

## APPENDIX C - Surface Water Management: Interim Guidance for Developers

*Note: This document forms an appendix to the Surface Water Management: Interim Guidance for Developers, which can be viewed on Shropshire Council's website. For details of submission requirements, refer to Section 7 of this document.*

### **SURFACE WATER MANAGEMENT PLAN**

A Surface Water Management Plan is required to accompany applications for all development within a medium or high risk surface water area and all major development proposals (10 or more dwellings or 0.5 hectares or more for residential development and 1,000m<sup>2</sup> or more for non residential)

#### **1. Provide evidence of your investigations into the existing sources of flooding on the proposed development site?**

**e.g.: consultation with the Environment Agency, Shropshire Council Flood and Water Management Team and relevant water company**

A Flood Risk Assessment and Drainage Strategy Report have been prepared by Eastwood Consulting Engineers (48888-ECE-XX-XX-RP-C-0001, 4888-ECE-XX-XX-RP-C-0002) which reviews various data sets and highlights any existing sources of flooding. A summary of the investigations is below.

##### **Environment Agency**

The Environment Agency's Flood Map for Planning and Long Term Flood Risk Maps have been reviewed to assess any existing sources of flooding (fluvial, tidal, surface water, reservoir).

##### *Fluvial and tidal:*

The site is recorded to lie within Flood Zone 1 (low risk).

##### *Surface water:*

The Environment Agency surface water flood risk map shows the majority of the site to be at very low risk of surface water flooding. There are two small isolated areas at low risk of surface water ponding, associated with topographic depressions. Following a review of the greenfield runoff within the wider catchment it is noted that surface water ponding in the south-east of the site is most likely from greenfield runoff within the site rather than from outside of the site. Very low risk refers to land having less than a 1 in 1,000 annual exceedance probability of flooding (0.1% AEP). Low risk refers to land having between a 1 in 1,000 and 1 in 100 annual exceedance probability of flooding (0.1% - 1% AEP).

#### *Reservoir:*

The whole site is recorded to lie outside of the maximum extent of flooding from reservoirs, even when there is flooding from rivers.

#### *Consultation:*

##### **Shropshire Council (LLFA)**

Shropshire Council have been consulted to determine whether there are any suitable watercourses near the site that can accept surface water discharge. A response received on 2<sup>nd</sup> May 2024 states the following:

- The Flood and Water Management Team do not have any watercourses shown on their mapping service; however, it is noted that not everything is mapped and it is recommended that a site survey is the only real way to determine what is present.

An additional email was sent to Shropshire Council to determine whether discharge to the public surface water sewer at the greenfield runoff rate would be acceptable in principle. Their response received on 19<sup>th</sup> September 2024 (Appendix 5) is summarised below:

- The surface water drainage design should be in accordance with Shropshire Councils SuDS Handbook.
- The SuDS Handbook stated that the peak flow should not exceed the peak greenfield runoff rate for the same event.
- Approval for the proposed discharge rate will be assessed as part of the planning application.

##### **Severn Trent Water**

Pre-planning advice has been received from Severn Trent Water; their reference 1112265 dated 4<sup>th</sup> April 2024. The main points of the advice are summarised below.

#### *Foul water:*

- The 150 mm foul sewer (MH SJ54373801) south of the site would be the most suitable connection point for the development.
- The network can accommodate flows, subject to a S106 submission.

Surface water:

- The surface water discharge hierarchy should be followed.
- Severn Trent Water expects all surface water from the development to be drained in a sustainable way to the nearest watercourse or land drainage channel, including highway drainage, subject to the developer discussing all aspects of the surface water drainage proposals with the Lead Local Flood Authority. The discharge rate to a watercourse or drainage ditch will be determined by the LLFA/ EA.
- Severn Trent Water will have to be satisfied that all sustainable options have been exhausted before allowing discharge to the public network.
- Sewer records show a watercourse that runs east and west of the site. It is advised to pursue a connection to this if feasible with flow rates to be agreed by the LLFA.

Additional correspondence was received from Severn Trent Water on 17<sup>th</sup> April 2024. A summary of the response is below:

- Foul water connection points are subject to S106 submission
- Once all SuDS options have been exhausted, including soakaways, a connection into the surface water sewer along Old Mill is a suitable connection point for your development. A connection is acceptable subject to a S106 submission. Please note that a connection at this location may involve crossing of third party land in which the appropriate consent must be sought.

An additional email was sent to Severn Trent Water to determine whether discharge to the public surface water sewer at the greenfield runoff rate would be acceptable in principle. Their response received on 2<sup>nd</sup> September 2024 (Appendix 4) is summarised below:

- Severn Trent Water confirm that they can accept flows for 5 l/s/ha for the whole site, equating to 17.61 l/s discharging into the surface water sewer at MH4805, subject to sustainable options being exhausted and a S106 application.

**2. Is the development site classed as:**

Greenfield

☒

Brownfield

☐

**3. What is the total area of the development site?**

40 500 m<sup>2</sup>

4. What is the area of hardstanding (impermeable surface) that currently exists on the development site?

0

5. What is the area of additional hardstanding will be added to the site as part of the development?

15 840 m<sup>2</sup>  
(without  
urban creep)

6. How has the site layout been designed to manage the surface water flood risk?

**e.g.: Habitable parts of the development are located in the areas of the site at lowest risk of flooding and highways act as exceedance flow paths channelling excess water toward an attenuation pond.**

**Managing pre-development surface water flood risk** (see 48888-ECE-XX-XX-RP-C-0001- FRA)

There is no existing surface water flood risk for the vast majority of the site. There are two small isolated areas at low risk of surface water ponding, associated with topographic depressions. Following a review of the greenfield runoff within the wider catchment it is noted that surface water ponding in the south-east of the site is most likely from greenfield runoff within rather than from outside of the site.

**Managing post-development surface water flood risk** (see 48888-ECE-XX-XX-RP-C-0001- FRA and 48888-ECE-XX-XX-RP-C-0002- Drainage Assessment)

The proposed surface water drainage system is designed to current best practice and to the standards laid out in the publication 'Design and Construction Guidance for foul and surface water sewers' and Building Regulations Part H 2015.

The presence of the propose surface water drainage system will remove/ manage surface water runoff on site for the 1 in 100 year plus 45% climate change event.

In the event of surface water exceedance during extreme rainfall events the site is laid out so that surface water runoff is directed away from houses, including those on neighbouring streets, via the proposed roads.

7. What is the means of discharge for surface water from the development site? Justification should be provided if infiltration methods are not being proposed.

|  |                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                      |
|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <b>Infiltration</b>                                                                                                                                                         | Infiltration testing has been conducted by Eastwood Consulting Engineers as part of the Phase 2 Site Investigation (Ref: 48888-ECE-XX-XX-RP-C-006). Four soakaway test pits were undertaken. None of the tests drained, and one of the test pits collapsed during monitoring. Infiltration type SuDS such as soakaways will therefore not be viable. |
|  |                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                      |
|  | <b>Watercourse</b>                                                                                                                                                          | The nearest watercourse is an unnamed stream/brook, located approximately 270 m west of the site, flowing south through Tilstock and eventually converging with Saulton Brook approximately 7 km further south.                                                                                                                                      |
|  | <b>Provide justification for not proposing to use infiltration methods</b>                                                                                                  | Surface water discharge to watercourse is not viable for a sustainable gravity drainage solution, as a rising main would be required to pump surface water to the unnamed watercourse located in the west of Tilstock.                                                                                                                               |
|  | <b>Sewer</b>                                                                                                                                                                | Yes                                                                                                                                                                                                                                                                                                                                                  |
|  | <b>Provide justification for not proposing to discharge to a watercourse<br/><br/>(provide further justification, above, for not proposing to use infiltration methods)</b> | Surface water will discharge via gravity to the 225 mm public surface water sewer located in Tilstock Lane at manhole 4805, subject to confirmation by Severn Trent Water and the LLFA. This will require evidence to demonstrate that all other discharge options (watercourse and infiltration) have been discounted.                              |

8. What Sustainable Drainage Systems (SuDS) will be used on the development site? Your response should include, as a minimum:
- the type and dimensions of the SuDS that are to be implemented on the development site;
  - design assumptions including details of how they accord with the design criteria contained in the Interim Guidance;
  - calculations showing how the SuDS proposed will be adequate, and;
  - drawings, providing visual aid to the above, including layout, exceedance flow routes (contours) and construction details

Additional sheets should be attached, where necessary, and referenced in the table below. Reference should be made to the SuDS Management Train in Section 7

| Type of SuDS feature |                           | Design features- in accordance with design criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------------|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Source Systems       | Permeable paving (Type C) | Permeable paving (Type C) is proposed for driveways. SuDS features proposed are subject to detailed design and confirmation of the groundwater table elevation following ongoing monitoring being conducted as part of the Phase 2 Site Investigation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Site Systems         | Swales                    | Proposals are for conveyance swales to be included within the site.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Regional Systems     | Detention basin and pond  | <p>A detention basin with an area of permanent water (pond) is proposed in the south-eastern portion of the site. The pond will be located within the northern portion of the basin with a permanent water depth of 600 mm. The basin is designed to have a maximum water depth of 1m, 1 in 3 side slopes and include an access track.</p> <p>A cross section of the proposed pond and basin is included in Appendix 6 of the Drainage Assessment report (Ref: 48842-ECE-XX-XX-RP-C-0004).</p> <p>Attenuation calculations included in Appendix 6 of the Drainage Assessment report (Ref: 48888-ECE-XX-XX-RP-C-0002) demonstrates that the proposed drainage features will be adequate to attenuate the 1 in 100 year + 45% climate change event with 10% urban creep.</p> |

|                         |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Regional Systems</b> | Detention basin and pond | <p>Surface water is proposed to discharge from the basin to the public surface water sewer, restricted to the greenfield rate of 17.61 l/s as agreed with Severn Trent Water (Appendix 6). The discharge connection point and rate are subject to approval from Severn Trent Water and LLFA.</p> <p>An exceedance flow route plan is included in Appendix 6 of the Drainage Assessment report (Ref: 48888-ECE-XX-XX-RP-C-0002) showing that in the event of blockages, runoff will be directed away from properties towards the basin at the site low point.</p> |
|-------------------------|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**9. What consideration has been given to the multifunctional benefits of the chosen SuDS features? Additional sheets should be attached, where necessary, and referenced in the table below.**

| Benefit              | Please tick whether this benefit will be achieved | Comment on how the benefit will be achieved                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------|---------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Biodiversity</b>  | ✓                                                 | <p>The proposed basin will include features such as; gentle slopes and shallow and deeper water zones which will encourage biodiverse habitats.</p> <p>Variations in topography will be used to protect ecologically valuable features from unsuitable mowing regimes by providing a physical constraint.</p> <p>Smooth surface finishes will be avoided where possible to encourage natural habitat development.</p> |
| <b>Recreation</b>    | ✓                                                 | <p>The surface water management system will be designed to help create a useable and enjoyable environment.</p> <p>The proposed basin and pond will provide a focus point along the surrounding footpaths which will provide attractive areas for users to enjoy a walk and spot wildlife.</p>                                                                                                                        |
| <b>Water Quality</b> | ✓                                                 | <p>No runoff will be discharged from the site to the receiving surface waters or sewers for the majority of small rainfall events (e.g. rainfall &lt; 5 mm).</p>                                                                                                                                                                                                                                                      |

|                       |   |                                                                                                                                                                                                                     |
|-----------------------|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Water Quality</b>  |   | The detention basin will enable a settling effect of suspended solids promoting the interception and breakdown of contaminants.                                                                                     |
| <b>Visual Amenity</b> | ✓ | The design of surface SuDS features such as basin and pond will enhance the experience of travelling through the development (by foot or vehicle) and make the development a more pleasant place to live and visit. |

**10. What are the secure, agreed maintenance processes that have been put in place for the each of the SuDS features described in Question 8?**

**e.g.: householder responsibility, management committee, local authority or water company**

Maintenance of the potential SuDS systems for this site will be in accordance with the recommendations within The SuDS Manual (CIRIA C753, 2015) as stipulated in Table 1, along with any recommendations provided by suppliers and product specifications.

Table 1 summarises maintenance actions and frequency for each component (surface and sub surface) of the drainage system. Maintenance access requirements such as vehicle and machinery access (where applicable) will also need consideration.

Features adopted by authorities, such as drainage authorities, will be maintained under their normal regime of inspection and maintenance.

The maintenance schedules in Table 1 should be followed to ensure flood risk on site does not increase through system blockages or poor maintenance. Following the maintenance schedule is required to ensure the drainage features remain functional for the lifetime of the development.

| <b><u>SuDS System</u></b> | <b><u>ACTION</u></b>                                                                                                                                                 | <b><u>FREQUENCY</u></b>               |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| <b>Basin</b>              | Inspect surface inlet/ outlet structures removing obstructions and silt as necessary. Check there is no physical damage.                                             | Monthly                               |
|                           | Mow grass access paths and verges surrounding basins at 35 to 50 mm minimum and 75 mm or as specified to provide a cared for appearance and allow pedestrian access. | Monthly or as required.               |
|                           | Confirm whether a liner is present to hold water or prevent pollution of groundwater to protect.                                                                     | Annually or every 3 years as required |
|                           | Where silt has accumulated on the apron or around inlet/ outlet, then remove.                                                                                        | Annually or every 3 years as required |
|                           | Retain as much existing vegetation as possible to ensure rapid re-colonisation of open areas.                                                                        | Annually or every 3 years as required |
|                           | Undertake silt removal during September-October to minimise damage to protected wildlife and ensure re-growth of aquatic vegetation before winter.                   | Annually or every 3 years as required |
| <b>Pond</b>               | Remove litter and debris                                                                                                                                             | Monthly (or as required)              |
|                           | Cut grass                                                                                                                                                            | Monthly (during growing seasons)      |
|                           | 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                                                                                                                           | Monthly (May-October)                 |

|               |                                                                                                                                                                                     |                               |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| <b>Pond</b>   | quality                                                                                                                                                                             |                               |
|               | Inspect silt accumulation and establish appropriate removal frequencies; undertake contamination testing once some build-up has occurred, to inform management and disposal options | Half yearly                   |
|               | Check any mechanical devices                                                                                                                                                        | Half yearly                   |
|               | 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 and planting from one quadrant of the main body of ponds without sediment forebays                                                                                  | Every 5 years, or as required |
|               | Repair erosion or other damage                                                                                                                                                      | As required                   |
|               | Replant, where necessary                                                                                                                                                            | As required                   |
|               | Aerate pond when signs of eutrophication are detected                                                                                                                               | As required                   |
|               | Repair / rehabilitate inlets, outlets and overflows                                                                                                                                 | As required                   |
|               |                                                                                                                                                                                     |                               |
| <b>Swales</b> | Mow amenity grass access paths and verges around swales at 35 – 50 mm minimum and 75 mm maximum.                                                                                    | Monthly or as required        |
|               | Mow swales at 100 mm with 150 mm maximum to filter and control runoff in normal grass swales.                                                                                       | Monthly or as required        |
|               | Where marsh or wetland develops in the swale due to wet conditions, cut annually, or as required at 100 mm.                                                                         | Annually or as required       |

|                                                     |                                                                                                                                                                                   |                                                                     |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|
| <b>Swales</b>                                       | Where there is a build-up of silt, remove and spread on site. Undertake when ground is damp in autumn or early spring and transplant turf and overseed to original design levels. | As required                                                         |
|                                                     | Spread excavated material (silt) on site above the SuDS design profile, in accordance with EA Waste Exemption Guidance.                                                           | As required                                                         |
|                                                     | All damage to be returned to design profile unless there is a design flaw.                                                                                                        | As required                                                         |
| <b>Guttering, gullies and piped drainage system</b> | General removal of litter and debris.                                                                                                                                             | 6 monthly, after autumn leaf fall (or as required)                  |
|                                                     | Cleaning of gullies, drainage channel and drainage channel sump units to remove debris and silt.                                                                                  | 6 monthly, after autumn leaf fall (or more frequently if necessary) |
|                                                     | Cleaning of manholes to remove debris and silt.                                                                                                                                   | Annually, after autumn leaf fall (or more frequently if necessary)  |
|                                                     | If the system allows rainfall infiltration from above, check filter surface for blockages. Remove and replace infiltration material if deemed necessary.                          | Annually                                                            |
|                                                     | Remove sediment from pre-treatment structures.                                                                                                                                    | Annually or as required                                             |
|                                                     | Inspection of all access chambers, inspection chambers, manholes and proprietary storage units to identify and make good any defects as necessary.                                | Annually                                                            |

|                                                     |                                                                                        |                                            |
|-----------------------------------------------------|----------------------------------------------------------------------------------------|--------------------------------------------|
| <b>Guttering, gullies and piped drainage system</b> | Inspect inlets, outlets, vents and overflows to ensure they are operating as designed. | Annually                                   |
| <b>Vortex flow control</b>                          | Remove Litter and Debris                                                               | Monthly                                    |
|                                                     | Cleaning of flow control to remove debris and silt                                     | Annually (or more frequently if necessary) |
|                                                     | Inspect inlets and outlets for blockages and clear if required                         | Monthly                                    |
|                                                     | Repair any damages to flow control device and manhole                                  | As required                                |
|                                                     | Repair any damage to manhole cover                                                     | As required                                |
|                                                     | Repair any damage to inlet/outlet                                                      | As required                                |
| <b>Inlets</b>                                       | Inspection for debris and sediment build up.                                           | Annually (and following poor performance)  |
|                                                     | Inspect inlets for blockages and clear if required.                                    | Monthly                                    |
|                                                     | Inspect inlet pipework for blockages, clogging, standing water and structural damage.  | Monthly                                    |
|                                                     | If drain inlet has settled, cracked or moved, investigate and repair as appropriate.   | As required                                |

Table 1: SuDS Maintenance