14811 Tor View School, Rossendale

Drainage Strategy

Booth King Partnership Limited

Revision P01 – September 2023

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1. Introduction

1.1. Scope

Booth King Partnership Ltd have been appointed by AHR as Civil and Structural Engineers for the proposed extension of Tor View School. The school is located in Rossendale, at BB4 6LR, and is a special school which meets the needs of learners with profound & multiple, severe and moderate learning difficulties.

The proposals comprise a 3 court Sports Hall with lean to equipment store and plantroom. A future phase block for changing and shower facilities is proposed.

The total proposed new roof area totals 640m^2, this includes the proposed future phase of works. In addition to the building footprint there is ancillary hard landscaping that has been included bringing the total development area to 900m^2.

A proposed development overview is shown in Figure 1.

This report identifies the drainage strategy to be employed on site, and how this is to be managed and maintained over time to ensure that the system continues to work satisfactorily.

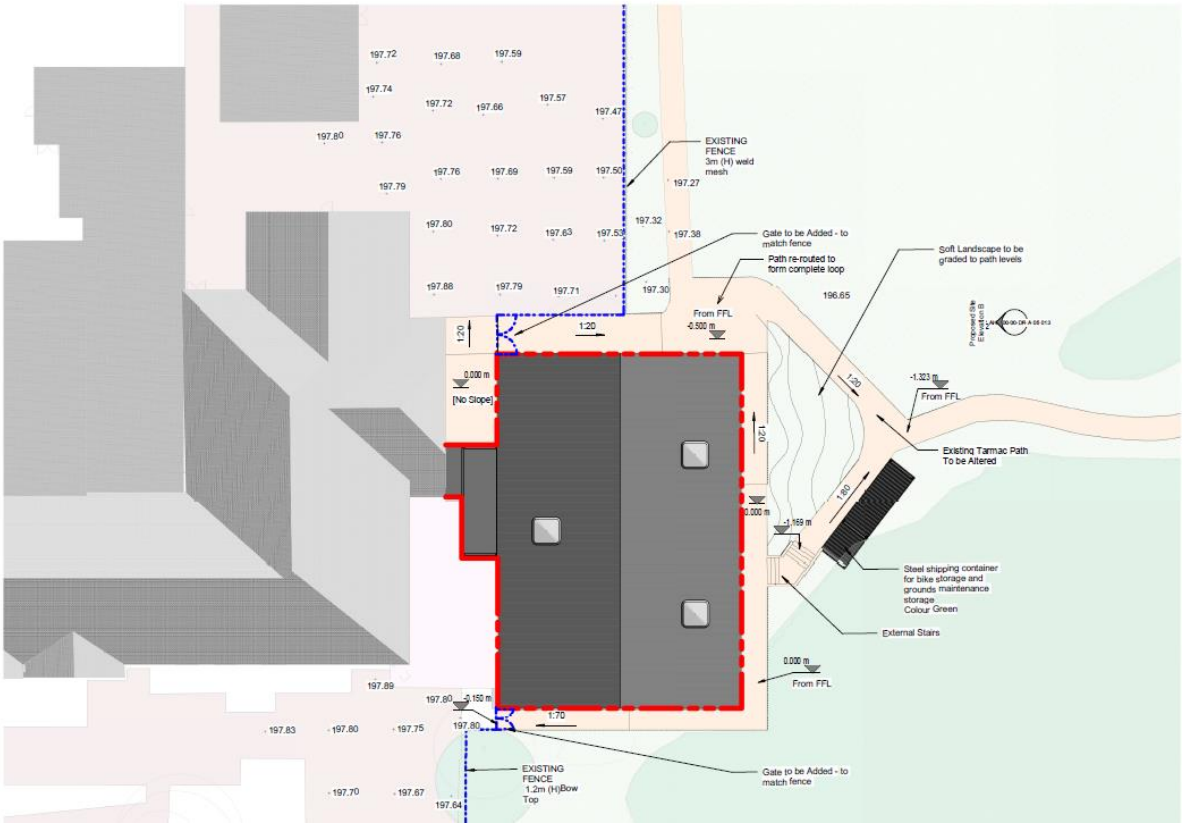


Figure 1 Proposed development overview

A site-specific Flood Risk Assessment has not been prepared, as Environment Agency legislation states that a Flood Risk Assessment is only required for developments with a total area of more than 1Ha. The total site area 900m^2. Despite the site being beneath the threshold for an FRA, we have nonetheless reviewed the EA Flood Map for Planning and the LA's own SFRA and concluded that the site lies within Flood Zone 1 in its entirety.

Some key information and design criteria which have been used during the development of the design are as follows:

- For design purposes, a brownfield discharge rate of 5.0l/s to an adjacent private SW network. The drainage is to be designed for a 1 in 100 year plus 40% climate change storm return period.
- The Environment Agency 'Flood Map for Planning' shows that the site is located within an area outside of the extreme flood extent (Flood Zone 1), meaning it has a less than 0.1% (1 in 1000) annual probability of flooding.
- Sustainable Drainage Systems (SuDS) are to be implemented and maintained for the lifetime of the building.
- A Phase 2 SI report has been executed and ground conditions underlying the site have been found to be primarily made ground and cohesive clay. Ground conditions, from our experience, are therefore unlikely to permit infiltration due to permeability characteristics of the clay and elevated levels of contamination within the made ground. No infiltration testing has been carried out at this stage. Therefore, connection to the existing combined private sewer network has been proposed.

1.2. Standards and Regulations

All elements of the works will be designed in accordance with the latest relevant British Standards and the Building Regulations and will comply with any relevant statutory or Local Authority requirements. Specifically, the below ground foul and surface water drainage systems will comply with:

- BS 752 Part 1 to 7;
- Local Authority Requirements;
- The SuDS manual by CIRIA;
- Building Regulations Part H;
- SSG – Sewerage Sector Guidance

2. Below Ground Drainage Strategy

2.1. Performance Objectives

The below ground drainage network is designed to convey water from the building to a suitable outfall. The principal objective is for surface water (from rainfall) to be stored, infiltrated or discharged from site in line with the NNPF runoff destination hierarchy. In this instance, given the nature of extending over existing hard-standing, remote from the site boundary or natural watercourse, the SW is to be discharged directly into the existing private combined drainage network. This eventually discharges to the public network toward Clod Lane.

Where possible, in line with the National Planning Policy, Sustainable Drainage Systems (SuDS) are used for restricting surface water flows off site.

2.2. Foul Drainage

Future Foul Water pop ups are required as part of a changing/shower facility.

The system is designed to flow not more than three-quarters full and will be laid at gradients that allow self-cleansing velocities to be achieved.

The on-site foul water network connects to existing foul UU 150mm pipe which crossed the site near the proposed building. An easement zone has been installed to keep this drain away from the proposed building.

2.3. Surface Water

2.3.1. Sustainable Drainage Systems (SuDS)

The National Planning Policy Framework states that Sustainable Drainage Systems (SuDS) should be used for restricting surface water flows off site.

Reference has been made to the St. Helens Borough Council Strategic Flood Risk Assessment (SFRA). This report states that.

"The Flood and Water Management Act 2010 requires new developments and redevelopments in England and Wales to have drainage plans for surface runoff approved by the Sustainable Drainage Systems Approval Body (SAB) where the construction work would have drainage implications. The SAB is responsible for adopting and maintaining new SuDS that serve more than one property and have been constructed as approved and function as designed."

The current National Standards for Sustainable Drainage Systems require all new developments, where practicable (excluding single properties), to implement SuDS. The standards set out appropriate design criteria based on four main parameters:

1. Runoff Destination hierarchy (in order of preference);
    a. To ground.
    b. To surface water body.
    c. To road drain or surface water sewer.
    d. To combined sewer.
2. Peak flow rate and volume (pre and post development)

3. Water Quality (based on potential hazards arising from development and sensitivity of the runoff destination)

4. Function (design; flood risk; operation and maintenance)

2.3.2 Ground Conditions

The Rogers Geotechnical Services (RGS) investigation indicates, the site is underlain by cohesive soils of low permeability. Moreover, contamination falls below screening levels.

A Phase 2 SI report has been executed and ground conditions underlying the site have been found to be primarily made ground and cohesive clay. Ground conditions, from our experience, are therefore unlikely to permit infiltration due to permeability characteristics of the clay and elevated levels of contamination within the made ground. No infiltration testing has been carried out at this stage. Therefore, connection to the existing combined private sewer network has been proposed.

2.3.3 Outfall Location

A comprehensive utilities survey has been carried out showing all the buried services located in and around the area of the proposed development.

Unfortunately, there is not a watercourse close to the location and in the context of a school environment, introducing one would carry with it significant health and safety risk. As such, we are proposing to discharge into the adjacent private CW sewer. Figure 2.

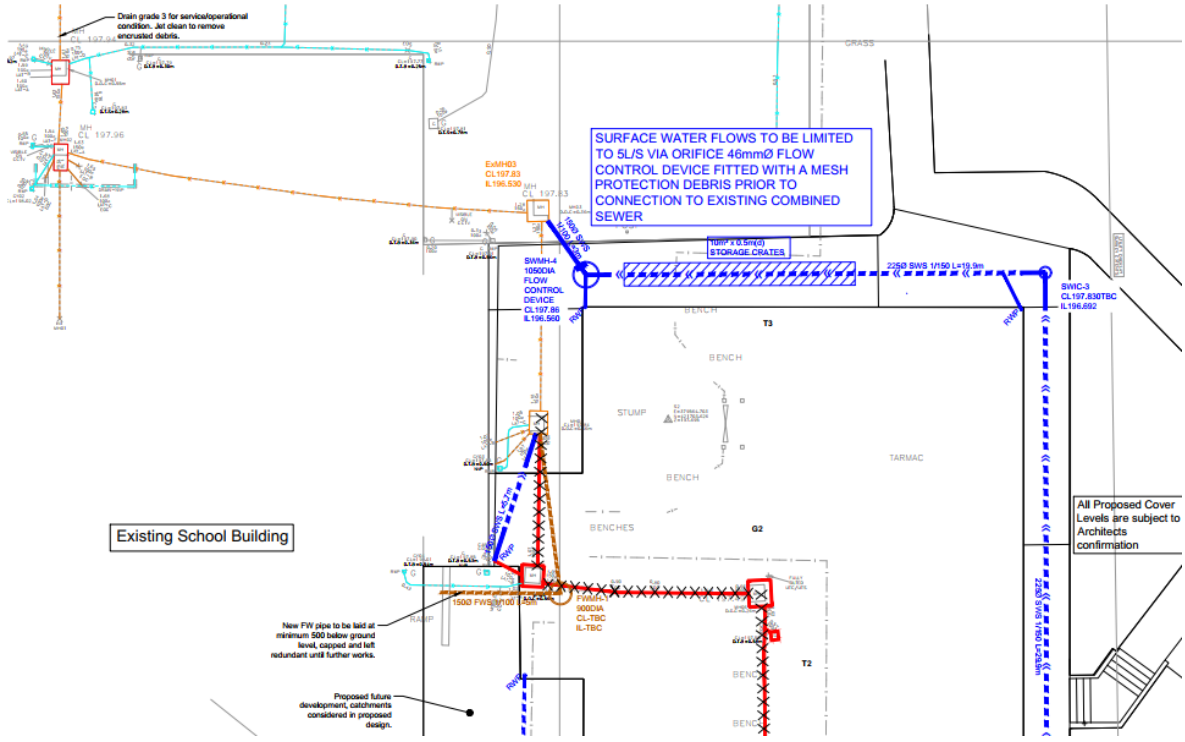


Figure 2 Surface Water Outfall

2.3.4 Assessment of surface water flows (existing and proposed)

The existing below ground surface water network collects water from all hard-standing areas on site via a network of channels and gullies.

The surface water flows have been analysed for the existing hard standing area within the site and the proposed arrangement, including the roofs and all new hardstanding areas.

The on-site network has been sized using the Causeway Flow with the following design criteria:

- No surcharging within the system for storm with a return period of 1:1 years.
- No surface water flooding for storms with a return period of 1:30 years.
- Controlled water flooding for storms with a return period of 1:100-year.
- Controlled water flooding for storms with a return period of 1:100-year + 40% increase for climatic change.
- Additionally, the proposed SuDS system has been sized to reduce discharge rates at the outfall for each of the above events.
- Greater than 50% betterment for most of storm events with flow discharge limited to 5 l/s.

2.3.5 Proposed SW Drainage

The runoff from roofs is collected and conveyed through a SW network of conventional pipes and manholes. A small volume of buried attenuation, totalling 5m^3 of storage is provided prior to the flow being restricted to 5 l/s max. for all storm events, for discharge into the existing private CW network.

2.3.6 Development Discharge Rates

As per the Phase 2 site investigation & the receipt of CCTV surveys the following existing runoff rates were calculated.

	Existing flows rate l/s	Proposed flow rate l/s
1 in 1 yr	6.8	2.3
1 in 30yr	16.6	4.3
1 in 100yr	21.4	4.8
1 in 100yr + 40%cc	27.6	5

These flow rates do not take into consideration the capacity of existing sewer connections. Flows generated from the site will likely have run at a surcharged rate during worst case intensity rainfall periods.

2.3.7 Supporting drawings and calculations

A full set of calculations are provided with this submission analysing the surface water network and verifying the above flow rates for the existing and proposed arrangements. The existing drainage network is shown on drawing no. 14811-BKP-V1-XX-DR-C-0500- P01 - Drainage GA.

3 Maintenance Requirements

The Drainage network and SuDS have been designed with minimal maintenance in mind. The maintenance is generally of a 'common sense' approach and is to comprise:

- Regular day to day care: - litter collection, grass cutting and checking the inlets and outlets where water enters or leaves a drainage feature.
- Occasional tasks: - managing vegetation in wet areas and removing any silt that builds up in the drainage features.
- Remedial work: - repairing damage when, and where, necessary.

Specific recommendations for each feature are provided in the following sections and should be referred to in the first instance if there are any issues. Please contact Booth King Partnership Ltd. if any further advice is required.

The Contractor is to ensure the network, including the existing private network downstream, is fully jetted and in full working order prior to handover.

3.1 Manholes

Manholes are typically sized in accordance with Sewers for Adoption, which relates to the incoming and outgoing pipe diameters. However, as the system is not Adopted, PPICs have been used where manufacturer's limitations permit.

Manholes have been located outside the building in all cases which will allow much greater freedom with future maintenance access.

Maintenance Schedule	Required Action	Frequency
Occasional Maintenance and Monitoring	Covers should be lifted and inspected for litter and debris to ensure that the runs are free flowing.	3 Monthly (or as required).

3.2 Orifice Flow Control device

The Orifice Flow Control is a versatile, self-activating device.

Some advantages include.

- Self-activating with no moving parts or power requirements
- Virtually maintenance free

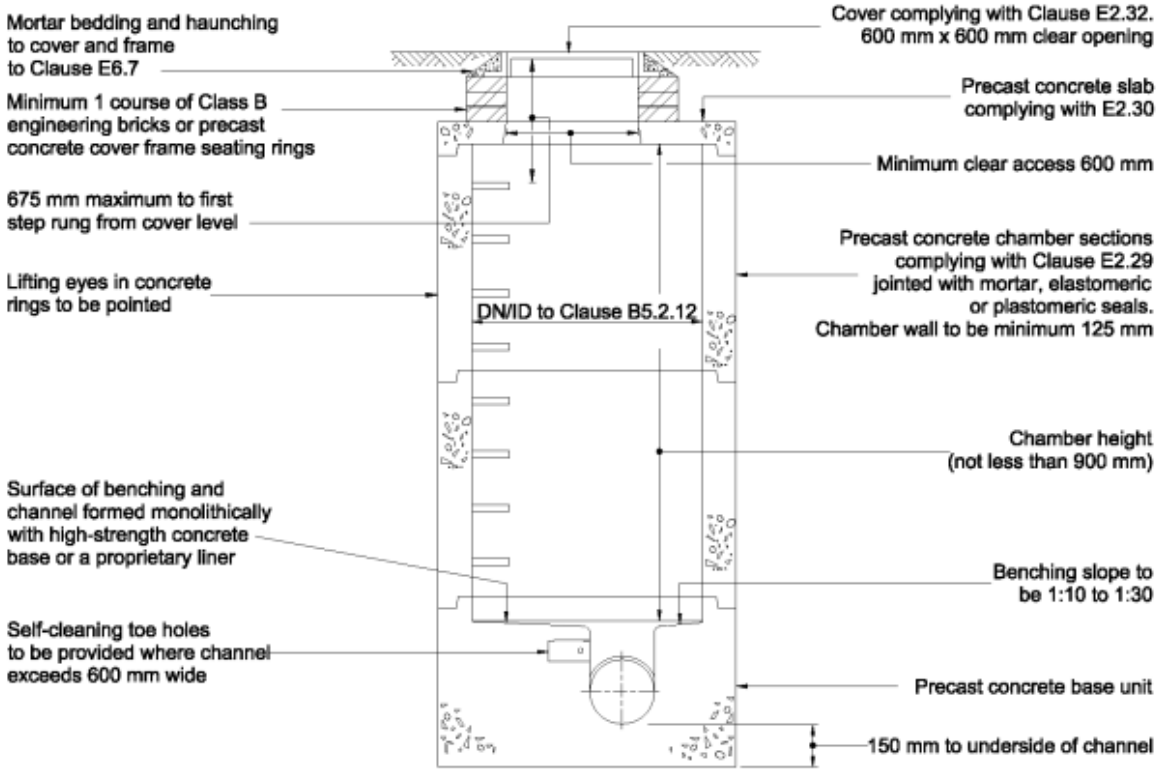
Maintenance Schedule	Required Action	Frequency
Occasional Maintenance and Monitoring	Covers should be lifted and inspected for litter and debris to ensure that the runs are free flowing.	3 Monthly (or as required).

Appendix A – Typical Manhole Details

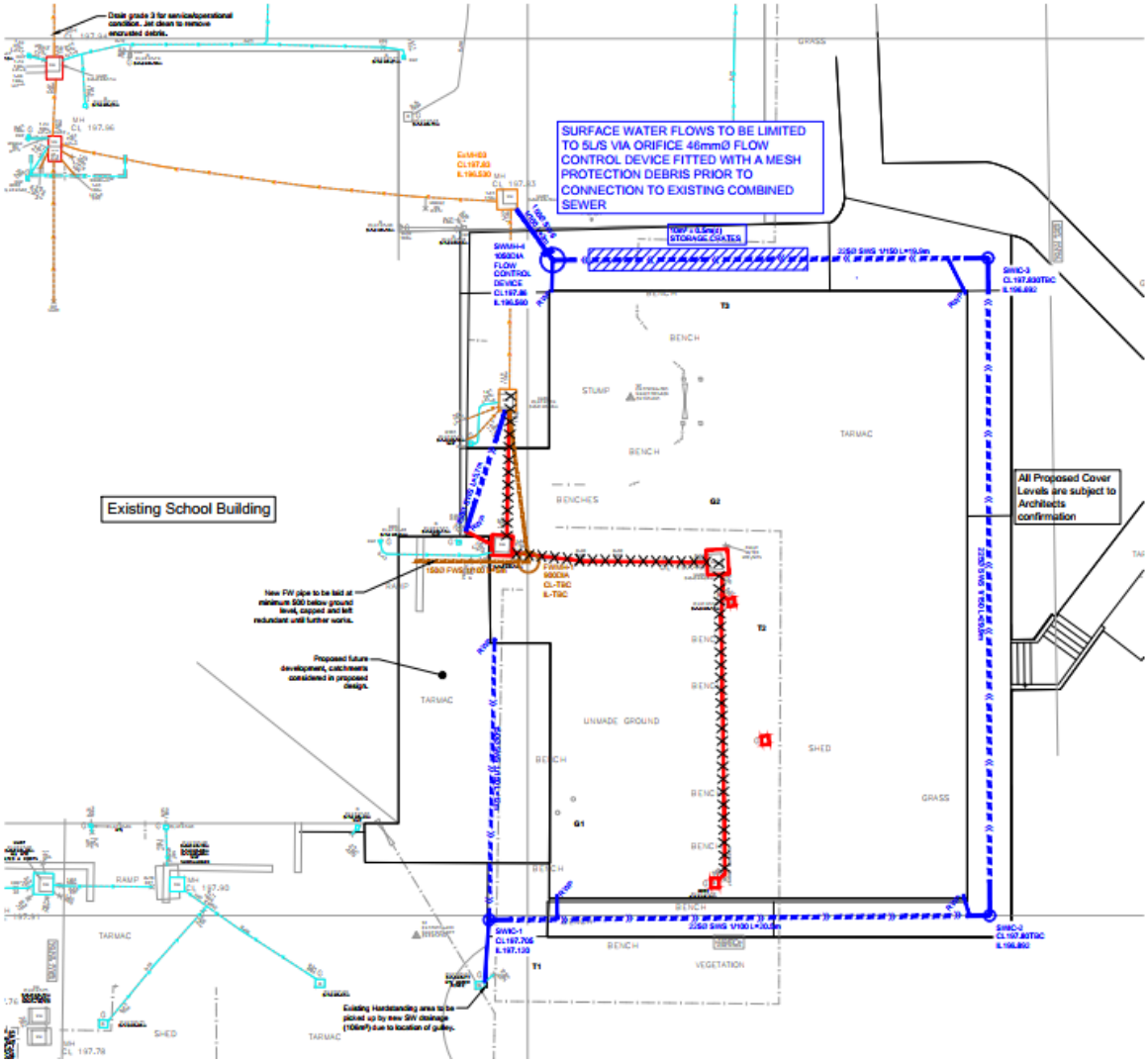
For maintenance requirements, please refer to product manual.

The manual provides information on the specifications, installation details, typical applications, and Technical Support information. Please refer to this documentation in the first instance for any future maintenance.

Figure B 9
Typical manhole detail – Type B
Depth from cover level to soffit of pipe 1.5 m to 3 m
Rigid material construction without concrete surround



Appendix B – Drainage Layout



Appendix C – Drainage Calculations