a S104 Agreement with Severn Trent (or other Sewerage Undertaker).
- The off-line attenuation basin will be adopted by a management company. Maintenance responsibility will fall solely to the appointed Management Company, as part of the maintenance of the surrounding open space.
- Permeable surfacing components located in the curtilage of individual dwellings and shared drives are the sole responsibility of the homeowners. An appointed Management Company will **NOT** be responsible for the operation and maintenance of any such SUDS component.
- The underground Geo-cellular Storage tank is in Private Driveways and will be maintained by an appointed Management Company (details to be confirmed when available)
- The management company will assume responsibility for maintenance of the system from completion of the final plot, until this time, Persimmon Homes will be responsible for maintenance.
- Should any maintenance or pollution incidents occur, residents should contact the management company using the contact details (to be provided when available).
- As detailed above, the Geo-cellular Attenuation tank is located under a private driveway and is therefore freely accessible from the adjacent adopted highway, property deeds will allow access for the management company to undertake maintenance.

4.0 OPERATION AND MAINTENANCE REQUIREMENTS

As with all traditional drainage systems, SuDS need to be inspected and maintained Regularly, to ensure they operate correctly and efficiently. If SuDS are not properly maintained, then there is a risk that the components become overloaded during periods of prolonged heavy rainfall, potentially resulting in localised flooding within the development. Recommendations for the maintenance of the SuDS components are detailed in the following section.

Should an issue or maintenance query arise then the contact details for Persimmon Homes Customer Service team is:

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Nwst.custcare@persimmonhomes.com, 0161 746 3730 normal office hours & 03330 156620 out of hours emergency.

Persimmon Homes Customer Care team are to be contacted until the management company (details TBC) have taken over, at which stage persimmon homes will pass on all details to the customers and make them aware of the change of responsibility.

As part of this process, it is recommended that inspection and maintenance records are retained by the appointed Management Company, to track the progressive performance of the SuDS over time. The inspection records should include the following:

- Sediment condition and depth
- Water observations (sheen, smell, etc.)
- Unscheduled maintenance needs
- Components that do not meet performance criteria and require maintenance
- Common problem areas, solutions and general observations
- Aesthetic conditions

For Health and Safety reasons as well as practicality, SuDS systems should be maintained during periods of dry weather wherever possible. Adhering to the recommended maintenance regimes outlined below will minimise the risk of maintenance activities being required when a fault becomes apparent, usually during a rainfall event.

A typical inspection and maintenance record is shown below:

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4.1 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 or manufacturer's recommendations - pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment
Occasional maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphosate applied directly into the weeds by an applicator (not spraying)	As required - once per year on less frequently used pavements
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm of the level of the paving	As required
	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 to 15 years or as required (if infiltration 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 48h after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

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4.2 Detention Basins

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Remove litter and debris	Monthly
	Cut grass - for spillways and access routes	Monthly (during growing season), as or required
	Cut grass - meadow grass in and around basin	Half yearly (spring - before nesting season, and autumn)
	Manage other vegetation and remove nuisance plants	Monthly (at start, then as required)
	Inspect inlets, outlets and overflows for blockages, and clear if required	Monthly
	Inspect banksides, structures, pipework etc for evidence of physical damage	Monthly
	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies.	Monthly (for first year), the annually or as required
	Check any penstocks and other mechanical devices	Annually
	Tidy all dead growth before start of growing season	Annually
	Remove sediment from inlets, outlet and forebay	Annually (or as required)
	Manage wetland plants in outlet pool - where provided	Annually
Occasional Maintenance	Reseed areas of poor vegetation growth	As required
	Prune and trim any trees and remove cuttings	Every 2 years, or as required
	Remove sediment from inlets, outlets, forebay and main basin when required	Every 5 years, or as required (likely to be minimal requirements where effective upstream source control is provided)
Remedial actions	Repair erosion or other damage by reseeding or re turfing	As required
	Realignment of rip-rap	As required
	Repair/rehabilitation of inlets, outlets and overflows	As required
	Relevel uneven surfaces and reinstate design levels	As required

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4.3 Operation and maintenance requirements for watercourse

Maintenance schedule	Required action	Typical frequency
Regular Maintenance	Remove litter and debris	Monthly (or as required)
	Cut the grass - public areas	Monthly (during growing season)
	Cut the meadow grass	Half yearly (spring, before nesting season, autumn)
	Inspect marginal and bankside vegetation and remove nuisance plants (for first 3 years)	Monthly (at start, then as required)
	Inspect inlets, outlets, banksides, structures, pipework etc for evidence of blockage and/or physical damage	Monthly
	Inspect water body for signs of poor water quality	Monthly (May-October)
	Inspect silt accumulation rates in any forebay and in main body of the watercourse and establish appropriate removal frequencies; undertake contamination testing once build- up has occurred to inform management and disposal options	Half yearly
	Clear and maintain GRIPS to watercourse to maintain overland flow routes	Annually
	Hand cut submerged and emergent aquatic plants (at minimum of 0.1m above pond base; include max 25% of pond surface)	Annually
	Remove 25% of bank vegetation from water's edge to minimum of 1m above water level	Annually
	Tidy all dead growth (scrub clearance) before start of growing season (Note: tree maintenance is usually part of overall landscape management contract)	Annually
	Remove sediment from any forebay	Every 1-5 years, or as required
	Remove sediment and planting from one quadrant of the main body of ponds without sediment forebays	Every 5 years, or as required
Occasional maintenance	Remove sediment from the main body of big ponds when pool volume is reduced by 20%	With effective pre-treatment, this will only be required rarely, e.g. every 25-50 years
Remedial actions	Repair erosion or other damage	As required
	Replant where necessary	As required
	Aerate watercourse when signs of eutrophication are detected	As required
	Realign rip-rap or repair other damage	As required
	Repair/rehabilitate inlets, outlets and overflows	As required

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4.4 Catchpit Manhole

Maintenance schedule	Required action	Typical frequency
Occasional maintenance	Remove litter, debris, and detritus that enters the drainage system	Annually, or as required
	Inspect inlets, outlets and overflows for blockages, and clear if required	Annually, or as required
	Inspect inlets and sump for silt accumulation, establish appropriate silt removal frequencies	Annually, or as required
Remedial actions	Remove and dispose of silt	Annually, or as required
	Remove and dispose of oils or petrol residues using safe standard practices	Annually, or as required

4.5 Sewer Mains

Maintenance schedule	Required action	Typical frequency
Monitoring & Occasional maintenance	CCTV Survey pipe network to check system is functioning correctly and that there are no cracks in the pipework.	Every 5 years
	Removal of blockages reported in the pipe network will also require a full CCTV Survey of the pipe network afterwards to confirm there are not any other blockages.	As required

4.6 Land Drain

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Remove litter (including leaf litter) and debris from land drain surface, access chambers and pre-treatment devices	Monthly or as required
	Inspect land drain surface, inlet/outlet pipework and control systems for blockages, clogging, standing water and structural damage	Monthly
	Inspect pre-treatment systems, inlets and perforated pipework for silt accumulation, and establish appropriate silt removal frequencies	Six monthly
	Remove sediment from pre-treatment devices	Six monthly or as required
Occasional maintenance	Remove or control tree roots where they are encroaching the sides of the land drain, using recommended methods (e.g. NJUG, 2007 or BS 398:2010)	As required
	At locations with high pollution loads, remove surface geotextile and replace, and wash or replace overlying filter medium	Five yearly or as required
	Clear, perforated pipework of blockages	As required

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4.7 Gullies & Linear Drainage Channels

Maintenance schedule	Required action	Typical frequency
Regular inspections	Remove litter, debris, and detritus that enters the gullies or linear drainage channels	Six monthly, or as required
	Inspect inlets and outlets for blockages, and clear if required	Six monthly, or as required
	Inspection of sump for silt accumulation, establish appropriate silt removal frequencies	Six monthly, or as required
Remedial actions	Remove and dispose of silt	Six monthly or as required
	Remove and dispose of oils or petrol residues using safe standard practices	Six monthly or as required

4.8 Headwall

Maintenance schedule	Required action	Typical frequency
Occasional Monitoring & Maintenance	Check for cracking or other damage to headwall structure	Annually or as required
	Check for erosion of the spillway	Annually or as required
Remedial actions	Repair cracking or other damage to headwall structure	As required
	Repair excessive erosion of spillway if it detrimentally affects	As required

4.9 Hydrobrake Manhole

Maintenance schedule	Required action	Typical frequency
Occasional	Remove litter, debris, and detritus that enters the drainage system	Six monthly, or as required
	Inspect inlets, outlets and overflows for blockages, and clear if required	Six monthly, or as required

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maintenance	Inspection Hydrobrake bypass door, open and close door, greasing of door to prevent mechanism from seizing	Six monthly, or as required
Remedial actions	Replace components of Hydrobrake if faulty in line with manufacturers guidance.	As required
	Replace entire Hydrobrake if components cannot be replaced in accordance with manufacturers guidance.	As required

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Offline Attenuation Basin (Pond)

As detailed above, flows will enter the SuDS basin and will return into the surface water system **ONLY** when levels allow. There will be no other connections direct to the attenuation basin. The SuDS basin will be in an area of open space and maintenance of the system will therefore be undertaken in conjunction with the regular maintenance of the area.

The following operation and maintenance requirements refer to the recommendations in The SUDS Manual (CIRIA C753) and from the manufacturer. Regular inspection and maintenance are required to ensure the effective long-term operation of above ground storage systems.

A large off-line attenuation basin is proposed in the open space in the East of the development. The basin is not proposed for adoption under a S104 Agreement and will be operated and maintained by an appointed Management Company. This will include the associated proposed inlet, which continues, until the adopted flow control device found at S23.

Permeable Surfacing

As detailed above, permeable surfacing is to be utilised site wide in both private and shared driveways. Flows collected from the permeable systems will connect into the private drainage system. The maintenance responsibilities for private driveways and shared driveways are to be that of the homeowner and **WILL NOT** be maintained by an appointed Management Company.

The following operation and maintenance requirements refer to the recommendations in The SUDS Manual (CIRIA C753) and from the manufacturer. Regular inspection and maintenance are required to ensure the effective long-term operation of above underground storage systems.

Offline Underground Geo-Cellular System

As detailed above, flows will enter and leave the Cellular system **ONLY** from the adopted surface water drainage system via a catch-pit manhole; there will be no private drainage connections direct to the system. The cellular units will be wrapped in an impermeable geotextile to ensure water from the surrounding ground cannot enter the system. The cellular storage unit will be located within a private drive and maintenance of the system will therefore be undertaken in conjunction with the regular maintenance of the area.

The following operation and maintenance requirements, refer to the recommendations in The SUDS Manual (CIRIA C753) and from the manufacturer. Regular inspection and maintenance is required to ensure the effective long-term operation, of the underground storage system.

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Land Drain

A land drainage run is proposed adjacent to the northern boundary which is designed to convey exceedance flows from offsite in critical events. The following operation and maintenance requirements refer to the recommendations in The SUDS Manual (CIRIA C753) and from the manufacturer. Regular inspection and maintenance is required to ensure the effective long-term operation of the underground storage system.

APPENDICES

Inspection Checklist

General information			
Site ID			
Site location and co-ordinates (GIS if appropriate)			
Elements forming the SuDS scheme		Approved drawing reference	
Inspection frequency		Approved specification reference	
Type of development		Specific purpose of any parts of the scheme (e.g. biodiversity, wildlife and visual aspects)	

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Inspection Date	Details	Y/ N	Action required	Date completed	Details	Y/ N	Action required	Date completed
General inspection items								
Is there any evidence of erosion, channelling, ponding (where not desirable) or other poor hydraulic performance?								
Is there any evidence of accidental spillages, oils, poor water quality, odours or nuisance insects?								
Have any health and safety risks been identified to either the public or maintenance operatives?								
Silt/Sediment accumulation								
Is there any sediment accumulation at inlets (or other defined accumulation zones such as the surface of filter drains or infiltration basins and within proprietary devices)? If yes, state depth (mm) and extent. Is removal required? If yes, state waste disposal requirements and confirm that all waste management requirements have been complied with (consult environmental regulator)								
Is surface clogging visible potentially problematic where water has to soak into the underlying construction or ground (e.g. underdrained swale or infiltration basin)?								

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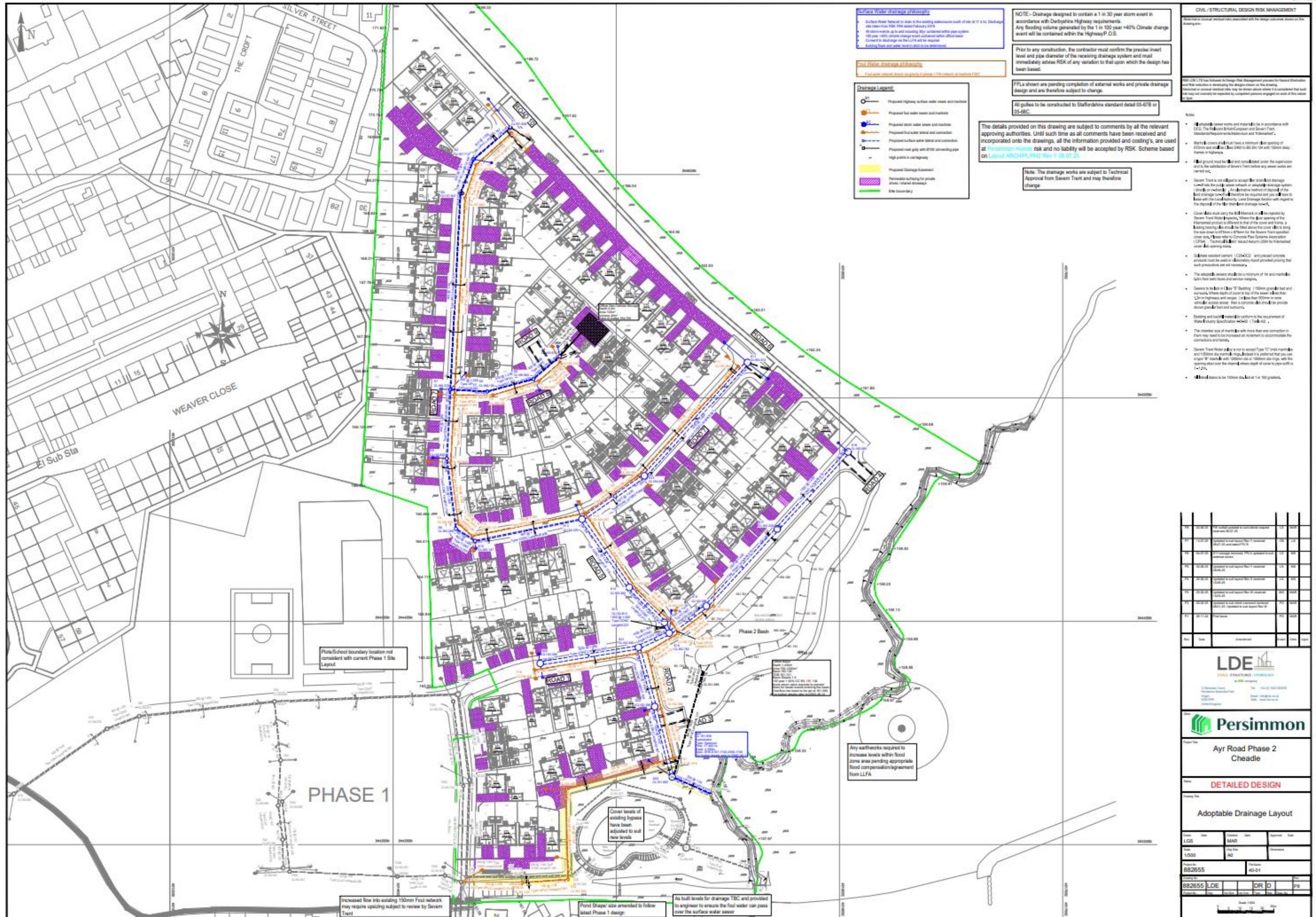
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Inspection Date	Details	Y/ N	Action required	Date completed	Details	Y/ N	Action required	Date completed
	Does permeable or porous surfacing require sweeping to remove silt?							
	Is there evidence of litter accumulation in the system? If yes, is this a blockage risk?							
	Is there any evidence of any other clogging or blockage of outlets or drainage paths?							
	Is the vegetation condition satisfactory (density, weed growth, coverage etc)? (check against approved planting regime)							
	Does any part of the system require weeding, pruning or mowing? (check against maintenance frequency state in approved design).							
	Is there any evidence of invasive species becoming established? If yes, state action required							
	Are any check dams or weirs in good condition?							
	Is there any evidence of any accidental damage to the system (e.g. wheel ruts?)							
	Is there any evidence of cross connections or other unauthorised inflows?							
	Is there any evidence of tampering with the flow control?							
	Are there any other matters that could affect the performance of the							

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Inspection Date	Details	Y/ N	Action required	Date completed	Details	Y/ N	Action required	Date completed
system in relation to the design objectives for hydraulic, water quality, biodiversity and visual aspects?								
Other observations								
Information appended (e.g. photos)								
Continue as current Increase maintenance Decrease maintenance								
Proposed date for next inspection								

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