

Hopwood Hall College St Mary's Gate, Rochdale Flood Risk Assessment and Drainage Strategy Report

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Acronyms	
AEP	Annual Exceedance Probability
AOD	Above Ordnance Datum
CIRIA	Construction Industry Research and Information Association
DCG	Design and Construction Guidance
DEFRA	Department for Environment, Food and Rural Affairs
EA	Environment Agency
FEPP	Flood Emergency and Evacuation Plan
FRA	Flood Risk Assessment
LLFA	Lead Local Flood Authority
NPPF	National Planning Policy Framework
PPG	Planning Practice Guidance
SFRA	Strategic Flood Risk Assessment
SWMP	Surface Water Management Plan
UU	United Utilities

1.0 Introduction

Roscoe have been commissioned to undertake a Flood Risk Assessment (FRA) for the proposed development at Hopwood Hall College, Rochdale, OL12 6RY. This statement will be used to support the planning application for the proposed development.

The national Planning Policy Framework (NPPF) states that an appropriate FRA will be required for all development proposals of 1ha or greater in Flood Zone 1 and for any development within Flood Zone 2 or 3.

The EA's Flood Map for Planning shows that the site is located in Flood Zone 2 and 3, this assessment will therefore focus on the flood risk to the site from watercourses.

This report will also outline the proposed drainage strategy for the site including a detailed SUDS assessment.

1.1 Relevant Policy

This FRA has been carried out in accordance with the NPPF and the accompanying Planning Practice Guidance (PPG) "Flood Risk and Coastal Change". This FRA also incorporates advice and guidance from the Environment Agency (EA), Manchester City, Salford city and Trafford Councils Strategic Flood Risk Assessment (SFRA) 2011 and CIRIA documents.

The surface water drainage strategy is in accordance with:

- The Department for Environment, Food and Rural Affairs (DEFRA) "Non-Statutory Technical Standards for Sustainable Drainage Systems".
- The Lead Local Flood Authority (LLFA), Rochdale Borough Council, guidance document on SUDS/Drainage.
- Building Regulations Part H

2.0 Site Description and Location

The site is located off Saint Marys Gate (A58), Rochdale. The postcode of the site is OL12 6RY, and can be further identified by grid reference 389339, 413366. The site area is approximately 2ha. The site is roughly rectangular with maximum plan dimensions of ~200m by ~195m. The site generally slopes gently southwards from the northern site boundary and lowest point of elevation at 117.4 AOD along the southern site boundary, the highest elevation on site is approx. 120.80m AOD. There are residential developments to the north and a neighbouring further education facility to the south.

Current use:

The site is currently a college with associated car parking, outdoor leisure area and soft play area. A public restaurant and hair salon are also present and part of the Block B building. There are three existing buildings present on site including two multi-storey buildings associated with the college. Most of the site is hard standing with the northern part of the site covered by asphalt and concrete for the existing college buildings and associated car park area. The southern area of the site bordering the river has undergone soft landscaping.



Figure 1.1.1: Existing site, showing site boundary- Existing Drainage- Google Maps 2025

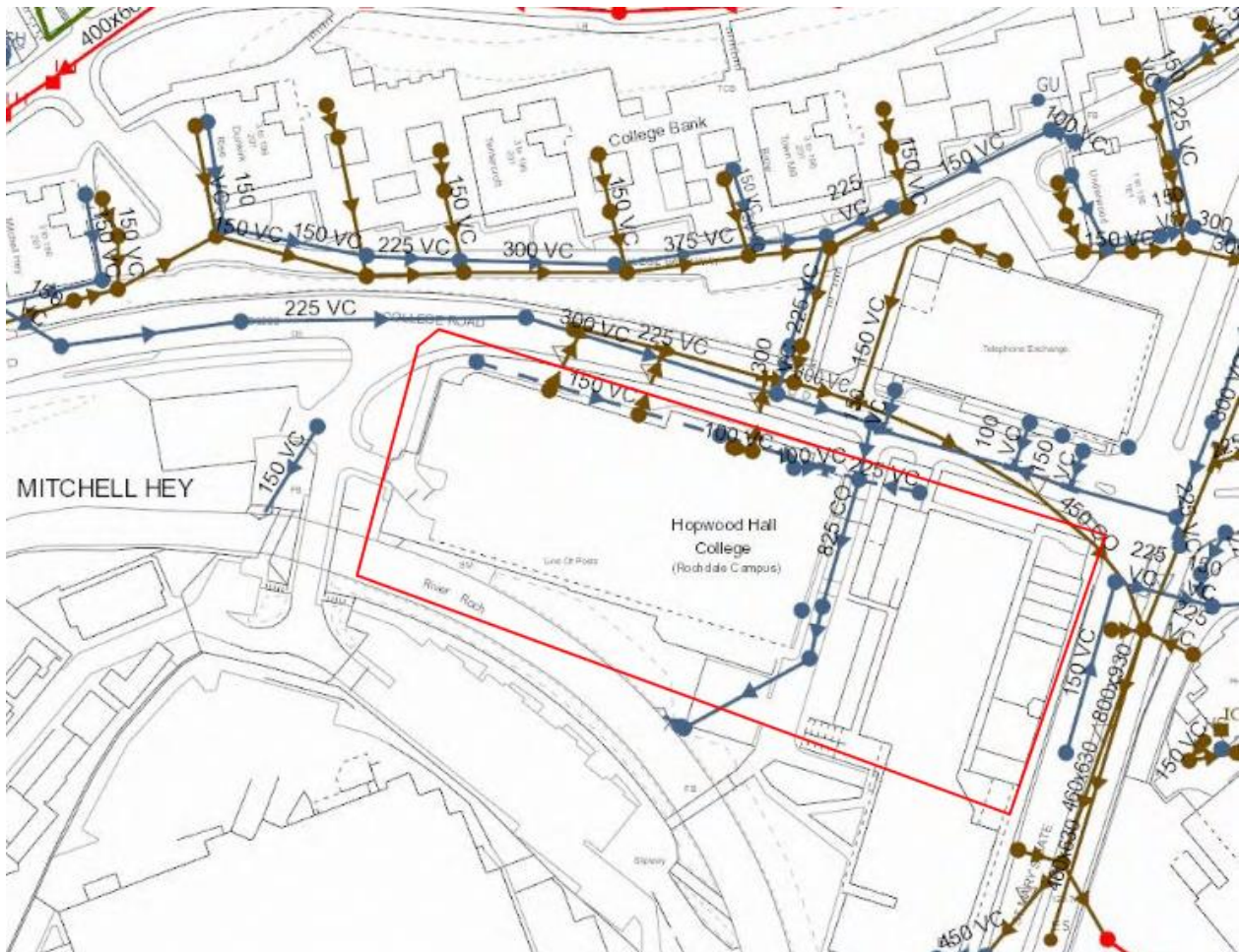


Figure 1.1.2: United Utilities Asset Location Map 2021

The sewer records were obtained from United Utilities and show that there is a 900mm surface water pipe that runs through the north of the site at College Road and runs south discharging into the River Roch. There are three discharge points at the River Roch, two are assumed as private and the other at surface water discharge for United Utilities.

A drainage CCTV survey was carried out on site by Survey and Engineering Projects on the 9th of September 2024. The survey detailed the conditions of the runs and provided videos and photographic evidence. Controlled discharge was not evident on site as concluded by the CCTV survey.

Information regarding the existing sewers have been gathered by various topographical surveys and United Utilities records and they have confirmed that:

- A existing 825mm UU surface water sewer to the north of the site at College Road, the downstream location of the surface water sewer is the River Roch.
- A existing 225mm UU foul water sewer that is located towards the north of the site at the car parks opposite College Road.

Additional surface water and foul water drainage systems are located in this area. The public surface water sewer that runs across the north of the car park is to be abandoned following an accepted S116 application.

As the site is currently classified as brownfield comprising existing college buildings and a car park, the existing drainage connections within the proposed construction area have been identified and will be re-utilised where feasible. Any on site sewers that become redundant following the completion of demolition works are expected to be decommissioned and removed.

2.1 Development Proposal

The proposal involves the demolition of the existing Block B building including the basement and the construction of a new four-storey block intended for teaching purposes. The development is to be situated in the northern section of the site, opposite College Road, on land currently occupied by car parking spaces.

The levels to the south of the site are not expected to change and will remain the same as the existing. The levels around the proposed school building vary between 19.770m AOD and 120.650m AOD with the Finished Floor Level of the proposed school set at 120.800m AOD. A full site drawing comparing the existing levels to the proposed site levels have been drawn and attached and attached as Appendix A. the proposals involve none of the existing levels to be lowered.

Associated works will include the reconfiguration of existing car parking areas, access roads, and both soft and hard landscaping in support of the new building. The red line boundary and proposed layout is detailed in Figure 2.1. The proposed works will be outside of the Riparian Zone, this has been displayed in Appendix I.

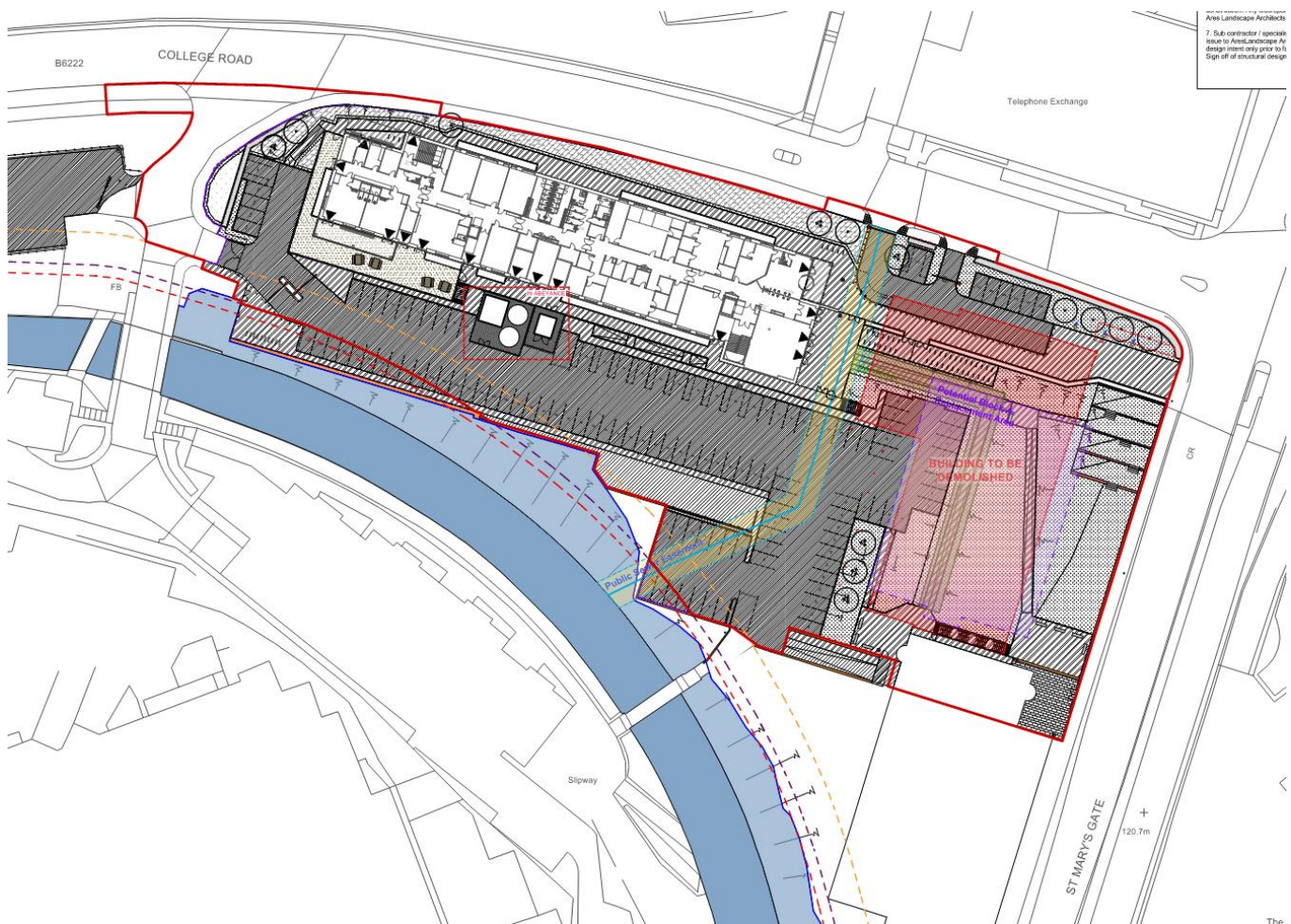


Figure 2.3: Proposed layout Ares Landscape Architects (dated 29/04/25)

3.0 Flood Risk Assessment

3.1 Flood Risk from Watercourses

The EA's flood map for planning shows that the site is located in Flood Zone 2/3 and is at risk of flooding from the River Roch. The river Roch is located directly south of the site. It continues westward as a minor watercourse, running along the southern boundary of the site. Land in this flood zone is assessed as having annual probability of river flooding greater than 1%. The EA's maps suggests that the site is not located in an area which benefits from flood defences however the EA's website also states that not all defences are shown on the map.

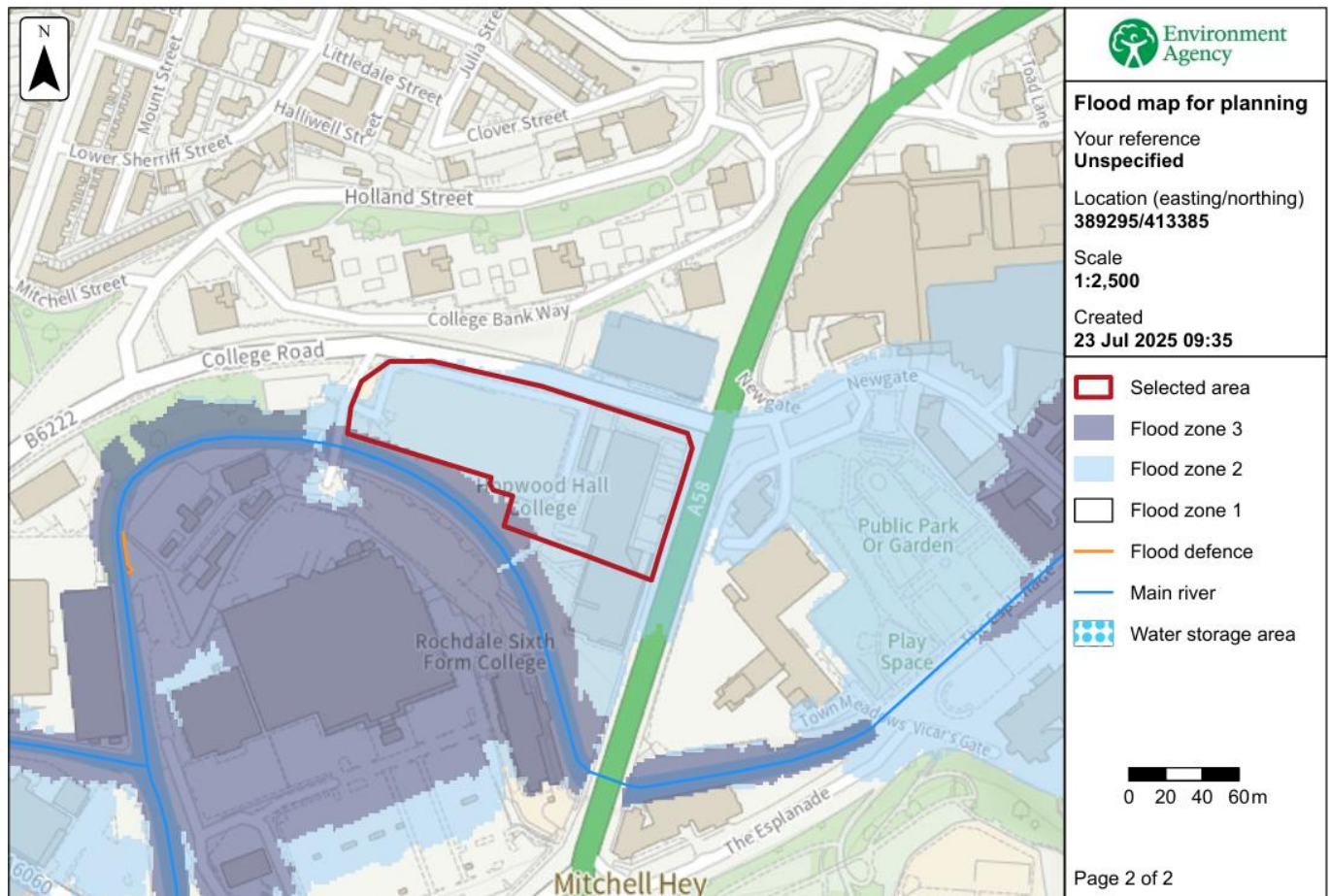


Figure 3.1: from EA Flood Map for Planning 2025

To further evaluate the fluvial flood risk associated with the River Roch, and to understand the potential extent and depth of flooding at the proposed development site, Roscoe contacted the Environment Agency (EA) to obtain site-specific Product 4 flood data. While the Lead Local Flood Authority (LLFA) confirmed that there are no recorded flood outlines directly affecting the site, they did provide details of historic flooding in the wider surrounding area (see Figure 3.2).

It is noted that the historic flood outlines:

- Do not include flooding from surface water, drainage exceedance, or overland runoff caused by rainfall; and
- Do not capture artificial flooding related to failure of water-bearing infrastructure such as sewers, pipelines, or treatment works.

Mapping provided by the EA identifies a history of recorded fluvial flooding within the inside of the river bend adjacent to the site. However, the flood extents shown remain confined within the bend and do not extend into

the proposed development footprint. The site itself lies outside the previously recorded flood outlines and is not identified as part of the functional floodplain (Flood Zone 3b) based on current EA data.

While the proposed development is located within Flood Zones 2 and 3, the site levels and available flood modelling data confirm that the lowest proposed site elevation is approximately 119.58 m AOD. This is higher than the nearest modelled flood levels provided by the EA Product 4 data:

- 1% AEP (with +35% climate change): 119.01 m AOD
- 1% AEP (with +70% climate change): 119.35 m AOD

These values indicate that the site maintains a modest freeboard even under upper-end climate change scenarios. Finished floor levels and critical infrastructure will be designed in line with or above these levels, ensuring resilience to fluvial flood risk.

Although the development will introduce new areas of hardstanding, the overall extent of impermeable area across the site is expected to remain broadly the same. As a result, there is no anticipated increase in surface water runoff. A surface water drainage strategy will be implemented incorporating Sustainable Drainage Systems (SuDS) to provide attenuation, water quality benefits, and to mimic the site's natural drainage regime as far as practicable. These measures will ensure that the development does not increase flood risk either on-site or to third parties.

A precautionary approach will continue through the detailed design and construction phases, including:

- Avoiding development in the most flood-prone areas of the site;
- Designing finished floor levels and critical infrastructure to be resilient to predicted future flood levels;
- Integrating SuDS to manage surface water sustainably; and
- Registering the site with the EA flood warning service and establishing safe access and egress routes, which have been identified and mapped with reference to the 1% AEP +70% climate change flood level.

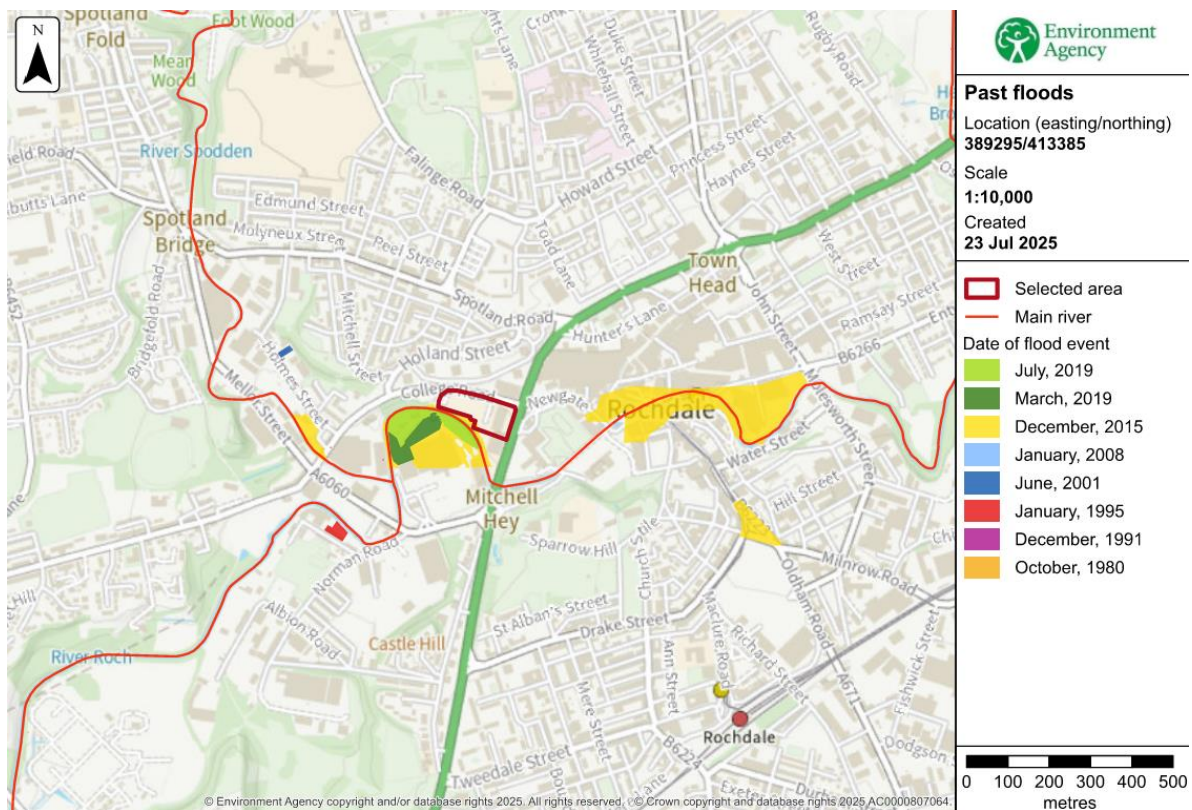


Figure 3.2: EA Historic Flooding Map

3.2 Sequential and Exception Tests

3.2.1 Sequential Test

In accordance with the NPPF, before planning permission can be granted the risk-based Sequential Test should be applied and accepted. This needs to be done for those developments in Zone 2 or 3, and for all but minor developments. The test's aim is to steer new development to areas at the lowest probability of flooding; Zone 1. Development should not be permitted if there are reasonably available sites to accommodate the proposed development in areas with a lower probability of flooding.

This development has a vulnerability classification of More Vulnerable, under the PPG and so as can be seen from Table 3.2 it is appropriate in Flood Zone 3 and the exception test will be required.

Flood Risk Vulnerability Classification		Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception test required	✓	✓
	Zone 3a	Exception test required	✓	×	Exception test required	✓
	Zone 3b Functional Floodplain	Exception test required	✓	×	×	×
Key: ✓ Development is appropriate. × Development should not be permitted.						

Table 3.2 Flood Risk Vulnerability and Flood Zone Compatibility from PPG "Flood Risk and Coastal Change" Table 3

3.2.2 Exception Test

In accordance with the NPPF clause 102, both the following elements must be demonstrated to pass the Exception Test:

"The proposed development provides wider sustainability benefits to the community that outweigh [the] flood risk"; and
 "a site-specific FRA has been carried out and can demonstrate that the development will be safe for its lifetime, taking account of the vulnerability of its users, without increasing [the] flood risk elsewhere".

Given the nature of the development, it is considered unlikely that suitable alternative sites would be available in the local area which could support construction of a new school. The proposed school building is to be situated in an area of the site where flood risk is the lowest. It may be possible that the majority of the site may be inundated during the critical flood event, no detailed modelled mapping is available to confirm this.

Based on the expected flow paths and the general flood map for planning, the lowest risk area of the site is anticipated to be in the northern side of side. This area is designated as flood zone 2 on the current flood map for planning, indicating the lowest flood risk and shallowest flood depths across all scenarios.

The following FRA has been carried out to satisfy the second condition.

3.3 Flood Risk from Groundwater

Groundwater flooding occurs when water rises to the surface from underlying permeable strata, often following prolonged periods of rainfall or elevated water tables.

The nearest British Geological Survey (BGS) borehole records, located adjacent to the southeastern boundary of the site, indicate the presence of Made Ground to depths of approximately 1.7 m below ground level (bgl), comprising a mixture of clay, brick, silt, and ash. Beneath this, natural granular deposits including fine to coarse sands and gravels extend to depths of approximately 3.7 m to 4.8 m bgl. Groundwater strikes were recorded at varying depths across the area, ranging from ground level to 4 m bgl.

These conditions suggest that the site may be susceptible to groundwater emergence under certain circumstances, particularly during extended periods of wet weather. However, the proposed development:

- Does not include any basement construction or deep excavations likely to intercept the water table;
- Proposes finished floor levels that are elevated above potential groundwater emergence zones;
- Retains overall site topography, avoiding significant alterations that could affect groundwater flow paths.

Based on the available ground investigation data and the nature of the proposed development, the risk of groundwater flooding is considered to be low. No significant dewatering or groundwater mitigation measures are anticipated as part of the construction phase.

Nevertheless, appropriate design precautions, such as ensuring service ducts are sealed, and that drainage infrastructure accounts for potential groundwater ingress, will be incorporated where necessary to maintain resilience.

3.4 Flood Risk from pluvial flooding

Pluvial flooding occurs when rainfall exceeds the capacity of surface water drainage systems, resulting in overland flow and ponding—particularly in low-lying areas or where infrastructure is inadequate. This type of flooding typically arises during intense or prolonged rainfall events.

Based on the Environment Agency's online surface water flood mapping (see Figure 3.3), parts of the site are identified as being at low to medium risk of surface water flooding, particularly during 1 in 100-year (1% AEP) and 1 in 30-year (3.33% AEP) rainfall events. The site's topography, as confirmed by LiDAR data, shows a general slope from north to south, with higher ground along College Road to the north and the A58 to the south. This creates a potential overland flow path through the site during periods of heavy rainfall.

Surface water risk is also present on surrounding roads—particularly to the north and east—where flood mapping indicates the possibility of localised ponding and flow routes toward the site. Overland flow paths have been identified from St Mary's Gate to the east and along the western boundary, both of which could contribute to surface water entering the site during extreme weather events.

However, a number of flood mitigation measures are already in place to reduce the site's vulnerability to surface water flooding:

- The site is currently served by a positive surface water drainage system, which efficiently collects and discharges runoff, minimising the risk of surface water accumulation on-site.
- Following significant flooding incidents in December 2017 and 2019, a series of improvements were implemented, including:
 - Installation of internal flood barriers and external flood walls to reduce the risk of water ingress;
 - Fitting of non-return valves (June 2020) to prevent surcharging from the adjacent river into the drainage network;

- Upgrades to the site's pump station, improving the ability to manage excess surface water, particularly in the undercroft area (noting that asset location records are limited).

These existing measures mitigate both fluvial and pluvial flood risk and ensure effective management of surface water runoff. As part of the proposed development, additional Sustainable Drainage Systems (SuDS) features—such as rain gardens and swales—will be incorporated to provide further attenuation, improve water quality, and manage peak discharge rates in line with the greenfield runoff rates calculated using the IH124 method.

With the existing infrastructure and proposed SuDS strategy, the residual risk of pluvial flooding is considered low, and surface water will be managed in accordance with best practice guidance and LLFA expectations.

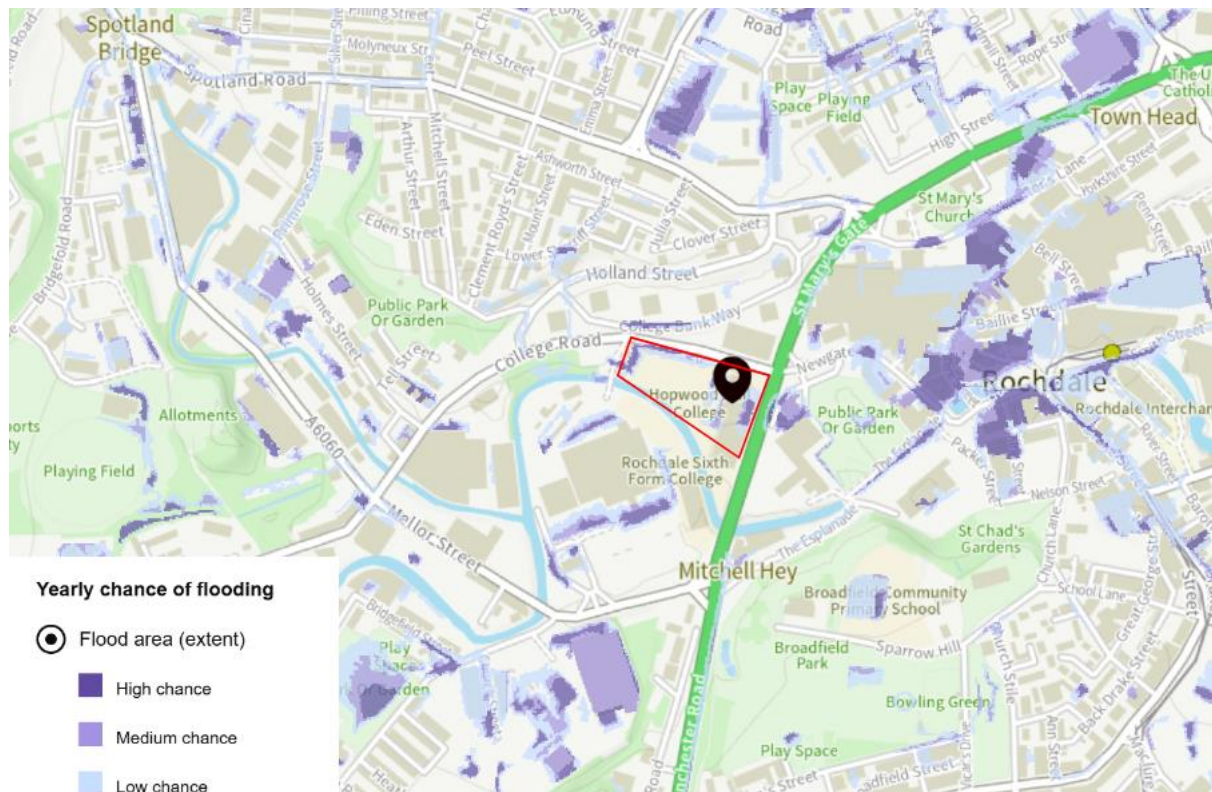


Figure 3.1 Environment Agency Surface Water Flood Risk Map

3.5 Flood Risk from Reservoirs

Overland flow occurs when surface water from adjacent land or infrastructure flows across the ground surface, often as a result of extreme rainfall events that exceed the capacity of existing drainage systems or due to blockages. Local topography plays a key role in directing such flows, with water generally moving toward lower-lying areas.

A review of topographic data and the surrounding urban environment has identified potential overland flow routes that could direct water toward the site, particularly from nearby roads and developed areas. One notable flow route is associated with College Bank Way, where exceedance or failure of the highway drainage infrastructure could lead to surface water running onto the site. These flows are expected to be shallow and relatively low in volume, and in most scenarios, any overland flow reaching the site would continue southwards toward the River Roch, following the site's natural gradient.

As illustrated in Figure 3.4, these overland flow paths are limited to small areas along the site boundary. The proposed development has been designed with due consideration to these flow routes:

- No significant changes to ground levels are proposed that would obstruct or redirect natural flows.

- All finished floor levels will be set above the surrounding ground to mitigate potential surface water entry.
- Additional SuDS features, including swales, will be used to intercept, slow, and attenuate any overland flow across the site.
- The site layout has been developed to avoid placing sensitive receptors (e.g. entrances, plant rooms) in areas susceptible to surface water accumulation.

With these measures in place and given the relatively shallow depth and volume of predicted overland flows, the residual risk from overland flow is considered low and can be effectively managed through site design and surface water drainage infrastructure.

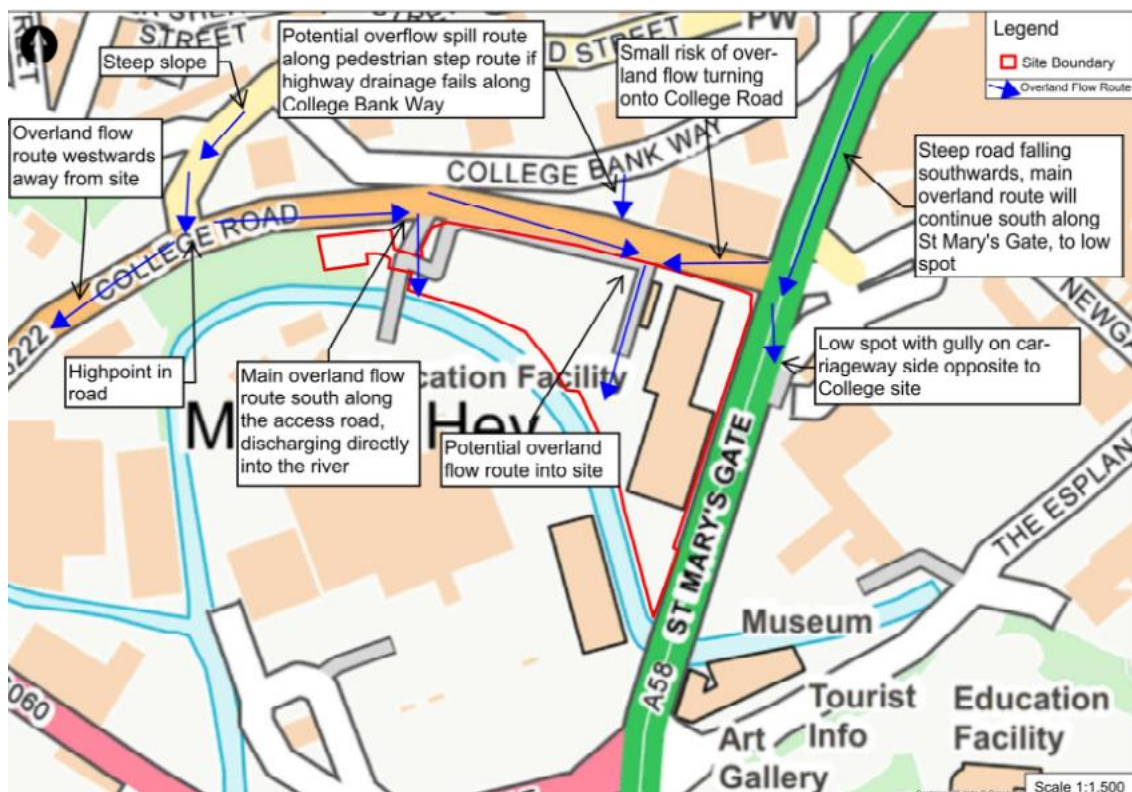


Figure 3.1 Environment Agency Risk of Reservoir Flooding Map

The EA's information states that reservoir flooding is extremely unlikely to happen and there has been no loss of life in the UK from reservoir flooding since 1925. The Reservoir Act of 1975 ensures that reservoirs are inspected regularly, and essential safety work is carried out.

Mitigation Measures for Surface Water and Overland Flows

The site's SuDS strategy includes swales; designed in accordance with the Non-Statutory Technical Standards for SuDS and local guidance from Rochdale Council and the Lead Local Flood Authority. The system has been designed to accommodate the 1 in 100-year rainfall event plus a 45% allowance for climate change, ensuring adequate on-site storage even during extreme events.

With these design measures in place, including flow control, storage, and backflow prevention, the development is considered to be at low risk of sewer flooding, and it will not increase risk elsewhere in the network.

3.6 Flood Risk from Sewers

Sewer flooding can occur when the capacity of the public sewer network is exceeded due to intense rainfall events, blockages, or hydraulic restrictions. According to publicly available records from Rochdale Borough Council, there have been historic incidents of sewer flooding within the wider Rochdale area, including locations near the proposed development site, see Figure 4.8. These records indicate a need for careful management of sewer-related flood risks, particularly as climate change increases the frequency and intensity of storm events.

The proposed development is a school, which is considered a more vulnerable land use in flood risk terms. Foul water and surface water from the site will discharge to the public foul sewer network, subject to approval by United Utilities. Surface water will additionally, be managed independently through a Sustainable Drainage System (SuDS), significantly reducing both flow rates and volumes discharging to the public network. This mitigates the potential to contribute to downstream sewer surcharge or flooding.

To address the potential flood risk from sewer surcharge, a key mitigation measure will be incorporated into the drainage design. Non-return valves will be installed on critical manholes and outfalls within the proposed surface water drainage system. These valves will prevent backflow from the public or downstream sewer network during high rainfall or surcharge conditions, ensuring that water cannot re-enter the site's drainage system from overloaded sewers. This is particularly important given the surcharged conditions modelled at the system outfall. The installation of non-return valves is a recognised and effective means of improving flood resistance, reducing the risk of internal and external flooding during exceedance events, and safeguarding property and infrastructure.

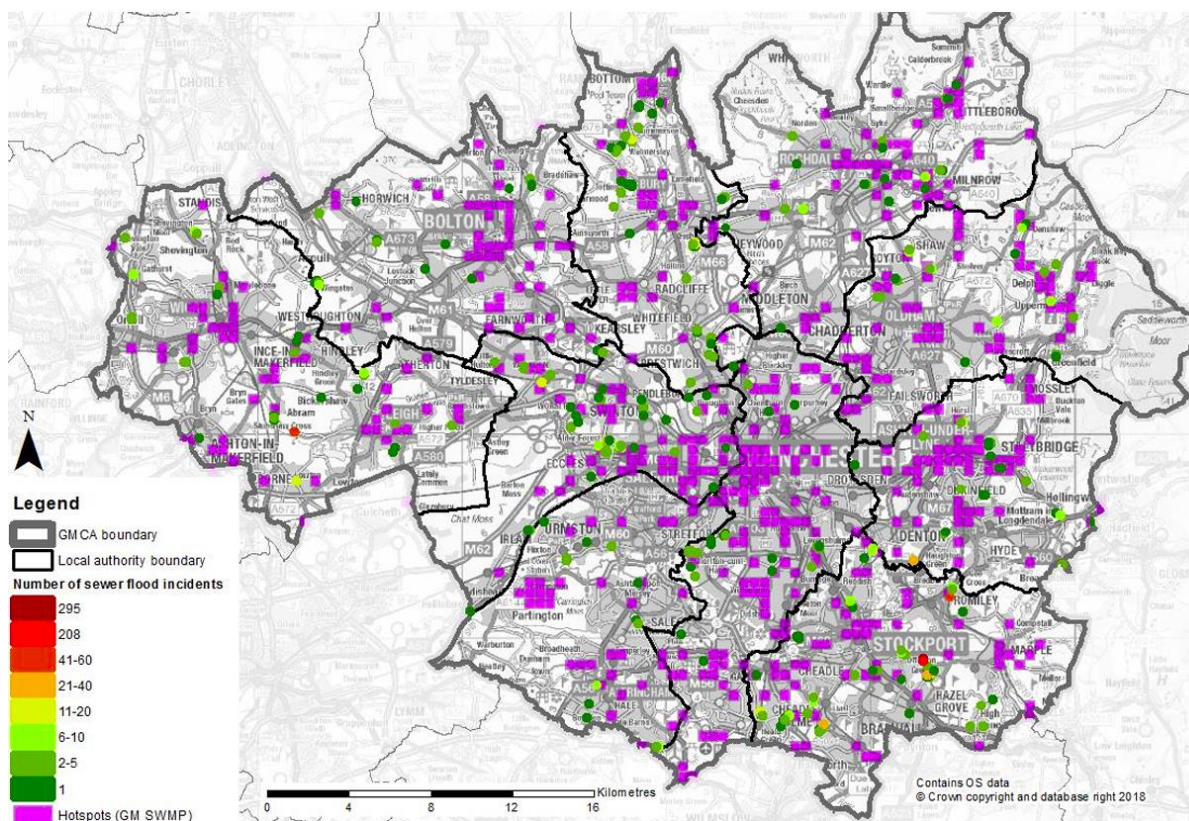


Figure 3.5 Rochdale Borough Council Sewer flooding Map

3.7 Climate Change

In accordance with the National Planning Policy Framework (NPPF) and Planning Practice Guidance (PPG), this Flood Risk Assessment considers the potential future impacts of climate change, including both central and upper-end allowances, despite the temporary nature of the proposed enabling works.

Product 4 data has been obtained from the Environment Agency for the River Roch. While no model nodes are located directly within the site boundary, two nearby fluvial model nodes positioned along the river corridor adjacent to the site provide the most representative flood levels. These levels were provided under a “defences removed” scenario, representing a conservative approach. The climate changed modelled fluvial node locations and levels have been included in Appendix B.

The modelled flood levels are as follows:

- 1% AEP +35% climate change (central allowance): 119.01 m AOD
- 1% AEP +70% climate change (upper-end allowance): 119.35 m AOD

The proposed development has been designed with a Finished Floor Level (FFL) of 120.800 m AOD, which provides a freeboard of approximately 1.45 m above the peak climate change flood level. This exceeds minimum recommended allowances for freeboard and ensures an appropriate level of resilience against future fluvial flood risk. A site-wide levels plan comparing proposed site levels and key development areas is included in Appendix A, confirming that the finished levels across the site support safe operation under future flood scenarios.

Additionally, the proposed external ground levels across the development site will remain unchanged or will match existing contours and will not be lowered as part of the works. This approach helps to preserve overland flow routes and ensures that the development will not result in any loss of floodplain storage or displacement of floodwater.

In summary, the development has appropriately accounted for the impacts of climate change through the use of flood data, elevated finished floor levels, and preservation of existing landform. The proposals meet the requirements of the NPPF and PPG and demonstrate resilience to future fluvial flood risk.

4.0 Flood Risk Assessment Safe Access, Warning and Evacuation Plan

In accordance with the Planning Practice Guidance (PPG), safe access and egress must be provided for all developments to ensure that occupants can safely enter and exit the site during flood events, including those influenced by climate change over the lifetime of the development.

The proposed development lies within an area of known flood risk, including fluvial, surface water (pluvial), and residual reservoir flood risk. While the development will not introduce basement levels or highly vulnerable uses, appropriate measures must be incorporated to manage the safety of occupants and emergency responders in the event of a flood.

To demonstrate safe access and egress, a Site-Specific Safe Access and Egress Plan has been prepared as part of this FRA. This plan identifies designated access routes that remain above the modelled flood level of 119.35 m AOD, which corresponds to the 1% Annual Exceedance Probability (AEP) event with a +70% climate change allowance. Key considerations include:

- Finished floor levels of the proposed buildings are set at 120.80 m AOD, well above the modelled flood level;
- Access routes across the site have been reviewed in relation to predicted flood extents to ensure dry escape routes are available;
- The site layout allows for safe refuge areas above flood levels;
- A full Flood Emergency and Evacuation Plan (FEED) will be developed and implemented as part of the site's operational flood risk management strategy.

Figure 4.1 A Safe Access and Egress Plan has been prepared to support this FRA, which identifies designated access routes across the site relative to the modelled flood level of 119.35 m AOD (1% AEP event with +70% climate change allowance). The drawing clearly illustrates the areas of the site that remain above this flood level, ensuring that dry routes are available for site operatives during a flood event. This plan demonstrates that, even under extreme flood scenarios, safe refuge and evacuation routes can be maintained, in accordance with NPPF and EA guidance.

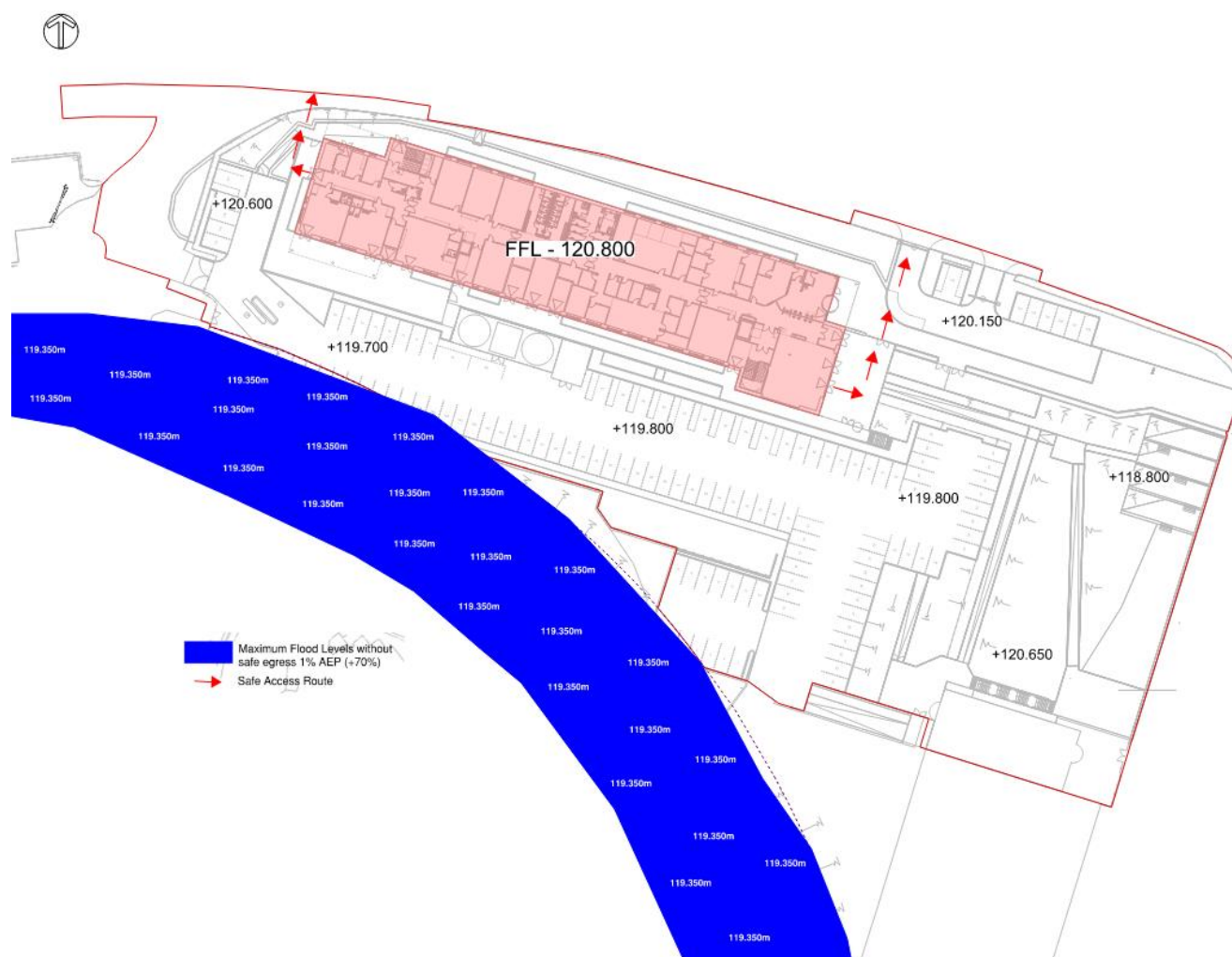


Figure 4.1 Safe Access and Egress Route

The Environment Agency (EA) monitors river and weather conditions and issues flood alerts and warnings through a national four-stage coded warning system. This system is designed to provide advance notice of potential flooding and allow individuals and organisations to take timely and appropriate action. The different stages and their recommended responses are outlined in Table 4.1 of this report. As the development will be used by school staff, students, and visitors, a site-specific Flood Warning and Evacuation Plan (FWEP) will be implemented as part of the school's emergency procedures.

All relevant staff will be registered with the EA's Flood Warning Service and trained in the actions required at each alert level. Flood response measures will not rely solely on EA alerts. On-site monitoring, such as observations of rising river levels or extreme rainfall, will also trigger emergency procedures to ensure a proactive response. Evacuation routes will be clearly identified and maintained throughout the lifetime of the school, with dry, safe access and egress routes available even under extreme flood scenarios.

Welfare facilities, key infrastructure, and critical teaching areas are located in parts of the site least vulnerable to flooding as seen in Figure 4.1. Regular training and drills will be undertaken so that staff and pupils are familiar with evacuation protocols, ensuring the school community is well-prepared and resilient in the event of a flood.

Table 4.1: Environment Agency Flood Warning System

Flood Alert - Prepare: Flooding is possible. Be prepared	
 Is used from two hours to twelve hours in advance of flooding.	Following Actions: - Check your flood risk - Sign up for flood warnings - Keep up to date with the latest situation - call Floodline on 0345 988 1188 - Be ready to follow your flood plan - Have insurance documents and any medications ready - Avoid walking, cycling or driving through any flood water - Move any livestock and farming equipment away from areas likely to flood
Flood Warning - Act: Flooding is expected. Immediate action is required	
 Is used from half an hour to two hours in advance of flooding.	Following Actions: - As with Flood Alert plus; - Protect yourself and your loved ones - Move your loved ones, pets and valuables to a safe place - Move to higher ground or the upper floor of a building - Turn off the gas, electricity and water in your home if it's safe - Put flood protection equipment in place - Do as the emergency services tell you - Help others if it's safe to do so
Severe Flood Warning - Survive: Severe flooding. Danger to life	
 issued when flooding threatens life and communities	Following Actions: - As with Flood Warning plus; - Stay in a safe place - Be ready to evacuate your home - Do as the emergency services tell you - Call 999 if you are in immediate danger - If you are caught in a flash flood move to higher ground or the upper floor of a building if it's safe.

5.0 Surface Water Run-off Assessment

5.1 Existing Run-off

The total site area is approximately 1.2ha, as described in Section 1, the site currently drains to a surface water drainage network on site.

The existing peak run-off rate into the current surface water drainage network for the design storm event was estimated by modelling the existing drainage network on MicroDrainage for a 2-year storm event and a 100-year storm event. The calculations and assumed parameters are included in Appendix C.

Table 5.1: Discharge Rate Summary

Storm Event	Discharge Rate (l/s)
2 Year	151.3
100 Year	360

5.2 Proposed Runoff

Given that the development is for a school, it is classified as “more vulnerable” under the National Planning Policy Framework (NPPF) vulnerability classifications. The anticipated design life of the development is 60 years, extending to approximately 2085. In line with the environment Agency guidance (March 2023), the 2070s epoch is most appropriate for the climate change allowance.

For this epoch, the peak river flow allowances range from:

- 30% (central allowance)
- 45% (upper end allowance)

For surface water drainage, the peak rainfall intensity allowance has been based on the most recent Environment Agency climate change guidance. The upper end uplift of 45% has been applied to the design of the surface water drainage strategy to account for increased rainfall intensity over the lifespan of the development. Sustainable Drainage Systems (SuDS), such as swales, will be implemented to manage runoff volumes where practicable.

By incorporating these allowances, the proposed development demonstrates compliance with national planning policy and provides a robust level of resilience to future flood risks associated with climate change.

The proposed surface water drainage strategy has been developed using detailed hydraulic modelling carried out in InfoDrainage, based on the 1 in 100-year rainfall event plus 45% climate change allowance. The system design is site specific, incorporating measured impermeable areas, site gradients and drainage infrastructure in accordance with current best practice and national guidance. The calculations and assumed parameters for the proposed case, modelled in InfoDrainage are included in Appendix D.

Roscoe proposes a 50% betterment on the 2-year storm discharge rate, aligning with the requirements set out by the Local Lead Flood Authority (LLFA). This results in a restricted flow rate of 75 litres per second (l/s) for the 2-year event. A 50% reduction at this return period is considered particularly beneficial, as it targets the more frequent rainfall events that typically place the greatest strain on existing surface water drainage systems. By reducing runoff from these regular storm events, the proposed strategy provides practical and measurable improvements to local surface water management.

The total discharge rate of 75 l/s will be distributed across two drainage outlets on the site—45 l/s to the western side and 30 l/s to the eastern side. To achieve these flow rates, two separate attenuation tanks will be provided, with storage volumes of approximately 185 m³ and 72 m³, respectively. The full proposed drainage layout can be seen in Appendix E.

As the surface water drainage system is to remain under private ownership, it will not be subject to adoption under Sewers for Adoption or the Design and Construction Guidance (DCG). A volumetric runoff coefficient (Cv) of 1.0 has been applied in accordance with the CIRIA SuDS Manual (C753). This conservative approach assumes that all catchment areas are fully impermeable, ensuring a robust and precautionary design. However, it is acknowledged that the inclusion of SuDS features, such as soft landscaping, will reduce runoff during certain rainfall events by promoting infiltration and surface water attenuation. The InfoDrainage inputs and results for the proposed case have been attached as Appendix D with the catchment areas attached in Appendix F.

5.3 Surface Water SUDS Strategy

In accordance with EA guidelines and CIRIA documents, surface water runoff should be managed as close to its source as possible. The NPPF states that the following drainage hierarchy should be used to determine runoff destination.

5.3.1 Infiltration Into the Ground

Soakaways and other methods of infiltrating into the ground may not be feasible on the site due to the local geology being predominantly made up of cohesive soils. In accordance with best practice and to assess the viability of infiltration-based drainage solutions, BRE Digest 365 infiltration testing was carried out on the site.

A ground investigation report was conducted by TIER Consult Group on the 3rd of March 2025, which included the results of the infiltration test. Infiltration testing was conducted at a soakaway pit, SA01, to a depth of 1.98m bgl on site. The location and result of the soakaway and failing head tests are included within Appendix G. Due to the significant depth of made ground and the poor infiltration test results, soakaways are not likely to be a viable form of surface water drainage.

These findings demonstrate that infiltration is not a viable option for surface water management on this site. As such, a positively drained system with controlled discharge to the receiving sewer or watercourse is proposed, in line with national and local design standards.

5.3.2 To a Surface Water Body

The River Roch runs directly along the southern boundary of the site and currently receives surface water runoff via three outfalls, two private and one public, which ultimately discharge into the river. While the river is an available receptor, direct discharge into it is not considered feasible for the proposed development. Constructing a new outfall or headwall would require works within the river corridor, potentially disrupting the watercourse and triggering the need for additional regulatory approvals such as an Environmental Permit. To avoid unnecessary disturbance to the river and to make use of existing infrastructure, the proposed surface water drainage strategy will discharge into the River Roch via the existing surface water sewer connections already present on site.

5.3.3 To a Surface Water Sewer, Highway Drain, or Another Drainage System

Where direct discharge to a watercourse is not feasible, the next preferable option under the SuDS hierarchy is discharge to a surface water sewer. On this site, there is an existing public surface water sewer that conveys runoff directly to the River Roch, as well as two private outfalls. The proposed drainage strategy maintains this arrangement by discharging surface water runoff to the existing surface water network, which in turn discharges to the River Roch. While this technically involves the use of a surface water sewer, the final outfall remains a nearby open watercourse, and the route is considered appropriate given the urban setting and existing drainage infrastructure. Discharge to the surface water sewer will be controlled through attenuation and flow restriction in line with the greenfield runoff rate targets and LLFA guidance. This connection will be indirect and will require a Section 106 agreement from United Utilities.

5.3.4 To a Combined Sewer

According to United Utilities asset survey, there is not a combined water sewer present on site, therefore this runoff destination will not be considered.

5.4 Proposed Discharge Rates and Attenuation Volume

Communications with United Utilities have been initiated with the intention to discharge surface water via gravity to their surface water drainage network located running through the site. The proposed discharge rates and attenuation volumes have been included in Section 5.2.

5.5 Water Quality

SuDS have the potential to provide water quality benefits to runoff entering the environment. The SuDS Manual states that SuDS should be designed to treat runoff to reduce the risk of environmental pollution. Chapter 26 of The SuDS Manual sets out the 'simple index approach' to water quality risk management. This approach has been used to quantify the benefits of the proposed SuDS scheme on water quality.

Step 1 of the simple index approach is to identify the pollution hazard indices for the proposed land use. As the site is a school, the CIRIA SuDS Manual (C753) categorises it under:

"Non-residential car parking with infrequent change" if you're considering areas like school car parks with less than 300 traffic movements per day.

Therefore, the proposed school development is considered to have a 'medium' pollution hazard level and Table 5.2 below shows the associated pollution hazard index:

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Residential roofs	Very Low	0.2	0.2	0.05
Other roofs	Low	0.3	0.2	0.05
Individual property driveways, residential car parks, low traffic roads and non-residential car parking with infrequent change	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change, all roads except low traffic roads and trunk roads/motorways	Medium	0.7	0.6	0.7
Sites with heavy pollution, sites where chemicals and fuels are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways	High	0.8	0.8	0.8

Table 5.2: Pollution Hazard Indices, taken from Table 26.2 of The SuDS Manual (CIRIA, 2015)

The principal destination of the runoff is to surface water sewer, but small amounts of infiltration may occur from unlined components. Therefore, the surface water pollution mitigation indices should be used for the main surface water discharge, and the groundwater pollution mitigation indices used for the discharge to groundwater.

The indicative surface water pollution mitigation indices for a swale is shown in Table 5.3 below:

Type of SuDS Component	TSS	Metals	Hydrocarbons
Swale	0.5	0.6	0.6

Table 5.3 Surface Water Pollution Mitigation Indices, taken from Table 26.3 of The SuDS Manual

To determine if a swale is enough for the school site using the simple index approach (SIA) from the CIRIA SuDS Manual (C753), the pollution hazard indices will need to be compared with the mitigation indices of the SuDS components.

Pollutant	TSS	Metals	Hydrocarbons
Pollution Index	0.5	0.4	0.4
Swale	0.5	0.6	0.6
Meets requirement?	yes	yes	yes

Table 5.4: Surface Water Pollution Mitigation Index vs mitigation assessment

Provided that the mitigation indices of the treatment techniques are greater than or equal to the hazard indices for the proposed development then there should be no reduction in the overall water quality within the receiving watercourse or groundwater body. Therefore, the incorporation of a swale will provide suitable prevention from pollution to surface water.

5.6 Biodiversity and Amenity

Swales have been selected as the primary SuDS feature for this site due to their ability to effectively manage surface water runoff while offering additional benefits in terms of biodiversity, amenity, and educational value. Swales are shallow, vegetated channels designed to convey, attenuate, and treat surface water runoff close to where it falls. By slowing flow rates and allowing infiltration and sedimentation, they contribute to both water quantity and quality objectives in line with the CIRIA SuDS Manual (C753).

From a biodiversity perspective, well-designed swales planted with native and pollinator-friendly vegetation can provide valuable linear habitats for invertebrates, birds, and small mammals. They can act as wildlife corridors, linking fragmented green spaces and enhancing ecological connectivity across the site. The use of varied planting and subtle changes in topography within the swale profiles further improves their ecological value, encouraging a diverse range of species.

In terms of amenity, swales offer a more visually attractive alternative to conventional piped systems, integrating into landscaped areas and softening the overall site layout. Within a school environment, swales also present a unique opportunity for hands-on environmental education. They provide a tangible, real-world example of sustainable water management that can support the curriculum in subjects such as geography, science, and environmental studies. Interpretation signage or integration into outdoor learning areas can further enhance their educational potential.

Overall, the proposed swales serve multiple functions: they contribute to runoff control, improve water quality, enhance biodiversity, and support the amenity and educational value of the development in a cost-effective and sustainable way.

5.7 Surface Water Maintenance Strategy

The successful implementation and operation of a SuDS system depends on a robust and clear maintenance strategy being implemented. The following measures should form part of the site's proposed management plan. It is envisaged that the majority of the site drainage will be offered for adoption to United Utilities subject to further discussions. However, the majority of the SuDS will be maintained by The Hopwood Hall College School and will form part of the overall maintenance regime for the site. A SuDS Proforma has been attached in Appendix J.

SuDS Element	Maintenance		
	Activity	Required Action	Typical Frequency
Swale	Regular Maintenance	Remove litter and debris	Monthly, or as required
		Cut the grass, manage vegetation and remove nuisance plants	Monthly at start, then as required
		Inspect inlets, outlets and overflows for blockages, and clear if required	Monthly
		Inspect for ponding, compaction and silt accumulation	Monthly or when required
		Inspect vegetation coverage	Monthly for 6 months, quarterly for 2 years, then half yearly
		Inspect inlets and facility surface for silt accumulation, establish appropriate silt removal frequencies	Half yearly
	Occasional Maintenance	Reseed areas of poor vegetation growth, alter plant types to better suit conditions, if required	As required or if bare soil is exposed over 10% of more of the swale treatment area.
	Remedial Actions	Repair erosion or other damage by re-turfing or reseedling	As required
		Relevel uneven surfaces and reinstate design levels	
Attenuation Tank	Monitoring / Inspections	Inspect all inlets, outlets, vents, overflows and control structures to ensure they are working as they should	Annually or after severe storms
		Inspect and identify any elements that are not operating correctly.	Monthly for three months, then half yearly or as required.
	Regular Maintenance	Remove sediments / debris from catch pits / gullies and control structures	Annually, after severe storms or as required
	Remedial Actions	Repair inlets, outlets, vents, overflows and control structures.	As required

Table 5.5 SuDS Maintenance Strategy as taken from The SuDS Manual

Effective SuDS design must assess all foreseeable risks during construction and maintenance. These must be mitigated during the detailed design stages where effective design will aim to avoid, reduce and mitigate risks. This process will also require input from the principal contractor who will ensure the construction of SuDS components are carried out in a safe and sustainable manner.

6.0 Exceedance Routes and Overland Flows

Surface water exceedance and overland flows occur when intense rainfall is unable to either soak into the ground or enter a drainage system; due to blockages or the capacity of the system being exceeded. Although drainage systems are currently designed for extreme storm events, it is not economical or sustainable to build large, oversized drainage networks for all types of extreme rainfall or scenarios. As a result, there will be occasions when surface water runoff will exceed the capacity of drains as outlined in CIRA 635 document 'Designing for exceedance in urban drainage – good practice':

"It is inevitable that as a result of extreme rainfall the capacities of sewers, covered watercourses and other drainage systems will be exceeded on occasion. Periods of exceedance occur when the rate of surface runoff exceeds the drainage system inlet capacity, when the pipe system becomes overloaded, or when the outfall becomes restricted due to flood levels in the receiving water."

Designing for exceedance aims to divert and control flood flows along routes where the risk of property flooding and the risk to health and safety is minimised and can be managed.

The proposed school building will be higher than the surrounding site, therefore the exceedance routes flow away from the building. The proposed attenuation tank and the surface water drainage network has been designed not to flood for the 1 in 100 year plus 45% rainfall event. A pre and post development ground levels plan is provided in Appendix A to demonstrate offsite flow paths on the site and that the level changes will not have a negative offsite risk.

7.0 Foul Water Assessment

As outlined in Section 1.0 the site has an existing foul and surface water drainage network serving the site which eventually discharge into public United Utilities assets before then discharging offsite.

It is proposed to re-use this existing connection to the public sewers with a new foul water network constructed to serve the proposed buildings. This network will connect into the public sewer via a new manhole ref FWMH9.

All proposed networks will be designed to Adoptable Standards as outlined in the Design and Construction Guidance (Appendix C of the Sewerage Sector Guidance in relation to the adoption of sewerage assets) (DCG) and in accordance with Building Regulations Part H.

The foul water drainage will discharge at an unrestricted flow, a foul flows worksheet has been attached in Appendix H.

A 'Pre-development Enquiry' will be submitted to United Utilities to confirm capacity exists within the receiving public sewers.

8.0 Conclusions

- Roscoe have been commissioned to undertake a Flood Risk Assessment (FRA) for the proposed development at Hopwood Hall College, Rochdale, OL12 6RY.
- The EA mapping indicates that the site is within Flood Zone 2/3 and is at risk of flooding from the River Roch.
- The site is located off Saint Marys Gate (A58), Rochdale. The postcode of the site is OL12 6RY, and can be further identified by grid reference 389339, 413366.
- The proposal involves the demolition of the existing Block B building including the basement and the construction of a new four-storey block intended for teaching purposes. The development is to be situated in the northern section of the site, opposite College Road, on land currently occupied by car parking spaces.
- Product 4 data was obtained from the EA and the flood levels are:

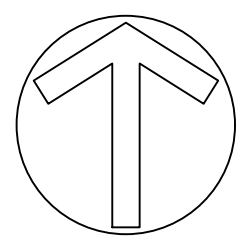
1% AEP (with +35% climate change): 119.01 m AOD

1% AEP (with +70% climate change): 119.35 m AOD

- This is lower than the lowest expected level on the proposed site which is 119.58m AOD.
- Based on the available ground investigation data and the nature of the proposed development, the risk of groundwater flooding is considered to be low.
- With the existing infrastructure and proposed SuDS strategy, the residual risk of pluvial flooding is considered low, and surface water will be managed in accordance with best practice guidance and LLFA expectations.
- The residual risk from overland flow is considered low and can be effectively managed through site design and surface water drainage infrastructure.
- The risk of groundwater flooding during the enabling phase is considered low, and will be mitigated through measures such as non-return valves.
- The residual risk from reservoir flooding is considered low.
- A Safe Access and Egress Plan has been prepared to support this FRA, which identifies designated access routes across the site relative to the modelled flood level of 119.35 m AOD (1% AEP event with +70% climate change allowance).
- The proposed surface water drainage strategy has been developed using detailed hydraulic modelling carried out in InfoDrainage, based on the 1 in 100-year rainfall event plus 45% climate change allowance.
- Roscoe proposes a 50% betterment on the 2-year storm discharge rate, aligning with the requirements set out by the Local Lead Flood Authority (LLFA). The total discharge rate of 75 l/s will be distributed across two drainage outlets on the site—45 l/s to the western side and 30 l/s to the eastern side. To achieve these flow rates, two separate attenuation tanks will be provided, with storage volumes of approximately 185 m³ and 72 m³, respectively.
- Swales and attenuation tanks will be used as the main method of SuDS for this proposal.

Appendix A

Existing and Proposed Enabling Works Site Levels



DO NOT SCALE

KEY PLAN
Existing Levels 119.59



PO1	05.08.25	AY	FOR INFORMATION	JT	JT
REV	DATE	BY	DESCRIPTION	CHK	APP

DRAWING STATUS FOR INFORMATION



CLIENT WILLMOTT DIXON

ARCHITECT SHEPPARD ROBSON

PROJECT HOPWOOD HALL COLLEGE
ROCHDALE

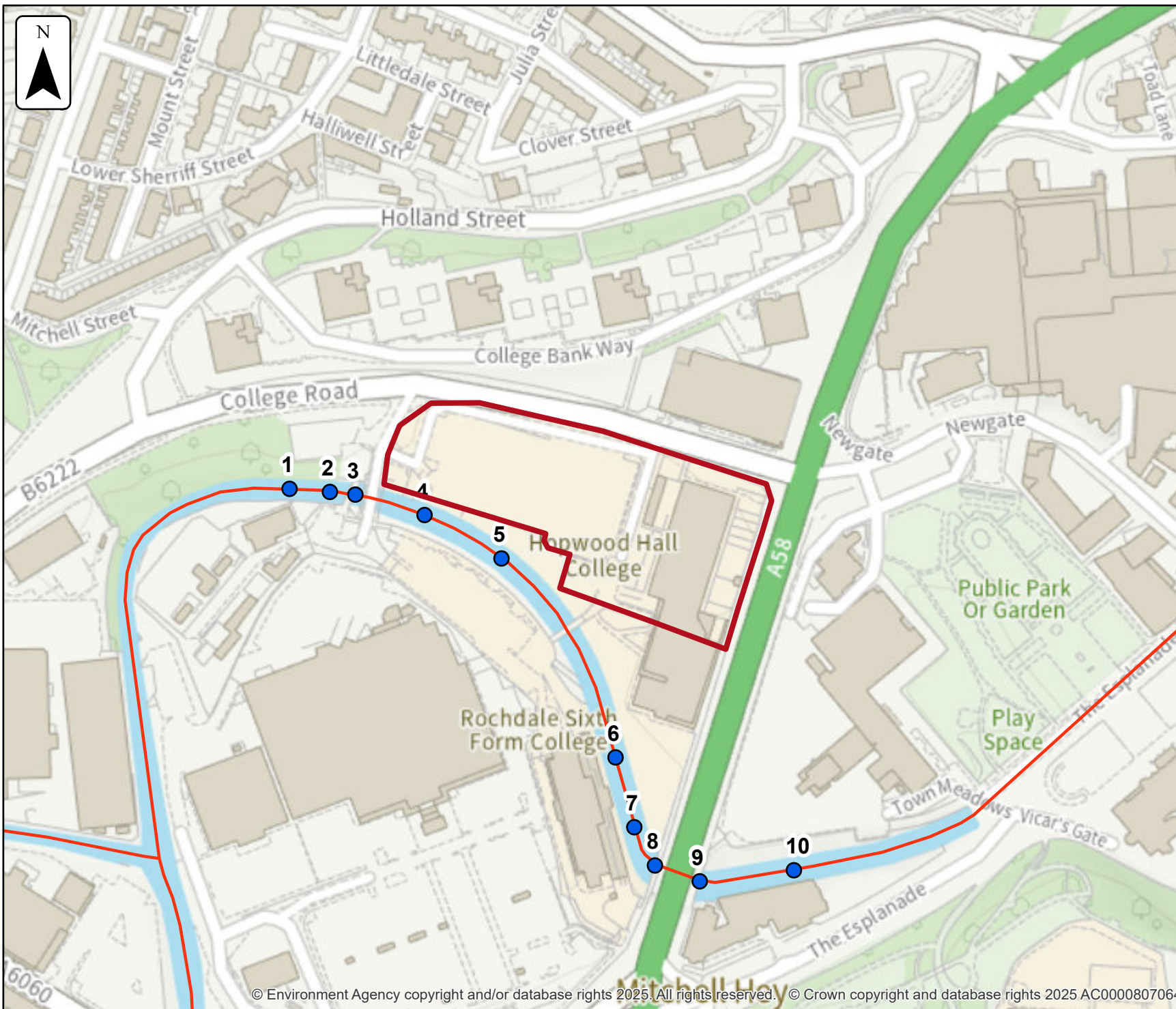
TITLE
EXISTING AND PROPOSED SITE LEVELS
GENERAL LAYOUT

SCALE @ A2:	1:200	CHECKED	JT	APPROVED	JT
PROJECT NUMBER:	24365	DESIGNED	AY	DRAWN	AY
				DATE	AUG 25

DRAWING NO:	FE0012-ROS-XX-XX-D-C-01100	REV	PO1
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Appendix B

Product 4 Data



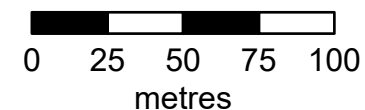
Defences removed climate change modelled fluvial node locations

Location (easting/northing)
389295/413385

Scale Created
1:2,500 23 Jul 2025

Model name
**Rochdale and
Littleborough 2013**

-  Selected area
-  Modelled location
-  Main river



Modelled node locations data

Defences removed climate change

Label	Modelled location ID	Easting	Northing	1% AEP (+20%)	1% AEP (+35%)	1% AEP (+70%)	1% AEP (+20%)	1% AEP (+35%)	1% AEP (+70%)
				Level	Level	Level	Flow	Flow	Flow
1	1674011	389146	413395	118.53	118.73	119.16	59.14	54.94	55.11
2	1673900	389165	413393	118.53	118.73	119.16	60.54	54.42	54.06
3	1673886	389178	413392	118.82	118.98	119.33	60.54	54.42	54.06
4	1674171	389211	413382	118.85	119.01	119.35	57.39	50.34	49.60
5	1673835	389248	413361	118.85	119.01	119.35	56.93	51.86	51.31
6	1674601	389304	413265	118.70	118.81	119.14	96.95	99.95	104.78
7	1674006	389313	413231	118.79	118.91	119.26	92.43	93.32	94.86
8	1674314	389323	413212	118.89	118.99	119.29	95.49	98.76	105.42
9	1674635	389345	413205	119.07	119.18	119.48	95.49	98.77	105.44
10	1674704	389390	413210	119.05	119.15	119.46	95.51	98.79	105.47

Data in this table comes from the Rochdale and Littleborough 2013 model.

Level values are shown in mAOD, and flow values are shown in cubic metres per second.

Any blank cells show where a particular scenario has not been modelled for this location.

Appendix C

MicroDrainage Calculations for Existing Site

Project: Hopwood Hall College Existing Surface Water Network 2yr Storm Event	Date: 07/11/2024		
	Designed by: JT	Checked by: JT	Approved By: JT
Report Details: Type: Inflows Storm Phase: Phase	Company Address: Roscoe		



Catchment Area

Type : Catchment Area

Area (ha)	0.27
-----------	------

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100



Catchment Area (1)

Type : Catchment Area

Area (ha)	0.289
-----------	-------

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100



Catchment Area (2)

Type : Catchment Area

Area (ha)	0.36
-----------	------

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100



Catchment Area (3)

Type : Catchment Area

Area (ha)	0.169
-----------	-------

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

Project: Hopwood Hall College Existing Surface Water Network 2yr Storm Event		Date: 07/11/2024	
Report Details: Type: Junctions Storm Phase: Phase		Designed by: JT	Checked by: JT
		Approved By: JT	
		Company Address: Roscoe	



Name	Junction Type	Easting (m)	Northing (m)	Cover Level (m)	Depth (m)	Invert Level (m)	Chamber Shape	Diameter (m)
EXSWMH01	Manhole	389224.858	413435.899	119.390	0.660	118.730	Circular	1.200
EXSWMH02	Manhole	389315.076	413409.331	119.390	2.640	116.750	Circular	1.200
EXSWMH03	Manhole	389320.690	413407.800	119.390	2.720	116.670	Circular	1.200
EXSWMH04	Manhole	389335.489	413404.666	119.590	2.710	116.880	Circular	1.200
EXSWMH05	Manhole	389310.702	413373.900	119.220	3.700	115.520	Circular	1.200
EXSWMH06	Manhole	389307.275	413363.110	119.220	3.770	115.450	Circular	1.200
Outfall	Manhole	389276.072	413346.123	117.210	2.100	115.110	Circular	1.200

Name	Lock
EXSWMH01	None
EXSWMH02	None
EXSWMH03	None
EXSWMH04	None
EXSWMH05	None
EXSWMH06	None
Outfall	None

Inlets

Junction	Inlet Name	Incoming Item(s)	Bypass Destination	Capacity Type
EXSWMH01	Inlet	Catchment Area	(None)	No Restriction
EXSWMH02	Inlet	01-> 02	(None)	No Restriction
	Inlet (1)	Catchment Area (1)	(None)	No Restriction
EXSWMH03	Inlet	02 -> 03 04 -> 03	(None)	No Restriction
	Inlet (1)	Catchment Area (2)	(None)	No Restriction
EXSWMH05	Inlet	03 -> 05	(None)	No Restriction
EXSWMH06	Inlet	05 -> 06	(None)	No Restriction
	Inlet (1)	Catchment Area (3)	(None)	No Restriction
Outfall	Inlet	06 -> Outfall	(None)	No Restriction

Outlets

Junction	Outlet Name	Outgoing Connection	Outlet Type
EXSWMH01	Outlet	01-> 02	Free Discharge
EXSWMH02	Outlet	02 -> 03	Free Discharge
EXSWMH03	Outlet	03 -> 05	Free Discharge
EXSWMH04	Outlet	04 -> 03	Free Discharge
EXSWMH05	Outlet	05 -> 06	Free Discharge
EXSWMH06	Outlet	06 -> Outfall	Free Discharge

Project: Hopwood Hall College Existing Surface Water Network 2yr Storm Event	Date: 07/11/2024		
	Designed by: JT	Checked by: JT	Approved By: JT
	Report Details: Type: Outfall Details Storm Phase: Phase		
Company Address: Roscoe			 Roscoe CIVIL & STRUCTURAL ENGINEERS INSPIRING BUILT ENVIRONMENTS

Outfalls

Outfall	Outfall Type	Fixed Surcharged Level (m)	Level Curve
Outfall	Free Discharge		

Project: Hopwood Hall College Existing Surface Water Network 2yr Storm Event	Date: 07/11/2024		
	Designed by: JT	Checked by: JT	Approved By: JT
	Report Title: Rainfall Analysis Criteria		
Company Address: Roscoe			 CIVIL & STRUCTURAL ENGINEERS INSPIRING BUILT ENVIRONMENTS

Runoff Type	Dynamic
Output Interval (mins)	5
Time Step	Default
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	300
Perform No Discharge Analysis	☐

Project: Hopwood Hall College Existing Surface Water Network 2yr Storm Event	Date: 07/11/2024		
	Designed by: JT	Checked by: JT	Approved By: JT
Report Details: Type: Inflows Summary Storm Phase: Phase	Company Address: Roscoe		



Critical Storm

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow (m³)
Catchment Area	FSR: 2 years: +0 %: 15 mins: Winter	0.27	42.5	19.640
Catchment Area (1)	FSR: 2 years: +0 %: 15 mins: Winter	0.29	45.3	20.964
Catchment Area (2)	FSR: 2 years: +0 %: 15 mins: Winter	0.36	56.6	26.173
Catchment Area (3)	FSR: 2 years: +0 %: 15 mins: Winter	0.17	26.5	12.243

Project: Hopwood Hall College Existing Surface Water Network 2yr Storm Event		Date: 07/11/2024	
Report Details: Type: Junctions Summary Storm Phase: Phase		Designed by: JT	Checked by: JT
		Approved By: JT	
		Company Address: Roscoe	



Critical Storm

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
EXSWMH01	FSR: 2 years: +0 %: 15 mins: Winter	119.3 90	118.7 30	118.83 2	0.102	42.5	0.116	0.000	40.4	19.641	OK
EXSWMH02	FSR: 2 years: +0 %: 15 mins: Winter	119.3 90	116.7 50	116.94 0	0.190	85.7	0.215	0.000	80.7	40.537	OK
EXSWMH03	FSR: 2 years: +0 %: 15 mins: Winter	119.3 90	116.6 70	116.78 7	0.117	137.3	0.132	0.000	135.0	66.723	OK
EXSWMH04	FSR: 2 years: +0 %: 15 mins: Summer	119.5 90	116.8 80	116.88 0	0.000	0.0	0.000	0.000	0.0	0.000	OK
EXSWMH05	FSR: 2 years: +0 %: 15 mins: Winter	119.2 20	115.5 20	115.71 8	0.198	135.0	0.224	0.000	129.7	66.656	OK
EXSWMH06	FSR: 2 years: +0 %: 15 mins: Winter	119.2 20	115.4 50	115.63 0	0.180	156.1	0.204	0.000	151.3	78.863	OK
Outfall	FSR: 2 years: +0 %: 15 mins: Winter	117.2 10	115.11 0	115.27 9	0.169	151.3	0.000	0.000	151.5	78.863	OK

Project: Hopwood Hall College Existing Surface Water Network 2yr Storm Event		Date: 07/11/2024	
Report Details: Type: Connections Summary Storm Phase: Phase		Designed by: JT	Checked by: JT
		Approved By: JT	
		Company Address: Roscoe	



Critical Storm

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
01-> 02	FSR: 2 years: +0 %: 15 mins: Winter	Pipe	EXSWM H01	EXSWM H02	119.4	118.83 2	0.146	19.641	1.2	0.25	40.4	OK
02 -> 03	FSR: 2 years: +0 %: 15 mins: Winter	Pipe	EXSWM H02	EXSWM H03	119.4	116.94 0	0.153	40.537	2.2	0.62	80.7	OK
03 -> 05	FSR: 2 years: +0 %: 15 mins: Winter	Pipe	EXSWM H03	EXSWM H05	119.4	116.78 7	0.157	66.723	1.8	0.04	135.0	OK
05 -> 06	FSR: 2 years: +0 %: 15 mins: Winter	Pipe	EXSWM H05	EXSWM H06	119.2	115.71 8	0.189	66.656	1.3	0.08	129.7	OK
06 -> Outfall	FSR: 2 years: +0 %: 15 mins: Winter	Pipe	EXSWM H06	Outfall	119.2	115.63 0	0.175	78.863	1.7	0.08	151.3	OK
04 -> 03	FSR: 2 years: +0 %: 15 mins: Summer	Pipe	EXSWM H04	EXSWM H03	119.6	116.88 0	0.057	0.000	0.0	0	0.0	OK

Project: Hopwood Hall College Existing Surface Water Network 2yr Storm Event	Date: 07/11/2024		
	Designed by: JT	Checked by: JT	Approved By: JT
Report Details: Type: Phase Management Storm Phase: Phase	Company Address: Roscoe		

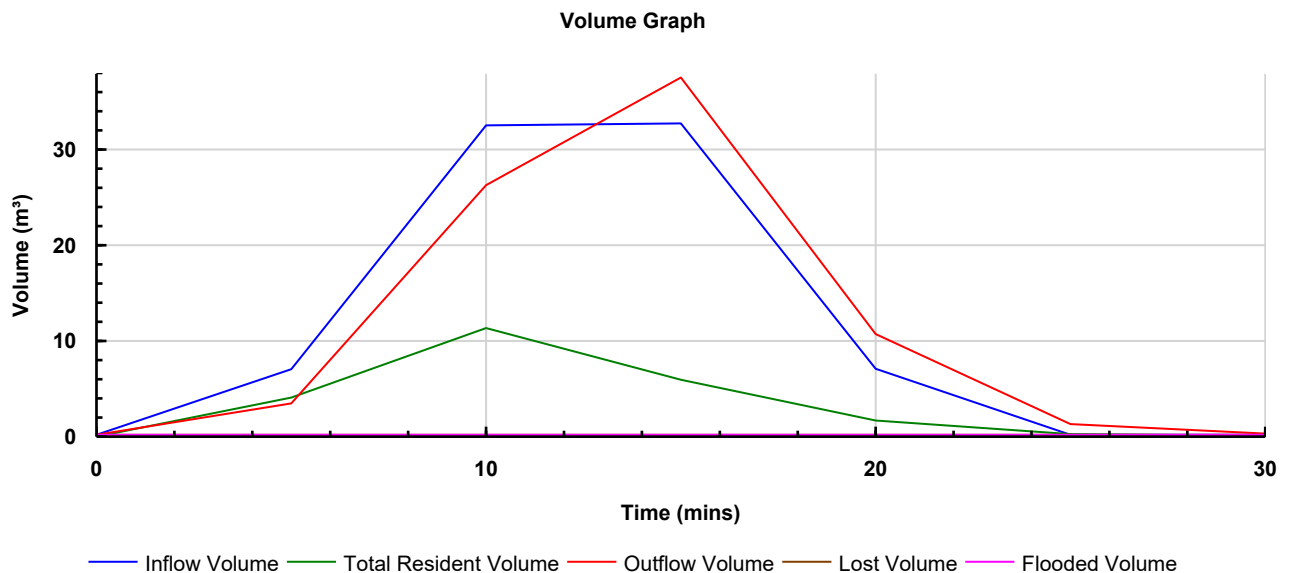
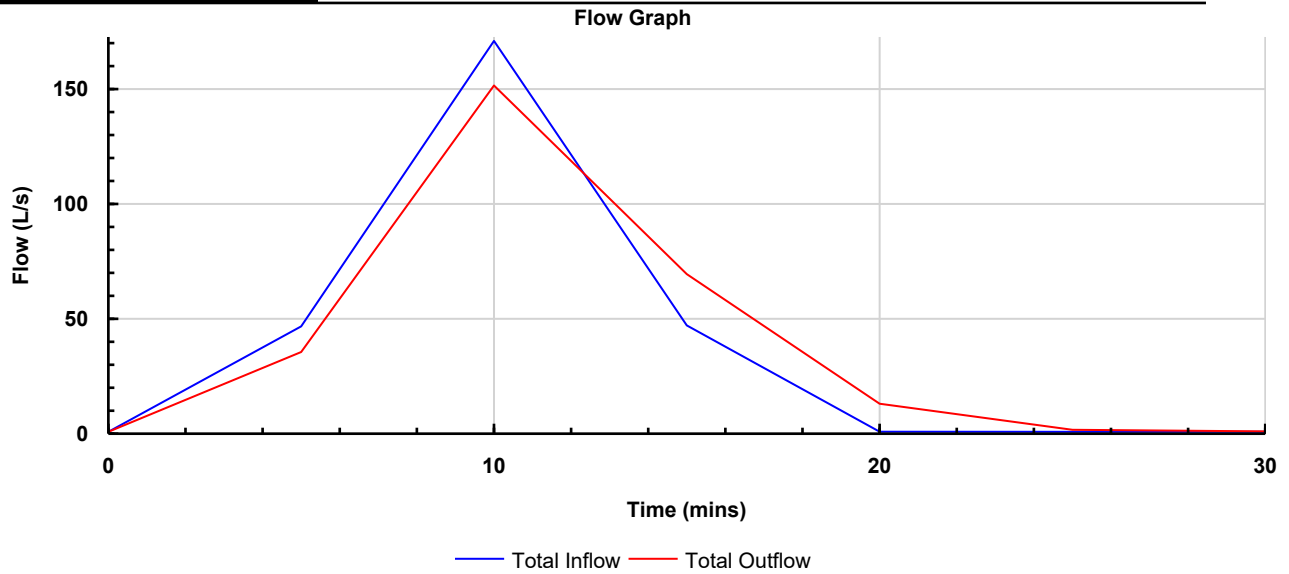


Phase
FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Winter

Tables

Name	Max. Inflow (L/s)	Total Inflow Volume (m³)	Max. Outflow (L/s)	Total Outflow Volume (m³)
Outfall			151.5	78.863
TOTAL	171.0	79.020	151.5	78.863

Graphs



Appendix D

InfoDrainage Calculations for Proposed Site

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junctions Storm Phase: Phase	Roscoe:		



Name	Junction Type	Easting (m)	Northing (m)	Cover Level (m)	Depth (m)	Invert Level (m)	Chamber Shape	Diameter (m)
SWMH1	Manhole	389220.758	413429.289	120.771	0.921	119.850	Circular	1.200
SWMH2	Manhole	389216.576	413415.650	120.707	0.998	119.709	Circular	1.200
SWMH3	Manhole	389241.971	413407.468	120.621	2.294	118.327	Circular	1.200
SWMH8	Manhole	389222.557	413404.113	119.618	1.461	118.157	Circular	1.200
SWMH9	Manhole	389239.510	413395.883	119.746	1.852	117.894	Circular	1.200
SWMH10	Manhole	389266.886	413386.444	119.793	2.083	117.710	Circular	1.200
SWMH5	Manhole	389264.739	413400.982	120.627	1.250	119.377	Circular	1.200
SWMH6	Manhole	389270.419	413399.461	120.628	2.321	118.307	Circular	1.200
SWMH7	Manhole	389290.772	413393.288	120.630	1.524	119.106	Circular	1.200
SWMH13	Manhole	389308.843	413386.623	120.623	2.114	118.509	Circular	1.200
SWMH11	Manhole	389284.017	413382.016	119.706	2.412	117.294	Circular	1.200
SWMH15	Manhole	389322.401	413396.867	120.570	1.536	119.034	Circular	1.200
SWMH16	Manhole	389341.242	413391.150	120.509	2.009	118.500	Circular	1.200
SWMH14	Manhole	389356.459	413386.682	120.289	1.317	118.972	Circular	1.200
SWMH17	Manhole	389337.779	413379.636	119.743	1.552	118.191	Circular	1.200
SWMH20	Manhole	389334.760	413369.693	119.434	3.603	115.831	Circular	1.200
FC100	Manhole	389316.435	413374.564	119.400	3.665	115.735	Circular	1.200
FC101	Manhole	389306.797	413375.071	119.400	2.387	117.013	Circular	1.200
SWMH19	Manhole	389331.290	413359.673	119.414	1.733	117.681	Circular	1.200
SWMH18	Manhole	389310.601	413348.694	119.673	1.758	117.915	Circular	1.200
SWMH21	Manhole	389363.717	413359.709	116.943	0.600	116.343	Circular	1.200
SWMH12	Manhole	389313.382	413403.365	120.750	1.493	119.257	Circular	1.200
SWMH4	Manhole	389248.525	413405.930	120.627	1.254	119.373	Circular	1.200
EXMH01	Manhole	389310.612	413373.658	119.220	3.700	115.520	Circular	1.200

Name	Lock
SWMH1	None
SWMH2	None
SWMH3	None
SWMH8	None
SWMH9	None
SWMH10	None
SWMH5	None
SWMH6	None
SWMH7	None
SWMH13	None
SWMH11	None
SWMH15	None
SWMH16	None
SWMH14	None
SWMH17	None
SWMH20	None
FC100	None
FC101	None
SWMH19	None
SWMH18	None
SWMH21	None
SWMH12	None
SWMH4	None
EXMH01	None

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junctions Storm Phase: Phase	Roscoe:		



Inlets

Junction	Inlet Name	Incoming Item(s)	Bypass Destination	Capacity Type
SWMH1	Inlet	Catchment Area	(None)	No Restriction
SWMH2	Inlet	1 > 2	(None)	No Restriction
	Inlet (1)	Catchment Area (4)	(None)	No Restriction
SWMH3	Inlet	2 > 3 4 > 3	(None)	No Restriction
	Inlet (1)	Catchment Area (5)	(None)	No Restriction
SWMH8	Inlet	Catchment Area (1)	(None)	No Restriction
SWMH9	Inlet	3 > 9	(None)	No Restriction
	Inlet (1)	8 > 9	(None)	No Restriction
	Inlet (2)	Catchment Area (2)	(None)	No Restriction
SWMH10	Inlet	9 > 10 6 > 10	(None)	No Restriction
	Inlet (1)	Catchment Area (3)	(None)	No Restriction
SWMH5	Inlet	Catchment Area (7)	(None)	No Restriction
SWMH6	Inlet	5 > 6 7 > 6	(None)	No Restriction
	Inlet (1)	Catchment Area (8)	(None)	No Restriction
SWMH7	Inlet	Catchment Area (10)	(None)	No Restriction
SWMH13	Inlet	12 > 13	(None)	No Restriction
	Inlet (1)	Catchment Area (12)	(None)	No Restriction
SWMH11	Inlet	10 > 11	(None)	No Restriction
	Inlet (1)	Catchment Area (9)	(None)	No Restriction
SWMH15	Inlet	Catchment Area (18)	(None)	No Restriction
SWMH16	Inlet	15 > 16	(None)	No Restriction
	Inlet (1)	14 > 16	(None)	No Restriction
	Inlet (2)	Catchment Area (19)	(None)	No Restriction
SWMH14	Inlet	Catchment Area (20)	(None)	No Restriction
SWMH17	Inlet	16 > 17	(None)	No Restriction
	Inlet (1)	Catchment Area (13)	(None)	No Restriction
SWMH20	Inlet	17 > 20 21 > 20 19 > 20	(None)	No Restriction
	Inlet (1)	Catchment Area (14)	(None)	No Restriction
FC100	Inlet	Pipe (4)	(None)	No Restriction
FC101	Inlet	Pipe (2)	(None)	No Restriction
SWMH19	Inlet	18 > 19 Catchment Area (15)	(None)	No Restriction
SWMH18	Inlet	Catchment Area (16)	(None)	No Restriction
SWMH12	Inlet	Catchment Area (11)	(None)	No Restriction
SWMH4	Inlet	Catchment Area (6)	(None)	No Restriction
EXMH01	Inlet	Pipe (5)	(None)	No Restriction
	Inlet (1)	Pipe (6)	(None)	No Restriction

Outlets

Junction	Outlet Name	Outgoing Connection	Outlet Type
SWMH1	Outlet	1 > 2	Free Discharge
SWMH2	Outlet	2 > 3	Free Discharge
SWMH3	Outlet	3 > 9	Free Discharge
SWMH8	Outlet	8 > 9	Free Discharge
SWMH9	Outlet	9 > 10	Free Discharge
SWMH10	Outlet	10 > 11	Free Discharge
SWMH5	Outlet	5 > 6	Free Discharge
SWMH6	Outlet	6 > 10	Free Discharge
SWMH7	Outlet	7 > 6	Free Discharge
SWMH13	Outlet	Pipe	Free Discharge
SWMH11	Outlet	Pipe (1)	Free Discharge
SWMH15	Outlet	15 > 16	Free Discharge
SWMH16	Outlet	16 > 17	Free Discharge

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junctions Storm Phase: Phase	Roscoe:		



Junction	Outlet Name	Outgoing Connection	Outlet Type
SWMH14	Outlet	14 > 16	Free Discharge
SWMH17	Outlet	17 > 20	Free Discharge
SWMH20	Outlet	Pipe (3)	Free Discharge
FC100	Outlet	Pipe (5)	Hydro-Brake®
	Invert Level (m)	115.735	
	Design Depth (m)	1.200	
	Design Flow (L/s)	30.0	
	Objective	Minimise Upstream Storage Requirements	
	Application	Surface Water Only	
	Sump Available	☐	
	Unit Reference	CHE-0221-3000-1200-3000	
FC101	Outlet	Pipe (6)	Hydro-Brake®
	Invert Level (m)	117.013	
	Design Depth (m)	1.337	
	Design Flow (L/s)	45.0	
	Objective	Minimise Upstream Storage Requirements	
	Application	Surface Water Only	
	Sump Available	☐	
	Unit Reference	CHE-0262-4500-1337-4500	
SWMH19	Outlet	19 > 20	Free Discharge
SWMH18	Outlet	18 > 19	Free Discharge
SWMH21	Outlet	21 > 20	Free Discharge
SWMH12	Outlet	12 > 13	Free Discharge
SWMH4	Outlet	4 > 3	Free Discharge

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Stormwater Controls Storm Phase: Phase	Roscoe:		



Tank101

Type : Tank

Dimensions

Exceedance Level (m)	118.350
Depth (m)	1.200
Base Level (m)	117.150
Freeboard (mm)	0
Initial Depth (m)	0.000
Porosity (%)	100
Average Slope (1:X)	0.00
Total Volume (m³)	184.800

Depth (m)	Area (m²)	Volume (m³)
0.000	154.00	0.000
1.200	154.00	184.800

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	Pipe
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	Pipe (1)
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	Pipe (2)
Outlet Type	Free Discharge

Advanced

Perimeter	Circular
Length (m)	17.000

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Stormwater Controls Storm Phase: Phase	Roscoe:		



Tank 100

Type : Tank

Dimensions

Exceedance Level (m)	116.950
Depth (m)	1.200
Base Level (m)	115.750
Freeboard (mm)	0
Initial Depth (m)	0.000
Porosity (%)	100
Average Slope (1:X)	0.00
Total Volume (m³)	72.000

Depth (m)	Area (m²)	Volume (m³)
0.000	60.00	0.000
1.200	60.00	72.000

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	Pipe (3)
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	Pipe (4)
Outlet Type	Free Discharge

Advanced

Perimeter	Circular
Length (m)	8.000

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Network Design Criteria Storm Phase: Phase	Roscoe:		



Flow Options

Peak Flow Calculation	(UK) Modified Rational Method
Min. Time of Entry (mins)	5
Max. Travel Time (mins)	30

Pipe Options

Lock Slope Options	None
Design Options	Minimise Excavation
Design Level	Level Soffits
Min. Cover Depth (m)	1.200
Min. Slope (1:X)	500.00
Max. Slope (1:X)	40.00
Min. Velocity (m/s)	1.0
Max. Velocity (m/s)	3.0
Use Flow Restriction	☐
Reduce Channel Depths	☐

Pipe Size Library

Default

Add. Increment (mm)	75
Max. Diameter (mm)	0

Diameter (mm)	Min. Slope (1:X)	Max. Slope (1:X)
100	0.00	0.00
150	0.00	0.00

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Network Design Criteria Storm Phase: Phase	Roscoe:		



Manhole Options

Apply Offset	☐
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Manhole Size Library

Default

Diameter / Width

Connection (mm)	Diameter / Length (m)	Width (m)
0	1.200	0.000
375	1.350	0.000
500	1.500	0.000
750	1.800	0.000

Additional Sizing

Connection (mm)	900
Diameter / Length (m)	0.900
Width (m)	0.000

Depth

Depth (m)	Diameter / Length (m)	Width (m)
0.000	1.050	0.000
1.500	1.200	0.000

Access

Depth (m)	Ladder Protrusion (mm)
0.000	130
3.000	230

Benching Requirements

Landing Width (mm)	500
Benching Width (mm)	225

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Outfall Details Storm Phase: Phase	Roscoe:		



Outfalls

Outfall	Outfall Type	Gated	Fixed Surcharged Level (m)	Level Curve
EXMH01	Fixed Surcharged Level	☐	115.520	
FSR : 2 years: +0 %: 15 mins: Summer			115.520	
FSR : 2 years: +0 %: 15 mins: Winter			115.520	
FSR : 2 years: +0 %: 30 mins: Summer			115.520	
FSR : 2 years: +0 %: 30 mins: Winter			115.520	
FSR : 2 years: +0 %: 60 mins: Summer			115.520	
FSR : 2 years: +0 %: 60 mins: Winter			115.520	
FSR : 2 years: +0 %: 120 mins: Summer			115.520	
FSR : 2 years: +0 %: 120 mins: Winter			115.520	
FSR : 2 years: +0 %: 240 mins: Summer			115.520	
FSR : 2 years: +0 %: 240 mins: Winter			115.520	
FSR : 2 years: +0 %: 360 mins: Summer			115.520	
FSR : 2 years: +0 %: 360 mins: Winter			115.520	
FSR : 2 years: +0 %: 480 mins: Summer			115.520	
FSR : 2 years: +0 %: 480 mins: Winter			115.520	
FSR : 2 years: +0 %: 960 mins: Summer			115.520	
FSR : 2 years: +0 %: 960 mins: Winter			115.520	
FSR : 2 years: +0 %: 1440 mins: Summer			115.520	
FSR : 2 years: +0 %: 1440 mins: Winter			115.520	

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Title: Rainfall Analysis Criteria	Roscoe:		



Runoff Type	Dynamic
Output Interval (mins)	5
Time Step	Default
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	300
Perform No Discharge Analysis	☐

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Inflows Summary Storm Phase: Phase	Roscoe:		



FSR: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Inflow

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m³)
Catchment Area	FSR: 2 years: +0 %: 15 mins: Summer	0.04	6.9	3.006
Catchment Area (1)	FSR: 2 years: +0 %: 15 mins: Summer	0.03	6.2	2.671
Catchment Area (2)	FSR: 2 years: +0 %: 15 mins: Summer	0.03	6.2	2.668
Catchment Area (3)	FSR: 2 years: +0 %: 15 mins: Summer	0.06	11.6	5.009
Catchment Area (4)	FSR: 2 years: +0 %: 15 mins: Summer	0.01	2.4	1.018
Catchment Area (5)	FSR: 2 years: +0 %: 15 mins: Summer	0.06	12.1	5.255
Catchment Area (6)	FSR: 2 years: +0 %: 15 mins: Summer	0.03	6.2	2.686
Catchment Area (7)	FSR: 2 years: +0 %: 15 mins: Summer	0.03	5.7	2.452
Catchment Area (8)	FSR: 2 years: +0 %: 15 mins: Summer	0.05	10.8	4.656
Catchment Area (9)	FSR: 2 years: +0 %: 15 mins: Summer	0.07	13.5	5.866
Catchment Area (10)	FSR: 2 years: +0 %: 15 mins: Winter	0.01	1.8	0.853
Catchment Area (11)	FSR: 2 years: +0 %: 15 mins: Summer	0.08	16.3	7.069
Catchment Area (12)	FSR: 2 years: +0 %: 15 mins: Summer	0.05	9.7	4.204
Catchment Area (13)	FSR: 2 years: +0 %: 15 mins: Summer	0.02	4.2	1.835
Catchment Area (14)	FSR: 2 years: +0 %: 15 mins: Summer	0.02	3.2	1.404
Catchment Area (15)	FSR: 2 years: +0 %: 15 mins: Summer	0.07	13.3	5.767
Catchment Area (16)	FSR: 2 years: +0 %: 15 mins: Summer	0.03	6.4	2.752
Catchment Area (18)	FSR: 2 years: +0 %: 15 mins: Summer	0.02	3.8	1.659
Catchment Area (19)	FSR: 2 years: +0 %: 15 mins: Summer	0.06	11.5	4.994
Catchment Area (20)	FSR: 2 years: +0 %: 15 mins: Summer	0.04	7.0	3.018

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junctions Summary Storm Phase: Phase	Roscoe:		



FSR: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SWMH1	FSR: 2 years: +0 %: 15 mins: Summer	120.771	119.850	119.919	0.069	6.9	0.077	0.000	6.7	3.005	OK
SWMH2	FSR: 2 years: +0 %: 15 mins: Summer	120.707	119.709	119.757	0.048	9.1	0.054	0.000	8.8	4.018	OK
SWMH3	FSR: 2 years: +0 %: 15 mins: Summer	120.621	118.327	118.434	0.107	27.1	0.121	0.000	26.0	11.956	OK
SWMH8	FSR: 2 years: +0 %: 15 mins: Summer	119.618	118.157	118.196	0.039	6.2	0.044	0.000	6.0	2.675	OK
SWMH9	FSR: 2 years: +0 %: 15 mins: Summer	119.746	117.894	118.023	0.129	38.1	0.145	0.000	36.1	17.273	OK
SWMH10	FSR: 2 years: +0 %: 15 mins: Summer	119.793	117.710	117.833	0.123	65.2	0.139	0.000	63.1	30.132	OK
SWMH5	FSR: 2 years: +0 %: 15 mins: Summer	120.627	119.377	119.404	0.027	5.7	0.031	0.000	5.6	2.453	OK
SWMH6	FSR: 2 years: +0 %: 15 mins: Summer	120.628	118.307	118.379	0.072	18.1	0.082	0.000	17.6	7.868	OK
SWMH7	FSR: 2 years: +0 %: 15 mins: Winter	120.630	119.106	119.129	0.023	1.8	0.025	0.000	1.8	0.852	OK
SWMH13	FSR: 2 years: +0 %: 15 mins: Summer	120.623	118.509	118.570	0.061	25.8	0.069	0.000	25.4	11.291	OK
SWMH11	FSR: 2 years: +0 %: 15 mins: Summer	119.706	117.294	117.462	0.168	76.6	0.190	0.000	74.6	36.035	OK
SWMH15	FSR: 2 years: +0 %: 15 mins: Summer	120.570	119.034	119.070	0.036	3.8	0.041	0.000	3.7	1.658	OK
SWMH16	FSR: 2 years: +0 %: 15 mins: Summer	120.509	118.500	118.583	0.083	22.1	0.094	0.000	21.4	9.666	OK
SWMH14	FSR: 2 years: +0 %: 15 mins: Summer	120.289	118.972	119.020	0.048	7.0	0.054	0.000	6.8	3.018	OK
SWMH17	FSR: 2 years: +0 %: 15 mins: Summer	119.743	118.191	118.280	0.089	25.7	0.101	0.000	25.0	11.495	OK
SWMH20	FSR: 2 years: +0 %: 60 mins: Summer	119.434	115.831	116.022	0.191	29.9	0.216	0.000	28.3	37.319	OK
FC100	FSR: 2 years: +0 %: 60 mins: Summer	119.400	115.735	116.015	0.280	17.2	0.317	0.000	17.2	35.367	Surcharged
FC101	FSR: 2 years: +0 %: 60 mins: Summer	119.400	117.013	117.370	0.357	33.4	0.404	0.000	33.5	80.493	Surcharged
SWMH19	FSR: 2 years: +0 %: 15 mins: Summer	119.414	117.681	117.831	0.150	19.4	0.170	0.000	17.2	8.508	Surcharged
SWMH18	FSR: 2 years: +0 %: 15 mins: Summer	119.673	117.915	117.975	0.060	6.4	0.067	0.000	6.1	2.749	OK
SWMH21	FSR: 2 years: +0 %: 15 mins: Summer	116.943	116.343	116.343	0.000	0.0	0.000	0.000	0.0	0.000	OK
SWMH12	FSR: 2 years: +0 %: 15 mins: Summer	120.750	119.257	119.317	0.060	16.3	0.068	0.000	16.1	7.071	OK
SWMH4	FSR: 2 years: +0 %: 15 mins: Summer	120.627	119.373	119.403	0.030	6.2	0.034	0.000	6.1	2.687	OK
EXMH01	FSR: 2 years: +0 %: 60 mins: Summer	119.220	115.520	115.582	0.062	50.7	0.000	0.000	50.7	115.833	OK

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Roscoe:		



FSR: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Avg. Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Residual Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Tank101	FSR: 2 years: +0 %: 60 mins: Summer	117.378	117.378	0.228	0.228	66.1	35.074	0.000	0.000	33.4	80.560	81.020	OK
Tank 100	FSR: 2 years: +0 %: 60 mins: Summer	116.018	116.018	0.268	0.268	28.3	16.077	0.000	0.000	17.2	35.437	77.671	OK

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Connections Summary Storm Phase: Phase	Roscoe:		



FSR: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1 > 2	FSR: 2 years: +0 %: 15 mins: Summer	Pipe	SWMH1	SWMH2	120.771	119.919	0.058	3.005	1.1	0.38	6.7	OK
2 > 3	FSR: 2 years: +0 %: 15 mins: Summer	Pipe	SWMH2	SWMH3	120.707	119.757	0.077	4.018	1.0	0.22	8.8	OK
4 > 3	FSR: 2 years: +0 %: 15 mins: Summer	Pipe	SWMH4	SWMH3	120.627	119.403	0.069	2.687	0.8	0.09	6.1	OK
3 > 9	FSR: 2 years: +0 %: 15 mins: Summer	Pipe	SWMH3	SWMH9	120.621	118.434	0.118	11.956	1.7	0.76	26.0	OK
8 > 9	FSR: 2 years: +0 %: 15 mins: Summer	Pipe	SWMH8	SWMH9	119.618	118.196	0.084	2.675	0.3	0.03	6.0	OK
9 > 10	FSR: 2 years: +0 %: 15 mins: Summer	Pipe	SWMH9	SWMH10	119.746	118.023	0.126	17.273	1.1	0.23	36.1	OK
10 > 11	FSR: 2 years: +0 %: 15 mins: Summer	Pipe	SWMH10	SWMH11	119.793	117.833	0.145	30.132	1.6	0.2	63.1	OK
5 > 6	FSR: 2 years: +0 %: 15 mins: Summer	Pipe	SWMH5	SWMH6	120.627	119.404	0.050	2.453	1.1	0.07	5.6	OK
7 > 6	FSR: 2 years: +0 %: 15 mins: Winter	Pipe	SWMH7	SWMH6	120.630	119.129	0.046	0.852	0.4	0.05	1.8	OK
6 > 10	FSR: 2 years: +0 %: 15 mins: Summer	Pipe	SWMH6	SWMH10	120.628	118.379	0.097	7.868	1.4	0.47	17.6	OK
12 > 13	FSR: 2 years: +0 %: 15 mins: Summer	Pipe	SWMH12	SWMH13	120.750	119.317	0.061	7.071	1.9	0.15	16.1	OK
15 > 16	FSR: 2 years: +0 %: 15 mins: Summer	Pipe	SWMH15	SWMH16	120.570	119.070	0.059	1.658	0.6	0.13	3.7	OK
14 > 16	FSR: 2 years: +0 %: 15 mins: Summer	Pipe	SWMH14	SWMH16	120.289	119.020	0.065	3.018	0.9	0.22	6.8	OK
16 > 17	FSR: 2 years: +0 %: 15 mins: Summer	Pipe	SWMH16	SWMH17	120.509	118.583	0.086	9.666	1.5	0.26	21.4	OK
17 > 20	FSR: 2 years: +0 %: 15 mins: Summer	Pipe	SWMH17	SWMH20	119.743	118.280	0.085	11.495	1.8	0.28	25.0	OK
21 > 20	FSR: 2 years: +0 %: 15 mins: Summer	Pipe	SWMH21	SWMH20	116.943	116.343	0.080	0.000	0.0	0	0.0	OK
18 > 19	FSR: 2 years: +0 %: 15 mins: Summer	Pipe	SWMH18	SWMH19	119.673	117.975	0.105	2.749	0.5	0.34	6.1	OK
19 > 20	FSR: 2 years: +0 %: 15 mins: Summer	Pipe	SWMH19	SWMH20	119.414	117.831	0.136	8.508	1.0	1.01	17.2	Surcharged
Pipe	FSR: 2 years: +0 %: 15 mins: Summer	Pipe	SWMH13	Tank101	120.623	118.570	0.114	11.291	2.6	0.16	25.4	OK

Hopwood Hall College:		Date: 31/07/2025		
		Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Connections Summary Storm Phase: Phase		Roscoe:		



Pipe (1)	FSR: 2 years: +0 %: 15 mins: Summer	Pipe	SWMH1 1	Tank101	119.706	117.462	0.145	36.035	2.0	0.35	74.6	OK
Pipe (2)	FSR: 2 years: +0 %: 60 mins: Summer	Pipe	Tank101	FC101	118.350	117.378	0.292	80.560	0.4	0.15	33.4	OK
Pipe (3)	FSR: 2 years: +0 %: 15 mins: Summer	Pipe	SWMH2 0	Tank 100	119.434	115.991	0.193	21.207	1.5	0.51	43.1	OK
Pipe (4)	FSR: 2 years: +0 %: 60 mins: Summer	Pipe	Tank 100	FC100	116.950	116.018	0.274	35.437	0.3	0.32	17.2	OK
Pipe (5)	FSR: 2 years: +0 %: 60 mins: Summer	Pipe	FC100	EXMH01	119.400	116.015	0.074	35.349	2.0	0.5	17.2	Surcharged
Pipe (6)	FSR: 2 years: +0 %: 60 mins: Summer	Pipe	FC101	EXMH01	119.400	117.370	0.064	80.484	4.7	0.31	33.5	Surcharged

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Phase Management Storm Phase: Phase	Roscoe:		


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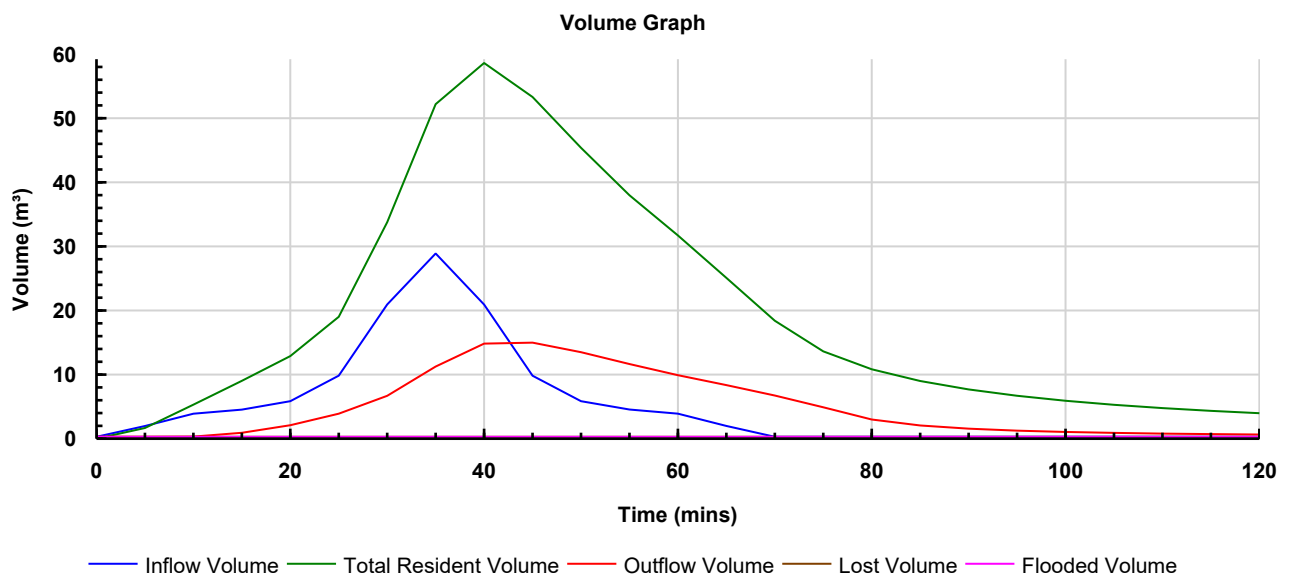
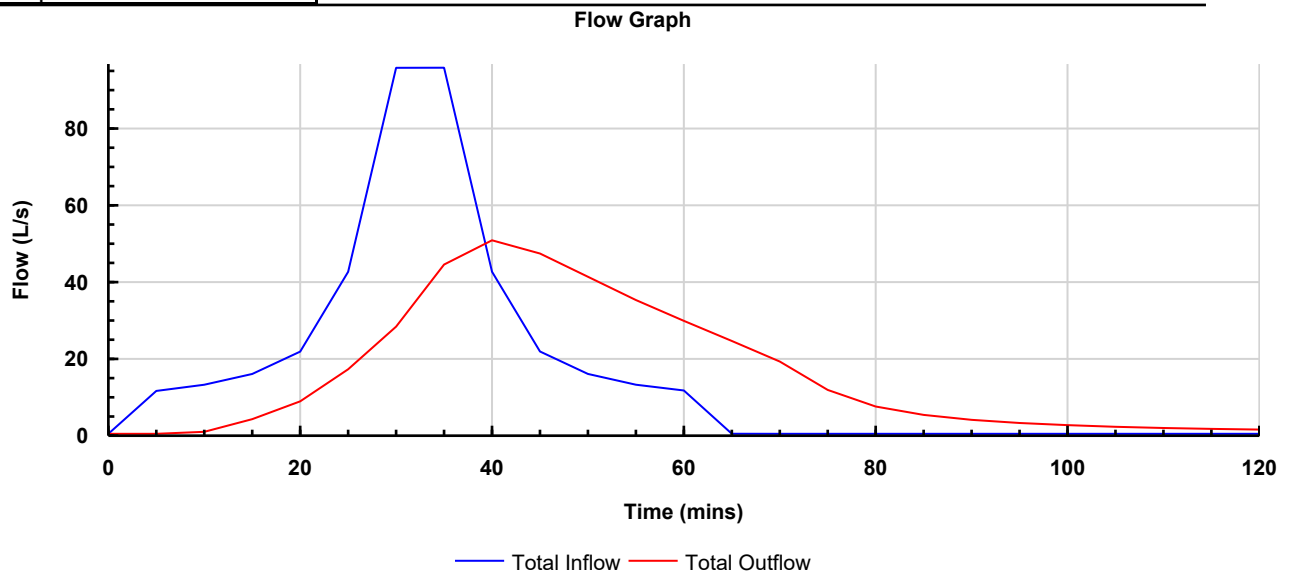
Phase

FSR: 2 years: Increase Rainfall (%): +0: 60 mins: Summer

Tables

Name	Max. Inflow (L/s)	Total Inflow Volume (m³)	Max. Outflow (L/s)	Total Outflow Volume (m³)
EXMH01			50.7	115.833
TOTAL	95.8	119.734	50.7	115.833

Graphs



Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Inflow Results Storm Phase: Phase	Roscoe:		



Catchment Area

Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Summer

Type : Catchment Area

Inflow

Max. Inflow (L/s)	6.9
Total Inflow Volume (m³)	3.006

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	1.5
10	6.9
15	1.6
20	0.0
25	0.0
30	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Inflow Results Storm Phase: Phase	Roscoe:		



Catchment Area (1)
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Summer

Type : Catchment Area

Inflow

Max. Inflow (L/s)	6.2
Total Inflow Volume (m³)	2.671

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	1.4
10	6.2
15	1.4
20	0.0
25	0.0
30	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Inflow Results Storm Phase: Phase	Roscoe:		



Catchment Area (2)
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Summer

Type : Catchment Area

Inflow

Max. Inflow (L/s)	6.2
Total Inflow Volume (m³)	2.668

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	1.4
10	6.2
15	1.4
20	0.0
25	0.0
30	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Inflow Results Storm Phase: Phase	Roscoe:		



Catchment Area (3)
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Summer

Type : Catchment Area

Inflow

Max. Inflow (L/s)	11.6
Total Inflow Volume (m³)	5.009

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	2.5
10	11.6
15	2.6
20	0.0
25	0.0
30	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Inflow Results Storm Phase: Phase	Roscoe:		



Catchment Area (4)
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Summer

Type : Catchment Area

Inflow

Max. Inflow (L/s)	2.4
Total Inflow Volume (m³)	1.018

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	0.5
10	2.4
15	0.5
20	0.0
25	0.0
30	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Inflow Results Storm Phase: Phase	Roscoe:		



Catchment Area (5)
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Summer

Type : Catchment Area

Inflow

Max. Inflow (L/s)	12.1
Total Inflow Volume (m³)	5.255

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	2.7
10	12.1
15	2.7
20	0.0
25	0.0
30	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Inflow Results Storm Phase: Phase	Roscoe:		



Catchment Area (6)
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Summer

Type : Catchment Area

Inflow

Max. Inflow (L/s)	6.2
Total Inflow Volume (m³)	2.686

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	1.4
10	6.2
15	1.4
20	0.0
25	0.0
30	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Inflow Results Storm Phase: Phase	Roscoe:		



Catchment Area (7)
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Summer

Type : Catchment Area

Inflow

Max. Inflow (L/s)	5.7
Total Inflow Volume (m³)	2.452

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	1.2
10	5.7
15	1.3
20	0.0
25	0.0
30	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Inflow Results Storm Phase: Phase	Roscoe:		



Catchment Area (8)
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Summer

Type : Catchment Area

Inflow

Max. Inflow (L/s)	10.8
Total Inflow Volume (m³)	4.656

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	2.4
10	10.8
15	2.4
20	0.0
25	0.0
30	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Inflow Results Storm Phase: Phase	Roscoe:		



Catchment Area (9)
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Summer

Type : Catchment Area

Inflow

Max. Inflow (L/s)	13.5
Total Inflow Volume (m³)	5.866

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	3.0
10	13.5
15	3.0
20	0.0
25	0.0
30	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Inflow Results Storm Phase: Phase	Roscoe:		



Catchment Area (10)
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Winter

Type : Catchment Area

Inflow

Max. Inflow (L/s)	1.8
Total Inflow Volume (m³)	0.853

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	0.5
10	1.8
15	0.5
20	0.0
25	0.0
30	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Inflow Results Storm Phase: Phase	Roscoe:		



Catchment Area (11)
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Summer

Type : Catchment Area

Inflow

Max. Inflow (L/s)	16.3
Total Inflow Volume (m³)	7.069

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	3.6
10	16.3
15	3.7
20	0.0
25	0.0
30	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Inflow Results Storm Phase: Phase	Roscoe:		



Catchment Area (12)

Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Summer

Type : Catchment Area

Inflow

Max. Inflow (L/s)	9.7
Total Inflow Volume (m³)	4.204

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	2.1
10	9.7
15	2.2
20	0.0
25	0.0
30	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Inflow Results Storm Phase: Phase	Roscoe:		



Catchment Area (13)
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Summer

Type : Catchment Area

Inflow

Max. Inflow (L/s)	4.2
Total Inflow Volume (m³)	1.835

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	0.9
10	4.2
15	0.9
20	0.0
25	0.0
30	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Inflow Results Storm Phase: Phase	Roscoe:		



Catchment Area (14)

Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Summer

Type : Catchment Area

Inflow

Max. Inflow (L/s)	3.2
Total Inflow Volume (m³)	1.404

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	0.7
10	3.2
15	0.7
20	0.0
25	0.0
30	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Inflow Results Storm Phase: Phase	Roscoe:		



Catchment Area (15)
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Summer

Type : Catchment Area

Inflow

Max. Inflow (L/s)	13.3
Total Inflow Volume (m³)	5.767

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	2.9
10	13.3
15	3.0
20	0.0
25	0.0
30	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Inflow Results Storm Phase: Phase	Roscoe:		



Catchment Area (16)

Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Summer

Type : Catchment Area

Inflow

Max. Inflow (L/s)	6.4
Total Inflow Volume (m³)	2.752

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	1.4
10	6.4
15	1.4
20	0.0
25	0.0
30	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Inflow Results Storm Phase: Phase	Roscoe:		



Catchment Area (18)

Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Summer

Type : Catchment Area

Inflow

Max. Inflow (L/s)	3.8
Total Inflow Volume (m³)	1.659

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	0.8
10	3.8
15	0.9
20	0.0
25	0.0
30	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Inflow Results Storm Phase: Phase	Roscoe:		



Catchment Area (19)

Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Summer

Type : Catchment Area

Inflow

Max. Inflow (L/s)	11.5
Total Inflow Volume (m³)	4.994

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	2.5
10	11.5
15	2.6
20	0.0
25	0.0
30	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Inflow Results Storm Phase: Phase	Roscoe:		



Catchment Area (20)

Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Summer

Type : Catchment Area

Inflow

Max. Inflow (L/s)	7.0
Total Inflow Volume (m³)	3.018

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	1.5
10	7.0
15	1.6
20	0.0
25	0.0
30	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



SWMH1

Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Summer

Type : Manhole

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	1.5	0.030	0.034	0.000	1.4
10	6.9	0.069	0.077	0.000	6.7
15	1.6	0.034	0.039	0.000	1.9
20	0.0	0.011	0.013	0.000	0.2
25	0.0	0.002	0.003	0.000	0.0
30	0.0	0.002	0.002	0.000	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



SWMH2
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Summer

Type : Manhole

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	1.9	0.022	0.024	0.000	1.8
10	9.1	0.048	0.054	0.000	8.8
15	2.4	0.027	0.030	0.000	2.8
20	0.2	0.010	0.012	0.000	0.4
25	0.0	0.003	0.003	0.000	0.0
30	0.0	0.001	0.001	0.000	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



SWMH3
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Summer

Type : Manhole

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	5.8	0.041	0.046	0.000	5.4
10	27.1	0.107	0.121	0.000	26.0
15	7.0	0.049	0.056	0.000	7.9
20	0.5	0.017	0.020	0.000	1.0
25	0.0	0.005	0.005	0.000	0.1
30	0.0	0.002	0.002	0.000	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



SWMH8
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Summer

Type : Manhole

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	1.4	0.019	0.021	0.000	1.3
10	6.2	0.039	0.044	0.000	6.0
15	1.4	0.021	0.024	0.000	1.7
20	0.0	0.008	0.009	0.000	0.2
25	0.0	0.002	0.002	0.000	0.0
30	0.0	0.001	0.001	0.000	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



SWMH9
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Summer

Type : Manhole

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	8.1	0.055	0.063	0.000	7.0
10	38.1	0.129	0.145	0.000	36.1
15	11.0	0.074	0.083	0.000	13.4
20	1.1	0.030	0.034	0.000	2.1
25	0.1	0.009	0.011	0.000	0.2
30	0.0	0.005	0.005	0.000	0.1

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



SWMH10
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Summer

Type : Manhole

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	13.3	0.051	0.057	0.000	12.3
10	65.2	0.123	0.139	0.000	63.1
15	20.9	0.069	0.078	0.000	23.1
20	2.7	0.028	0.032	0.000	3.7
25	0.2	0.009	0.010	0.000	0.3
30	0.1	0.005	0.005	0.000	0.1

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



SWMH5
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Summer

Type : Manhole

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	1.2	0.013	0.015	0.000	1.2
10	5.7	0.027	0.031	0.000	5.6
15	1.3	0.014	0.016	0.000	1.4
20	0.0	0.004	0.004	0.000	0.1
25	0.0	0.001	0.001	0.000	0.0
30	0.0	0.000	0.000	0.000	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



SWMH6
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Summer

Type : Manhole

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	3.9	0.032	0.036	0.000	3.7
10	18.1	0.072	0.082	0.000	17.6
15	4.3	0.037	0.041	0.000	4.9
20	0.2	0.012	0.014	0.000	0.5
25	0.0	0.002	0.003	0.000	0.0
30	0.0	0.001	0.002	0.000	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



SWMH7
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Winter

Type : Manhole

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	0.5	0.012	0.013	0.000	0.4
10	1.8	0.023	0.025	0.000	1.8
15	0.5	0.013	0.015	0.000	0.6
20	0.0	0.005	0.006	0.000	0.1
25	0.0	0.001	0.002	0.000	0.0
30	0.0	0.001	0.001	0.000	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



SWMH13
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Summer

Type : Manhole

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	5.6	0.033	0.037	0.000	5.5
10	25.8	0.061	0.069	0.000	25.4
15	6.2	0.029	0.033	0.000	6.7
20	0.3	0.009	0.010	0.000	0.6
25	0.0	0.002	0.002	0.000	0.0
30	0.0	0.001	0.002	0.000	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



SWMH11
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Summer

Type : Manhole

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	15.3	0.075	0.085	0.000	14.3
10	76.6	0.168	0.190	0.000	74.6
15	26.2	0.092	0.104	0.000	29.0
20	3.7	0.036	0.041	0.000	4.6
25	0.3	0.011	0.013	0.000	0.4
30	0.1	0.006	0.007	0.000	0.1

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



SWMH15
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Summer

Type : Manhole

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	0.8	0.017	0.019	0.000	0.8
10	3.8	0.036	0.041	0.000	3.7
15	0.9	0.019	0.022	0.000	1.0
20	0.0	0.007	0.008	0.000	0.1
25	0.0	0.002	0.002	0.000	0.0
30	0.0	0.001	0.001	0.000	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



SWMH16
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Summer

Type : Manhole

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	4.8	0.036	0.041	0.000	4.5
10	22.1	0.083	0.094	0.000	21.4
15	5.4	0.042	0.047	0.000	6.3
20	0.3	0.015	0.017	0.000	0.7
25	0.0	0.003	0.004	0.000	0.0
30	0.0	0.001	0.002	0.000	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



SWMH14
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Summer

Type : Manhole

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	1.5	0.022	0.025	0.000	1.5
10	7.0	0.048	0.054	0.000	6.8
15	1.6	0.025	0.028	0.000	1.8
20	0.0	0.008	0.009	0.000	0.2
25	0.0	0.002	0.002	0.000	0.0
30	0.0	0.001	0.001	0.000	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



SWMH17
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Summer

Type : Manhole

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	5.4	0.038	0.043	0.000	5.1
10	25.7	0.089	0.101	0.000	25.0
15	7.2	0.047	0.053	0.000	8.0
20	0.7	0.018	0.020	0.000	1.1
25	0.0	0.005	0.006	0.000	0.1
30	0.0	0.002	0.002	0.000	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



SWMH20
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 60 mins: Summer

Type : Manhole

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	2.7	0.037	0.042	0.000	2.0
10	3.9	0.047	0.053	0.000	3.9
15	4.8	0.050	0.056	0.000	4.7
20	6.4	0.057	0.065	0.000	6.3
25	12.5	0.081	0.092	0.000	11.9
30	28.3	0.132	0.149	0.000	27.0
35	29.9	0.172	0.194	0.000	28.3
40	14.9	0.191	0.216	0.000	15.4
45	7.5	0.165	0.186	0.000	8.4
50	5.1	0.131	0.148	0.000	5.9
55	4.1	0.103	0.116	0.000	4.7
60	3.6	0.081	0.092	0.000	4.0
65	0.8	0.057	0.064	0.000	1.4
70	0.1	0.034	0.038	0.000	0.5
75	0.0	0.015	0.017	0.000	0.2
80	0.0	0.005	0.006	0.000	0.0
85	0.0	0.004	0.004	0.000	0.0
90	0.0	0.003	0.004	0.000	0.0
95	0.0	0.003	0.003	0.000	0.0
100	0.0	0.002	0.003	0.000	0.0
105	0.0	0.002	0.002	0.000	0.0
110	0.0	0.002	0.002	0.000	0.0
115	0.0	0.002	0.002	0.000	0.0
120	0.0	0.002	0.002	0.000	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



FC100

Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 60 mins: Summer

Type : Manhole

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	0.0	0.000	0.000	0.000	0.0
10	0.4	0.017	0.019	0.000	0.1
15	0.9	0.048	0.055	0.000	0.8
20	1.7	0.070	0.079	0.000	1.6
25	3.4	0.101	0.114	0.000	3.1
30	8.4	0.167	0.189	0.000	7.8
35	15.2	0.251	0.284	0.000	14.8
40	17.2	0.280	0.317	0.000	17.2
45	15.1	0.256	0.290	0.000	15.3
50	12.2	0.223	0.252	0.000	12.4
55	9.8	0.195	0.220	0.000	10.0
60	8.0	0.172	0.195	0.000	8.1
65	6.3	0.151	0.171	0.000	6.4
70	4.6	0.128	0.144	0.000	4.8
75	3.4	0.109	0.124	0.000	3.5
80	2.6	0.095	0.108	0.000	2.7
85	2.1	0.084	0.095	0.000	2.1
90	1.7	0.074	0.084	0.000	1.7
95	1.4	0.067	0.076	0.000	1.4
100	1.1	0.061	0.069	0.000	1.2
105	0.9	0.055	0.063	0.000	1.0
110	0.8	0.051	0.058	0.000	0.8
115	0.7	0.047	0.053	0.000	0.7
120	0.6	0.044	0.050	0.000	0.6

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



FC101

Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 60 mins: Summer

Type : Manhole

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	0.0	0.001	0.001	0.000	0.0
10	0.9	0.032	0.037	0.000	0.5
15	3.6	0.084	0.095	0.000	3.1
20	7.4	0.129	0.145	0.000	7.0
25	14.3	0.189	0.214	0.000	13.8
30	21.5	0.240	0.271	0.000	20.4
35	30.3	0.317	0.359	0.000	29.6
40	33.4	0.357	0.404	0.000	33.5
45	31.6	0.340	0.385	0.000	31.9
50	28.3	0.308	0.349	0.000	28.6
55	24.6	0.275	0.311	0.000	25.0
60	21.1	0.247	0.279	0.000	21.4
65	17.6	0.220	0.249	0.000	17.8
70	13.8	0.191	0.216	0.000	14.1
75	7.4	0.137	0.155	0.000	7.9
80	4.2	0.100	0.113	0.000	4.4
85	2.7	0.079	0.089	0.000	2.8
90	1.8	0.065	0.073	0.000	1.9
95	1.4	0.056	0.063	0.000	1.4
100	1.0	0.049	0.055	0.000	1.1
105	0.8	0.043	0.048	0.000	0.9
110	0.7	0.038	0.043	0.000	0.7
115	0.6	0.035	0.040	0.000	0.6
120	0.5	0.032	0.036	0.000	0.5

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



SWMH19
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Summer

Type : Manhole

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	4.2	0.050	0.057	0.000	3.7
10	19.4	0.150	0.170	0.000	17.2
15	4.8	0.064	0.073	0.000	6.1
20	0.2	0.022	0.025	0.000	0.8
25	0.0	0.006	0.007	0.000	0.1
30	0.0	0.003	0.003	0.000	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



SWMH18
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Summer

Type : Manhole

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	1.4	0.027	0.030	0.000	1.3
10	6.4	0.060	0.067	0.000	6.1
15	1.4	0.032	0.036	0.000	1.8
20	0.0	0.011	0.013	0.000	0.2
25	0.0	0.003	0.003	0.000	0.0
30	0.0	0.002	0.002	0.000	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



SWMH21

Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Summer

Type : Manhole

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	0.0	0.000	0.000	0.000	0.0
10	0.0	0.000	0.000	0.000	0.0
15	0.0	0.000	0.000	0.000	0.0
20	0.0	0.000	0.000	0.000	0.0
25	0.0	0.000	0.000	0.000	0.0
30	0.0	0.000	0.000	0.000	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



SWMH12
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Summer

Type : Manhole

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	3.6	0.028	0.031	0.000	3.5
10	16.3	0.060	0.068	0.000	16.1
15	3.7	0.030	0.034	0.000	4.0
20	0.0	0.008	0.009	0.000	0.3
25	0.0	0.001	0.001	0.000	0.0
30	0.0	0.000	0.001	0.000	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



SWMH4
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Summer

Type : Manhole

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	1.4	0.014	0.016	0.000	1.3
10	6.2	0.030	0.034	0.000	6.1
15	1.4	0.015	0.017	0.000	1.5
20	0.0	0.004	0.005	0.000	0.1
25	0.0	0.001	0.001	0.000	0.0
30	0.0	0.000	0.000	0.000	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



EXMH01
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 60 mins: Summer

Type : Manhole

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	0.0	0.000	0.000	0.000	0.0
10	0.5	0.007	0.000	0.000	0.5
15	3.8	0.017	0.000	0.000	3.8
20	8.5	0.025	0.000	0.000	8.5
25	16.9	0.034	0.000	0.000	16.9
30	28.0	0.045	0.000	0.000	28.1
35	44.3	0.058	0.000	0.000	44.3
40	50.7	0.062	0.000	0.000	50.7
45	47.2	0.060	0.000	0.000	47.2
50	41.1	0.055	0.000	0.000	41.1
55	35.0	0.050	0.000	0.000	35.0
60	29.6	0.046	0.000	0.000	29.6
65	24.3	0.041	0.000	0.000	24.3
70	18.9	0.036	0.000	0.000	18.9
75	11.5	0.029	0.000	0.000	11.5
80	7.2	0.023	0.000	0.000	7.1
85	5.0	0.020	0.000	0.000	5.0
90	3.7	0.018	0.000	0.000	3.7
95	2.8	0.016	0.000	0.000	2.8
100	2.3	0.015	0.000	0.000	2.3
105	1.8	0.014	0.000	0.000	1.8
110	1.5	0.013	0.000	0.000	1.5
115	1.3	0.012	0.000	0.000	1.3
120	1.1	0.011	0.000	0.000	1.1

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junctions Storm Phase: Phase	Roscoe:		



Name	Junction Type	Easting (m)	Northing (m)	Cover Level (m)	Depth (m)	Invert Level (m)	Chamber Shape	Diameter (m)
SWMH1	Manhole	389220.758	413429.289	120.771	0.921	119.850	Circular	1.200
SWMH2	Manhole	389216.576	413415.650	120.707	0.998	119.709	Circular	1.200
SWMH3	Manhole	389241.971	413407.468	120.621	2.294	118.327	Circular	1.200
SWMH8	Manhole	389222.557	413404.113	119.618	1.461	118.157	Circular	1.200
SWMH9	Manhole	389239.510	413395.883	119.746	1.852	117.894	Circular	1.200
SWMH10	Manhole	389266.886	413386.444	119.793	2.083	117.710	Circular	1.200
SWMH5	Manhole	389264.739	413400.982	120.627	1.250	119.377	Circular	1.200
SWMH6	Manhole	389270.419	413399.461	120.628	2.321	118.307	Circular	1.200
SWMH7	Manhole	389290.772	413393.288	120.630	1.524	119.106	Circular	1.200
SWMH13	Manhole	389308.843	413386.623	120.623	2.114	118.509	Circular	1.200
SWMH11	Manhole	389284.017	413382.016	119.706	2.412	117.294	Circular	1.200
SWMH15	Manhole	389322.401	413396.867	120.570	1.536	119.034	Circular	1.200
SWMH16	Manhole	389341.242	413391.150	120.509	2.009	118.500	Circular	1.200
SWMH14	Manhole	389356.459	413386.682	120.289	1.317	118.972	Circular	1.200
SWMH17	Manhole	389337.779	413379.636	119.743	1.552	118.191	Circular	1.200
SWMH20	Manhole	389334.760	413369.693	119.434	3.603	115.831	Circular	1.200
FC100	Manhole	389316.435	413374.564	119.400	3.665	115.735	Circular	1.200
FC101	Manhole	389306.797	413375.071	119.400	2.387	117.013	Circular	1.200
SWMH19	Manhole	389331.290	413359.673	119.414	1.733	117.681	Circular	1.200
SWMH18	Manhole	389310.601	413348.694	119.673	1.758	117.915	Circular	1.200
SWMH21	Manhole	389363.717	413359.709	116.943	0.600	116.343	Circular	1.200
SWMH12	Manhole	389313.382	413403.365	120.750	1.493	119.257	Circular	1.200
SWMH4	Manhole	389248.525	413405.930	120.627	1.254	119.373	Circular	1.200
EXMH01	Manhole	389310.612	413373.658	119.220	3.700	115.520	Circular	1.200

Name	Lock
SWMH1	None
SWMH2	None
SWMH3	None
SWMH8	None
SWMH9	None
SWMH10	None
SWMH5	None
SWMH6	None
SWMH7	None
SWMH13	None
SWMH11	None
SWMH15	None
SWMH16	None
SWMH14	None
SWMH17	None
SWMH20	None
FC100	None
FC101	None
SWMH19	None
SWMH18	None
SWMH21	None
SWMH12	None
SWMH4	None
EXMH01	None

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junctions Storm Phase: Phase	Roscoe:		



Inlets

Junction	Inlet Name	Incoming Item(s)	Bypass Destination	Capacity Type
SWMH1	Inlet	Catchment Area	(None)	No Restriction
SWMH2	Inlet	1 > 2	(None)	No Restriction
	Inlet (1)	Catchment Area (4)	(None)	No Restriction
SWMH3	Inlet	2 > 3 4 > 3	(None)	No Restriction
	Inlet (1)	Catchment Area (5)	(None)	No Restriction
SWMH8	Inlet	Catchment Area (1)	(None)	No Restriction
SWMH9	Inlet	3 > 9	(None)	No Restriction
	Inlet (1)	8 > 9	(None)	No Restriction
	Inlet (2)	Catchment Area (2)	(None)	No Restriction
SWMH10	Inlet	9 > 10 6 > 10	(None)	No Restriction
	Inlet (1)	Catchment Area (3)	(None)	No Restriction
SWMH5	Inlet	Catchment Area (7)	(None)	No Restriction
SWMH6	Inlet	5 > 6 7 > 6	(None)	No Restriction
	Inlet (1)	Catchment Area (8)	(None)	No Restriction
SWMH7	Inlet	Catchment Area (10)	(None)	No Restriction
SWMH13	Inlet	12 > 13	(None)	No Restriction
	Inlet (1)	Catchment Area (12)	(None)	No Restriction
SWMH11	Inlet	10 > 11	(None)	No Restriction
	Inlet (1)	Catchment Area (9)	(None)	No Restriction
SWMH15	Inlet	Catchment Area (18)	(None)	No Restriction
SWMH16	Inlet	15 > 16	(None)	No Restriction
	Inlet (1)	14 > 16	(None)	No Restriction
	Inlet (2)	Catchment Area (19)	(None)	No Restriction
SWMH14	Inlet	Catchment Area (20)	(None)	No Restriction
SWMH17	Inlet	16 > 17	(None)	No Restriction
	Inlet (1)	Catchment Area (13)	(None)	No Restriction
SWMH20	Inlet	17 > 20 21 > 20 19 > 20	(None)	No Restriction
	Inlet (1)	Catchment Area (14)	(None)	No Restriction
FC100	Inlet	Pipe (4)	(None)	No Restriction
FC101	Inlet	Pipe (2)	(None)	No Restriction
SWMH19	Inlet	18 > 19 Catchment Area (15)	(None)	No Restriction
SWMH18	Inlet	Catchment Area (16)	(None)	No Restriction
SWMH12	Inlet	Catchment Area (11)	(None)	No Restriction
SWMH4	Inlet	Catchment Area (6)	(None)	No Restriction
EXMH01	Inlet	Pipe (5)	(None)	No Restriction
	Inlet (1)	Pipe (6)	(None)	No Restriction

Outlets

Junction	Outlet Name	Outgoing Connection	Outlet Type
SWMH1	Outlet	1 > 2	Free Discharge
SWMH2	Outlet	2 > 3	Free Discharge
SWMH3	Outlet	3 > 9	Free Discharge
SWMH8	Outlet	8 > 9	Free Discharge
SWMH9	Outlet	9 > 10	Free Discharge
SWMH10	Outlet	10 > 11	Free Discharge
SWMH5	Outlet	5 > 6	Free Discharge
SWMH6	Outlet	6 > 10	Free Discharge
SWMH7	Outlet	7 > 6	Free Discharge
SWMH13	Outlet	Pipe	Free Discharge
SWMH11	Outlet	Pipe (1)	Free Discharge
SWMH15	Outlet	15 > 16	Free Discharge
SWMH16	Outlet	16 > 17	Free Discharge

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junctions Storm Phase: Phase	Roscoe:		



Junction	Outlet Name	Outgoing Connection	Outlet Type
SWMH14	Outlet	14 > 16	Free Discharge
SWMH17	Outlet	17 > 20	Free Discharge
SWMH20	Outlet	Pipe (3)	Free Discharge
FC100	Outlet	Pipe (5)	Hydro-Brake®
	Invert Level (m)	115.735	
	Design Depth (m)	1.200	
	Design Flow (L/s)	30.0	
	Objective	Minimise Upstream Storage Requirements	
	Application	Surface Water Only	
	Sump Available	☐	
	Unit Reference	CHE-0221-3000-1200-3000	
FC101	Outlet	Pipe (6)	Hydro-Brake®
	Invert Level (m)	117.013	
	Design Depth (m)	1.337	
	Design Flow (L/s)	45.0	
	Objective	Minimise Upstream Storage Requirements	
	Application	Surface Water Only	
	Sump Available	☐	
	Unit Reference	CHE-0262-4500-1337-4500	
SWMH19	Outlet	19 > 20	Free Discharge
SWMH18	Outlet	18 > 19	Free Discharge
SWMH21	Outlet	21 > 20	Free Discharge
SWMH12	Outlet	12 > 13	Free Discharge
SWMH4	Outlet	4 > 3	Free Discharge

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Stormwater Controls Storm Phase: Phase	Roscoe:		



Tank101

Type : Tank

Dimensions

Exceedance Level (m)	118.350
Depth (m)	1.200
Base Level (m)	117.150
Freeboard (mm)	0
Initial Depth (m)	0.000
Porosity (%)	100
Average Slope (1:X)	0.00
Total Volume (m³)	184.800

Depth (m)	Area (m²)	Volume (m³)
0.000	154.00	0.000
1.200	154.00	184.800

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	Pipe
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	Pipe (1)
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	Pipe (2)
Outlet Type	Free Discharge

Advanced

Perimeter	Circular
Length (m)	17.000

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Stormwater Controls Storm Phase: Phase	Roscoe:		



Tank 100

Type : Tank

Dimensions

Exceedance Level (m)	116.950
Depth (m)	1.200
Base Level (m)	115.750
Freeboard (mm)	0
Initial Depth (m)	0.000
Porosity (%)	100
Average Slope (1:X)	0.00
Total Volume (m³)	72.000

Depth (m)	Area (m²)	Volume (m³)
0.000	60.00	0.000
1.200	60.00	72.000

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	Pipe (3)
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	Pipe (4)
Outlet Type	Free Discharge

Advanced

Perimeter	Circular
Length (m)	8.000

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Network Design Criteria Storm Phase: Phase	Roscoe:		



Flow Options

Peak Flow Calculation	(UK) Modified Rational Method
Min. Time of Entry (mins)	5
Max. Travel Time (mins)	30

Pipe Options

Lock Slope Options	None
Design Options	Minimise Excavation
Design Level	Level Soffits
Min. Cover Depth (m)	1.200
Min. Slope (1:X)	500.00
Max. Slope (1:X)	40.00
Min. Velocity (m/s)	1.0
Max. Velocity (m/s)	3.0
Use Flow Restriction	☐
Reduce Channel Depths	☐

Pipe Size Library

Default

Add. Increment (mm)	75
Max. Diameter (mm)	0

Diameter (mm)	Min. Slope (1:X)	Max. Slope (1:X)
100	0.00	0.00
150	0.00	0.00

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Network Design Criteria Storm Phase: Phase	Roscoe:		



Manhole Options

Apply Offset	☐
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Manhole Size Library

Default

Diameter / Width

Connection (mm)	Diameter / Length (m)	Width (m)
0	1.200	0.000
375	1.350	0.000
500	1.500	0.000
750	1.800	0.000

Additional Sizing

Connection (mm)	900
Diameter / Length (m)	0.900
Width (m)	0.000

Depth

Depth (m)	Diameter / Length (m)	Width (m)
0.000	1.050	0.000
1.500	1.200	0.000

Access

Depth (m)	Ladder Protrusion (mm)
0.000	130
3.000	230

Benching Requirements

Landing Width (mm)	500
Benching Width (mm)	225

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Outfall Details Storm Phase: Phase	Roscoe:		



Outfalls

Outfall	Outfall Type	Gated	Fixed Surcharged Level (m)	Level Curve
EXMH01	Fixed Surcharged Level	☐	115.520	
FSR : 100 years: +45 %: 15 mins: Summer			115.520	
FSR : 100 years: +45 %: 15 mins: Winter			115.520	
FSR : 100 years: +45 %: 30 mins: Summer			115.520	
FSR : 100 years: +45 %: 30 mins: Winter			115.520	
FSR : 100 years: +45 %: 60 mins: Summer			115.520	
FSR : 100 years: +45 %: 60 mins: Winter			115.520	
FSR : 100 years: +45 %: 120 mins: Summer			115.520	
FSR : 100 years: +45 %: 120 mins: Winter			115.520	
FSR : 100 years: +45 %: 240 mins: Summer			115.520	
FSR : 100 years: +45 %: 240 mins: Winter			115.520	
FSR : 100 years: +45 %: 360 mins: Summer			115.520	
FSR : 100 years: +45 %: 360 mins: Winter			115.520	
FSR : 100 years: +45 %: 480 mins: Summer			115.520	
FSR : 100 years: +45 %: 480 mins: Winter			115.520	
FSR : 100 years: +45 %: 960 mins: Summer			115.520	
FSR : 100 years: +45 %: 960 mins: Winter			115.520	
FSR : 100 years: +45 %: 1440 mins: Summer			115.520	
FSR : 100 years: +45 %: 1440 mins: Winter			115.520	

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Title: Rainfall Analysis Criteria	Roscoe:		



Runoff Type	Dynamic
Output Interval (mins)	5
Time Step	Default
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	300
Perform No Discharge Analysis	☐

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Inflows Summary Storm Phase: Phase	Roscoe:		



FSR: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Inflow

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m³)
Catchment Area	FSR: 100 years: +45 %: 15 mins: Summer	0.04	24.6	10.654
Catchment Area (1)	FSR: 100 years: +45 %: 15 mins: Summer	0.03	21.8	9.473
Catchment Area (2)	FSR: 100 years: +45 %: 15 mins: Summer	0.03	21.8	9.455
Catchment Area (3)	FSR: 100 years: +45 %: 15 mins: Summer	0.06	40.9	17.747
Catchment Area (4)	FSR: 100 years: +45 %: 15 mins: Summer	0.01	8.3	3.609
Catchment Area (5)	FSR: 100 years: +45 %: 15 mins: Summer	0.06	42.9	18.610
Catchment Area (6)	FSR: 100 years: +45 %: 15 mins: Summer	0.03	21.9	9.512
Catchment Area (7)	FSR: 100 years: +45 %: 15 mins: Summer	0.03	20.0	8.682
Catchment Area (8)	FSR: 100 years: +45 %: 15 mins: Summer	0.05	38.1	16.500
Catchment Area (9)	FSR: 100 years: +45 %: 15 mins: Summer	0.07	48.0	20.787
Catchment Area (10)	FSR: 100 years: +45 %: 15 mins: Winter	0.01	6.5	3.019
Catchment Area (11)	FSR: 100 years: +45 %: 15 mins: Summer	0.08	57.8	25.046
Catchment Area (12)	FSR: 100 years: +45 %: 15 mins: Summer	0.05	34.4	14.887
Catchment Area (13)	FSR: 100 years: +45 %: 15 mins: Summer	0.02	15.0	6.508
Catchment Area (14)	FSR: 100 years: +45 %: 15 mins: Summer	0.02	11.5	4.979

Hopwood Hall College:		Date: 31/07/2025		
		Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Inflows Summary Storm Phase: Phase		Roscoe:		



Catchment Area (15)	FSR: 100 years: +45 %: 15 mins: Summer	0.07	47.1	20.427
Catchment Area (16)	FSR: 100 years: +45 %: 15 mins: Summer	0.03	22.5	9.758
Catchment Area (18)	FSR: 100 years: +45 %: 15 mins: Summer	0.02	13.6	5.885
Catchment Area (19)	FSR: 100 years: +45 %: 15 mins: Summer	0.06	40.8	17.705
Catchment Area (20)	FSR: 100 years: +45 %: 15 mins: Summer	0.04	24.7	10.687

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junctions Summary Storm Phase: Phase	Roscoe:		



FSR: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SWMH1	FSR: 100 years: +45 %: 15 mins: Summer	120.771	119.850	120.361	0.511	24.6	0.578	0.000	16.7	10.640	Surcharged
SWMH2	FSR: 100 years: +45 %: 15 mins: Summer	120.707	119.709	120.217	0.508	25.0	0.575	0.000	24.3	14.241	Surcharged
SWMH3	FSR: 100 years: +45 %: 15 mins: Summer	120.621	118.327	119.966	1.639	75.1	1.853	0.000	67.9	42.380	Surcharged
SWMH8	FSR: 100 years: +45 %: 120 mins: Summer	119.618	118.157	118.345	0.188	10.1	0.212	0.000	10.1	21.312	OK
SWMH9	FSR: 100 years: +45 %: 120 mins: Summer	119.746	117.894	118.345	0.451	64.8	0.510	0.000	61.8	137.849	Surcharged
SWMH10	FSR: 100 years: +45 %: 120 mins: Summer	119.793	117.710	118.341	0.631	110.0	0.714	0.000	109.1	240.325	Surcharged
SWMH5	FSR: 100 years: +45 %: 15 mins: Summer	120.627	119.377	119.428	0.051	20.0	0.058	0.000	19.9	8.680	OK
SWMH6	FSR: 100 years: +45 %: 15 mins: Summer	120.628	118.307	119.253	0.946	58.0	1.070	0.000	52.2	27.890	Surcharged
SWMH7	FSR: 100 years: +45 %: 15 mins: Summer	120.630	119.106	119.267	0.161	9.0	0.182	0.000	1.6	2.749	Surcharged
SWMH13	FSR: 100 years: +45 %: 15 mins: Summer	120.623	118.509	118.632	0.123	91.5	0.140	0.000	90.6	39.859	OK
SWMH11	FSR: 100 years: +45 %: 120 mins: Summer	119.706	117.294	118.336	1.042	131.3	1.178	0.000	128.4	287.058	Surcharged
SWMH15	FSR: 100 years: +45 %: 15 mins: Summer	120.570	119.034	119.105	0.071	13.6	0.080	0.000	13.3	5.880	OK
SWMH16	FSR: 100 years: +45 %: 15 mins: Summer	120.509	118.500	118.766	0.266	78.4	0.300	0.000	72.6	34.258	Surcharged
SWMH14	FSR: 100 years: +45 %: 15 mins: Summer	120.289	118.972	119.075	0.103	24.7	0.116	0.000	24.3	10.683	OK
SWMH17	FSR: 100 years: +45 %: 15 mins: Summer	119.743	118.191	118.451	0.260	87.6	0.294	0.000	84.6	40.773	Surcharged
SWMH20	FSR: 100 years: +45 %: 60 mins: Summer	119.434	115.831	116.945	1.114	108.3	1.260	0.000	105.1	138.846	Surcharged
FC100	FSR: 100 years: +45 %: 60 mins: Summer	119.400	115.735	116.922	1.187	30.7	1.343	0.000	29.5	129.193	Surcharged
FC101	FSR: 100 years: +45 %: 120 mins: Summer	119.400	117.013	118.323	1.310	43.5	1.481	0.000	43.3	374.665	Surcharged
SWMH19	FSR: 100 years: +45 %: 15 mins: Summer	119.414	117.681	118.894	1.213	62.1	1.372	0.000	55.4	30.174	Surcharged
SWMH18	FSR: 100 years: +45 %: 15 mins: Summer	119.673	117.915	119.058	1.143	22.5	1.293	0.000	15.0	9.757	Surcharged

Hopwood Hall College:				Date: 31/07/2025							
				Designed by: AY	Checked by: JT	Approved By: JT					
Report Details: Type: Junctions Summary Storm Phase: Phase				Roscoe:							
SWMH21	FSR: 100 years: +45 %: 60 mins: Summer	116.9 43	116.3 43	116.94 5	0.602	5.6	2.344	1.665	1.2	3.474	Flood
SWMH12	FSR: 100 years: +45 %: 15 mins: Summer	120.7 50	119.2 57	119.38 3	0.126	57.8	0.143	0.000	57.1	25.048	OK
SWMH4	FSR: 100 years: +45 %: 15 mins: Summer	120.6 27	119.3 73	120.02 1	0.648	21.9	0.733	0.000	14.6	9.510	Surcharged
EXMH01	FSR: 100 years: +45 %: 240 mins: Winter	119.2 20	115.5 20	115.60 1	0.081	71.3	0.000	0.000	71.0	665.942	OK

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Roscoe:		



FSR: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Avg. Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Residual Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Tank101	FSR: 100 years: +45 %: 120 mins: Summer	118.331	118.331	1.181	1.181	170.6	181.925	0.000	0.000	43.5	374.728	1.555	OK
Tank 100	FSR: 100 years: +45 %: 60 mins: Summer	116.930	116.930	1.180	1.180	105.1	70.791	0.000	0.000	30.7	129.400	1.679	OK

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Connections Summary Storm Phase: Phase	Roscoe:		



FSR: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1 > 2	FSR: 100 years: +45 %: 15 mins: Summer	Pipe	SWMH1	SWMH2	120.771	120.361	0.150	10.640	1.0	0.95	16.7	Surcharged
2 > 3	FSR: 100 years: +45 %: 15 mins: Winter	Pipe	SWMH2	SWMH3	120.707	120.129	0.150	14.248	1.4	0.6	24.4	Surcharged
4 > 3	FSR: 100 years: +45 %: 15 mins: Summer	Pipe	SWMH4	SWMH3	120.627	120.021	0.150	9.510	0.8	0.21	14.6	Surcharged
3 > 9	FSR: 100 years: +45 %: 15 mins: Summer	Pipe	SWMH3	SWMH9	120.621	119.966	0.150	42.380	3.8	1.99	67.9	Surcharged
8 > 9	FSR: 100 years: +45 %: 15 mins: Summer	Pipe	SWMH8	SWMH9	119.618	118.230	0.164	9.491	0.5	0.09	21.4	OK
9 > 10	FSR: 100 years: +45 %: 15 mins: Summer	Pipe	SWMH9	SWMH10	119.746	118.149	0.309	61.314	1.3	0.68	107.6	OK
10 > 11	FSR: 100 years: +45 %: 15 mins: Summer	Pipe	SWMH10	SWMH11	119.793	118.093	0.375	105.475	1.7	0.61	187.0	Surcharged
5 > 6	FSR: 100 years: +45 %: 15 mins: Summer	Pipe	SWMH5	SWMH6	120.627	119.428	0.150	8.680	1.1	0.26	19.9	OK
7 > 6	FSR: 100 years: +45 %: 30 mins: Winter	Pipe	SWMH7	SWMH6	120.630	119.141	0.150	4.119	0.4	0.13	4.5	OK
6 > 10	FSR: 100 years: +45 %: 15 mins: Summer	Pipe	SWMH6	SWMH10	120.628	119.253	0.150	27.829	3.0	1.39	52.2	Surcharged
12 > 13	FSR: 100 years: +45 %: 15 mins: Summer	Pipe	SWMH12	SWMH13	120.750	119.383	0.125	25.048	2.5	0.53	57.1	OK
15 > 16	FSR: 100 years: +45 %: 15 mins: Summer	Pipe	SWMH15	SWMH16	120.570	119.105	0.150	5.880	0.8	0.45	13.3	OK
14 > 16	FSR: 100 years: +45 %: 15 mins: Summer	Pipe	SWMH14	SWMH16	120.289	119.075	0.150	10.683	1.4	0.79	24.3	OK
16 > 17	FSR: 100 years: +45 %: 15 mins: Summer	Pipe	SWMH16	SWMH17	120.509	118.766	0.225	34.258	1.8	0.87	72.6	Surcharged

Hopwood Hall College:		Date: 31/07/2025		
		Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Connections Summary Storm Phase: Phase		Roscoe:		



17 > 20	FSR: 100 years: +45 %: 15 mins: Summer	Pipe	SWMH1 7	SWMH2 0	119.743	118.451	0.218	40.773	2.2	0.95	84.6	Surcharged
21 > 20	FSR: 100 years: +45 %: 60 mins: Winter	Pipe	SWMH2 1	SWMH2 0	116.943	116.931	0.300	0.003	0.0	0.01	1.2	Flood Risk
18 > 19	FSR: 100 years: +45 %: 30 mins: Summer	Pipe	SWMH1 8	SWMH1 9	119.673	118.771	0.150	13.327	0.9	0.86	15.3	Surcharged
19 > 20	FSR: 100 years: +45 %: 15 mins: Summer	Pipe	SWMH1 9	SWMH2 0	119.414	118.894	0.150	30.174	3.1	3.25	55.4	Surcharged
Pipe	FSR: 100 years: +45 %: 15 mins: Summer	Pipe	SWMH1 3	Tank101	120.623	118.632	0.225	39.859	2.6	0.58	90.6	OK
Pipe (1)	FSR: 100 years: +45 %: 15 mins: Summer	Pipe	SWMH1 1	Tank101	119.706	118.020	0.375	123.666	2.4	1.12	236.3	Surcharged
Pipe (2)	FSR: 100 years: +45 %: 240 mins: Winter	Pipe	Tank101	FC101	118.350	118.054	0.375	458.583	0.7	0.35	78.3	Surcharged
Pipe (3)	FSR: 100 years: +45 %: 15 mins: Summer	Pipe	SWMH2 0	Tank 100	119.434	116.658	0.300	72.801	1.9	1.59	133.8	Surcharged
Pipe (4)	FSR: 100 years: +45 %: 60 mins: Winter	Pipe	Tank 100	FC100	116.950	116.913	0.300	129.433	0.4	0.57	30.9	Surcharged
Pipe (5)	FSR: 100 years: +45 %: 240 mins: Winter	Pipe	FC100	EXMH01	119.400	116.279	0.107	207.328	2.2	0.88	29.9	Surcharged
Pipe (6)	FSR: 100 years: +45 %: 360 mins: Winter	Pipe	FC101	EXMH01	119.400	117.788	0.077	510.367	5.4	0.41	44.9	Surcharged

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Phase Management Storm Phase: Phase	Roscoe:		


Roscoe
CIVIL & STRUCTURAL ENGINEERS
INSPIRING BUILT ENVIRONMENTS

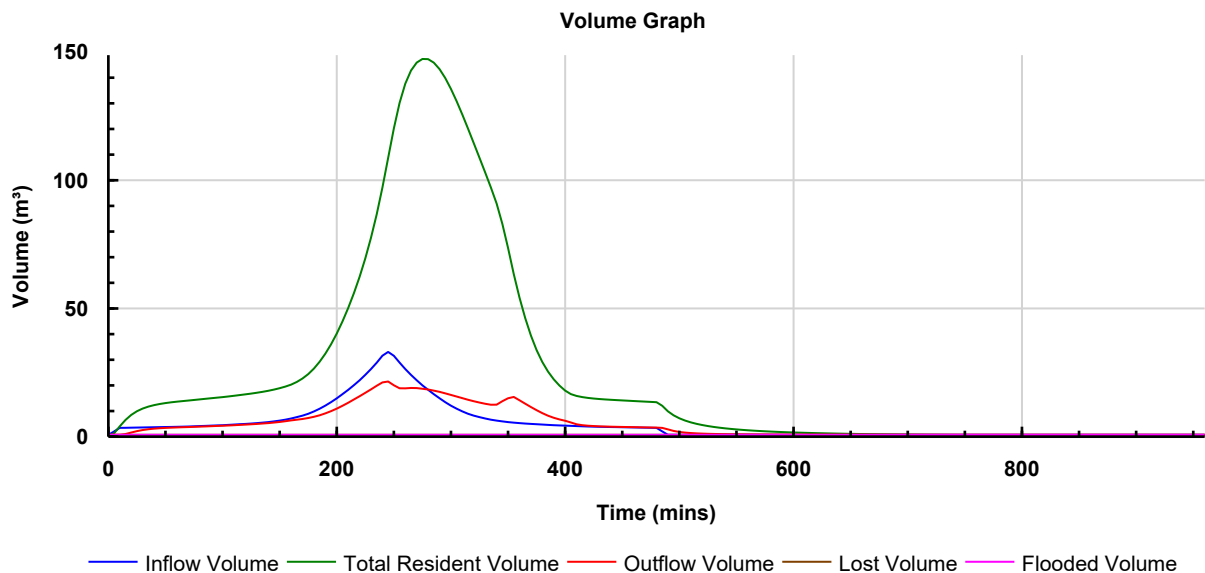
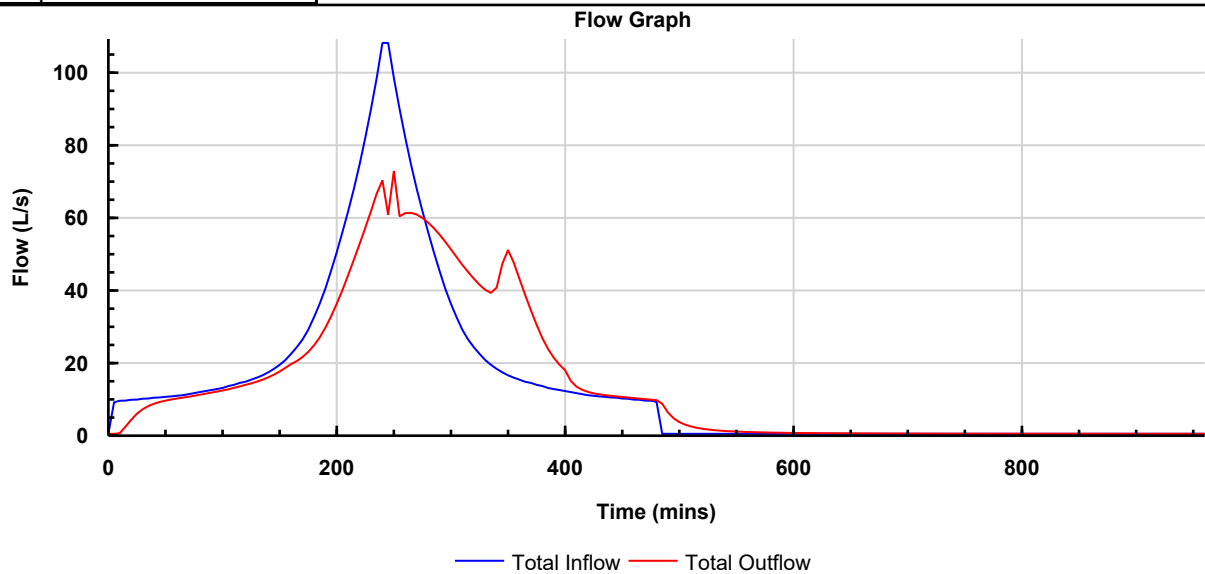


Phase
FSR: 100 years: Increase Rainfall (%): +45: 480 mins: Summer

Tables

Name	Max. Inflow (L/s)	Total Inflow Volume (m³)	Max. Outflow (L/s)	Total Outflow Volume (m³)
EXMH01			72.7	797.575
TOTAL	108.2	797.948	72.7	797.575

Graphs



Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Inflow Results Storm Phase: Phase	Roscoe:		



Catchment Area

Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 15 mins: Summer

Type : Catchment Area

Inflow

Max. Inflow (L/s)	24.6
Total Inflow Volume (m³)	10.654

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	5.4
10	24.6
15	5.5
20	0.0
25	0.0
30	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Inflow Results Storm Phase: Phase	Roscoe:		



Catchment Area (1)
Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 15 mins: Summer

Type : Catchment Area

Inflow

Max. Inflow (L/s)	21.8
Total Inflow Volume (m³)	9.473

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	4.8
10	21.8
15	4.9
20	0.0
25	0.0
30	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Inflow Results Storm Phase: Phase	Roscoe:		



Catchment Area (2)
Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 15 mins: Summer

Type : Catchment Area

Inflow

Max. Inflow (L/s)	21.8
Total Inflow Volume (m³)	9.455

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	4.8
10	21.8
15	4.9
20	0.0
25	0.0
30	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Inflow Results Storm Phase: Phase	Roscoe:		



Catchment Area (3)
Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 15 mins: Summer

Type : Catchment Area

Inflow

Max. Inflow (L/s)	40.9
Total Inflow Volume (m³)	17.747

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	9.1
10	40.9
15	9.2
20	0.0
25	0.0
30	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Inflow Results Storm Phase: Phase	Roscoe:		



Catchment Area (4)
Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 15 mins: Summer

Type : Catchment Area

Inflow

Max. Inflow (L/s)	8.3
Total Inflow Volume (m³)	3.609

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	1.8
10	8.3
15	1.9
20	0.0
25	0.0
30	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Inflow Results Storm Phase: Phase	Roscoe:		



Catchment Area (5)
Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 15 mins: Summer

Type : Catchment Area

Inflow

Max. Inflow (L/s)	42.9
Total Inflow Volume (m³)	18.610

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	9.5
10	42.9
15	9.6
20	0.0
25	0.0
30	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Inflow Results Storm Phase: Phase	Roscoe:		



Catchment Area (6)
Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 15 mins: Summer

Type : Catchment Area

Inflow

Max. Inflow (L/s)	21.9
Total Inflow Volume (m³)	9.512

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	4.9
10	21.9
15	4.9
20	0.0
25	0.0
30	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Inflow Results Storm Phase: Phase	Roscoe:		



Catchment Area (7)

Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 15 mins: Summer

Type : Catchment Area

Inflow

Max. Inflow (L/s)	20.0
Total Inflow Volume (m³)	8.682

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	4.4
10	20.0
15	4.5
20	0.0
25	0.0
30	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Inflow Results Storm Phase: Phase	Roscoe:		



Catchment Area (8)
Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 15 mins: Summer

Type : Catchment Area

Inflow

Max. Inflow (L/s)	38.1
Total Inflow Volume (m³)	16.500

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	8.4
10	38.1
15	8.5
20	0.0
25	0.0
30	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Inflow Results Storm Phase: Phase	Roscoe:		



Catchment Area (9)
Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 15 mins: Summer

Type : Catchment Area

Inflow

Max. Inflow (L/s)	48.0
Total Inflow Volume (m³)	20.787

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	10.6
10	48.0
15	10.7
20	0.0
25	0.0
30	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Inflow Results Storm Phase: Phase	Roscoe:		



Catchment Area (10)

Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 15 mins: Winter

Type : Catchment Area

Inflow

Max. Inflow (L/s)	6.5
Total Inflow Volume (m³)	3.019

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	1.8
10	6.5
15	1.8
20	0.0
25	0.0
30	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Inflow Results Storm Phase: Phase	Roscoe:		



Catchment Area (11)

Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 15 mins: Summer

Type : Catchment Area

Inflow

Max. Inflow (L/s)	57.8
Total Inflow Volume (m³)	25.046

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	12.8
10	57.8
15	12.9
20	0.0
25	0.0
30	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Inflow Results Storm Phase: Phase	Roscoe:		



Catchment Area (12)

Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 15 mins: Summer

Type : Catchment Area

Inflow

Max. Inflow (L/s)	34.4
Total Inflow Volume (m³)	14.887

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	7.6
10	34.4
15	7.7
20	0.0
25	0.0
30	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Inflow Results Storm Phase: Phase	Roscoe:		



Catchment Area (13)

Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 15 mins: Summer

Type : Catchment Area

Inflow

Max. Inflow (L/s)	15.0
Total Inflow Volume (m³)	6.508

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	3.3
10	15.0
15	3.4
20	0.0
25	0.0
30	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Inflow Results Storm Phase: Phase	Roscoe:		



Catchment Area (14)

Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 15 mins: Summer

Type : Catchment Area

Inflow

Max. Inflow (L/s)	11.5
Total Inflow Volume (m³)	4.979

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	2.5
10	11.5
15	2.6
20	0.0
25	0.0
30	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Inflow Results Storm Phase: Phase	Roscoe:		



Catchment Area (15)

Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 15 mins: Summer

Type : Catchment Area

Inflow

Max. Inflow (L/s)	47.1
Total Inflow Volume (m³)	20.427

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	10.4
10	47.1
15	10.5
20	0.0
25	0.0
30	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Inflow Results Storm Phase: Phase	Roscoe:		



Catchment Area (16)

Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 15 mins: Summer

Type : Catchment Area

Inflow

Max. Inflow (L/s)	22.5
Total Inflow Volume (m³)	9.758

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	5.0
10	22.5
15	5.0
20	0.0
25	0.0
30	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Inflow Results Storm Phase: Phase	Roscoe:		



Catchment Area (18)

Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 15 mins: Summer

Type : Catchment Area

Inflow

Max. Inflow (L/s)	13.6
Total Inflow Volume (m³)	5.885

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	3.0
10	13.6
15	3.0
20	0.0
25	0.0
30	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Inflow Results Storm Phase: Phase	Roscoe:		



Catchment Area (19)

Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 15 mins: Summer

Type : Catchment Area

Inflow

Max. Inflow (L/s)	40.8
Total Inflow Volume (m³)	17.705

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	9.1
10	40.8
15	9.1
20	0.0
25	0.0
30	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Inflow Results Storm Phase: Phase	Roscoe:		



Catchment Area (20)

Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 15 mins: Summer

Type : Catchment Area

Inflow

Max. Inflow (L/s)	24.7
Total Inflow Volume (m³)	10.687

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	5.5
10	24.7
15	5.5
20	0.0
25	0.0
30	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



SWMH1
Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 15 mins: Summer

Type : Manhole

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	5.4	0.060	0.067	0.000	5.2
10	24.6	0.511	0.578	0.000	16.7
15	5.5	0.140	0.159	0.000	14.1
20	0.0	0.017	0.019	0.000	0.5
25	0.0	0.003	0.003	0.000	0.0
30	0.0	0.002	0.002	0.000	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



SWMH2

Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 15 mins: Summer

Type : Manhole

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	7.0	0.041	0.047	0.000	6.7
10	25.0	0.508	0.575	0.000	17.5
15	16.0	0.179	0.203	0.000	24.3
20	0.5	0.016	0.018	0.000	1.0
25	0.0	0.003	0.003	0.000	0.0
30	0.0	0.001	0.001	0.000	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



SWMH3
Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 15 mins: Summer

Type : Manhole

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	21.0	0.088	0.099	0.000	20.0
10	75.1	1.639	1.853	0.000	67.9
15	48.4	1.058	1.196	0.000	55.3
20	1.2	0.026	0.030	0.000	2.5
25	0.0	0.005	0.005	0.000	0.1
30	0.0	0.002	0.002	0.000	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



SWMH8

Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 120 mins: Summer

Type : Manhole

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	1.0	0.016	0.018	0.000	0.9
10	1.0	0.017	0.019	0.000	1.0
15	1.1	0.018	0.020	0.000	1.1
20	1.2	0.018	0.021	0.000	1.2
25	1.3	0.019	0.021	0.000	1.3
30	1.5	0.020	0.023	0.000	1.5
35	1.7	0.022	0.024	0.000	1.7
40	2.1	0.024	0.027	0.000	2.1
45	3.0	0.028	0.031	0.000	2.9
50	4.6	0.034	0.039	0.000	4.5
55	6.9	0.042	0.047	0.000	6.8
60	10.1	0.050	0.057	0.000	10.0
65	10.1	0.050	0.057	0.000	10.1
70	6.9	0.102	0.115	0.000	5.8
75	4.6	0.164	0.186	0.000	4.1
80	3.0	0.188	0.212	0.000	2.9
85	2.1	0.184	0.208	0.000	2.4
90	1.7	0.165	0.187	0.000	2.0
95	1.5	0.138	0.156	0.000	1.9
100	1.3	0.105	0.119	0.000	1.8
105	1.2	0.070	0.079	0.000	1.7
110	1.1	0.033	0.037	0.000	1.6
115	1.0	0.017	0.019	0.000	1.0
120	1.0	0.016	0.019	0.000	1.0
125	0.0	0.007	0.008	0.000	0.2
130	0.0	0.003	0.003	0.000	0.0
135	0.0	0.002	0.002	0.000	0.0
140	0.0	0.001	0.001	0.000	0.0
145	0.0	0.001	0.001	0.000	0.0
150	0.0	0.000	0.001	0.000	0.0
155	0.0	0.000	0.000	0.000	0.0
160	0.0	0.000	0.000	0.000	0.0
165	0.0	0.000	0.000	0.000	0.0
170	0.0	0.000	0.000	0.000	0.0
175	0.0	0.000	0.000	0.000	0.0
180	0.0	0.000	0.000	0.000	0.0
185	0.0	0.000	0.000	0.000	0.0
190	0.0	0.000	0.000	0.000	0.0
195	0.0	0.000	0.000	0.000	0.0
200	0.0	0.000	0.000	0.000	0.0
205	0.0	0.000	0.000	0.000	0.0
210	0.0	0.000	0.000	0.000	0.0
215	0.0	0.000	0.000	0.000	0.0
220	0.0	0.000	0.000	0.000	0.0
225	0.0	0.000	0.000	0.000	0.0
230	0.0	0.000	0.000	0.000	0.0
235	0.0	0.000	0.000	0.000	0.0
240	0.0	0.000	0.000	0.000	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



SWMH9

Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 120 mins: Summer

Type : Manhole

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	5.7	0.046	0.052	0.000	4.8
10	6.7	0.053	0.060	0.000	6.7
15	7.1	0.055	0.062	0.000	7.0
20	7.6	0.057	0.064	0.000	7.6
25	8.4	0.059	0.067	0.000	8.3
30	9.5	0.063	0.071	0.000	9.4
35	10.9	0.068	0.076	0.000	10.8
40	13.6	0.075	0.085	0.000	13.3
45	18.8	0.089	0.101	0.000	18.4
50	29.0	0.112	0.126	0.000	28.3
55	43.8	0.141	0.159	0.000	42.9
60	62.9	0.172	0.195	0.000	61.8
65	64.8	0.226	0.255	0.000	56.7
70	45.4	0.364	0.412	0.000	44.3
75	30.6	0.427	0.483	0.000	30.2
80	20.8	0.451	0.510	0.000	20.8
85	14.4	0.447	0.505	0.000	14.6
90	11.5	0.428	0.484	0.000	11.8
95	10.1	0.401	0.453	0.000	10.5
100	9.0	0.368	0.416	0.000	9.5
105	8.2	0.333	0.376	0.000	9.0
110	7.6	0.296	0.334	0.000	8.5
115	6.8	0.257	0.290	0.000	7.8
120	6.4	0.218	0.247	0.000	7.6
125	0.9	0.163	0.185	0.000	3.0
130	0.1	0.100	0.113	0.000	2.2
135	0.0	0.037	0.042	0.000	1.6
140	0.0	0.008	0.009	0.000	0.1
145	0.0	0.005	0.005	0.000	0.0
150	0.0	0.003	0.004	0.000	0.0
155	0.0	0.002	0.002	0.000	0.0
160	0.0	0.002	0.002	0.000	0.0
165	0.0	0.001	0.001	0.000	0.0
170	0.0	0.001	0.001	0.000	0.0
175	0.0	0.001	0.001	0.000	0.0
180	0.0	0.001	0.001	0.000	0.0
185	0.0	0.001	0.001	0.000	0.0
190	0.0	0.000	0.000	0.000	0.0
195	0.0	0.000	0.000	0.000	0.0
200	0.0	0.000	0.000	0.000	0.0
205	0.0	0.000	0.000	0.000	0.0
210	0.0	0.000	0.000	0.000	0.0
215	0.0	0.000	0.000	0.000	0.0
220	0.0	0.000	0.000	0.000	0.0
225	0.0	0.000	0.000	0.000	0.0
230	0.0	0.000	0.000	0.000	0.0
235	0.0	0.000	0.000	0.000	0.0
240	0.0	0.000	0.000	0.000	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



SWMH10

Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 120 mins: Summer

Type : Manhole

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	9.2	0.042	0.048	0.000	8.4
10	11.6	0.049	0.056	0.000	11.6
15	12.3	0.051	0.057	0.000	12.3
20	13.3	0.053	0.059	0.000	13.2
25	14.6	0.055	0.062	0.000	14.5
30	16.4	0.058	0.066	0.000	16.3
35	18.9	0.062	0.070	0.000	18.8
40	23.5	0.069	0.078	0.000	23.3
45	32.5	0.082	0.093	0.000	32.1
50	50.1	0.105	0.119	0.000	49.3
55	76.0	0.136	0.154	0.000	74.9
60	110.0	0.151	0.171	0.000	109.1
65	102.8	0.381	0.431	0.000	99.4
70	78.5	0.532	0.601	0.000	78.0
75	52.9	0.604	0.683	0.000	52.7
80	35.4	0.631	0.714	0.000	35.4
85	25.2	0.629	0.712	0.000	25.3
90	20.1	0.611	0.691	0.000	20.2
95	17.6	0.584	0.660	0.000	17.7
100	15.9	0.551	0.623	0.000	16.0
105	14.7	0.516	0.583	0.000	15.0
110	13.9	0.479	0.541	0.000	14.1
115	12.9	0.440	0.498	0.000	13.3
120	12.3	0.401	0.454	0.000	12.8
125	3.4	0.348	0.393	0.000	4.7
130	2.2	0.284	0.321	0.000	4.0
135	1.6	0.221	0.250	0.000	3.4
140	0.1	0.158	0.178	0.000	2.0
145	0.0	0.097	0.109	0.000	1.9
150	0.0	0.038	0.043	0.000	1.5
155	0.0	0.005	0.006	0.000	0.1
160	0.0	0.003	0.004	0.000	0.0
165	0.0	0.003	0.003	0.000	0.0
170	0.0	0.002	0.003	0.000	0.0
175	0.0	0.002	0.002	0.000	0.0
180	0.0	0.001	0.002	0.000	0.0
185	0.0	0.001	0.001	0.000	0.0
190	0.0	0.001	0.001	0.000	0.0
195	0.0	0.000	0.000	0.000	0.0
200	0.0	0.000	0.000	0.000	0.0
205	0.0	0.000	0.000	0.000	0.0
210	0.0	0.000	0.000	0.000	0.0
215	0.0	0.000	0.000	0.000	0.0
220	0.0	0.000	0.000	0.000	0.0
225	0.0	0.000	0.000	0.000	0.0
230	0.0	0.000	0.000	0.000	0.0
235	0.0	0.000	0.000	0.000	0.0
240	0.0	0.000	0.000	0.000	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



SWMH5
Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 15 mins: Summer

Type : Manhole

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	4.4	0.024	0.028	0.000	4.4
10	20.0	0.051	0.058	0.000	19.9
15	4.5	0.025	0.028	0.000	4.6
20	0.0	0.006	0.007	0.000	0.2
25	0.0	0.001	0.001	0.000	0.0
30	0.0	0.000	0.000	0.000	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



SWMH6
Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 15 mins: Summer

Type : Manhole

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	14.1	0.063	0.071	0.000	13.6
10	58.0	0.946	1.070	0.000	52.2
15	14.7	0.090	0.101	0.000	24.7
20	0.4	0.017	0.019	0.000	1.2
25	0.0	0.004	0.004	0.000	0.0
30	0.0	0.003	0.003	0.000	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



SWMH7
Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 15 mins: Summer

Type : Manhole

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	1.4	0.019	0.022	0.000	1.3
10	9.0	0.161	0.182	0.000	-2.8
15	1.4	0.021	0.024	0.000	1.6
20	0.0	0.007	0.008	0.000	0.2
25	0.0	0.001	0.002	0.000	0.0
30	0.0	0.001	0.001	0.000	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



SWMH13
Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 15 mins: Summer

Type : Manhole

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	20.1	0.056	0.063	0.000	19.9
10	91.5	0.123	0.140	0.000	90.6
15	21.5	0.055	0.063	0.000	22.6
20	0.7	0.014	0.016	0.000	1.3
25	0.0	0.003	0.003	0.000	0.0
30	0.0	0.002	0.002	0.000	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



SWMH11

Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 120 mins: Summer

Type : Manhole

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	10.5	0.063	0.071	0.000	9.6
10	13.9	0.070	0.079	0.000	13.9
15	14.7	0.070	0.080	0.000	14.7
20	15.8	0.073	0.082	0.000	15.8
25	17.4	0.076	0.086	0.000	17.3
30	19.6	0.082	0.092	0.000	19.5
35	22.5	0.089	0.100	0.000	22.4
40	27.9	0.101	0.115	0.000	27.6
45	38.6	0.122	0.138	0.000	38.2
50	59.3	0.159	0.179	0.000	58.5
55	90.1	0.229	0.259	0.000	87.6
60	131.3	0.482	0.545	0.000	128.4
65	121.6	0.735	0.831	0.000	120.6
70	93.3	0.910	1.029	0.000	92.8
75	62.8	1.003	1.134	0.000	62.6
80	41.9	1.040	1.176	0.000	41.8
85	29.9	1.042	1.178	0.000	30.0
90	23.9	1.024	1.159	0.000	24.0
95	21.0	0.998	1.128	0.000	21.1
100	18.9	0.966	1.092	0.000	19.0
105	17.6	0.930	1.052	0.000	17.7
110	16.5	0.893	1.010	0.000	16.7
115	15.5	0.855	0.967	0.000	15.7
120	15.0	0.816	0.923	0.000	15.1
125	4.7	0.764	0.864	0.000	4.9
130	4.0	0.700	0.791	0.000	4.3
135	3.4	0.637	0.720	0.000	3.7
140	2.0	0.574	0.649	0.000	2.3
145	1.9	0.513	0.580	0.000	2.4
150	1.5	0.454	0.513	0.000	2.1
155	0.1	0.396	0.448	0.000	0.6
160	0.0	0.336	0.381	0.000	1.0
165	0.0	0.266	0.301	0.000	1.8
170	0.0	0.185	0.210	0.000	1.7
175	0.0	0.113	0.128	0.000	1.4
180	0.0	0.052	0.059	0.000	1.0
185	0.0	0.007	0.008	0.000	0.1
190	0.0	0.003	0.004	0.000	0.0
195	0.0	0.002	0.003	0.000	0.0
200	0.0	0.002	0.002	0.000	0.0
205	0.0	0.001	0.002	0.000	0.0
210	0.0	0.001	0.001	0.000	0.0
215	0.0	0.001	0.001	0.000	0.0
220	0.0	0.001	0.001	0.000	0.0
225	0.0	0.001	0.001	0.000	0.0
230	0.0	0.001	0.001	0.000	0.0
235	0.0	0.001	0.001	0.000	0.0
240	0.0	0.001	0.001	0.000	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



SWMH15
Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 15 mins: Summer

Type : Manhole

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	3.0	0.032	0.036	0.000	2.9
10	13.6	0.071	0.080	0.000	13.3
15	3.0	0.035	0.039	0.000	3.5
20	0.0	0.010	0.012	0.000	0.3
25	0.0	0.002	0.002	0.000	0.0
30	0.0	0.001	0.001	0.000	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



SWMH16
Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 15 mins: Summer

Type : Manhole

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	17.2	0.071	0.081	0.000	16.5
10	78.4	0.266	0.300	0.000	72.6
15	18.7	0.079	0.090	0.000	20.9
20	0.7	0.023	0.025	0.000	1.8
25	0.0	0.004	0.004	0.000	0.0
30	0.0	0.002	0.002	0.000	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



SWMH14
Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 15 mins: Summer

Type : Manhole

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	5.5	0.042	0.048	0.000	5.3
10	24.7	0.103	0.116	0.000	24.3
15	5.5	0.045	0.051	0.000	6.1
20	0.0	0.012	0.014	0.000	0.4
25	0.0	0.002	0.002	0.000	0.0
30	0.0	0.001	0.001	0.000	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



SWMH17
Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 15 mins: Summer

Type : Manhole

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	19.8	0.077	0.087	0.000	19.1
10	87.6	0.260	0.294	0.000	84.6
15	24.3	0.091	0.102	0.000	26.6
20	1.8	0.027	0.031	0.000	2.8
25	0.0	0.005	0.006	0.000	0.1
30	0.0	0.002	0.003	0.000	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



SWMH20
Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 60 mins: Summer

Type : Manhole

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	11.2	0.076	0.086	0.000	10.2
10	14.4	0.087	0.098	0.000	14.2
15	17.4	0.099	0.112	0.000	17.2
20	23.7	0.123	0.140	0.000	22.8
25	45.2	0.217	0.246	0.000	42.1
30	100.9	0.549	0.620	0.000	93.3
35	108.3	0.964	1.091	0.000	105.1
40	55.8	1.114	1.260	0.000	54.9
45	26.5	1.110	1.255	0.000	25.8
50	18.4	1.079	1.220	0.000	19.9
55	15.9	1.043	1.179	0.000	16.6
60	13.1	0.982	1.111	0.000	13.3
65	2.6	0.893	1.010	0.000	3.0
70	1.1	0.780	0.882	0.000	1.5
75	1.2	0.674	0.762	0.000	1.7
80	1.1	0.576	0.651	0.000	1.6
85	0.1	0.481	0.544	0.000	1.3
90	0.0	0.350	0.396	0.000	1.7
95	0.0	0.241	0.272	0.000	2.1
100	0.0	0.162	0.183	0.000	1.7
105	0.0	0.107	0.121	0.000	1.1
110	0.0	0.068	0.077	0.000	0.7
115	0.0	0.041	0.046	0.000	0.4
120	0.0	0.020	0.023	0.000	0.3

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



FC100

Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 60 mins: Summer

Type : Manhole

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	0.2	0.004	0.005	0.000	0.0
10	2.7	0.085	0.097	0.000	2.3
15	6.2	0.142	0.160	0.000	5.8
20	10.8	0.199	0.225	0.000	10.4
25	18.3	0.286	0.323	0.000	17.7
30	30.7	0.495	0.560	0.000	29.5
35	25.7	0.880	0.995	0.000	24.1
40	28.4	1.159	1.311	0.000	27.9
45	28.2	1.187	1.343	0.000	28.2
50	28.1	1.185	1.340	0.000	28.2
55	27.4	1.131	1.279	0.000	27.6
60	26.5	1.069	1.209	0.000	26.7
65	25.2	0.983	1.112	0.000	25.6
70	23.6	0.870	0.984	0.000	24.0
75	22.0	0.765	0.865	0.000	22.4
80	20.4	0.668	0.755	0.000	20.8
85	22.2	0.571	0.646	0.000	22.8
90	26.7	0.439	0.496	0.000	27.2
95	20.6	0.332	0.376	0.000	21.0
100	14.8	0.255	0.289	0.000	15.2
105	10.2	0.201	0.227	0.000	10.5
110	7.2	0.162	0.184	0.000	7.4
115	5.2	0.135	0.152	0.000	5.4
120	3.9	0.114	0.129	0.000	4.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



FC101

Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 120 mins: Summer

Type : Manhole

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	0.1	0.004	0.004	0.000	0.0
10	5.2	0.099	0.112	0.000	4.3
15	12.3	0.172	0.195	0.000	11.8
20	14.8	0.195	0.221	0.000	14.6
25	16.4	0.207	0.234	0.000	16.2
30	18.1	0.221	0.250	0.000	17.9
35	20.3	0.237	0.268	0.000	20.1
40	23.1	0.259	0.293	0.000	23.0
45	27.6	0.294	0.332	0.000	27.1
50	34.4	0.359	0.406	0.000	33.7
55	43.5	0.471	0.533	0.000	42.8
60	30.5	0.671	0.759	0.000	31.0
65	37.3	0.933	1.055	0.000	36.4
70	40.9	1.140	1.289	0.000	40.3
75	42.6	1.256	1.421	0.000	42.3
80	43.3	1.304	1.475	0.000	43.2
85	43.2	1.310	1.481	0.000	43.3
90	42.9	1.294	1.463	0.000	43.0
95	42.4	1.268	1.434	0.000	42.6
100	41.9	1.236	1.398	0.000	42.0
105	41.3	1.202	1.359	0.000	41.4
110	40.6	1.165	1.318	0.000	40.7
115	39.9	1.127	1.275	0.000	40.1
120	39.2	1.089	1.231	0.000	39.3
125	38.2	1.038	1.174	0.000	38.4
130	36.9	0.974	1.102	0.000	37.2
135	35.7	0.911	1.031	0.000	35.9
140	34.4	0.849	0.960	0.000	34.6
145	33.1	0.789	0.892	0.000	33.3
150	31.7	0.730	0.826	0.000	32.0
155	30.8	0.672	0.760	0.000	31.0
160	33.5	0.613	0.693	0.000	33.8
165	7.5	0.576	0.652	0.000	39.8
170	41.4	0.458	0.518	0.000	41.8
175	35.6	0.387	0.438	0.000	36.0
180	29.7	0.325	0.367	0.000	30.3
185	24.0	0.272	0.307	0.000	24.5
190	18.7	0.230	0.260	0.000	19.1
195	14.6	0.197	0.223	0.000	14.9
200	8.6	0.150	0.169	0.000	9.2
205	4.6	0.106	0.120	0.000	4.9
210	2.9	0.083	0.094	0.000	3.0
215	2.0	0.068	0.077	0.000	2.1
220	1.4	0.058	0.065	0.000	1.5
225	1.1	0.051	0.057	0.000	1.2
230	0.9	0.044	0.050	0.000	0.9
235	0.7	0.039	0.044	0.000	0.7
240	0.6	0.036	0.040	0.000	0.6

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



SWMH19
Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 15 mins: Summer

Type : Manhole

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	15.1	0.113	0.127	0.000	13.7
10	62.1	1.213	1.372	0.000	55.4
15	22.7	0.366	0.414	0.000	28.3
20	0.5	0.035	0.040	0.000	2.1
25	0.0	0.007	0.008	0.000	0.1
30	0.0	0.003	0.004	0.000	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



SWMH18
Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 15 mins: Summer

Type : Manhole

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	5.0	0.052	0.059	0.000	4.7
10	22.5	1.143	1.293	0.000	15.0
15	5.0	0.244	0.276	0.000	12.2
20	0.0	0.017	0.020	0.000	0.5
25	0.0	0.003	0.003	0.000	0.0
30	0.0	0.002	0.002	0.000	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



SWMH21
Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 60 mins: Summer

Type : Manhole

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	0.0	0.000	0.000	0.000	0.0
10	0.0	0.000	0.000	0.000	0.0
15	0.0	0.000	0.000	0.000	0.0
20	0.0	0.000	0.000	0.000	0.0
25	0.0	0.000	0.000	0.000	0.0
30	5.6	0.022	0.025	0.000	-5.6
35	1.6	0.452	0.512	0.000	-1.6
40	0.8	0.600	0.689	0.011	-0.8
45	0.7	0.602	2.344	1.665	-0.7
50	0.8	0.543	0.614	0.000	-0.8
55	0.0	0.526	0.595	0.000	1.0
60	0.0	0.470	0.531	0.000	0.1
65	0.0	0.381	0.431	0.000	0.4
70	0.0	0.267	0.303	0.000	0.9
75	0.0	0.162	0.183	0.000	1.2
80	0.0	0.064	0.072	0.000	1.1
85	0.0	0.006	0.007	0.000	0.1
90	0.0	0.004	0.004	0.000	0.0
95	0.0	0.003	0.003	0.000	0.0
100	0.0	0.003	0.003	0.000	0.0
105	0.0	0.002	0.002	0.000	0.0
110	0.0	0.002	0.002	0.000	0.0
115	0.0	0.001	0.002	0.000	0.0
120	0.0	0.001	0.001	0.000	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



SWMH12
Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 15 mins: Summer

Type : Manhole

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	12.8	0.053	0.059	0.000	12.5
10	57.8	0.126	0.143	0.000	57.1
15	12.9	0.055	0.062	0.000	13.8
20	0.0	0.012	0.014	0.000	0.6
25	0.0	0.001	0.001	0.000	0.0
30	0.0	0.001	0.001	0.000	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



SWMH4
Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 15 mins: Summer

Type : Manhole

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	4.9	0.027	0.030	0.000	4.8
10	21.9	0.648	0.733	0.000	14.6
15	4.9	0.051	0.058	0.000	14.5
20	0.0	0.006	0.007	0.000	0.2
25	0.0	0.001	0.001	0.000	0.0
30	0.0	0.000	0.000	0.000	0.0

Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



EXMH01

Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 240 mins: Winter

Type : Manhole

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	0.0	0.000	0.000	0.000	0.0
10	0.0	0.002	0.000	0.000	0.0
15	1.6	0.011	0.000	0.000	1.6
20	6.2	0.021	0.000	0.000	6.2
25	11.1	0.028	0.000	0.000	11.1
30	14.8	0.032	0.000	0.000	14.8
35	17.1	0.034	0.000	0.000	17.1
40	18.1	0.036	0.000	0.000	18.1
45	18.8	0.036	0.000	0.000	18.8
50	19.5	0.037	0.000	0.000	19.5
55	20.3	0.038	0.000	0.000	20.3
60	21.5	0.039	0.000	0.000	21.5
65	23.2	0.041	0.000	0.000	23.2
70	25.6	0.043	0.000	0.000	25.6
75	29.0	0.046	0.000	0.000	29.0
80	33.2	0.049	0.000	0.000	33.2
85	38.2	0.053	0.000	0.000	38.2
90	43.8	0.058	0.000	0.000	43.9
95	49.8	0.062	0.000	0.000	49.8
100	55.9	0.066	0.000	0.000	55.9
105	61.8	0.070	0.000	0.000	61.8
110	67.5	0.074	0.000	0.000	67.5
115	71.0	0.077	0.000	0.000	71.0
120	71.3	0.080	0.000	0.000	70.4
125	60.4	0.079	0.000	0.000	60.4
130	63.1	0.081	0.000	0.000	63.1
135	64.6	0.081	0.000	0.000	64.6
140	65.4	0.080	0.000	0.000	65.4
145	66.5	0.080	0.000	0.000	66.5
150	67.6	0.081	0.000	0.000	67.6
155	67.6	0.081	0.000	0.000	67.6
160	66.4	0.078	0.000	0.000	66.4
165	64.1	0.075	0.000	0.000	64.1
170	61.5	0.072	0.000	0.000	61.5
175	58.6	0.068	0.000	0.000	58.6
180	55.5	0.065	0.000	0.000	55.5
185	52.4	0.062	0.000	0.000	52.4
190	49.4	0.060	0.000	0.000	49.4
195	46.8	0.058	0.000	0.000	46.8
200	44.6	0.057	0.000	0.000	44.6
205	42.8	0.055	0.000	0.000	42.8
210	41.3	0.054	0.000	0.000	41.3
215	40.0	0.054	0.000	0.000	40.0
220	38.9	0.053	0.000	0.000	38.9
225	38.1	0.052	0.000	0.000	38.1
230	37.7	0.052	0.000	0.000	37.7
235	40.8	0.055	0.000	0.000	40.6

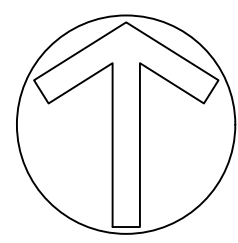
Hopwood Hall College:	Date: 31/07/2025		
	Designed by: AY	Checked by: JT	Approved By: JT
Report Details: Type: Junction Results Storm Phase: Phase	Roscoe:		



Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
240	37.1	0.052	0.000	0.000	37.1
245	46.4	0.061	0.000	0.000	46.3
250	39.7	0.057	0.000	0.000	39.7
255	33.2	0.052	0.000	0.000	33.2
260	27.0	0.046	0.000	0.000	27.0
265	21.1	0.041	0.000	0.000	21.1
270	16.6	0.036	0.000	0.000	16.6
275	11.0	0.029	0.000	0.000	10.9
280	6.1	0.021	0.000	0.000	6.1
285	3.9	0.017	0.000	0.000	3.9
290	2.8	0.014	0.000	0.000	2.8
295	2.1	0.013	0.000	0.000	2.1
300	1.7	0.011	0.000	0.000	1.7
305	1.4	0.010	0.000	0.000	1.4
310	1.1	0.009	0.000	0.000	1.1
315	1.0	0.009	0.000	0.000	1.0
320	0.8	0.008	0.000	0.000	0.8
325	0.7	0.008	0.000	0.000	0.7
330	0.6	0.007	0.000	0.000	0.6
335	0.6	0.007	0.000	0.000	0.6
340	0.5	0.007	0.000	0.000	0.5
345	0.4	0.006	0.000	0.000	0.4
350	0.4	0.006	0.000	0.000	0.4
355	0.4	0.006	0.000	0.000	0.3
360	0.3	0.005	0.000	0.000	0.3
365	0.3	0.005	0.000	0.000	0.3
370	0.3	0.005	0.000	0.000	0.3
375	0.2	0.005	0.000	0.000	0.2
380	0.2	0.005	0.000	0.000	0.2
385	0.2	0.005	0.000	0.000	0.2
390	0.2	0.004	0.000	0.000	0.2
395	0.2	0.004	0.000	0.000	0.2
400	0.2	0.004	0.000	0.000	0.2
405	0.2	0.004	0.000	0.000	0.2
410	0.2	0.004	0.000	0.000	0.2
415	0.1	0.004	0.000	0.000	0.1
420	0.1	0.004	0.000	0.000	0.1
425	0.1	0.004	0.000	0.000	0.1
430	0.1	0.003	0.000	0.000	0.1
435	0.1	0.003	0.000	0.000	0.1
440	0.1	0.003	0.000	0.000	0.1
445	0.1	0.003	0.000	0.000	0.1
450	0.1	0.003	0.000	0.000	0.1
455	0.1	0.003	0.000	0.000	0.1
460	0.1	0.003	0.000	0.000	0.1
465	0.1	0.003	0.000	0.000	0.1
470	0.1	0.003	0.000	0.000	0.1
475	0.1	0.003	0.000	0.000	0.1
480	0.1	0.003	0.000	0.000	0.1

Appendix E

Proposed Site Drainage Layout



Drainage design is currently based upon latest Architect information and has been produced for initial cost/benchmark purposes. Subject to change following additional information being provided and UU input on constraints.

DO NOT SCALE

NOTES:

- Locations of SVPs and RWPS to be confirmed with Architect/M&E consultant. Drainage is subject to change following confirmation.
- Connections to the public sewers to be agreed with United Utilities.
- SW Discharge rate agreed to be agreed with council through planning and with United Utilities.
- Any cover levels shown are indicative. Cover level to suit landscaping strategy.
- Attenuation volumes to be confirmed subject to detailed drainage design.
- All drainage is to remain private and designed following Building Regulations Part H guidance.
- Any drainage channels to be Gatic Pavement or similar approved.
- Drains with less than 0.6m cover to have concrete surround. This will be confirmed following landscape architect external level construction information.
- Drainage not to be re-used to be grubbed out or removed.
- All internal foul gully's to be fitted with non return valves. Refer to drawing FE0012-RS-XX-XX-D-C-0562 for standard detail drawing.
- Final foundation layout and depths TBC. May affect level and position of drainage runs.
- PPIC access opening to be restricted to 350mm diameter or 300x300mm where depth of chamber to inverts is more than 1m.
- Connection points for surface and foul drainage is subject to change following CCTV information and approvals.
- Location of all surface water pick up points are subject to finalised landscape Architects levels design.
- Attenuation tank location and size shown indicatively, finalised pond to be developed at detailed design.
- Existing drainage shown to be abandoned is subject to CCTV survey confirming that the sewers will no longer be live following demolition of existing buildings.
- All external hardstanding designed as impermeable. Drainage design subject to change if area's of permeable surfacing are introduced.
- Drainage design has allowed for the standard 1.2m cover from crown of pipe to ground level at the head of drainage runs in trafficked areas and 0.9m cover in pedestrian zones. All drainage depths are subject to change following detailed design and discussions with the wider construction team.
- Ground floor slab of proposed building to be suspended with a void space to underside. All foul pop-ups currently anticipated to go underneath ground floor slab.
- It is currently anticipated that existing buildings Block A & Block B will be kept live during the construction of the proposed new building. Surface water drainage systems have been split into two distinct systems to allow for ease of construction.
- Easement for existing surface water is currently shown at 3m either side. This has been approved by UU. Any retaining requirements within the easement to be confirmed by UU.
- The privately owned sewers that have been proposed to be abandoned do not show an easement. CCTV has shown these sewers will no longer be live following demolishing works.
- Proposed flow rate is based upon the existing brownfield run off rate, as the existing network has been modelled for a 2 year storm plus charge. A minimum 50% betterment has been applied to suit UU and Local Authority Guidance. Subject to approval by UU and the LLFA.
- Rodding access required for all pop-ups.

- Proposed Surface Water Drainage
- Slot Drain - Gatic
- Filter Drain
- BD Surface Water Back Drop
- BG Gully
- BSU Rain Water Pipe
- BSU Channel Drain Sump
- RE Surface Water Rodding Eye
- FC Surface Water Flow Control Chamber
- VP Bypass Interceptor
- VP Vent Pipe
- Cellular Attenuation Tank
- Easements
- Proposed Foul Sewer Drainage
- Foul Pop Up
- BD Foul Back Drop
- BG Internal Floor Gully
- Existing UU Surface Water Drainage
- Existing UU Foul Sewer Drainage
- Existing Private Surface Water Sewer to be abandoned
- Existing Private Foul Water Sewer to be abandoned / Kept for addition use
- Back of Wall Drainage
- Potential EV Canopy Rain Water Pipe
- Existing Slot Drain
- Channel Drain Sump
- Swale

REV	DATE	BY	DESCRIPTION	CHK	APP
P10	05.08.25	AY	UPDATED TO SUIT COMMENTS	JT	JC
P09	33.06.25	AY	STAGE 4 SS ISSUE FOR APPROVAL	JT	DB
P08	06.06.25	AY	STAGE 4 SS ISSUE FOR APPROVAL	JT	DB
P07	02.05.25	AY	STAGE 4 SS ISSUE FOR APPROVAL	JT	DB
P06	16.04.25	AY	STAGE 4 DRAFT ISSUE	JT	DB
P05	11.03.25	AY	UPDATED DRAINAGE DESIGN TO SUIT COMMENTS	JT	DB
P04	04.02.25	AY	UPDATED DRAINAGE DESIGN	JT	DB
P03	11.12.24	AY	UPDATED ISSUE TO SUIT COMMENTS	JT	DB
P02	02.12.24	AY	STAGE 3 ISSUE	JT	DB
P01	02.05.24	AY	STAGE 2 ISSUE	JT	JC

SS: SUITABLE FOR REVIEW AND ACCEPTANCE



CLIENT: WILLMOTT DIXON

ARCHITECT: SHEPPARD ROBSON

PROJECT: HOPWOOD HALL COLLEGE
ROCHDALE

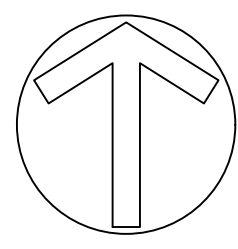
TITLE: BELOW GROUND DRAINAGE
GENERAL LAYOUT

SCALE @ A0:	1:200	CHECKED:	JT	APPROVED:	JC
PROJECT NUMBER:	24365	DESIGNED:	AY	DRAWN:	AY
DRAWING No:		DATE:		MAY 2024	

FE0012-RS-XX-XX-D-C-0500 P10

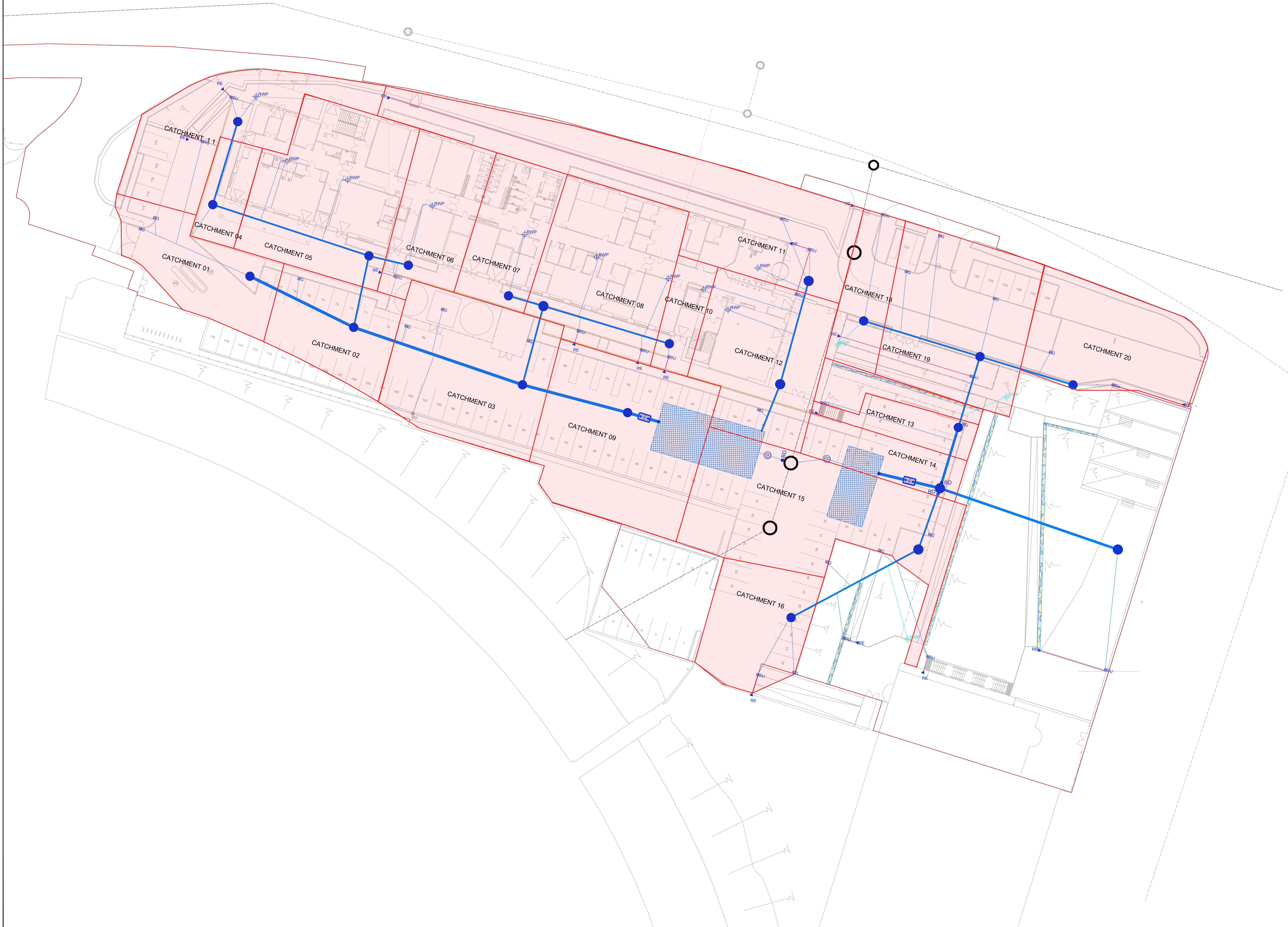
Appendix F

Catchment Areas for InfoDrainage



Drainage design is currently based upon latest Architect information and has been produced for initial cost benchmark purposes. Subject to change following additional information being provided and UU input on constraints.

DO NOT SCALE



P01	05.08.25	AY	FOR INFORMATION	JT	JC
REV	DATE	BY	DESCRIPTION	DWN	APP

DRAWING STATUS: FOR INFORMATION



CLIENT: WILLMOTT DIXON

ARCHITECT: SHEPPARD ROBSON

PROJECT: HOPWOOD HALL COLLEGE
ROCHDALE

TITLE: BELOW GROUND DRAINAGE
CATCHMENT PLAN

SCALE @ A0:	1:200	CHECKED:	JT	APPROVED:	JC
PROJECT NUMBER:	24365	DESIGNED:	AY	DATE:	AUG 25

DRAWING NO:	FE0012-RS-XX-XX-D-C-0500	REV:	P01
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Appendix G

Infiltration Test Results

**Tier Environmental**

Chadwick House
Birchwood Park
Warrington Rd
WA3 6AE

Client:

WILMOTT DIXON

Site:

HOPWOOD HALL COLLEGE

Test ID:

SA01 CYCLE 1

Job Number:

TE1880

Technician:

LH

Test Date:

26/11/2024

Test Number:

1 of 2

Comments:

Soakage Pit Width [m] 0.75

Soakage Pit Length [m] 2.2

Soakage Pit Depth [m] 1.98

Depth to water at start of test bgl [m]

Effective Storage Depth [m] 1.98

Free Volume [%] 100

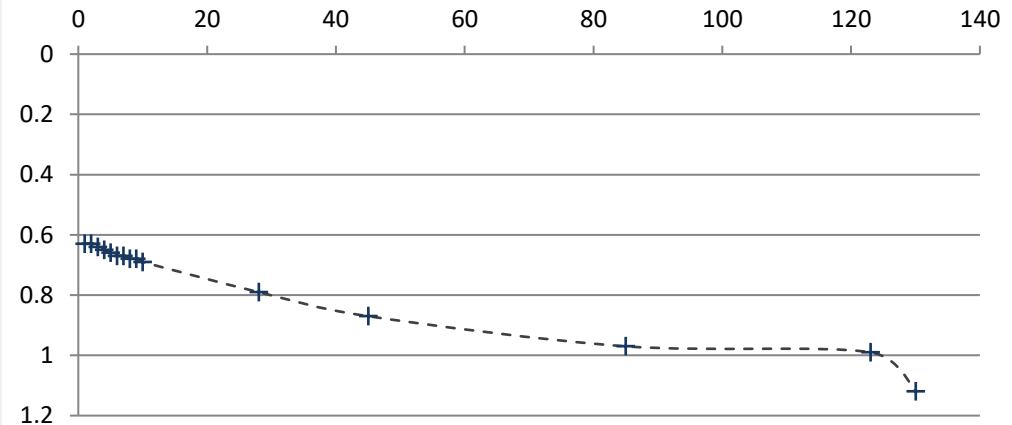
Effective Depth at 25% Drainage 0.495

Effective Depth at 75% Drainage 1.485

Time to Drain From 25% to 75% [s] N/A

Internal Surface Area [m²] 7.491Effective Storage Volume [m³] 1.6335

Test Completion [%] 57%

**Soil infiltration rate(m/s)**

Soakaway failed. Estimated to take at
least 3.06 hours to drain 75%

SOAKAGE TRIAL PIT INFILTRATION TEST RESULTS

Measurement N°	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Time [min]	1	2	3	4	5	6	7	8	9	10	28	45	85	123	130					
Depth to water [m]	0.63	0.63	0.64	0.65	0.66	0.67	0.67	0.68	0.68	0.69	0.79	0.87	0.97	0.99	1.12					

**Tier Environmental**

Chadwick House
Birchwood Park
Warrington Rd
WA3 6AE

Client:

WILMOTT DIXON

Site:

HOPWOOD HALL COLLEGE

Test ID:

SA01 CYCLE 2

Job Number:

TE1880

Technician:

LH

Test Date:

26/11/2024

Test Number:

2 of 2

Comments:

Soakage Pit Width [m] 0.75

Soakage Pit Length [m] 2.2

Soakage Pit Depth [m] 1.98

Depth to water at start of test bgl [m]

Effective Storage Depth [m] 1.98

Free Volume [%] 100

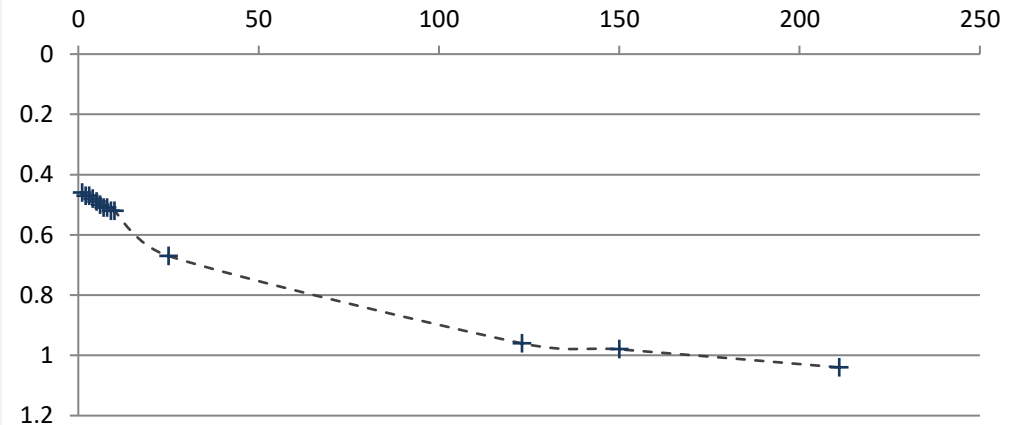
Effective Depth at 25% Drainage 0.495

Effective Depth at 75% Drainage 1.485

Time to Drain From 25% to 75% [s] N/A

Internal Surface Area [m²] 7.491Effective Storage Volume [m³] 1.6335

Test Completion [%] 53%

**Soil infiltration rate(m/s)**

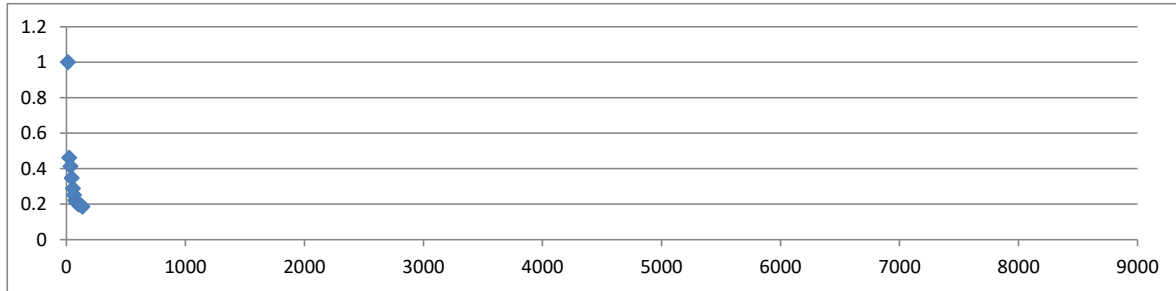
Soakaway failed. Estimated to take at least 18.85 hours to drain 75%

SOAKAGE TRIAL PIT INFILTRATION TEST RESULTS

Measurement N°	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Time [min]	1	2	3	4	5	6	7	8	9	10	25	123	150	211						
Depth to water [m]	0.46	0.47	0.47	0.48	0.49	0.5	0.51	0.51	0.52	0.52	0.67	0.96	0.98	1.04						

VARIABLE HEAD PERMEABILITY TEST IN BOREHOLE

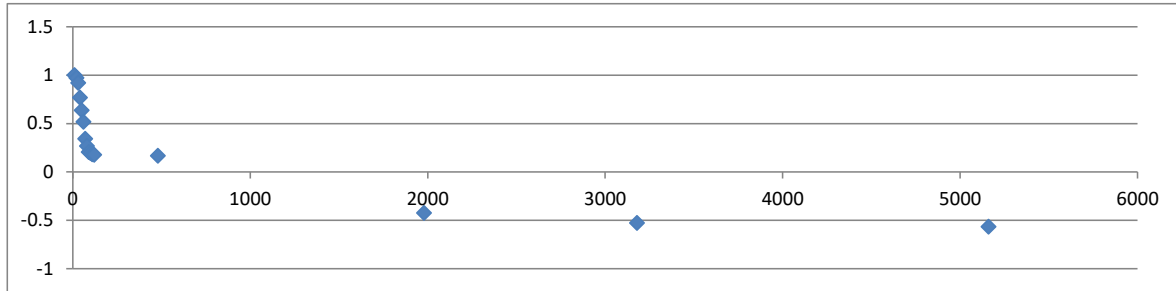
BOREHOLE No.:	WS112	TEST No.:	1			
	DEPTH (m)	5.45	DATE	11.12.2024	SHEET	1



Time Elapsed (secs)	Depth of water below top of casing - d _i (m)	h (m) - (d _i -d ₀)	h _i /h ₀				
14	0.93	1.67	1		Test Section Depth	m	2.6
24	1.83	0.77	0.46107784		Borehole Depth	m	5.45
34	1.91	0.69	0.41317365		Borehole Diameter	m	0.15
44	2.02	0.58	0.34730539		Casing Depth	m	NA
54	2.12	0.48	0.28742515		Depth to Standing Water Level (d ₁)	Assumed m	0.93
64	2.18	0.42	0.25149701		Height of casing agl (h _c)	m	0.6
74	2.23	0.37	0.22155689		Height of top of casing above water table	m	1.53
84	2.25	0.35	0.20958084		Depth to Water at Start of Test below casing level (d ₀)	m	0.06
94	2.26	0.34	0.20359281		Depth to Water at End of Test below casing level	m	2.58
104	2.27	0.33	0.19760479		Depth to Filter at Start of Test	m	
114	2.27	0.33	0.19760479		Depth to Filter at End of Test	m	
134	2.29	0.31	0.18562874		Response Zone Length	m	0.2
180	2.3				Borehole Diameter in Test Section	m	0.15
300	2.35				Cross-sectional Area of Borehole	m ²	0.02
420	2.41				Intake factor (BS5930 p51):	Figure 7 (F) =	1.14
540	2.53				Basic Time Lag = (T)	t ₁ = 14.00	s.h ₁ = 1.00
1920	3.38					t ₂ = 104.00	s.h ₂ = 0.20
3120	3.52				Coefficient of Permeability (k) ms-1 =		2.78E-04
7800	3.6						
Remarks		Borehole cleaned out prior to test.					
Compiled By	JB	Date	17/11/2014				
Checked By	AR	Date	19/11/2014				
Geology of Test Section:		Very dense light brown very sandy subangular to rounded fine to coarse GRAVEL of flint. (LYNCH HILL MEMBER)					
Tier Environmental Ltd Unit 5 Office Village Sandpiper Court, Chester Business Park Chester CH4 9QZ Tel. 01925 818 388							
				Project Number			
				Project Name			
				Client			

VARIABLE HEAD PERMEABILITY TEST IN BOREHOLE

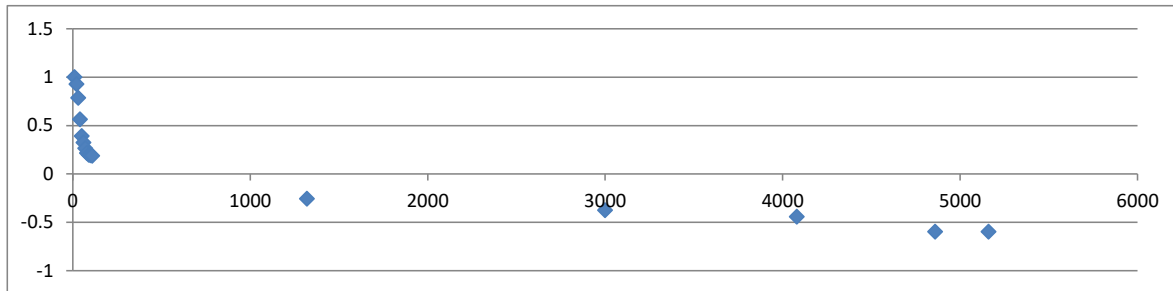
BOREHOLE No.:	WS112	TEST No.:	2			
	DEPTH (m)	5.45	DATE	11.12.2024	SHEET	2



Time Elapsed (secs)	Depth of water below top of casing - d _i (m)	h (m) - (d ₁ -d ₀)	h ₁ /h ₀				
10	0.84	1.76	1		Test Section Depth	m	2.6
20	0.89	1.71	0.97159091		Borehole Depth	m	5.45
30	0.98	1.62	0.92045455		Borehole Diameter	m	0.15
40	1.25	1.35	0.76704545		Casing Depth	m	NA
50	1.48	1.12	0.63636364		Depth to Standing Water Level (d ₁)	Assumed m	0.93
60	1.69	0.91	0.51704545		Height of casing agl (h _c)	m	0.6
70	2	0.6	0.34090909		Height of top of casing above water table	m	1.53
80	2.13	0.47	0.26704545		Depth to Water at Start of Test below casing level (d ₀)	m	0.06
90	2.24	0.36	0.20454545		Depth to Water at End of Test below casing level	m	2.58
100	2.26	0.34	0.19318182		Depth to Filter at Start of Test	m	
110	2.28	0.32	0.18181818		Depth to Filter at End of Test	m	
120	2.29	0.31	0.17613636		Response Zone Length	m	0.2
480	2.31	0.29	0.16477273		Borehole Diameter in Test Section	m	0.15
1980	3.35	-0.75	-0.4261364		Cross-sectional Area of Borehole	m ²	0.02
3180	3.53	-0.93	-0.5284091		Intake factor (BS5930 p51):	Figure 7 (F) =	1.14
5160	3.6	-1	-0.5681818		Basic Time Lag = (T)	t ₁ = 10.00	s.h ₁ = 1.00
						t ₂ = 100.00	s.h ₂ = 0.19
					Coefficient of Permeability (k) ms ⁻¹ =		2.82E-04
Remarks							
Borehole cleaned out prior to test.							
Compiled By	JB	Date	17/11/2014				
Checked By	AR	Date	19/11/2014				
Geology of Test Section:		Very dense light brown very sandy subangular to rounded fine to coarse GRAVEL of flint. (LYNCH HILL MEMBER)					
Tier Environmental Ltd							
Unit 5 Office Village					Project Number		
Sandpiper Court, Chester Business Park					Project Name		
Chester CH4 9QZ					Client		
Tel. 01925 818 388							
							

VARIABLE HEAD PERMEABILITY TEST IN BOREHOLE

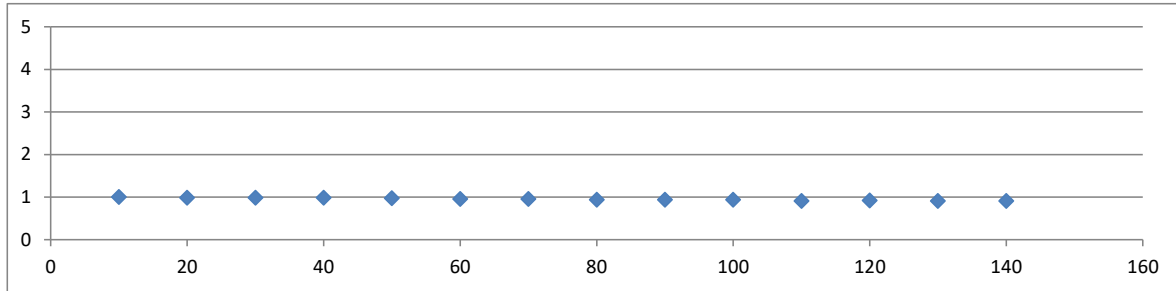
BOREHOLE No.:	WS112	TEST No.:	3			
	DEPTH (m)	5.45	DATE	11.12.2024	SHEET	3



Time Elapsed (secs)	Depth of water below top of casing - d ₁ (m)	h (m) - (d ₁ -d ₀)	h ₁ /h ₀								
10	0.93	1.67	1		Test Section Depth	m	2.6				
20	1.05	1.55	0.92814371		Borehole Depth	m	5.45				
30	1.29	1.31	0.78443114		Borehole Diameter	m	0.15				
40	1.66	0.94	0.56287425		Casing Depth	m	NA				
50	1.95	0.65	0.38922156		Depth to Standing Water Level (d ₁)	Assumed m	0.93				
60	2.06	0.54	0.32335329		Height of casing agl (h _c)	m	0.6				
70	2.16	0.44	0.26347305		Height of top of casing above water table	m	1.53				
80	2.24	0.36	0.21556886		Depth to Water at Start of Test below casing level (d ₀)	m	0.06				
90	2.27	0.33	0.19760479		Depth to Water at End of Test below casing level	m	2.58				
100	2.28	0.32	0.19161677		Depth to Filter at Start of Test	m					
110	2.29	0.31	0.18562874		Depth to Filter at End of Test	m					
1320	3.03	-0.43	-0.257485		Response Zone Length	m	0.2				
					Borehole Diameter in Test Section	m	0.15				
3000	3.23	-0.63	-0.3772455								
4080	3.34	-0.74	-0.4431138		Cross-sectional Area of Borehole	m ²	0.02				
4860	3.6	-1	-0.5988024		Intake factor (BS5930 p51):	Figure 7 (F) =	1.14				
5160	3.6	-1	-0.5988024		Basic Time Lag = (T)	t ₁ = 10.00	s.h ₁ = 1.00				
						t ₂ = 100.00	s.h ₂ = 0.19				
					Coefficient of Permeability (k) ms ⁻¹ =		2.83E-04				
Remarks		Borehole cleaned out prior to test.									
Compiled By	JB							Date	17/11/2014		
Checked By	AR							Date	19/11/2014		
Geology of Test Section:								Very dense light brown very sandy subangular to rounded fine to coarse GRAVEL of flint. (LYNCH HILL MEMBER)			
Tier Environmental Ltd Unit 5 Office Village Sandpiper Court, Chester Business Park Chester CH4 9QZ Tel. 01925 818 388											
				Project Number							
				Project Name							
				Client							

VARIABLE HEAD PERMEABILITY TEST IN BOREHOLE

BOREHOLE No.:	WS116	TEST No.:	1			
	DEPTH (m)	5.45	DATE	11.12.2024	SHEET	1

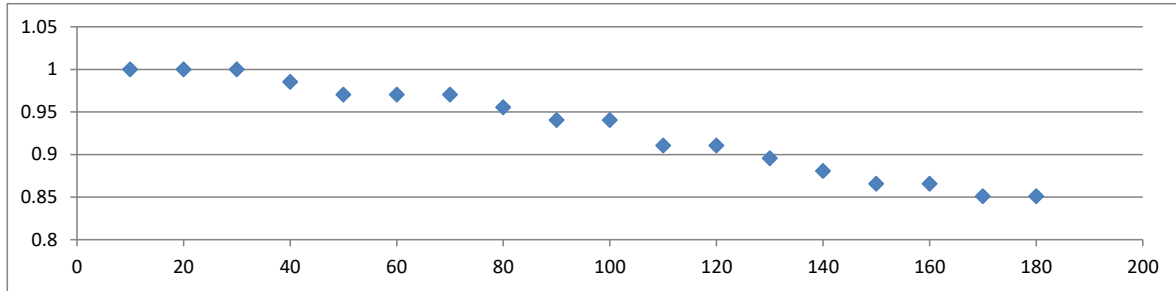


Time Elapsed (secs)	Depth of water below top of casing - d _i (m)	h (m) - (d _i -d ₀)	h _i /h ₀				
10	1.97	0.63	1		Test Section Depth	m	2.6
20	1.98	0.62	0.98412698		Borehole Depth	m	5.45
30	1.98	0.62	0.98412698		Borehole Diameter	m	0.15
40	1.98	0.62	0.98412698		Casing Depth	m	NA
50	1.99	0.61	0.96825397		Depth to Standing Water Level (d ₁)	Assumed m	0.93
60	2	0.6	0.95238095		Height of casing agl (h _c)	m	0.6
70	2	0.6	0.95238095		Height of top of casing above water table	m	1.53
80	2.01	0.59	0.93650794		Depth to Water at Start of Test below casing level (d ₀)	m	0.06
90	2.01	0.59	0.93650794		Depth to Water at End of Test below casing level	m	2.58
100	2.01	0.59	0.93650794		Depth to Filter at Start of Test	m	
110	2.03	0.57	0.9047619		Depth to Filter at End of Test	m	
120	2.02	0.58	0.92063492		Response Zone Length	m	0.2
130	2.03	0.57	0.9047619		Borehole Diameter in Test Section	m	0.15
140	2.03	0.57	0.9047619		Cross-sectional Area of Borehole	m ²	0.02
		2.6	4.12698413		Intake factor (BS5930 p51):	Figure 7 (F) =	1.14
		2.6	4.12698413		Basic Time Lag = (T)	t ₁ = 10.00	s.h ₁ = 1.00
						t ₂ = 100.00	s.h ₂ = 0.94
					Coefficient of Permeability (k) ms-1 =		1.13E-05
Remarks							
Borehole cleaned out prior to test.							
Compiled By	JB	Date	17/11/2014				
Checked By	AR	Date	19/11/2014				
Geology of Test Section:		Very dense light brown very sandy subangular to rounded fine to coarse GRAVEL of flint. (LYNCH HILL MEMBER)					
Tier Environmental Ltd							
Unit 5 Office Village							
Sandpiper Court, Chester Business Park							
Chester CH4 9QZ							
Tel. 01925 818 388							
				Project Number			
				Project Name			
				Client			



VARIABLE HEAD PERMEABILITY TEST IN BOREHOLE

BOREHOLE No.:	WS116	TEST No.:	2			
	DEPTH (m)	5.45	DATE	11.12.2024	SHEET	2

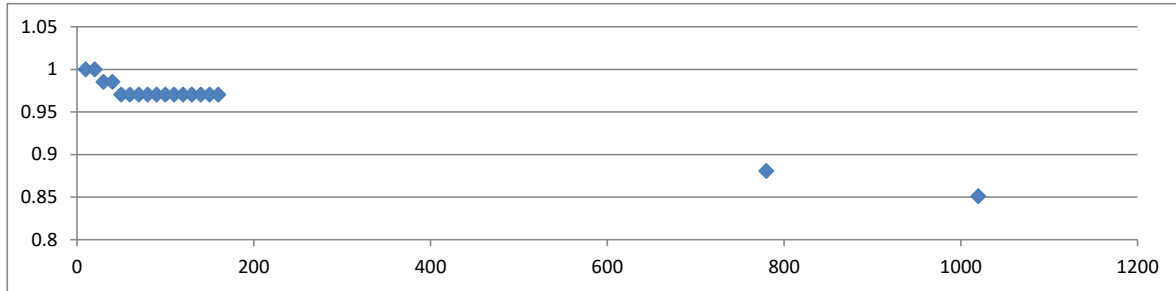


Time Elapsed (secs)	Depth of water below top of casing - d ₁ (m)	h (m) - (d ₁ -d ₁)	h ₁ /h ₀				
10	1.93	0.67	1		Test Section Depth	m	2.6
20	1.93	0.67	1		Borehole Depth	m	5.45
30	1.93	0.67	1		Borehole Diameter	m	0.15
40	1.94	0.66	0.98507463		Casing Depth	m	NA
50	1.95	0.65	0.97014925		Depth to Standing Water Level (d ₁)	Assumed m	0.93
60	1.95	0.65	0.97014925		Height of casing agl (h _c)	m	0.6
70	1.95	0.65	0.97014925		Height of top of casing above water table	m	1.53
80	1.96	0.64	0.95522388		Depth to Water at Start of Test below casing level (d ₀)	m	0.06
90	1.97	0.63	0.94029851		Depth to Water at End of Test below casing level	m	2.58
100	1.97	0.63	0.94029851		Depth to Filter at Start of Test	m	
110	1.99	0.61	0.91044776		Depth to Filter at End of Test	m	
120	1.99	0.61	0.91044776		Response Zone Length	m	0.2
130	2	0.6	0.89552239		Borehole Diameter in Test Section	m	0.15
140	2.01	0.59	0.88059701		Cross-sectional Area of Borehole	m ²	0.02
150	2.02	0.58	0.86567164		Intake factor (BS5930 p51):	Figure 7 (F) =	1.14
160	2.02	0.58	0.86567164		Basic Time Lag = (T)	t ₁ = 10.00	s.h ₁ = 1.00
170	2.03	0.57	0.85074627			t ₂ = 100.00	s.h ₂ = 0.94
180	2.03	0.57	0.85074627		Coefficient of Permeability (k) ms ⁻¹ =		1.06E-05
Remarks							
Borehole cleaned out prior to test.							
Compiled By	JB	Date	17/11/2014				
Checked By	AR	Date	19/11/2014				
Geology of Test Section:		Very dense light brown very sandy subangular to rounded fine to coarse GRAVEL of flint. (LYNCH HILL MEMBER)					
Tier Environmental Ltd							
Unit 5 Office Village							
Sandpiper Court, Chester Business Park							
Chester CH4 9QZ							
Tel. 01925 818 388							
				Project Number			
				Project Name			
				Client			



VARIABLE HEAD PERMEABILITY TEST IN BOREHOLE

BOREHOLE No.:	WS116	TEST No.:	2			
	DEPTH (m)	5.45	DATE	11.12.2024	SHEET	2



Time Elapsed (secs)	Depth of water below top of casing - d _i (m)	h (m) - (d ₁ -d ₀)	h ₁ /h ₀					
10	1.93	0.67	1		Test Section Depth	m	2.6	
20	1.93	0.67	1		Borehole Depth	m	5.45	
30	1.94	0.66	0.98507463		Borehole Diameter	m	0.15	
40	1.94	0.66	0.98507463		Casing Depth	m	NA	
50	1.95	0.65	0.97014925		Depth to Standing Water Level (d ₁)	Assumed m	0.93	
60	1.95	0.65	0.97014925		Height of casing agl (h _c)	m	0.6	
70	1.95	0.65	0.97014925		Height of top of casing above water table	m	1.53	
80	1.95	0.65	0.97014925		Depth to Water at Start of Test below casing level (d ₀)	m	0.06	
90	1.95	0.65	0.97014925		Depth to Water at End of Test below casing level	m	2.58	
100	1.95	0.65	0.97014925		Depth to Filter at Start of Test	m		
110	1.95	0.65	0.97014925		Depth to Filter at End of Test	m		
120	1.95	0.65	0.97014925		Response Zone Length	m	0.2	
130	1.95	0.65	0.97014925		Borehole Diameter in Test Section	m	0.15	
140	1.95	0.65	0.97014925		Cross-sectional Area of Borehole	m ²	0.02	
150	1.95	0.65	0.97014925		Intake factor (BS5930 p51):	Figure 7 (F) =	1.14	
160	1.95	0.65	0.97014925		Basic Time Lag = (T)	t ₁ = 10.00	s.h ₁ =	1.00
780	2.01	0.59	0.88059701			t ₂ = 100.00	s.h ₂ =	0.97
1020	2.03	0.57	0.85074627		Coefficient of Permeability (k) ms ⁻¹ =			5.20E-06
Remarks		Borehole cleaned out prior to test.						
Compiled By	JB	Date	17/11/2014					
Checked By	AR	Date	19/11/2014					
Geology of Test Section:		Very dense light brown very sandy subangular to rounded fine to coarse GRAVEL of flint. (LYNCH HILL MEMBER)						
Tier Environmental Ltd Unit 5 Office Village Sandpiper Court, Chester Business Park Chester CH4 9QZ Tel. 01925 818 388								
				Project Number				
				Project Name				
				Client				

APPENDIX I - DEFINITIONS OF TERMS USED IN QUALITATIVE AND QUANTITATIVE RISK ASSESSMENTS

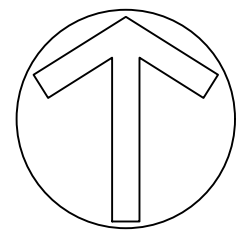
Appendix H

Proposed Site Foul Drainage Flow Calculations

Stack Reference	Qww		Total Qww
SS08	1.00	FWMH01	9.7l/s
SS14	1.50		
SS07	1.90		
SS12	2.00		
SS13	1.20		
SS15	1.30		
SS20	0.80		
SVP06	2.1	FWMH02	5.5l/s
SS09	0.9		
SS10	1.2		
SS11	1.3		
SVP01	1.9	FWMH03	8.3l/s
SS16	1.5		
SS17	1.7		
SS18	0.8		
SS19	2.4		
SVP08	1.0	FWMH04	11.6l/s
SS01	1.5		
SS02	0.2		
SS03	2.2		
SS05	0.9		
SS21	0.4		
SS22	0.3		
SS23	0.8		
SS24	1.0		
SS25	0.9		
SS26	0.6		
SS27	0.4		
SS29	1.4		
SVP02	4.4	FWMH05	4.4l/s
SVP09	1.0	FWMH05	5.3l/s
SS04	0.9		
SS28	1.2		
5 X FG	2.2		
SVP03	3.6	FWMH06	6.2l/s
SVP04	2.6		
SVP05	2.2	FWMH06	8.8l/s
SS06	0.9		
SS30	1.3		
SS31	0.3		
SS32	0.4		
SS33	1.1		
SS39	0.9		
3 X FG	1.7		
SS34	0.9	FWMH07	3l/s
SS35	1.2		
SS40	0.9		
SS37	0.9	FWMH09	5.3l/s
SS38	1.2		
SS41	0.5		
SS42	1.1		
SS43	0.7		
SS44	0.9		
SVP07	1.4	FWMH08	3l/s
SS45	0.2		
SS46	0.5		
SS47	0.2		
SS48	0.7		

Appendix I

Riparian Zone Drawing



Proposed works outside of
Riparian Zone

Riparian Zone

2m Offset

DO NOT SCALE

NOTES:

1. Do not scale this drawing. All dimensions must be checked/verified on site. If in doubt ask.
2. This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.
3. All dimensions in millimetres unless noted otherwise. All levels in metres unless noted otherwise.

Legend

- Site Boundary
- Riparian Zone
- 2.0m Offset

P01	05.08.25	AY	FOR INFORMATION	JT	JC
REV	DATE	BY	DESCRIPTION	DWN	APP

DRAWING STATUS: FOR INFORMATION



CLIENT: WILLMOTT DIXON

ARCHITECT: SHEPPARD ROBSON

PROJECT: HOPWOOD HALL COLLEGE
ROCHDALE

TITLE: BUFFER ZONE
FOR NEW WORKS

SCALE @ A2:	CHECKED:	JT	APPROVED:	JC
1:200	DESIGNED:	AY	DATE:	JULY 2025
PROJECT NUMBER:	24365	DRAWN:	AY	REV:

DRAWING No: FE0012-RS-XX-XX-D-C-0557 P01

Appendix J

SuDS Pro-Forma

NORTH WEST SuDS PRO-FORMA

This pro-forma is a requirement for any planning application for major development¹.

It supports applicants in summarising and confirming how surface water from a development will be managed sustainably under current and future conditions.

Your sustainable drainage system should be designed in accordance with [CIRIA The SuDS Manual C753](#) and any necessary adoption standards.

HOW TO COMPLETE

Blue Box	Instruction/ Question
Orange Box	Evidence Required
White Box	To be completed by Developer / Consultant

1. Complete ALL white boxes
2. Submit this pro-forma to the Local Planning Authority, along with:
 - Sustainable Drainage Strategy
 - Site Specific Flood Risk Assessment (if required)
 - Minimum supporting evidence, as indicated in orange boxes of this pro-forma.

GUIDANCE TO SUPPORT YOU

The pro-forma should be completed in conjunction with ‘Completing your SuDS Pro Forma Guide.’

The pro-forma can be completed using freely available tools such as [Tools for Sustainable Drainage Systems](#) or appropriate industry standard surface water management design software.

¹ as defined in Section 2 of [Statutory Instrument 2015 No. 595](#) or on sites in Critical Drainage Areas.

SECTION 1. APPLICATION & DEVELOPMENT DETAILS

Planning Application Reference <i>(if available)</i>	25/00541/FUL	
State type of planning application <i>i.e. Pre-application, Outline, Full, Hybrid, Reserved Matters*</i> <i>*Information only required if drainage is to be considered as part of reserved matters application</i>	full Application	
Developer(s) Name:	Willmott Dixon	
Consultant(s) Name:	Roscoe	
Development Address <i>(including postcode)</i>	OL12 6RY	
Development Grid Reference <i>(Eastings/Northings)</i>	389339, 413366	
Total Development Site Area (Ha)	2ha	
Drained Area (Ha)* of Development	2ha	
Please indicate the flood zone that your development is in. Tick all that apply. <i>Based on the Environment Agency Flood Map for Planning and the relevant Local Authority Strategic Flood Risk Assessment (to identify Flood Zones 3a/3b).</i>	Flood Zone 1 ☐ Flood Zone 2 ☒ Flood Zone 3a ☒ Flood Zone 3b ☐	
What is the surface water risk of the site? Tick all that apply. <i>Based on the Environment Agency Surface Water Flood Map.</i>	High ☐ Medium ☐ Low ☒	
Have you submitted a Site Specific Flood Risk Assessment (FRA)? <i>See separate guidance notes for clarification on when a FRA is required</i>	Yes ☒ No ☐	
Have you submitted a Sustainable Drainage Strategy?	Yes ☒ No ☐	
Does your drainage proposal provide multi-functional benefits via SuDS?	Yes ☒ No ☐	
Expected Lifetime of Development <i>(years)</i> <i>Refer to Planning Practice Guidance "Flood Risk and Coastal Change" Paragraph 026</i>	60	
Development Type:		State Proposed Number of Units
Greenfield Site Site is wholly undeveloped, and a new drainage system will be installed	☐	
Previously Developed/ Brownfield Site - Site is already developed, and the <u>entirety</u> of the existing surface water drainage system will be used to serve the new development (evidence must be provided to prove existing surface water drainage system is reusable); OR - Where records of the previously developed system are not available so that the hydraulic characteristics of the system cannot be determined or where the drainage system is not in reasonable working order i.e. broken, blocked or no longer operational for other reasons.	☒	1
Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 1.		

SECTION 2: IMPERMEABLE AREA AND EXISTING DRAINAGE

	Existing (E)	Proposed (P)	Change (P – E)
State Impermeable Area (Ha)	2ha	2ha	0
Evidence Required: Plans showing development layout of site with existing and proposed impermeable areas.			☒

Are there existing sewers, watercourses, water bodies, highway drains, soakaways or filter drains on the site?	Yes ☒ No ☐ Don't Know ☐
Evidence Required: Plan(s) showing existing layout to include all: - Watercourses, open and culverted - Water bodies – ponds, swales etc. - Sewers, including manholes - Highway drains, include manholes, gullies etc. - Infiltration features - soakaways, filter drains etc.	☒

Drainage Design <u>Outline planning applications</u> should be able to demonstrate that a suitable drainage system is achievable. <u>All other type of planning application</u> should provide full details or reference to previous planning application where drainage details have been submitted or approved.		
Select which design approach you are taking to manage water quantity (refer to Section 3.3 SuDS Manual)		
Approach 1 – Volume control / Long Term Storage (Technical Standards S2/3, S4/5) - The attenuated runoff volume for the 1 in 100 year 6 hour event (plus climate change allowance) is limited to the greenfield runoff volume for the 1 in 100 year 6 hour event, with any additional runoff volume utilising long term storage and either infiltrated or released at 2 l/s/ha - The discharge rate for the critical duration 1 in 1 year event is restricted to the 1 in 1 year greenfield runoff rate - The discharge rate for the critical duration 1 in 100 year event (plus climate change allowance) is restricted to the 1 in 100 year greenfield runoff rate	☒	
Approach 2 – Qbar (Technical Standards S6) Justification has been provided that the provision of volume control/long term storage is not appropriate and an attenuation only approach is proposed. All events up to the critical duration 1 in 100 year event (plus climate change allowance) are limited to Qbar (1 in 2 year greenfield rate) or 2 l/s/ha, whichever is greater.	☐	
Evidence Required: Plans showing: - Existing flow routes and flood risks - Modified flow routes - Contributing and impermeable areas - Current (if any) and proposed 'source control' and 'management train' locations of sustainable drainage components (C753 Chapter 7) - Details of drainage ownership - Details of exceedance routes (Technical Standards S9) - Topographic survey - Locations and number of existing and proposed discharge points		☒

Note consideration should be given to manage surface water from both impermeable and permeable surfaces (including gardens and verges) likely to enter the drainage system.

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 2.

SECTION 3: PEAK RUNOFF RATES – TECHNICAL STANDARDS S2, S3 AND S6 (UNLESS S1 APPLIES)

Rainfall Event	Existing Rate (l/s)	Greenfield Rate (l/s)	Proposed Rate (l/s) <i>Previously developed sites - In line with S3 should be equivalent to Greenfield runoff rates – discuss with LLFA if this is not achievable pre-application</i>
Qbar (Approach 2)			
1 in 1 Year Event (Approach 1)	151.3		75
1 in 30 Year Event	n/a		n/a
1 in 100 Year Event* (Approach 1)	360		75
* Total discharge at the 1 in 100 year rate should be restricted to the greenfield runoff volume for the 1 in 100 Year 6 hour event with additional volumes (long-term storage volume) released at a rate no greater than 2 l/s/ha where infiltration is not possible. The climate change allowance should only be applied to the proposed rate and not the existing or greenfield rate.			
Evidence Required: Methodology used to calculate peak runoff rate clearly stated and justified. Impermeable areas plan, supported by topographical survey confirming positive drainage. Hydraulic calculations and details of software used.			☒ ☒ ☒

State the hydraulic method used in your calculations
(Refer to Table 24.1 of The SuDS Manual)

InfoDrainage

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 3.

SECTION 4: DISCHARGE VOLUME – TECHNICAL STANDARDS S4, S5 AND S6 (UNLESS S1 APPLIES)

Rainfall Event	Existing Volume (m ³)	Greenfield Volume (m ³)	Proposed Volume (m ³)
1 in 100 Year 6 Hour Event <i>(Approach 1)</i>	7776		1620
Does the below statement apply to your development proposal? Long term storage is not achievable on this site and, in accordance with S6 of the Non Statutory Technical Standards for SuDS, the surface water discharge rates for events up to and including the 1 in 100 year critical event are limited to Qbar (Approach 2)			Yes ☒ No ☐
Evidence Required: Approach to managing the quantity of surface water leaving the site clearly stated and justified Methodology used to calculate discharge volume clearly stated and justified. Hydraulic calculations and details of software used.			☒ ☒ ☒

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 4.	
--	--

SECTION 5: STORAGE – TECHNICAL STANDARDS S7 AND S8

State climate change allowance used (%)	45
State housing density (houses per ha)	
State urban creep allowance used (%)	
Evidence Required: State / used in appropriate industry standard surface water management design software.	☒

State storage volume required (m³) (excluding non-void spaces) <i>Must include an allowance for climate change and urban creep</i>	260
Have you incorporated interception into your design? <i>(Refer to Chapter 24 of The SuDS Manual C753)</i> <i>Where possible, infiltration or other techniques are to be used to try and achieve zero discharge to receiving waters for rainfall depths up to 5mm.</i>	Yes ☒ No ☐
Evidence Required: Drainage plans showing location of attenuation and all flow control devices and supporting calculations.	☒

Summarise how storage will be provided for 1 in 30 year event on site. <i>Storage must be designed to ensure that at no flooding occurs onsite in a 1 in 30 year event except in designed areas and no flooding occurs offsite in a 1 in 100 year (plus climate change allowance) event.</i>	Attenuation
Summarise how storage will be provided for 1 in 100 year (plus climate change) event on site. <i>Where storage above the 1 in 30 year rainfall event is provided in designated areas designed to accommodate excess surface water volumes, plans showing storage locations and surface water depths and supported by calculations used in appropriate industry standard surface water management design software. It is important to run a range of duration events to ensure the worst case condition is found for each drainage element on the site</i>	Attenuation
Evidence Required: Plans showing size and location of storage and supporting calculations. Where there is controlled flooding, extents and depths must be indicated.	☒

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 5.	
--	--

SECTION 6: WATER QUALITY PROTECTION

Contaminated surface water run-off can have negative impacts on the quality of receiving water bodies. The potential level of contamination will influence final the design of an appropriate treatment train as part of your sustainable drainage system.

Is the proposal site known to be or potentially contaminated?	Yes ☐	No ☒
If the site is contaminated, it should be demonstrated that the sustainable drainage system will not increase the risk of pollution to controlled waters through the mobilisation of contaminants and/or creation of new pollution pathways.		

Confirm the Pollution Hazard Level of the proposed development - Tick <u>ALL</u> that apply Refer to Pollution Hazard Indices for different Land Use Classifications in Table 26.2 of The SuDS Manual C753 for further guidance.		
Pollution Hazard Level Tick <u>ALL</u> that apply	Surface water run-off from the proposed development will drain from:	
VERY LOW	☐	Residential roofs
LOW	☒	- Other roofs (typically commercial/industrial roofs) - Individual property driveways, residential car parks, low traffic roads (e.g. cul de sacs, home-zones and general access roads) - Non-residential car parking with infrequent change (e.g. schools, offices) i.e. < 300 traffic movements/day
MEDIUM	☐	- Commercial yard and delivery areas - Non-residential car parking with frequent change (e.g. hospitals, retail) - All roads except low traffic roads and trunk roads/motorways²
HIGH	☐	- Sites with heavy pollution (e.g. haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites) - Sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured - Industrial sites - Trunk roads and motorways¹

If the development's Pollution Hazard Level is 'Very Low' or 'Low', has the sustainable drainage design been risk assessed and appropriate mitigation measures included?	Yes ☒	No ☐
If the proposed development has a very low or low polluting potential, you should design your sustainable drainage system to include an appropriate treatment train in accordance with The SuDS Manual (C753).		

If the development's Pollution Hazard Level is 'Medium' or 'High', is the application supported by a detailed water quality risk assessment?	Yes ☐	No ☐
- If the proposed development has a high polluting potential, a detailed risk assessment <u>will</u> be required to identify an appropriate SuDS treatment train and ensure compliance with Paragraph 170 of the National Planning Policy Framework. - If the proposed development has a medium polluting potential, a detailed risk assessment <u>may</u> be required depending on the nature, scale and location of the development.		

Has pre-application advice on water quality been obtained from the Environment Agency?	Yes ☐	No ☒
If YES, provide details:		

² Motorways and trunk roads should follow the guidance and risk assessment process set out in Highways Agency (2009).

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 6.

SECTION 7: DETAILS OF YOUR SUSTAINABLE DRAINAGE SYSTEM

a) Function of your Sustainable Drainage System

Do your proposals store rainwater for later use (as a resource)?	Yes ☐ No ☒
Evidence Required: Please provide a brief sentence in the adjacent white box to describe how this function has been achieved.	

Do your proposals promote source control to manage rainfall close to where it falls? (e.g. promoting natural losses through soakage, infiltration and evapotranspiration)	Yes ☒ No ☐
Evidence Required: Please provide a brief sentence in the adjacent white box to describe how this function has been achieved.	swales

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 7a.

b) Hierarchy of Drainage Options – Planning Practice Guidance

The proposed method of discharge are set out within order of priority. Generally, the aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable.

Proposed method of surface water discharge		Is this proposed?	
Hierarchy Level 1: Into the ground (via infiltration)		Yes ☐ No ☒	
If YES - Evidence Required		If NO – Evidence Required Tick ALL that apply	
☐	A. Completed Infiltration Checklist from The SuDS Manual (C753) Appendix B <i>An editable version of this form is available on SusDrain website.</i>	☒	A. Site investigation to demonstrate that the ground is not free draining. Test results to be provided in accordance with: - The methodology within BRE 365 (2016), OR - Falling head permeability tests BS EN ISO 22282-2: 2012
☐	B. British Geological Survey (BGS) Infiltration SuDS Map	☒	B. NOTE: where an applicant is unable to access a site to undertake testing, e.g. where unable to access a site for an outline application, they can submit a SuDS GeoReport or similar.
☐	C. Infiltration testing to BRE 365 (2016) or falling head permeability tests to BS EN ISO 22282-2: 2012 (optional for outline)	☒	C. Evidence to confirm that infiltration to ground would result in a risk of deterioration to ground water quality.
☐	'Plan B' sustainable drainage plan and statement of approach with an alternative discharge method, in case infiltration proposals are proven not feasible upon	☒	D. Geotechnical advice from a competent person* which determines that infiltration of water to ground would pose an unacceptable risk of geohazards to the site and/or local area.

	further site specific ground investigation e.g. to consider seasonal variations to groundwater.		<i>*Note: Competent person may include a Chartered Engineer, Chartered Geologists, Registered Ground Engineering Professionals (RoGEP).</i>
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Proposed method of surface water discharge		Is this proposed?	
Hierarchy Level 2: To a surface water body <i>(select type)</i> NOTE: Consent from LLFA or Permit from Environment Agency may be required – refer to guidance		Yes ☒ No ☐ N/A ☐	
		☒ Main river ☐ Ordinary watercourse	☐ Canal ☐ Other water body
If YES - Evidence Required		If NO – Evidence Required Tick ALL that apply	
☒ Surface water body / watercourse survey and report		☐ Plan showing nearby watercourses and waterbodies AND ☐ Statement providing justification in your Sustainable Drainage Strategy <i>Note: Where discharge of any element in the hierarchy is discounted, an applicant should provide justification. If the reasoning for discounting a discharge of surface water to watercourse relates to issues associated with third party land or the securing of any other required consent, it may be necessary for the applicant to provide evidence to the local planning authority to support their proposed approach.</i>	

Proposed method of surface water discharge		Is this proposed?	
Hierarchy Level 3: To a surface water sewer or highway drain <i>(select type)</i>		Yes ☒ No ☐ N/A ☐	
		☒ Surface water sewer	☐ Highway drain
If YES - Evidence Required		If NO – Evidence Required Tick ALL that apply	
☒ Written correspondence from Water and Sewerage Company/ Highway Authority regarding proposed connection.		☐ Plan showing nearby sewers and highway drains AND ☐ Statement providing justification in your Sustainable Drainage Strategy	

Proposed method of surface water discharge		Is this proposed?	
Hierarchy Level 4: To combined sewer		Yes ☐ No ☐ N/A ☒	
If YES - Evidence Required		If NO – Evidence Required	
☐ Written correspondence from Water and Sewerage Company		N/A	

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 7b.	
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c) Proposed SuDS Component Types

	Tick ALL that apply				
Within property boundary	☐ Rainwater harvesting	☐ Green/ blue roofs	☐ Pervious pavements [Type: A ☐ B ☐ C ☐	☐ Soakaway	☐ Bio retention systems

	Tick ALL that apply				
Within development site boundary (not property)	☐ Infiltration system [Type: ☐ Surface level ☐ Below ground]		☐ Filter strips	☐ Filter drains	☒ Swales
	☐ Bio retention system	☐ Detention basins	☐ Ponds and wetlands	☒ Attenuation tanks/ Oversized pipes	☐ Other (state below)
	If 'Other' please state:				

Off site (not within the boundary of the proposed development)	Please state:
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I confirm that the above selected components have been designed in accordance with The SuDS Manual (C753).	I confirm ☒
I confirm that the management of flows resulting from rainfall in excess of a 1 in 100 year plus climate change rainfall event, and their exceedance route(s), has been fully considered in order to minimise the risks to people, property (new and existing) and infrastructure.	I confirm ☒

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 7c.	
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The applicant is responsible to ensure that ALL components selected in Section 7 can be maintained for the design life of the development. This information is required so the Local Planning Authority can ensure the maintenance and management of the sustainable drainage system. The Local Planning Authority will discuss how this will be secured (e.g. via planning condition or planning obligation).

		Information Provided?
Maintenance Schedule		Yes ☒ No ☐
Evidence Required: A copy of the maintenance schedule including: Proactive and preventative maintenance Detailing regular, occasional and remedial maintenance activities including recommendations for inspection and monitoring. This should include recommended frequencies, advice on plant/ machinery required and an explanation of the objectives for the maintenance proposed and potential implications of not meeting them. Reactive and corrective maintenance (e.g. product repair and replacement). Including advice on excavations, or similar works, in locations that could affect the SuDS components/ adjacent structures.		☒

Information Provided?	
Maintenance and Management Arrangements	Yes ☒ No ☐
Evidence Required: Evidence of formal agreement with the party responsible for undertaking maintenance. Please select any of the adopting bodies that you will be offering your sustainable drainage components for adoption. Tick all that apply. ☐ Water and Sewerage Company <i>Section 104 agreement (Water Industry Act 1991)</i> ☐ Highway Authority <i>Section 278/38 agreement (Highways Act 1980)</i> ☐ Local Authority Public Open Space <i>[Refer to Local Authority Policy]</i> Please select the arrangement(s) for all non-adopted sustainable drainage components. Tick all that apply. ☐ Management Company ☐ Property Owner <i>(for SuDS components within property boundary only)</i> ☐ Other (please state)	☒

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 8.

DECLARATION AND SUBMISSION

This pro-forma has been completed using evidence from information which has been submitted with the planning application.

The information submitted in the Sustainable Drainage Strategy and site-specific Flood Risk Assessment (FRA), where submitted, is proportionate to the site conditions, flood risks and magnitude of development and I agree that this information can be used as evidence to this sustainable drainage approach.

Submitter Details			
Completed by	Nirodha Perera	Email Address	niro.perera@roscoe.co
		Telephone Number(s)	
Signed off by	Nirodha Perera	Accreditation(s) and/or Qualification(s) of Signatory	MEng GMICE
Date (dd/mm/yyyy)	05/08/2025	Company	Roscoe

Client Details			
Name	Niro Perera	Company	Roscoe