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St Nicholas Primary School

Surface Water Drainage Strategy

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DOCUMENT CONTROL SHEET

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Appendices

Surface Water Drainage Strategy

1 Overview

This report sets out the drainage strategy for the site.

Infiltration is not viable as the site has shallow dissolution features, which could lead to localised surface erosion. This would be a particular concern if the infiltration were concentrated in localised area. Therefore, it is proposed to replicate natural surface infiltration for external surfaces where possible but otherwise to discharge via a highway drain located on the A48 linking to Brook Lane and ultimately discharging in to the River Waycock, (see appendix B)

3 SuDS Drainage Hierarchy / Runoff destination (S1)

The Statutory Standards for Sustainable Drainage Systems published by the Welsh Government sets out five priority levels regarding the destination of runoff from sites, these are as follows:

- Priority Level 1: Surface water runoff is collected for use;
- Priority Level 2: Surface water runoff is infiltrated to ground;
- Priority Level 3: Surface water runoff is discharged to a surface water body;
- Priority Level 4: Surface water runoff is discharged to a surface water sewer. Highway drain, or another drainage system;
- Priority Level 5: Surface water runoff is discharged to a combined sewer.

3.1 Priority Level 1: Surface water runoff is collected for use

It is a requirement of the Welsh Statutory National Standards for Sustainable Drainage Systems that as far as possible there will be no discharge from the site for the majority of rainfall events of less than 5mm. The following has been suggested as a way to manage this rainfall within the boundaries of the site.
Collecting the surface water runoff for use should be considered in the design.

- **Rainwater Harvesting** - There is an opportunity to incorporate rainwater harvesting into the design due to regular demand of non-potable water on site. However, the school is not situated in an area of water shortage, so the benefits of this would be small. When this is considered against the small size of the school together with cost of installation and maintenance the net gain would be negligible. Therefore, it has been decided not to install a rainwater harvesting system.

- **Installing a green roof** - A green roof can assist with retaining additional runoff within the boundaries of the site whilst enhancing the biodiversity, amenity, and educational benefits. Given the rural location of the school and the additional construction costs and associated ongoing maintenance costs it has been decided that the benefits would be negligible, and this has not been incorporated into the design of the school.

- **Rain gardens** – Rain gardens can be used to collect runoff from storms for the purposes of irrigation to help reduce potable water use for landscape maintenance as well as reducing surface water runoff from the site. Rain gardens implemented with means to overflow to other SuDS features can enable a varied runoff management system, which provides benefits to pollution control and biodiversity. Rain gardens have been proposed for the attenuation of storm flows, cleansing of pollutants and enhancing the biodiversity and amenity value of the site.

• • **Water detention** - Infiltration/detention basins can be designed with capacity to retain the initial 5mm of runoff from the impermeable areas of the site, providing design and site constraints allow, this can give the water the opportunity to evaporate off over time and pollutants to be retained. Detention ponds have not been proposed as they can present a risk of drowning and would require secure fencing to keep safe.

3.2 **Priority Level 2: Surface water runoff is infiltrated to ground**
Infiltration rates were within a suitable range for an infiltration solution. However, the bedrock beneath the site is relatively shallow and is at risk of dissolution. This means that concentrated localised infiltration could lead to voids forming in the bedrock with the potential for a sudden and dramatic collapse in the future. Therefore, the localised infiltration is not being considered for this site. However, where appropriate permeable surfaces together with an infiltration blanket will be considered as this would replicate natural infiltration rates and bedrock dissolution would not be locally increased.

3.3 **Priority Level 3: Surface water runoff is discharged to a surface water body**
There are no watercourses within the vicinity of the site, the nearest watercourse is a tributary to the Ely River, located approximately 425m to the northeast. Therefore, this method of discharge is not feasible for the proposed development.

3.4 **Priority Level 4: Surface water runoff is discharged to a surface water sewer. Highway drain, or another drainage system**
Highway drains in the A48 linking to Brook Lane have been identified as being connected to the River Waycock. This route and connection is shown on the drawing included in Appendix B. Early discussions with the Vale of Glamorgan SAB team have indicated that this route for discharge would be acceptable. However, a catchment analysis of the drains noting any necessary upgrades of the highway drains in this area would be required.

The discharge location will have to be agreed with VoGC and Welsh Water.

3.5 **Priority Level 5: Surface water runoff is discharged to a combined sewer**
This method of discharge Is not currently under consideration.

4 Surface water runoff hydraulic control (S2)
The proposed school is made up of hardstanding area (building, hard play areas, car parking and a service yard) which is impermeable and soft landscaped areas including soft play areas, pitches, and allocated habitat areas. The proposed layout of the school is presented in Appendix A.

The total site area within the site boundary is approximately 1.32ha. Currently, approximately 0.2ha is developed and impermeable (school, hardstanding, and parking area).

Approximately 0.57ha will be developed as part of this proposal. This is made up of the school building, car parking, service yard, hard play areas, MUGA games court, pedestrian areas and the non-allocated area highlighted on the proposed layout drawing.
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Hydraulic control will be achieved by infiltrating hardstanding areas using permeable surfaces and infiltration blankets where possible. All other flows will be attenuated using a combination of rain gardens and below ground temporary storage tanks. These devices will be designed to reduce the offsite flows to be representative of greenfield run off rates.

5 Water Quality (S3)

The water collected from the roof will have a very low pollutant value and can be discharges directly to the drainage network

Water from hardstanding areas will have a low pollutant value but will be passed through a filter system before being discharged into the drainage network.

Water from access road and parking areas will pass through a Raingarden system where pollutants and hydrocarbons will be collected prior to being discharged into the drainage network.

6 Amenity (S4)

The school itself provide public amenity and will encourage educational interaction of the children and the environment.

However further public amenity will be provided via the rain gardens and outdoor activity areas such as play grounds and sports areas.

7 Biodiversity (S5)

The school is located in rural setting and is surrounded by biodiversity. However, this will be enhanced by the selected planting of the rain gardens and the maintenance of hedgerows between this and the neighbouring sites.

8 Design of drainage for construction, operation and maintenance (S6)

The contractor will develop a construction and management plan for the construction works.

The drainage network will be designed to work using gravity and to be self-cleansing.

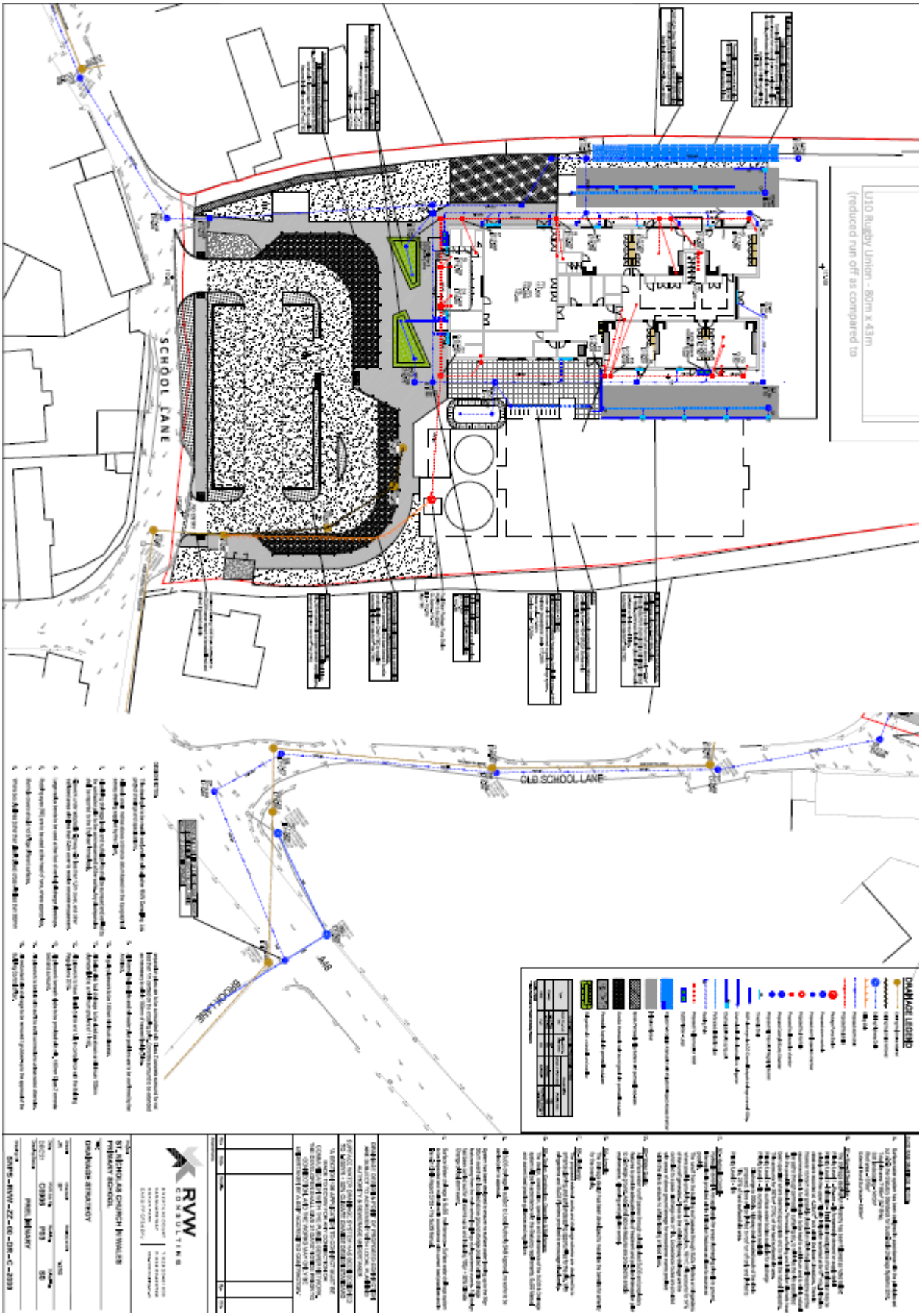
The filter blanket areas will require regular annual inspection and may require improvement works to remove silt/ fine material. However, these will be designed in accordance with the recommendations of the SUDS manual and filter membranes will be installed to limit the movement of fine material into the main filter medium.

The raingardens will require regular annual inspection and may require improvement works to remove silt/ fine material or build-up of contamination such as hydrocarbon. The selected planting in these areas will assist in neutralising these contaminants, however excessive build ups may require removal and cleansing.

Below ground storage tanks will be at risk of collecting silt/ fine material. these will be provided with an inspection chamber to allow regular inspections and access for cleansing should this be required.

Silt trap manholes will be used appropriately to prevent the translocation of contaminants from one area to another.

Appendix A – Drainage Layout



Appendix B – Drainage Route / Discharge Destination