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**VARLEY STREET SEN SCHOOL
FLOOD RISK ASSESSMENT &
DRAINAGE STRATEGY REPORT**

MARCH 2023

VARLEY STREET SEN SCHOOL FLOOD RISK ASSESSMENT & DRAINAGE STRATEGY REPORT KIER CONSTRUCTION

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1. EXECUTIVE SUMMARY

This report details the Flood Risk and Drainage Strategy for the proposed Full planning application for the proposed SEN school development. Table 1 below provides a summary of the Flood Risk and Drainage / SuDS Strategy for the scheme.

Table 1 – Drainage / SuDS Summary

Item	Brief Description
Flood Zone	Fluvial Flood Zone 1 (Low Risk). At low risk of flooding from all other sources. See Figure 2.
Geology	A phase 2 SI (Appendix C), states the underlying bedrock is the Pennine Upper Coal Measures, as encountered in two of the boreholes at depths of 23.5m and 26.5m bgl comprising grey mudstone with minor sandstone bands. Large areas of made ground are recorded throughout the site, typically beneath the layer of topsoil 0.30m thick. The Made Ground thickness range is between 0.50m and 3.30m, generally thickest in the south-western half of the site thinning to the northeast. Underlying it is a layer of stiff brown/grey clay, recorded to depths of up to 5m. Whilst no infiltration testing to BRE has been done, groundwater infiltration has been observed in b/h WS 1 to WS 7 and WS 10 and recorded as slow (0.1 – 0.2 L/hour) in all cases. Also, groundwater was present at depths 0.85 and 4.95m bgl, which is considered to represent a perched water table. Intact Coal Measures were encountered at depths 23.5m and 26.5m bgl, with no voids or loss of flush. There is no evidence of unrecorded shallow unrecorded mine workings. Further investigation in that regard is recommended, as well as BRE infiltration testing.
Infiltration Rate	Falling head testing is currently being scheduled.
Nearest Watercourses	The River Irk is 900m to North The Rochdale Canal is 110m to South. The Ashton Canal is 600m to South
Nearest Adopted Sewers	There are combined 300mm dia. public sewers on Sawley Road (north of development) and on James Street (along the South site boundary);

Item	Brief Description
Surface Water Outfall and SuDS Hierarchal Approach	Infiltration to Ground - Based on the SI Phase 2 Report, with soil predominantly clay with low infiltration rates (0.1 – 0.2 L/hour – please refer to the Appendix C) and the perched high groundwater table recorded at depths 0.85 and 4.95m bgl infiltration is deemed unfeasible; further test results awaited. Connection to Watercourse – Feasibility of discharging into the Rochdale Canal is currently being investigated (please refer to Appendix F); it is noted that such solution would be onerous, with private pipes located in public highways and private land owned by others. Furthermore, levels arrangement may require a pumped solution. Consultation with CRT (please see Appendix E) indicated the canal running at its capacity, with detailed impact assessment under way to alleviate downstream flood risk from canal. However, any required mitigation measures are unlikely to be undertaken in time for this development (confirmation of programme requested from CRT and is awaited). Connection to Surface Water Sewer – No suitable Surface Water sewers exist in close proximity to the site. Connection to Combined Sewer – 300mm dia. public sewer on James Street is considered if other options are proven unfeasible.
Existing Discharge Rate	The site is currently a vacant plot of waste land formerly used as a school playing field. It is primarily grassland, with a tarmac games court located in the western extent of the site. Site is classed as Greenfield. Existing discharge rates are estimated on the basis of the SuDS Manual. The total site area of 1.55 Ha existing discharge rate calculated this way is 10.58l/s (QBAR) – please refer to Appendix G for the calculations
Proposed Discharge Rate	The site has a proposed surface water outfall via connection into the existing 300mm dia combined sewer on James Street. Proposed discharge rate of 7l/s was calculated on the basis of the proposed hardstanding area only (1.07Ha) (See Appendices E, F and G).
Allowance for Climate Change	40% for 1:30 year 45% for 1:100 year
Proposed Attenuation Method and Volume	Attenuation tank. Dims: 32 x 17.5 x 1.2 with 95% voids (627.2m³); Porous pavement (44.9m³) giving total volume of 672.1m³, based on a 7L/s discharge.
SuDS features	Water Quantity – Geocellular Storage Tank, flow control (hydrobrake). Water Quality – Silt traps, Petrol/Oil separator, Trapped gullies, catchpits
Maintenance Responsibility	Management Company / Site owner
Foul Drainage Outfall	Adopted UU CW Sewer in James Street

There is no increase in surface water flood risk from the development site to the surrounding district since the existing storm water flow rates are to be maintained. Therefore, the development does not increase the risk of flooding to the other adjacent properties and roads. Out of chamber or gully flooding for the events in excess of the 100-year plus 45% climate change event may occur within the development site and is classed as exceedance flows. Flood water from this event will be contained within the development site and directed away from the buildings to the external hard and soft landscaped areas.

2. INTRODUCTION

- 2.1 Ridge & Partners LLP have been appointed by ISG Construction Ltd (NW) to prepare this Flood Risk Assessment (FRA) and Drainage Strategy Report to support the full planning application for educational end use with associated gardens and car parking areas. The assessment has been undertaken in line with the new 'National Planning Policy Framework' (NPPF), plus the accompanying 'Flood Risk and Coastal Change' chapter of the National Planning Practice Guidance.
- 2.2 This report has been commissioned by ISG Construction Ltd (NW) and is specific to their interests in the development proposals as described by the Architectural plan in **Appendix A**.
- 2.3 The report has been commissioned to identify any drainage-related issues associated with the proposed development and which are subsequently addressed within this report.
- Identify available data relating to flood risk at the site.
 - Determine whether the site is at risk from flooding from all sources, including from breach or overtopping of any existing flood defences, surface water flooding and/or groundwater flooding.
 - Consider the flood risk from all other sources.
 - Determine the current surface water drainage regime and assess any potential increase in surface water runoff as a result of the proposed development.
 - Discuss Sustainable Drainage Systems (SuDS) as an option for reducing surface water flood risk.
 - Devise an appropriate outline surface water drainage strategy (including calculation where appropriate) to deal with any potential increase in surface water runoff and include for climate change.
 - Devise an appropriate outline foul water drainage strategy.
 - Consider the recommendations of Manchester City Council Local Flood Risk Management Strategy (LFRMS) and Manchester City Level 2 Hybrid Strategic Flood Risk Assessment (SFRA).
 - Assess mitigation measures & off-site impacts and define any residual risks.

3. PLANNING POLICY AND CONSULTATION

3.1. Planning Policy Framework

- 3.1.1. The flood maps provided by the Environment Agency (EA) locate the site within Flood Zone 1, i.e. land defined as having an annual probability of fluvial flooding of less than 1 in 1000 in any year (<0.1%). As a requirement of the NPPF (2019) and accompanying National Planning Practice Guidance (NPPG), the proposed development has to satisfy the requirements of the Sequential Test and where applicable the Exception Test.
- 3.1.2. Sequential Test:
Under the NPPF (2021), Zone 1 is defined as low probability flood risk. The proposal is for new educational establishment, which in line with Annex 3: Flood risk vulnerability classification is classified as 'More Vulnerable'.
- 3.1.3. Placing both these criteria into Table 2 (Flood Risk Vulnerability and Flood Zone 'incompatibility'), More Vulnerable development in Flood Zone 1 determines that 'Development is Appropriate' and an Exception test is not required.
- 3.1.4. Exception Test:
As the Sequential test is passed, the Exception test is not required.

3.2. Local Flood Risk Management Strategy (LFRMS)

- 3.2.1. LFRMS's assess the risk associated with all types of flooding and provide the information required to identify the amount of development permitted in an area; how drainage systems in the area should function and also how risks in vulnerable areas can be reduced and/or mitigated. The Flood and Water Management Act made it a duty of Lead Local Flood Authorities (LLFA) to produce a Local Flood Risk Management Strategy. The NPPF states that Regional Planning Bodies (RPB's) or Local Planning Authorities (LPA's) should prepare SFRA's in consultation with the EA.
- 3.2.2. Manchester City Council have prepared a Flood Risk Management Strategy for its administrative area. The report was published in September 2014. The purpose of this LFRMS is to assess and map all known sources of flood risk including fluvial, surface water, sewer, groundwater and all impounded water bodies, taking into account future climate change predictions in order to manage the risk of local flooding in their areas.
- 3.2.3. A summary of the main elements from the LFRMS associated with the development site is detailed below. The LFRMS also includes a summary of the Manchester City, Salford City and Trafford Councils Level 2 Hybrid Strategic Flood Risk Assessment (SFRA) finalised by JBA Consulting in March 2011. Both of the full reports can be found on the Trafford Council's website.
- LFRMS provides a detailed understanding of flood risks across the borough from all sources.
 - Development is located within a Flood Zone 1 and is at low risk of fluvial flooding.
 - Little or no incidents of sewer flooding.

- Little or no incidents of historical flooding.
- Little or no incidents of groundwater flooding.
- Site is within an identified Critical Drainage Area – Conurbation Core.
- Full sequential and exception tests to be carried out where applicable.
- New developments surface water runoff rates leaving the site are no greater than the runoff rates prior to the proposed development.

4. THE SITE

4.1. Site Details

4.1.1. The site details are summarised in Table 2 below:

Table 2: Site Referencing Information

Item	Brief Description
Site name	Varley Street SEN School
Site address and location	Sawley Road, Manchester M40 8DP
Planning Authority	Manchester City Council
Lead Local Flood Authority	Manchester City Council
Drainage Statutory Undertaker	United Utilities
Site Area	Total Site area is 1.55Ha.
Approximate Grid Reference	OS: 386127, 399603
General Locality	The site is located in Miles Platting, approximately 1km Northwest of Etihad football Stadium.

4.2. Site Description

- 4.2.1. The proposed site and surrounding boundary conditions is shown **Figure 1**. The blue line boundary denotes the application boundary.
- 4.2.2. The site area is approximately 1.55 Hectares and is an education building that is being redeveloped as a Special Educational Needs (SEN) school for Primary and Secondary school pupils.
- 4.2.3. The site is a rectangular shaped parcel, formerly used as a school playing field and currently unoccupied. Sawley Road is at the North boundary of the site, with Vickers Street (A6010) at the East boundary, James Street on the South and a plot of land adjoining the Nelson Street to the West.



Figure 1: Proposed Site Layout

4.3. Proposed Development

- 4.3.1. As discussed in the earlier sections, the report is prepared to support the full planning application for the redevelopment of the land currently unoccupied (formerly used as a school playground) into a SEN Primary and Secondary School.
- 4.3.2. Access into the school will be via two new accesses proposed along Sawley Road.
- 4.3.3. The current outline Architectural Master Plan in **Appendix A** provides an indication of the proposals of the site.

5. DEFINITION OF FLOOD HAZARD

5.1. Sources of information

- 5.1.1. The NPPF (2021) requires the developer to consider the impact of runoff generated by the proposed development onto the downstream catchment, and to assess the risk of runoff from the surrounding district impacting on the development footprint. Further, the report is to consider flood risk from all other sources. The following section defines the flood risk receptors and anticipated flood risk. Section 5 then discusses in further detail the probability of flooding and the likely impacts.

Table 2: Sources of information used in the identification of flood risk

Source of Information	Details
Environment Agency Flood Map	Indicative Flood Maps
United Utilities	Sewer Records
Historic Maps	From various websites
Trafford Council LFRMS (2014)	Report & Various Maps from LFRMS

5.2. Flooding from Rivers (Fluvial)

The River Irk is located approximately 1km North of the site. The Rochdale Canal is located 110m South of the site. Ashton Canal is located 600m south of the site.

- 5.2.1. **Figure 2** below locates the site on the Environment Agency's indicative floodplain map. It is clear from this that the red line boundary sits outside of a fluvial generator of flood water from any identified water body or river. It is considered therefore that the overall site lays outside of the active 100-year and extreme event floodplains, thus lying within 'Flood Zone 1 Classification' in accordance with NPPF Guidance, i.e. probability of annual fluvial flooding significantly less than 1 in 1000 in any one year (<0.1%). The risk from fluvial flood water is diminished to acceptable levels, removing the requirement for further investigation and assessment of the fluvial flood regime.



Figure 2 – The EA's Flood Zone Map

5.3. Flooding From Land (Overland Flow)

- 5.3.1. A review of the Gov.uk surface water map indicated small areas of the site being at risk of very low to low surface water flooding as illustrated in **Figure 3**.
- 5.3.2. The map identified one small area within the existing development to be at low risk of surface water flooding and this appears to be confined to the site boundaries. There are some areas of low risk of flooding on the Sawley Road entrance to site.
- 5.3.3. The site generally falls towards its southwest corner. The North boundary is almost flush to the highway, whilst there is a sloping down towards the eastern boundary. The grassed area of the existing boundary to the east (presumably for outdoor activities) is flat sloping very gently to the north. Ground levels range from 59.600m AOD to 60.400m AOD, evident to the topographical survey in **Appendix B**.
- 5.3.4. The proposed Surface Water Drainage Strategy is to be designed so that no surface water flooding / overland flow occurs up to the 1:30 year event. Exceedance flows beyond the 1:30 year up to the 1:100 year + climate change events are permitted to flood the surrounding hardstanding areas. However, these flows shall be kept away from the buildings and surrounding areas.
- 5.3.5. To further manage surface water flows, water will be stored in a cellular tank below ground where it will get attenuated prior to being discharged at a limited flow rate. The current strategy envisages

this to be discharged into the existing combined sewer on James Street. However, there is an ongoing discussion with the United Utilities, who are insisting on other options being further investigated (such as discharge into Rochdale Canal, infiltration etc.). To date, possibility to accommodate such alternatives has proven to be quite limited.

- 5.3.6. As such, by incorporating appropriate mitigation measures and designing the drainage strategy to ensure that any surface water flooding is controlled the risk of flooding from overland flow is considered to be low.



Figure 3 – The EA's Indicative Surface Water Flood map

5.4. Flooding from Artificial Drainage

- 5.4.1. The Rochdale Canal and Ashton Canal are located approximately 110m and 600m to the South of the site. There are no reports of flooding on site from these sources.
- 5.4.2. United Utilities (UU) sewer records have been reviewed and confirm that there is an abandoned Foul Sewer Overflow Pipe that enters the site at its southeast corner. No Easement requirement is anticipated in that regard. See **Appendix D** for UU sewer records.
- 5.4.3. The area is not recorded to be susceptible to surface water flooding or have any reported incidents of historical flooding according to the Manchester City Council LFRMS (2014).

As such the risk of flooding at the site is regarded as low.

5.5. Flooding from Groundwater

The Manchester City Council LFRMS (2014) does not identify the site as at risk from groundwater flooding.

- 5.5.1. The Phase 2 SI describes that ground conditions typically comprised of made ground overlying stiff brown/grey clay. Strikes of water were encountered at depths between 0.85 and 4.95m BGL, which are considered by the SI to be representing a perched water table. Trial pit groundwater inflows showed slow seepage into the ground.
- 5.5.2. Furthermore, the proposals for the site do not include any basement or underground structures that would be susceptible to the risk of groundwater.
- 5.5.3. The site is deemed to have a low susceptibility to groundwater flooding.

5.6. Flooding from Infrastructure Failure

- 5.6.1. There are no structural, hydraulic or geotechnical infrastructure within the site boundary.

6. ASSESSMENT OF FLOOD RISK ON DEVELOPMENT SITE (PROBABILITY)

6.1. Summary

- 6.1.1. Section 5 has defined the anticipated flood risks from all sources. **Table 3** below considers each of the sources and defines in tabular format the Probability of Flood Risk associated to each and the likely impacts to the proposed development. Below is a table summary of the flood risks associated with the development site.

Table 3 – Flood Risk Summary

Source	Flood Risk	Likely Impacts	Remarks
Tidal	Low	Low	Site not tidally influenced.
Fluvial (Watercourse)	Low	Low	Site located in Flood Zone 1 (low risk).
Overland Flow	Low	Low	Indicative EA mapping shows site is at low risk. There are no flow routes through the site that need to be maintained.
Infrastructure Failure	Low	Low	Not located in close proximity to structural, hydraulic or geotechnical infrastructure.
Groundwater	Low	Low	No indication through SFRA site investigation, that the site is at risk of groundwater flooding.
Artificial Sources	Low	Low	No indication through the SFRA of sewer flooding incidents.

7. OUTLINE DRAINAGE STRATEGY

7.1. Existing Surface Water Runoff

- 7.1.1. The existing site area is approximately 1.55ha and is classified as a greenfield site. The greenfield runoff rate has been calculated on the basis of the proposed hardstanding area of 1.07ha. The site is considered to discharge directly to a public combined sewer at a restricted rate.
- 7.1.2. Pre-development runoff rates for the site were calculated as greenfield for the area that is to be developed, using the Wallingford greenfield runoff tool (please refer to **Appendix G**).

Table 4: Pre-development Greenfield Runoff Rates

	Proposed site impermeable area (Ha)	Existing run off - Calculated using Wallingford Greenfield runoff tool
Existing Development	1.07	7l/s

7.2. Geology

- 7.2.1. According to the Phase 2 SI (**Appendix C**) carried out by Enviro Solution, the site has underlying Bedrock of Pennine Upper Coal Measures, comprising grey mudstone with minor sandstone bands.
- 7.2.2. This report identifies top layers of made ground within depths between 0.50m and 3.30m BGL, generally thickest in the south-western half of the site thinning to the northeast, underlain with stiff brown/grey clay up to 5m depth.
- 7.2.3. The report states slow seepage of water into trial pits at depths from 1.20m to 2.0m at several locations, which does not suggest utilizing soakaways as means of drainage. However, for detailed design stage, a ground investigation (including BRE365 soakaway testing works) for the site would be required, since we consider the infiltrating SuDS not feasible for this site.

7.3. Hydrology

- 7.3.1. Rochdale Canal is located around 110m West of the site. This watercourse does not pose a risk of flooding the site. In between the site and the Rochdale Canal there is a bund of private properties and public highways which make any pipe routing onerous (please refer to **Appendix F**). Furthermore, as confirmed by the CRT, Rochdale Canal currently runs at its capacity and a detailed impact assessment is under way to determine mitigation measures to alleviate downstream flood risk from the Canal. Since this assessment is not specific to our site, we requested their input on its programme, which is still awaited. However, we do not believe that any mitigation works will be done in time for this development. The EA Surface Water flood maps show significant flood risk emanating from the canal downstream of the site (**Figure 3**). This puts a number of properties at risk of flooding from the canal in its current state. As such, increase in flow to the canal from the site would exacerbate this flood risk and is not considered suitable.

- 7.3.2. For the reasons stated above, Rochdale Canal is not deemed suitable for receiving any storm contributions from the site. Notwithstanding the UU's request, it should not be considered as a viable alternative to connection into the existing 300mm dia. combined sewer on James Street.
- 7.3.3. The River Irk is located around 900m North of the site and Ashton Canal is located 600m to the South. Floodplains exist between these 2 watercourses and the site, reducing the risk of flooding on our site.

7.4. Existing Drainage

- 7.4.1. There are existing United Utilities assets (See **Appendix D**) located around the site boundary, which include a 300dia. VC combined sewer in James Road and Sawley Street.
- 7.4.2. There is also an abandoned foul overflow pipe entering the site at its southeast corner from the James Street direction. There is no indication of any current discharge from the site into the UU assets.

7.5. Sustainable Drainage Systems

7.5.1. SuDS Objectives

Sustainable drainage developed in line with the ideals of sustainable development is collectively referred to as Sustainable Drainage Systems (SuDS). At a particular site, these systems are designed both to manage the environmental risks resulting from the urban runoff and to contribute wherever possible to environmental enhancement. SuDS objectives are therefore to minimise the impacts from the development on the quantity and quality of the runoff and maximise amenity and biodiversity opportunities (CIRIA C753, 2015).

7.5.2. SuDS's Design Themes

A strong design theme is essential if the maximum aesthetic benefits are to be gained from the SuDS approach. At a more local scale the SuDS should link with the individual's plot structure, planting, public open space requirements and amenity areas, gaining multiple benefits from a limited area of land.

7.5.3. The SuDS Management Train

The 'Management Train Approach' should be central to the surface water drainage strategy of the proposed site. The main objective is treatment and control of runoff as near to the source as possible protecting downstream habitats and further enhancing the amenity value of the site. This concept uses a hierarchy of drainage techniques to incrementally reduce pollution, flow rates and volumes of storm water discharge from the site, and is as follows:

1. **Prevention** – The use of good site design and housekeeping measures to prevent runoff and pollution and includes the use of rainwater reuse / harvesting.
2. **Source Controls** – Control of runoff at source or as close to source as possible (e.g. soakaways, green roofs, pervious pavements).
3. **Site Control** – Management of water in a local area and can include below ground storage / attenuation, detention basins, large infiltration devices.
4. **Regional Control** – Management of water from a site or various sites and can include wetlands and balancing ponds.

7.5.4. SuDS Site Constraints

SuDS techniques are suitable for all sites; therefore, an assessment of the existing site is required so that SuDS limitations can be determined.

- Land Use Characteristics: The size and type of the development plot allows a range of source control and site control SuDS devices to be considered are to be below ground only. Above ground SuDS features have been discounted due on site space constraints.
- Site Characteristics: Infiltration testing to BRE365 has not been undertaken yet, however the SI report produced by Enviro Solution suggest low infiltration rate is to be assumed. On this basis, the drainage has been done with the assumption that infiltration is not a suitable method of surface water discharge. However, bearing in mind the UUs specific request to follow the SUDS hierarchy, it is recommended soakaway testing is undertaken at the appropriate stage to confirm an exact rate of infiltration.
- Catchment Characteristics: The site is currently classed as Greenfield.
- Environmental and Amenity Performance: The inclusion of SuDS within the overall development is a key driver in providing both amenity and habitat creation. Safety to all future occupiers is paramount and so best practice guidance will be incorporated so that these devices blend into the surrounding without the need for significant safety precautions. Maintenance plans will be prepared for all SuDS devices that are included.

7.5.5. SuDS Methods

Tables 5 and 6, below, provide an assessment of various above and below ground SuDS methods that can provide water quality treatment and management of flows to reduce runoff rates and volumes and whether they can be suitably incorporated at this development site. The purpose of this assessment is to set out options to be considered at the planning stage with consideration to time constraints, viability and lifetime maintenance of the development.

Table 5: Surface SuDS Methods

Method	Comment	Suitability for Development
Green Roofs	• Can be used on suitable low-rise buildings to provide retention, attenuation and treatment of rainwater - Promotes evaporation and local biodiversity.	<u>Not Suitable:</u> • Architectural proposals for the development do not incorporate these into the design.
Water Butts	• Plastic tanks placed at the base of rainwater down pipes to collect rainwater runoff from the roof areas.	<u>Not Suitable:</u> • Not suitable due to risk of damage by students.
Rainwater Harvesting	• Rainwater harvesting reduces the total runoff volume from the developed site and reduces treated water consumption.	<u>Not Suitable:</u> • Additional costs of installation would have severe effect on viability of development. • Running and maintenance costs would not be acceptable to client.

Infiltration Options	Reduces total run off volume from the development.	<u>Not Suitable:</u> Ground conditions indicate infiltration will be most likely not possible at a useful rate. Further Infiltration tests are recommended.
Permeable Surfacing (Infiltration)	- Reduces total run off volume from the development. - Can be used to enhance water quality.	<u>Not Suitable:</u> Ground conditions indicate infiltration will be most likely not possible at a useful rate. Further Infiltration tests are recommended.
Permeable Surfacing (Standard)	- Can be used to enhance quality of runoff water. - Sub-base provides 'source' storage and reduces the volume of storage downstream. - The storage can be created with selection of the stone fill or use of plastic box stems. - Impermeable membrane at base of construction to prevent impact on pavement stability.	<u>Suitable (only for play area)</u> - Permeable parking spaces are not suitable due to the long term maintenance requirements and cost of replacement. - Suitable for the play area
Swales, basins and ponds	- Provide areas for above ground surface runoff storage. - Swales also improve water quality through filtration.	<u>Not Suitable:</u> Architectural proposals and the topography of the site deem this unsuitable.

Table 6: Sub-Surface SuDS Methods

Method	Comment	Suitability for Development
Geocellular Storage	- Suitable for sites with insufficient space for basins etc. - Suitable for sites where topography prevents the use of open basins etc. - Can be very effective infiltration devices subject to ground conditions.	<u>Suitable:</u> The use of geocellular attenuation may be possible to retain excess storm water.
Large Diameter Pipes, Culverts or Tanks	- Suitable for sites with insufficient space for basins etc. - Provide a volume of below ground storage with a high void ratio and good man entry provision to allow for future maintenance and cleaning.	<u>Not Suitable:</u> Site configuration makes using large diameter pipes less desirable than geocellular storage.

	Generally suitable for adoption by the statutory water company.	
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7.5.6. SuDS Hierarchal Approach

Based on the SuDS assessment in **Tables 5 and 6**, plus an assessment of the local site conditions, the SuDS hierarchal approach for discharge of surface water at the development site is considered in greater detail below:

Table 7: SuDS Hierarchal Approach

Method	Suitability	Suitability for Development
Infiltration to Ground	No	Site Investigation suggest that infiltration would not be a suitable method of discharging surface water runoff. BRE365 testing to be carried out to confirm an exact rate of infiltration.
Connection to Watercourse	No	With Rochdale Canal 110m away from the site, connecting into it would involve having our private pipes being located in public highways and third party owned private land. The Canal is known to run at capacity and due for mitigation.
Connection to Surface Water Sewer	No	There are no surface water sewers located in proximity of the site.
Connection to Combined Sewer	Yes	With infiltration deemed unsuitable (further testing to BRE365 is recommended) and onerous connection to Rochdale Canal, a connection to the combined sewer at the south of the site will be acceptable via a new connection at a discharge rate of 7l/s .

7.5.7. SuDS Design Philosophy

The SuDS assessment and hierarchal approach discussed in **Tables 5, 6 and 7** above has defined the overall SuDS strategy. Thus, the SuDS philosophy for the development site is the promotion of Prevention, Source Control and Site Control techniques with discharge rates to be limited to **7l/s**, to reduce the risk of both site and downstream flooding.

The following design philosophy is proposed:

- Surface water treatment using the 'Management Train' approach to remove and isolate contamination at all SuDS facilities prior to conveyance further downstream.
- Site control in the form of a geocellular storage.
- Aim to limit where possible the impermeable fraction of development.

7.6. Surface Water Drainage Strategy

- 7.6.1. Based on the current information, other means of discharge (i.e. new outfall into Rochdale Canal and infiltration) from the site are not deemed suitable. Consequently, the following drainage strategy will be adopted into the design instead.
- 7.6.2. As requested by United Utilities, the existing run off rates from the proposed development will be reduced to a maximum rate of **7l/s**, considering only the greenfield discharge rate from the hardstanding areas.
- 7.6.3. An attenuation based SW Drainage Strategy is considered feasible for the development, with run off from the hardstanding areas (highways, car park and roof) directed to the new below ground infrastructure and then pass via flow control unit that is to be situated upstream of the connection to the existing combined water network.
- 7.6.4. The flows from the proposed development are to be collected via series of gullies, before being stored into 2 geo-cellular tanks. Thereafter, the surface water is to be discharged into the combined water sewers at a maximum allowable rate of **7l/s**.
- 7.6.5. **Table 9** below defines the outline post-development attenuation volumes. The volumes identified below are preliminary and may alter at detailed design stage. Please refer to the below **Figures 4 and 5** and the **Appendix H** for detailed Microdrainage calculation printouts.

Table 9: Attenuation Volume

Method of Attenuation	Total Volume
Geocellular Storage / Porous Pavement	672.1m ³ (TBC)

Pond (Tank/Storage Structure)

Structure Number	U/S MH Name	(D/S) Pipe Number	D/MH Name	Structure Type
1	SW1.10	1.009		Complex

Complex Details

Invert Level of Structure (m): 57.117

Depth (m)	Volume (m³)	Depth (m)	Volume (m³)
0.000	313.5	5.000	672.1
0.000	418.0	5.300	672.1
1.000	522.5	6.000	672.1
1.200	627.0	6.200	672.1
1.400	627.2	6.400	672.1
1.600	627.2	6.600	672.1
1.800	627.2	6.800	672.1
2.000	627.2	7.000	672.1
2.200	627.2	7.200	672.1
2.400	641.2	7.400	672.1
2.600	672.1	7.600	672.1
2.800	672.1	7.800	672.1
3.000	672.1	8.000	672.1
3.200	672.1	8.200	672.1
3.400	672.1	8.400	672.1
3.600	672.1	8.600	672.1
3.800	672.1	8.800	672.1
4.000	672.1	9.000	672.1
4.200	672.1	9.200	672.1
4.400	672.1	9.400	672.1
4.600	672.1	9.600	672.1
4.800	672.1	9.800	672.1
5.000	672.1	10.000	672.1

Network Details

Cover Level (m): 59.991

Lowest Incoming Pipe: 5.003 Invert: 57.267 (m)

Outgoing Pipe: 1.009 Invert: 57.267 (m)

Please specify pipe number for flow through structure, or please specify DS pipe number for structures on manhole locations.

Figure 4 – Tank Size

Online Controls

Tank Number	D/S Pipe Number	U/S MH Name	Control Type	Volume (m³)
1	1.009	SW1.10	Hydro-Brake®	8.9

Hydro-Brake® Details

Hydro-Brake® Range: Optimum

Invert Level (m): 57.267

Design Head (m): 1.200

Design Flow (l/s): 7.0

Objective: Minimise upstream storage

Application: Surface

Sump Available: ☒

Flush-Flow (l/s): ☐ 0.0

Unit Reference: MD-SHE-0121-7000-1200-7000

Headloss (m)	Flow (l/s)
0.100	4.3
0.200	6.6
0.300	7.0
0.400	7.0

Network Details

Cover Level (m): 59.991

Lowest Incoming Pipe: 5.003 Invert: 57.267 (m)

Outgoing Pipe: 1.009 Invert: 57.267 (m)

Select downstream Pipe Number

Figure 5 – Flow Control parameters

7.7. Pollution Control

- 7.7.1. **Simple Index Approach:** To deliver adequate treatment, the selected SuDS components should have a total pollution mitigation index (for each contaminant type) that equals or exceeds the pollution hazard index (for each contaminant type). Where the principal destination of the runoff is not to groundwater, the surface water indices should be used (Table 26.3). The risk to surface waters will be low, as dilution will be high for large events, so treatment is not required.
- 7.7.2. **Table 10 & 11** below assess the pollution mitigation according to the Simple Index Approach.

Table 10: Car parking pollution hazard mitigation

Element	Pollution Hazard Indices			
	Pollution Hazard Level	Total suspended solids	Metals	Hydro-Carbons
Non-residential car parking with infrequent change	Low	0.5	0.4	0.4
	SuDS mitigation indices			
SPEL Stormceptor Class 1 bypass separator ESP Range	First Level	0.8	0.6	0.9
Total SuDS mitigation indices		0.8	0.6	0.9
RESIDUAL IMPACT (Pollution hazard indices – total SuDS mitigation indices)		-0.3	-0.2	-0.5

Table 11: Roof pollution hazard mitigation

Element	Pollution Hazard Indices			
	Pollution Hazard Level	Total suspended solids	Metals	Hydro-Carbons
Other roofs	Low	0.3	0.2	0.05
	SuDS mitigation indices			
Filter drains	Second Level (x1) x0.5	(0.4) 0.2	(0.4) 0.2	(0.4) 0.2
Total SuDS mitigation indices		0.2	0.2	0.2
RESIDUAL IMPACT (Pollution hazard indices – total SuDS mitigation indices)		+0.1	0.00	-0.15

- 7.7.3. With exception to the Total Suspended Solids from the roofs, the results show that the Total SuDS mitigation index is less or equal than that produced by the hazards, so it can be assumed that the SuDS mitigation systems are sufficient for pollution control on site and do not increase the risk of pollution to site or to the wider area. The TSS part from the roof can easily be addressed by introducing catchpits instead of manholes at points of connection from the roofs into the network.
- 7.7.4. **Step 3:** As the system does not discharge to protected waters and the Total SuDS mitigation index for all hazards is estimated at < 0, a precautionary approach does not need to be considered.
- 7.7.5. **Water Quality design:** The designed system supports the management of water quality in receiving surface waters and through the implementation of a variety of SuDS. Permeable surfacing on the MUGA pitch, above the cellular storage and filter drains has been incorporated into system. There are to be multiple levels of treatment incorporated into the development, including catchpits, trapped gullies and silt traps. These provide filtration at various points in the system to improve water quality before the surface water passes through a retention separator close to the parking areas to remove pollutants before entering the system. The risk of pollution is considered low from the school; however, these systems will mitigate any risk that did exist to the water quality on site.
- 7.7.6. As such, it can be considered the risk of pollution from site is negligible and any risk is sufficiently managed by systems on site.

7.8. Foul Water Strategy

The outline foul water drainage strategy is to connect to the existing combined water sewer located in James Road via existing private drainage on site. See **Appendix F** for Ridge design drawings.

8. MANAGEMENT MEASURES, OFF SITE IMPACTS AND RESIDUAL RISK

8.1. Flood Risk Management Measures

- 8.1.1. The report has found the site to be at low risk of flooding from all sources.
- 8.1.2. The surface water drainage strategy will aim to discharge surface water flows via connection into the existing 300mm dia. combined sewer located in James Street. Attenuation has been proposed in the form of a geocellular storage tank. The new surface water networks will be designed in line with current British Standard and Design & Construction Guidance up to the 100-year storm return period including an allowance for climate change.
- 8.1.3. The system will restrict runoff from the Proposed development to maximum **7l/s** prior to discharge into the UU combined water sewer.
- 8.1.4. The use of SuDS in the form of Source Control and Site Control measures, with controlled (restricted) outflow, will help to minimise the flood risk impact to the surrounding sewer network.
- 8.1.5. There will be a site management health and safety document prepared in respect of the final development. This will include the required maintenance regime for the on-site drains and drainage facilities such as the channels, gullies, pipes, manholes and all SuDS facilities.
- 8.1.6. Should any flooding occur from the new sewers and drains it will be directed away from the buildings to the external areas.

8.2. Off Site Impacts

- 8.2.1. Up to and including the 100-year plus increase in rainfall allowance due to climate change (CC) event, the report has justified that there is no risk of flooding.
- 8.2.2. Surface water runoff does not increase from the pre-development regime and utilises SuDS solutions to satisfy the site constraints, the proposed development will therefore not increase flood risk onto its locality.

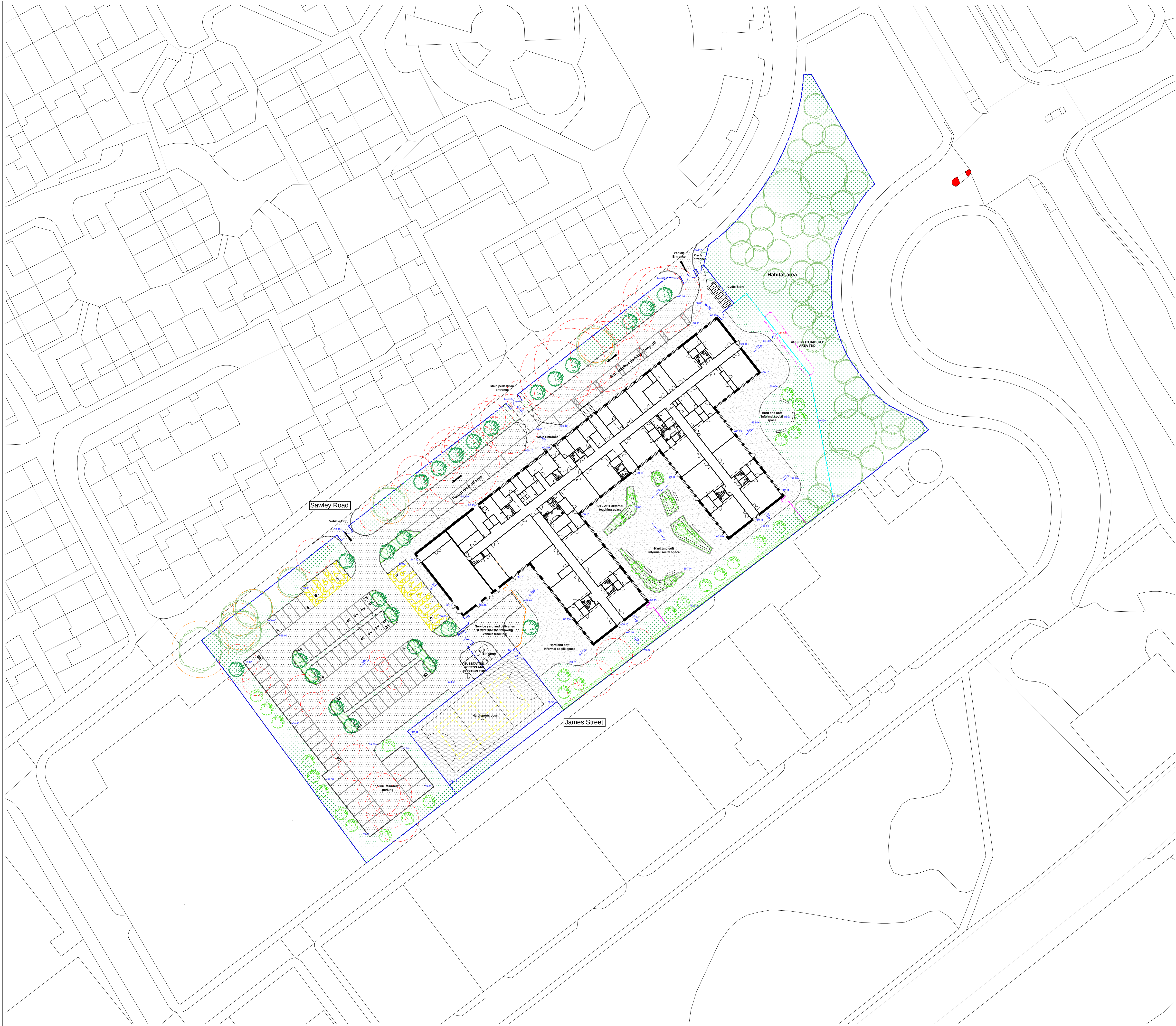
8.3. Residual Risk

- 8.3.1. With careful design of the drainage elements as described above there will be no residual flood-related risks that will remain after the development has been completed.

9. APPENDICES

- Appendix A – Architectural Site Layout
- Appendix B – Topographical Survey
- Appendix C – Excerpts from phase 2 SI Report
- Appendix D – United Utilities Sewer Records
- Appendix E – United Utilities Response to Pre-Development enquiry; CRT response
- Appendix F – Ridge Design Drawings; Outfall Alternatives Sketch
- Appendix G – Site Discharge Rate Calculations
- Appendix H - MICRODRAINAGE calculations output
- Appendix I - NW SUDS Proforma

APPENDIX A – ARCHITECTURAL SITE LAYOUT



LEGEND

Surfaces

- Pedestrian asphalt to footpaths and hard play area
- Vehicular asphalt to parking area, access roads and service yard
- Porous pedestrian asphalt surface to hard surface games court

Boundaries

- Secure Line: 2.4m height weldmesh fence (Colour: TBC)
- 2.0m Close-boarded timber fence
- 1.2m Vertical bar railings (Colour: TBC)
- 1.2m Timber post and rail fencing

Soft Landscaping

- Existing trees to be retained (TBC)
- Existing trees to be removed (TBC)
- Proposed tree planting - 14-16cm girth
- Proposed tree planting - 10-12cm girth
- Native hedge 60-80cm height
- Ornamental planting beds, 2-3L stock
- Grass seeding: Eco-rich amenity seed mix
- Grass seeding: Flowering meadow mix

Landscape Features

- External benches TBC
- Cycle store
- EV Charging 8No.
- Accessible parking bay 8No.
- Parking bay 60No.

dep

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Client
ISG

Project
Varley Street School

Description
Proposed Landscape Layout

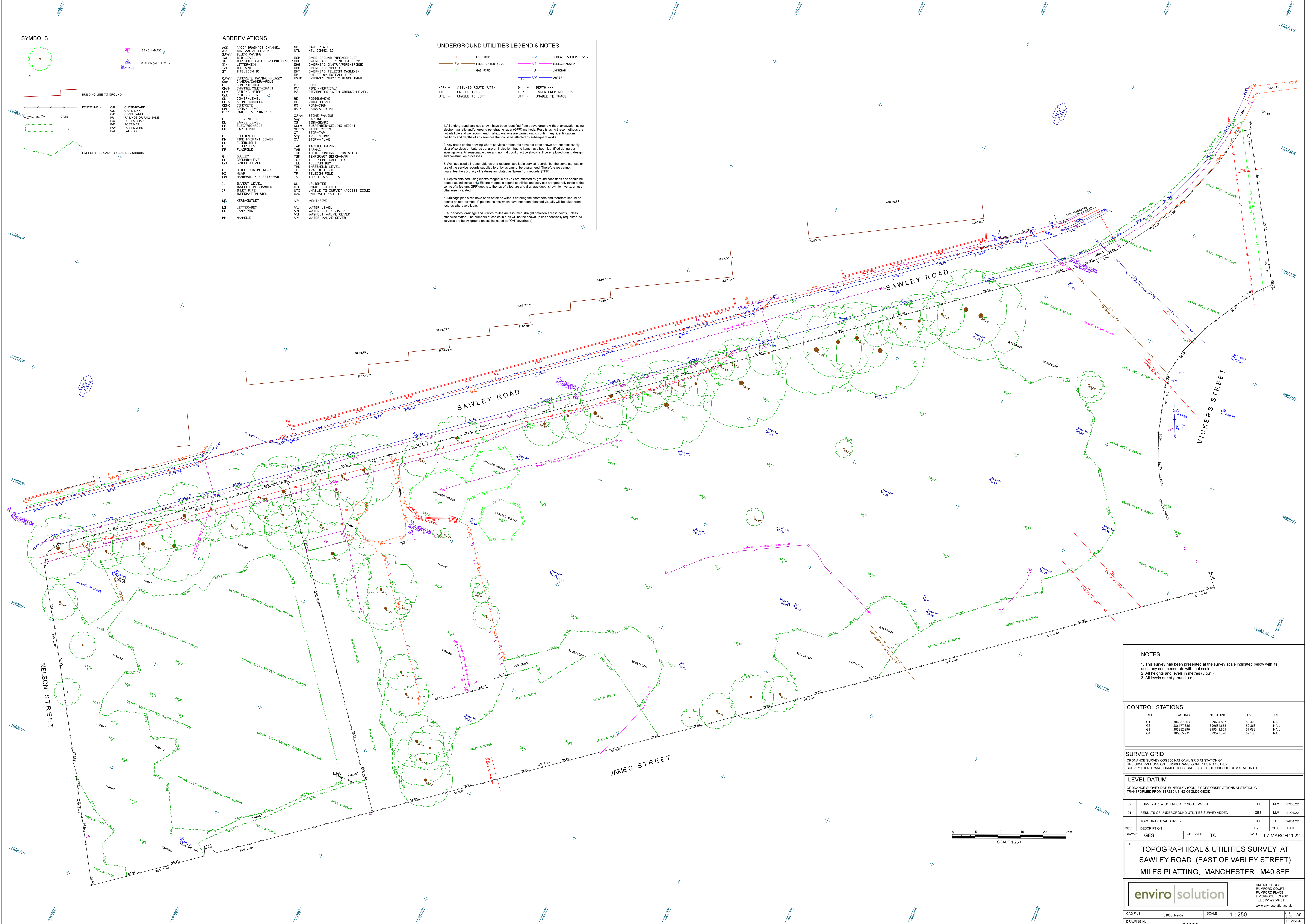
Status	Job number	
S3	5155	
Scale	Drawn	Date
1:500 @ A1	AH	02.02.23
Drawing number	Revision	
VAR-DEP-XX-XX-DR-L-00001	P01	

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All levels and dimensions to be checked on site by contractor prior to commencement; Any variations to be reported to the client. This drawing is to be read in conjunction with all others relating to the project and all information derived accordingly; any anomalies to be reported to the client. Do not scale from this drawing. Use figured dimensions only. Work shown on this drawings to be carried out in accordance with current British Standards and Codes of Practice.

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APPENDIX B – TOPOGRAPHICAL SURVEY



UNDERGROUND UTILITIES LEGEND & NOTES

UE	ELECTRIC	SV	SURFACE-WATER SEWER
FW	FIBRE-WATER SEWER	UT	TELECOM/CATV
UG	GAS PIPE	U	UNKNOWN
		UV	WATER

AND - ASSUMED ROUTE (UTT)
END OF TRACE
UTL - UNABLE TO LIFT

D - DEPTH (m)
TFR - TAKEN FROM RECORDS
UTT - UNABLE TO TRACE

1. All underground services shown have been identified from above ground without excavation using electro-magnetic and/or ground penetrating radar (GPR) methods. Results using these methods are not infallible and we recommend trial excavations are carried out to confirm any identifications, positions and depths of any services that could be affected by subsequent works.

2. Any areas on the drawing where services or features have not been shown are not necessarily clear of services or features but are an indication that no items have been identified during our investigations. All reasonable care and normal good practice should still be employed during design and construction processes.

3. We have used all reasonable care to research available service records, but the completeness or use of the service records supplied to or by us cannot be guaranteed. Therefore we cannot guarantee the accuracy of features annotated as 'taken from records' (TFR).

4. Depths obtained using electro-magnetic or GPR are affected by ground conditions and should be treated as indicative only. Electro-magnetic depths to utilities and services are generally taken to the centre of a feature. GPR depths to the top of a feature and drainage depth shown to inverts, unless otherwise indicated.

5. Drainage pipe sizes have been obtained without entering the chambers and therefore should be treated as approximate. Pipe dimensions which have not been obtained visually will be taken from records where available.

6. All services, drainage and utilities routes are assumed straight between access points, unless otherwise stated. The numbers of cables in runs will not be shown unless specifically requested. All services are below ground unless indicated as 'CH' (overhead).

NOTES

- This survey has been presented at the survey scale indicated below with its accuracy commensurate with that scale.
- All heights and levels in metres (u.o.n.)
- All levels are at ground u.o.n.

CONTROL STATIONS				
REF	EASTING	NORTHING	LEVEL	TYPE
G1	386087.903	399614.837	59.420	NAIL
G2	386177.386	399684.658	59.863	NAIL
G3	385982.296	399543.865	57.038	NAIL
G4	386005.931	399573.328	59.130	NAIL

SURVEY GRID

ORDNANCE SURVEY OSG36 NATIONAL GRID AT STATION G1
GPS OBSERVATIONS ON ETR88 TRANSFORMED USING OSTM02
SURVEY THEN TRANSFORMED TO A SCALE FACTOR OF 1.000000 FROM STATION G1

LEVEL DATUM

ORDNANCE SURVEY DATUM NEWLYN (IGN) BY GPS OBSERVATIONS AT STATION G1
TRANSFORMED FROM ETR88 USING OSGM02 GEOD

Q2	SURVEY AREA EXTENDED TO SOUTH-WEST	GES	MM	07/03/22
01	RESULTS OF UNDERGROUND UTILITIES SURVEY ADDED <th>GES</th> <th>MM</th> <th>27/01/22</th>	GES	MM	27/01/22
0	TOPOGRAPHICAL SURVEY <th>GES</th> <th>TC</th> <th>24/01/22</th>	GES	TC	24/01/22
REV	DESCRIPTION <td>BY</td> <td>CHK</td> <td>DATE</td>	BY	CHK	DATE
DRAWN	GES	CHECKED	TC	DATE 07 MARCH 2022

TITLE

TOPOGRAPHICAL & UTILITIES SURVEY AT
SAWLEY ROAD (EAST OF VARLEY STREET)
MILES PLATTING, MANCHESTER M40 8EE

envirosolution

AMERICA HOUSE
RUMFORD COURT
RUMFORD PLACE
LIVERPOOL, L3 5SD
TEL 0151-291-6451
www.envirosolution.co.uk

CAD FILE	01088_Prev02	SCALE	1 : 250	SHEET	A0
DRAWING No	01088			REVISION	02

APPENDIX C – EXCERPTS FROM THE PHASE 2 SI REPORT

3 Ground Conditions

3.1 Made Ground

Made Ground was encountered in all of the exploratory boreholes typically beneath a 0.30m layer of topsoil. The Made Ground ranged in thickness between 0.50m and 3.30m and was generally thickest in the south-western half of the site thinning to the northeast.

The Made Ground can be described as reworked fill. It generally consists of a brown/ grey gravelly sandy reworked clays and grey/brown/black clayey sandy gravel with variable amounts of brick, tile, glass, concrete, sandstone fragments, slag and timber.

Evidence of hydrocarbon contamination was noted in TP1, WS7, TP7, TP13, TP14 and TP16.

A buried obstruction was encountered in TP19 at 0.70m bgl.

3.2 Diamicton

Diamicton deposits were encountered in 26 no. exploratory holes at the site. The diamicton generally consists of soft to stiff brown/ orange/ grey mottled clay. A thick (4.5m to 5.5m) band of fine sand was recorded in RT2 and RT1 respectively at depth of 10.0m and 11.0m bgl.

Uncorrected SPT N values recorded in the diamicton ranged between 8 and 32 which indicates a medium, becoming very high strength clay with an approximate undrained shear strength range of between 40kN/m² and 160kN/m² using the general approximation of:

Undrained shear strength = $N \times 5$ (after Stroud, 1974).

The diamicton shows an increasing strength with depth. Based on these results, then it is considered that a Characteristic Shear Strength of 100kN/m² can be adopted for foundation design.

3.3 Bedrock

Bedrock of the Pennine Upper Coal Measures was encountered in 2 no. of the exploratory boreholes at depths of between 23.5m and 26.5m bgl. The depth to bedrock is shown to increase towards the north.

The Coal Measures consist of grey mudstone with minor sandstone bands. Minimal flakes of coal were noted in RT1 at 32.0m bgl.

The recorded borehole logs are shown in **Appendix C**. The recorded trial pit logs are included in **Appendix D**.

3.4 Groundwater

Groundwater inflows were recorded during the investigation in TP3 at 2.0m, TP7 at 1.70m, TP8 at 1.20m, TP16 at 1.50m, TP17 at 1.40m. In all cases, seepage into the trial pits was slow.

Groundwater was recorded in the monitoring wells (WS2, WS3, WS6 and WS7) at depths of between 0.85 and 4.95m bgl. It is considered that these strikes represent a perched water table.

Evidence of hydrocarbon contamination was noted in WS7 and TP14.

3.5 Ground Gas

Ground gases such as methane and carbon dioxide have been detected in both the Made Ground and natural ground deposits beneath the site. Monitoring records are included in **Appendix G** and the data is summarised in Table 3 below.

Table 3: Monitoring Summary

Borehole ID	Response Zone	Highest Detected Flow Rate (l/hr)	CH4 Range (%v/v)	CO2 Range (%v/v)	O2 Range (%v/v)
WS1	Made Ground	0.3	0	0.2 – 6.1	10.7 – 19.8
WS2	Made Ground	0.2	0	1.3 – 3.0	14.5 – 17.4
WS3	Made Ground and Natural Ground	0.2	0	0.2 – 0.4	17.1 – 19.5
WS6	Natural Ground	0.2	0	6.0 – 8.3	8.0 – 15.6
WS7	Made Ground and Natural Ground	0.2	0	2.4 – 4.2	2.6 – 16.1
WS10	Natural Ground	0	0	2.0 – 2.2	17.2 – 19.4

An assessment of the ground gases monitoring results is provided in Section 6.

3.6 Chemical Analysis

The results of the chemical analysis are assessed in Section 6. A copy of the laboratory test certificates is included in **Appendix E**.

3.7 Geotechnical Model

Table 4: Geotechnical Model

Stratum	Depth to Base (m bgl)	Parameters/ Comments	
		Strength Parameters	Other Parameters/ Notes
Made Ground	0.40m – 2.5m	SPT N values 5 – 11	Brown/ grey gravelly sandy reworked clays and grey/ brown/ black clayey sandy gravel with variable amounts of brick, tile, glass, concrete, sandstone fragments, slag and timber. Hydrocarbons noted in 6 no. locations
Diamicton/ Glaciofluvial Deposits	23.5 – 26.5m	SPT N values 8 – 32	Soft to stiff brown/ orange/ grey mottled clay, becoming stiff with depth. 4.5m to 5.5m thick sand layer at 10m to 11m bgl.



Figure 3

Appendix C – Borehole Logs

Job Title: Varley Street				Client: Mace Group		Borehole No: WS1			
Location: Varley Street, Manchester						Page 1 of 10			
Borehole Construction	Sample		Soil Vapour (ppm)	Groundwater	Depth (m)	SPT	Drilling Dates: 17.01.22	Drilling Method: Window Sampler	
							Drilling Contractor: EnviroSolution Ltd	Borehole Diameter: 87mm	
	Logged by: Tom Craig	Screen Type & Diameter: n/a							
	Checked by: Gemma Lucas	Screen Slot Size: n/a							
							Description	Comments	
					0		Made Ground: Grass on black sandy CLAY with brick fragments and slate FILL		0
							Made Ground: Firm brown reworked gravelly CLAY		
					1	9			1
							Made Ground: Black sandy medium GRAVEL FILL		
					2	5			2
					3	11			3
							Stiff brown/ grey CLAY		
					4	32			4
					5				5
Non-slotted install							Surrounded by bentonite seal, capped with flush cover and gas valve		
Slotted install							Surrounded by 10mm gravel and installed with end cap		
Legend: • Disturbed Sample † Down Borehole Analysis ○ Undisturbed Sample ∇ Groundwater Table ⊙ Headspace Analysis Δ Perched Water Table									

[illegible]

Job Title: Varley Street				Client: Mace Group				Borehole No: WS3			
Location: Varley Street, Manchester								Page 3 of 10			
Borehole Construction	Sample		Soil Vapour (ppm)	Groundwater	Depth (m)	SPT	Drilling Dates: 17.01.22		Drilling Method: Window Sampler		
							Drilling Contractor: EnviroSolution Ltd		Borehole Diameter: 87mm		
	Number	Type					Logged by: Tom Craig		Screen Type & Diameter: n/a		
							Checked by: Gemma Lucas		Screen Slot Size: n/a		
						0	Description		Comments	0	
							Grass on brown TOPSOIL				
							Made Ground: Firm brown/ grey reworked gravelly CLAY with brick fragments				
						1	6			1	
							Soft grey CLAY				
						2	5			2	
							No recovery				
							Stiff brown/ grey CLAY				
						3	12			3	
						4	30			4	
						5				5	
Non-slotted Install							Surrounded by bentonite seal, capped with flush cover and gas valve				
Slotted Install							Surrounded by 10mm gravel and installed with end cap				
Legend: ♦ Disturbed Sample † Down Borehole Analysis ○ Undisturbed Sample ∇ Groundwater Table ⊙ Headspace Analysis Δ Perched Water Table											

[illegible]

Job Title: Varley Street							Client: Mace Group					Borehole No: WS5						
Location: Varley Street, Manchester												Page 5 of 10						
Borehole Construction		Sample		Soil Vapour (ppm)	Groundwater	Depth (m)	SPT	Drilling Dates: 17.01.22					Drilling Method: Window Sampler					
								Drilling Contractor: EnviroSolution Ltd					Borehole Diameter: 87mm					
		Number Type						Logged by: Tom Craig					Screen Type & Diameter: n/a					
								Checked by: Gemma Lucas					Screen Slot Size: n/a					
						0		Description							Comments			0
								Grass on clayey TOPSOIL										
								Made Ground: Brown reworked gravelly CLAY with concrete fragments										
						1	7	Firm grey/ brown mottled slightly gravelly CLAY										1

Job Title: Varley Street				Client: Mace Group				Borehole No: WS6			
Location: Varley Street, Manchester								Page 6 of 10			
Borehole Construction	Sample		Soil Vapour (ppm)	Groundwater	Depth (m)	SPT	Drilling Dates: 17.01.22		Drilling Method: Window Sampler		
	Number	Type					Drilling Contractor: EnviroSolution Ltd		Borehole Diameter: 87mm		
							Logged by: Tom Craig		Screen Type & Diameter: n/a		
							Checked by: Gemma Lucas		Screen Slot Size: n/a		
						Description		Comments			
						Made Ground: Grass on brown sandy TOPSOIL with brick fragments and glass				0	
						Made Ground: Firm grey/ brown mottled reworked slightly gravelly CLAY with occasional coal fragments and glass				1	
						Stiff grey/ brown mottled slightly gravelly CLAY				2	
						Stiff brown sandy CLAY				4	
Non-slotted Install						Surrounded by bentonite seal, capped with flush cover and gas valve				5	
Slotted Install						Surrounded by 10mm gravel and installed with end cap					
Legend: ♦ Disturbed Sample † Down Borehole Analysis ○ Undisturbed Sample ∇ Groundwater Table ⊙ Headspace Analysis Δ Perched Water Table											

Job Title: Varley Street					Client: Mace Group					Borehole No: WS7				
Location: Varley Street, Manchester										Page 7 of 10				
Borehole Construction	Sample		Soil Vapour (ppm)	Groundwater	Depth (m)	SPT	Drilling Dates: 17.01.22			Drilling Method: Window Sampler				
	Number	Type					Drilling Contractor: EnviroSolution Ltd			Borehole Diameter: 87mm				
							Logged by: Tom Craig			Screen Type & Diameter: n/a				
							Checked by: Gemma Lucas			Screen Slot Size: n/a				
					0		Description			Comments			0	
							Grass on brown clayey TOPSOIL							
							Made Ground: Black clayey GRAVEL heavily stained black with oily sheen			Strong hydrocarbon odour				
1.0m ▲					1	6	Soft to firm dark grey reworked sandy gravelly CLAY						1	
							Firm to stiff brown/ grey mottled CLAY							
					2	19	Soft grey CLAY						2	
2.5m ▲							Stiff brown CLAY							
					3	16							3	
						19								
					4								4	
					5								5	
Non-slotted Install							Surrounded by bentonite seal, capped with flush cover and gas valve							
Slotted Install							Surrounded by 10mm gravel and installed with end cap							
Legend:														
+ Disturbed Sample ↑ Down Borehole Analysis														
○ Undisturbed Sample ∇ Groundwater Table														
⊙ Headspace Analysis ▲ Perched Water Table														

[illegible]

[illegible]

Job Title: Varley Street				Client: Mace Group		Borehole No: WS10			
Location: Varley Street, Manchester						Page 10 of 10			
Borehole Construction	Sample		Soil Vapour (ppm)	Groundwater	Depth (m)	SPT	Drilling Dates: 17.01.22	Drilling Method: Window Sampler	
	Number	Type					Drilling Contractor: EnviroSolution Ltd	Borehole Diameter: 87mm	
							Logged by: Tom Craig	Screen Type & Diameter: n/a	
							Checked by: Gemma Lucas	Screen Slot Size: n/a	
						Description	Comments	0	
						Made Ground: Brown/ grey clayey gravelly FILL with brick fragments			
						Firm brown/ grey mottled CLAY			
						Very stiff brown CLAY			
						2	20		2
						3	18		3
						4	25		4
						5			5
Non-slotted Install						Surrounded by bentonite seal, capped with flush cover and gas valve			
Slotted Install						Surrounded by 10mm gravel and installed with end cap			
Legend: ♦ Disturbed Sample † Down Borehole Analysis ○ Undisturbed Sample ∇ Groundwater Table ⊙ Headspace Analysis Δ Perched Water Table									

Project:	Varley Street				Weather:	Dry, overcast	
Project Number:	D0108	Date:	24/01/2022		Engineer:	IP	

Monitoring Point Reference	Date / Time	Atmos. Pressure (mbar)	Temp. (°C)	Flow Rate (l/h)	Time (sec)	CH ₄ (% v/v)	LEL (%)	CO ₂ (% v/v)	O ₂ (% v/v)	H ₂ S (ppm)	CO (ppm)	VOC (ppm)	Depth to Water (m bgl)	Depth to base (m bgl)	Comments
WS1	24/01/2022 14:00:00	1005	5	Initial	Initial	0	0.0	0.2	18.9	0	0		Dry	2.50	
					30	0	0.0	6.0	0.9	0	0				
					60	0	0.0	6.0	0.4	0	0				
					90	0	0.0	6.1	0.3	0	0				
					120	0	0.0	6.1	0.2	0	0				
				Steady	150	0	0.0	6.1	0.2	0	0				
					180	0	0.0	6.1	0.2	0	0				
					Initial	0	0.0	1.3	17.4	0	0				
					30	0	0.0	3.0	14.6	0	0				
					60	0	0.0	3.0	14.3	0	0				
WS2	24/01/2022 14:10:00	1005	5	Initial	Initial	0	0.0	3.0	14.3	0	0		1.18	3.00	
					30	0	0.0	3.0	14.3	0	0				
					60	0	0.0	3.0	14.3	0	0				
					90	0	0.0	3.0	14.3	0	0				
					120	0	0.0	3.0	14.3	0	0				
				Steady	150	0	0.0	3.0	14.3	0	0				
					180	0	0.0	3.0	14.3	0	0				
					Initial	0	0.0	2.0	14.8	0	0				
					30	0	0.0	0.3	19.3	0	0				
					60	0	0.0	0.2	20.0	0	0				
WS3	24/01/2022 14:20:00	1005	5	Initial	Initial	0	0.0	0.2	20.0	0	0		1.45	2.80	
					30	0	0.0	0.2	20.0	0	0				
					60	0	0.0	0.2	20.0	0	0				
					90	0	0.0	0.2	20.0	0	0				
					120	0	0.0	0.2	20.0	0	0				
				Steady	150	0	0.0	0.2	20.0	0	0				
					180	0	0.0	0.2	20.0	0	0				
					Initial	0	0.0	2.4	15.6	0	0				
					30	0	0.0	7.4	11.1	0	0				
					60	0	0.0	7.4	10.4	0	0				
WS6	24/01/2022 14:30:00	1005	5	Initial	Initial	0	0.0	7.5	10.2	0	0		4.95	3.00	
					30	0	0.0	7.5	10.2	0	0				
					60	0	0.0	7.5	10.2	0	0				
					90	0	0.0	7.5	10.2	0	0				
					120	0	0.0	7.6	10.2	0	0				
				Steady	150	0	0.0	7.6	10.1	0	0				
					180	0	0.0	7.6	10.1	0	0				
					Initial	0	0.0	0.0	19.4	0	0				
					30	0	0.0	2.0	17.3	0	0				
					60	0	0.0	2.0	17.3	0	0				
WS7	24/01/2022 14:40:00	1005	5	Initial	Initial	0	0.0	2.0	17.3	0	0		0.95	3.00	No gas bung in place, gas bung added during visit. Strong hydrocarbon odour noted from well.
					30	0	0.0	2.0	17.3	0	0				
					60	0	0.0	2.0	17.3	0	0				
					90	0	0.0	2.0	17.3	0	0				
					120	0	0.0	2.0	17.3	0	0				
				Steady	150	0	0.0	2.0	17.3	0	0				
					180	0	0.0	2.0	17.3	0	0				
					Initial	0	0.0	0.0	19.4	0	0				
					30	0	0.0	2.0	17.3	0	0				
					60	0	0.0	2.0	17.3	0	0				
WS10	24/01/2022 14:50:00	1005	5	Initial	Initial	0	0.0	2.0	17.3	0	0		Dry	4.00	
					30	0	0.0	2.0	17.3	0	0				
					60	0	0.0	2.0	17.3	0	0				
					90	0	0.0	2.0	17.3	0	0				
					120	0	0.0	2.0	17.3	0	0				
				Steady	150	0	0.0	2.0	17.3	0	0				
					180	0	0.0	2.0	17.3	0	0				
					Initial	0	0.0	0.0	19.4	0	0				
					30	0	0.0	2.0	17.3	0	0				
					60	0	0.0	2.0	17.3	0	0				

Notes:			Ambient Concentration	
			CH ₄	0
			CO ₂	0.1
			O ₂	20.6
			H ₂ S	0
			CO	0
QA Checklist:			Instrument Details:	
QA Checklist:			Serial No.	
Gas monitor calibrated			Landfill Gas Analyser	
All filters in place			G507192	
Flow reading stable and zeroed			Dip meter/ interface probe	



Project:	Varley Street			Weather:	Dry, overcast	
Project Number:	06206	Date:	31/05/2022	Engineer:	JP	

Monitoring Point Reference	Date / Time	Atmos. Pressure (inches)	Temp. (°C)	Flow Rate (l/min)	Time (sec)	CH ₄ (% v/v)	HC (%)	CO ₂ (% v/v)	O ₂ (% v/v)	H ₂ S (ppm)	CO (ppm)	VOC (ppm)	Depth to Water (m lg)	Depth to base (m lg)	Comments
WS1	31/05/2022 11:05:00	1008	8	Initial	0	0.0	0.0	4.1	19.8	0	0		Dry	2.50	
					30	0	0.0	3.2	13.0	0	0				
					60	0	0.0	3.7	13.1	0	0				
					90	0	0.0	3.4	11.1	0	0				
					120	0	0.0	3.4	10.7	0	0				
				Steady	150	0	0.0	3.4	11.1	0	0				
					180	0	0.0	3.4	11.1	0	0				
					210	0	0.0	3.4	11.1	0	0				
					240	0	0.0	3.4	11.1	0	0				
					270	0	0.0	3.4	11.1	0	0				
WS2	31/05/2022 11:10:00	1008	8	Initial	0	0.0	0.0	3.0	14.6	0	0		1.90	3.00	
					30	0	0.0	2.3	13.3	0	0				
					60	0	0.0	2.2	16.8	0	0				
					90	0	0.0	2.3	16.9	0	0				
					120	0	0.0	2.2	16.9	0	0				
				Steady	150	0	0.0	2.2	16.9	0	0				
					180	0	0.0	2.2	16.9	0	0				
					210	0	0.0	2.2	16.9	0	0				
					240	0	0.0	2.2	16.9	0	0				
					270	0	0.0	2.2	16.9	0	0				
WS3	31/05/2022 11:20:00	1008	8	Initial	0	0.0	0.0	0.4	17.0	0	10		1.30	2.80	
					30	0	0.0	0.4	16.1	0	13				
					60	0	0.0	0.4	15.7	0	43				
					90	0	0.0	0.4	15.6	0	45				
					120	0	0.0	0.4	15.6	0	51				
				Steady	150	0	0.0	0.4	15.6	0	51				
					180	0	0.0	0.4	15.6	0	51				
					210	0	0.0	0.4	15.6	0	51				
					240	0	0.0	0.4	15.6	0	51				
					270	0	0.0	0.4	15.6	0	51				
WS4	31/05/2022 11:30:00	1008	8	Initial	0	0.0	0.0	6.0	8.0	0	0		Dry	4.70	
					30	0	0.0	5.3	8.8	0	0				
					60	0	0.0	5.3	9.1	0	0				
					90	0	0.0	5.3	9.1	0	0				
					120	0	0.0	5.3	9.1	0	0				
				Steady	150	0	0.0	5.3	9.1	0	0				
					180	0	0.0	5.3	9.1	0	0				
					210	0	0.0	5.3	9.1	0	0				
					240	0	0.0	5.3	9.1	0	0				
					270	0	0.0	5.3	9.1	0	0				
WS7	31/05/2022 11:40:00	1008	8	Initial	0	0.0	0.0	2.4	18.1	0	10		0.85	2.90	Hydrocarbon odour noted from well. Slight sheen to water sample.
					30	0	0.0	2.4	4.3	0	11				
					60	0	0.0	2.4	3.2	0	10				
					90	0	0.0	2.4	3.0	0	10				
					120	0	0.0	2.4	2.8	0	11				
				Steady	150	0	0.0	2.4	2.6	0	10				
					180	0	0.0	2.4	2.6	0	10				
					210	0	0.0	2.4	2.6	0	10				
					240	0	0.0	2.4	2.6	0	10				
					270	0	0.0	2.4	2.6	0	10				
WS10	31/05/2022 11:50:00	1008	8	Initial	0	0.0	0.0	0.0	19.4	0	0		Dry	4.00	
					30	0	0.0	2.2	17.2	0	0				
					60	0	0.0	2.2	17.3	0	0				
					90	0	0.0	2.2	17.2	0	0				
					120	0	0.0	2.2	17.2	0	0				
				Steady	150	0	0.0	2.2	17.2	0	0				
					180	0	0.0	2.2	17.2	0	0				
					210	0	0.0	2.2	17.2	0	0				
					240	0	0.0	2.2	17.2	0	0				
					270	0	0.0	2.2	17.2	0	0				

Notes:

QA Checklist

QA Checklist

QA Checklist

All data to date

Draw reading table and spread

Instrument Details

Landfill Gas Analyser

NO

Gas analyser

Serials

007140

Ambient Concentration

CH₄

CO₂

O₂

H₂S

CO

0

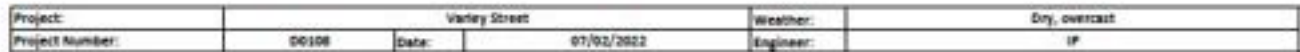
0.1

20.6

0

0

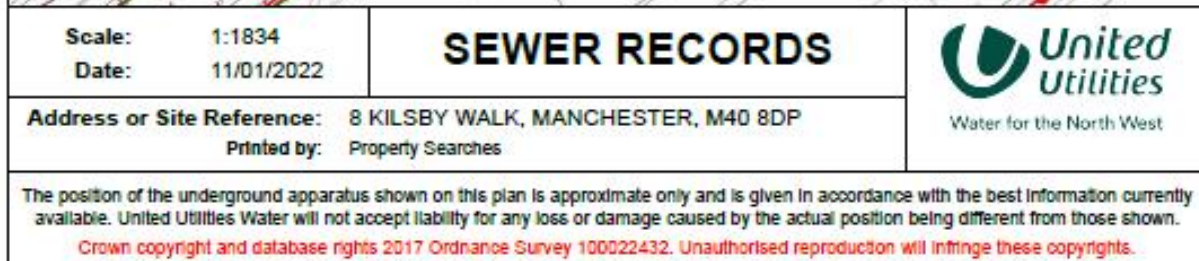




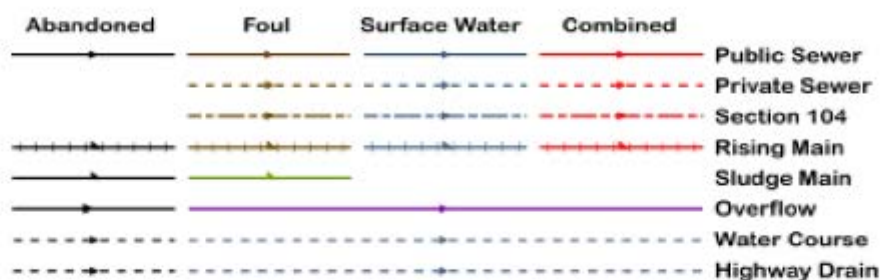
				Ambient Concentration	
gk (Acid test)				CO ₂	0
gk (Acid test)		Instrument details	Serial No.	CO ₂	0.3
gas monitor calibration	Y	Calibrated gas monitor	CO2 Pro2	O ₂	20.8
HD films in place	Y	HD		H ₂ S	0
Flow reading stable and correct	Y	Flow meter/ interface probe		CO	0



APPENDIX D – UNITED UTILITIES SEWER RECORDS



Wastewater Symbolology



All point assets follow the standard colour convention: **red** – combined **brown** - foul
blue – surface water **purple** - overflow

- | | |
|------------------------|----------------------------|
| ● Manhole | ◆ Side Entry Manhole |
| ● HS Head of System | ⌋ Outfall |
| ● ES Extent of Survey | ▢ Screen Chamber |
| ● RE Rodding Eye | ▢ IC Inspection Chamber |
| ● IN Inlet | ⊙ Bifurcation Chamber |
| ● DP Discharge Point | ▢ LH Lamp Hole |
| ● VV Vortex | ⌋ T Junction / Saddle |
| ● PE Penstock | ⊙ Catchpit |
| ● WO Washout Chamber | ⊙ Valve Chamber |
| ● VA Valve | ▢ Vent Column |
| ● AV Air Valve | ⊙ Vortex Chamber |
| ● NRV Non Return Valve | ⊙ Penstock Chamber |
| ● SO Soakaway | ▢ Network Storage Tank |
| ● GU Gully | ▢ Sewer Overflow |
| ● CA Cascade | ▢ Ww Treatment Works |
| ● FM Flow Meter | ▲ Ww Pumping Station |
| ● HA Hatch Box | ▢ Septic Tank |
| ● OI Oil Interceptor | ▢ Control Kiosk |
| ● SM Summit | ▽ Change of Characteristic |
| ● DS Drop Shaft | |
| ● OP Orifice Plate | |

APPENDIX E – UU RESPONSE TO PRE-DEVELOPMENT ENQUIRY; CRT RESPONSE

Predrag Rajkovic

From: Gareth Taylor <Gareth.Taylor@canalrivertrust.org.uk>
Sent: 22 February 2023 13:45
To: Predrag Rajkovic
Subject: RE: 5020683 - Varley Street SEN - FAO Gareth Taylor

Predrag

At present the Rochdale Canal is at capacity, and we are undertaking a detailed impact assessment, so that we can mitigate the flood risk going forward.

The proposal is further complicated by having the drainage system running through a number of public highways or additional third-party land ownership, which would complicate the commercial agreement required for a discharge to the canal.

If you have an alternative, it would best to pursue this option. However, if you have no alternative, we can assess the SWD, but its likely that you will get a result stating unacceptable without mitigation. Were you will have to contribute to any mitigation put forward by our detailed impact assessment.

Regards

Gareth Taylor (BSc)

Infrastructure Services, Works Engineer (Northwest)

Northwest Region: Lancaster canal, Leeds to Liverpool canal (Yorkshire Boarder – Greenberfield Locks).

Manchester, Bury & Bolton Canal, Rochdale Canal & Ashton Canal.



Canal & River Trust | NW Waterway | Canal Cottage | Lowerhouse Lane | Rosegrove | Burnley | BB12 6HU | Mob: 07484 913064 |

For further information and a copy of the 3rd Party Code of Practice please follow the link below.

<https://canalrivertrust.org.uk/business-and-trade/undertaking-works-on-our-property-and-our-code-of-practice>

From: Predrag Rajkovic <Predragrajkovic@ridge.co.uk>
Sent: 08 February 2023 13:30
To: Gareth Taylor <Gareth.Taylor@canalrivertrust.org.uk>
Subject: FW: 5020683 - Varley Street SEN - FAO Gareth Taylor

Dear Sir,

I am writing to you with regards to one of our developments – Varley Street in North Manchester (near Miles Platting - sketch attached to this mail for easy reference).

We intend to drain the site via direct connection into the existing combined sewer nearby. However, having placed our pre-development inquiry with the United Utilities, we have been requested to explore other options, too.

Few of them envisage connecting into the Rochdale Canal located south of our site.

We would appreciate your thoughts on whether such arrangement would be acceptable.

Please do not hesitate to contact the undersigned for any further clarification.

With best regards,

Predrag Rajkovic BEng CEng MICE
Technical Associate
Ridge and Partners LLP
07553 883227
0161 833 9579
Predragrajkovic@ridge.co.uk



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Cadw mewn cysylltiad

Cofrestrwch i dderbyn e-gylchlythyr Glandŵr Cymru <https://canalrivertrust.org.uk/newsletter>

Cefnogwch ni ar <https://www.facebook.com/canalrivertrust>

Dilynwch ni ar <https://twitter.com/canalrivertrust> ac <https://www.instagram.com/canalrivertrust>

Mae'r e-bost hwn a'i atodiadau ar gyfer defnydd y derbynnydd bwriedig yn unig. Os nad chi yw derbynnydd bwriedig yr e-bost hwn a'i atodiadau, ni ddylech gymryd unrhyw gamau ar sail y cynnwys, ond yn hytrach dylech eu dileu heb eu copïo na'u hanfon ymlaen a rhoi gwybod i'r anfonwr eich bod wedi eu derbyn ar ddamwain. Mae unrhyw farn

neu safbwynt a fynegir yn eiddo i'r awdur yn unig ac nid ydynt o reidrwydd yn cynrychioli barn a safbwyntiau Glandŵr Cymru.

Mae Glandŵr Cymru yn gwmni cyfyngedig drwy warant a gofrestrwyd yng Nghymru a Lloegr gyda rhif cwmni 7807276 a rhif elusen gofrestredig 1146792. Swyddfa gofrestredig: National Waterways Museum Ellesmere Port, South Pier Road, Ellesmere Port, Cheshire CH65 4FW.

Predrag Rajkovic

From: seweradoptions@uuplc.co.uk
Sent: 07 March 2023 13:06
To: Philip Barrett; Predrag Rajkovic
Subject: Pre Development Enquiry for: Varley Street SEN School UU Reference Number : 03453598

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Predrag,

Thanks for your email and attached correspondence from the LLFA. We would insist that any possibility of draining surface water from your site to the Canal is further explored with CaRT. The email made clear there are issues currently with flooding and capacity, but mentions that there may be the possibility of a connection if mitigation were to be provided.

Given the nature and scale of the development this would introduce a large volume of flows (even though restricted) to the combined sewer system. We are not ruling a potential connection out to the public sewer, but in line with the surface water hierarchy would request that the Canal, being a more sustainable way of draining surface water is further explored.

Please could you the possibility of draining to the canal considering mitigation measures resulting from the CaRT detailed impact assessment be explored further please.

Please could this also be discussed with the LLFA?

Please could further information on infiltration be provided - this has not yet been agreed to be unfeasible.

If a surface water connection to the combined sewer were to be agreed we would request a restricted rate to QBar based on the positively drained impermeable area.

We would need to assess the site levels and drainage levels as the combined sewer in James Street to the south currently shows as modelled flood risk for certain return periods, please provide points of connection and levels information for assessment.

Please also provide further information on the proposed sports pitch - is this to have under attenuation storage? If being positively drained to the public sewer this pitch would need further assessment.

Kind regards,

Shoaib.



Shoaib Tauqeer
Developer Engineer
Developer Services & Metering
M: 07876745601
unitedutilities.com

If you have received a great service today why not tell us?

----- Original Message -----

From: Philip Barrett [pbarrett@ridge.co.uk]

Sent: 24/02/2023 15:51

To: seweradoptions@uuplc.co.uk

Subject: Automatic reply: Pre Development Enquiry for: Varley Street SEN School UU Reference Number : 03453598

EXTERNAL EMAIL This email originated outside of the organisation. Do not click links or open attachments unless you recognise the sender and know the content is safe.

I am away from the office and will return on 27.02.23

I will get back to you on my return.

If there is anything Urgent, please contact Adam Matadar (07469 378701, adammatadar@ridge.co.uk)

Thanks

Phil



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Predrag Rajkovic

From: Philip Barrett
Sent: 07 February 2023 13:23
To: Predrag Rajkovic
Subject: FW: Pre Development Enquiry for: Varley Street SEN School UU Reference Number : 03453598

Predrag – please see below.

We may need to review potential outfall to Canal south of the site.

Kind Regards

Philip Barrett
Associate
Ridge and Partners LLP
07425 637708
0161 833 9579
PBarrett@ridge.co.uk



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From: seweradoptions@uuplc.co.uk <seweradoptions@uuplc.co.uk>
Sent: 01 February 2023 11:41
To: Philip Barrett <PBarrett@ridge.co.uk>
Subject: FW: Pre Development Enquiry for: Varley Street SEN School UU Reference Number : 03453598

Good Morning,

Please see our response below that was sent to you on 24th January.

If I can be of any further help please do not hesitate to contact.

Kind Regards,



Tonicha Wilde
Customer Advisor Advanced
Developer Services & Metering
Customer Services
Direct Tel: N/A
Tel: 0345 026 8989 (option 4)
unitedutilities.com

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----- Forwarded Message -----

From: seweradoptions@uuplc.co.uk [seweradoptions@uuplc.co.uk]

Sent: 24/01/2023 15:15

To: pbarrett@ridge.co.uk

Subject: Pre Development Enquiry for: Varley Street SEN School UU Reference Number : 03453598

Good afternoon Philip,

Pre Development Enquiry for: Varley Street SEN School UU Reference Number : 03453598

We have carried out an assessment of your application which is based on the information provided. This pre-development advice on your drainage strategy will be valid for 12 months. Your drainage strategy will need to be reviewed by other competent authorities as part of the planning process, and we advise that you carry out the necessary site investigations to confirm the viability of your proposals.

If your investigations require access to our public sewer network, we ask that you contact our network engineers with a request for an access certificate via our main contact telephone number 0345 6723 723 or refer to the link below:

<https://www.unitedutilities.com/builders-developers/working-near-our-assets/>

Foul Water

Foul flow from this site will be allowed to drain into the public foul water/combined sewer system.

Our preferred point of discharge would be to the 300mm diameter public combined sewer within James Street located to the south of your proposed development at an unrestricted rate as you have indicated.

If you are able to identify an alternative, more suitable point of discharge, we request that you contact us at your earliest convenience so that we can assess suitability.

In accordance with our infrastructure plans we may ask you to change your point of connection. Therefore please contact us when you are ready to formalise your drainage proposals, we would suggest before you submit for Full Planning.

Surface Water

All surface water flow from the proposed development should drain in-line with the drainage hierarchy, as outlined in Paragraph 80, (Reference ID: 7-080-20150323), of the National Planning Practice Guidance. We also recommend you prioritise the use of multi-functional sustainable drainage systems for the management of surface water in accordance with national planning policy.

Generally, the aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable.

This is outlined as follows, in order of priority:

1. into the ground (infiltration);
2. to a surface waterbody;
3. to a surface water sewer or highway drain;
4. to a combined sewer.

For guidance, The [North West SuDS Pro-Forma](#) provides information on the appropriate evidence required at each stage of the hierarchy, to demonstrate how each level has been discounted.

The Lead Local Flood Authority has responsibility for all surface water drainage concerns and their input to your proposal is critical. You should also consider whether it is necessary to discuss your proposal with the Environment Agency, or Internal Drainage Board (if operating in your area).

The Local Planning Authority are the determining authority for any application for planning permission and the appropriate authority for determining cost viability of a proposed drainage scheme, such assessments are outside of the jurisdiction of United Utilities.

Infiltration

Surface water runoff generated from this development should discharge to the ground via infiltration system where feasible.

A detailed evidence based feasibility assessment must be carried out in line with Chapter 25 of the CIRIA SuDS Manual 2015 to determine whether infiltration is a suitable method of surface water disposal.

Particular attention must be paid to Ground Water Source Protection Zones to ensure that the risk of pollution to these valuable resources is not compromised. Details can be obtained from the government website:

<https://www.gov.uk/guidance/groundwater-source-protection-zones-spzs#find-groundwater-spzs>

If your site is in a Groundwater Source Protection Zone, you should have regard to the Environment Agency's approach to Groundwater Protection. Information on this is available via the link below:

<https://www.gov.uk/government/publications/groundwater-protection-position-statements>

Please note that such a location could have implications for the principle of your development and the need for additional mitigating measures to protect the groundwater environment and public water supply in the detailed design of your site.

Waterbody

If an evidence based assessment has been carried out and confirms that infiltration is not feasible, we recommend that you contact the Lead Local Flood Authority and/or Environment Agency to discuss a point of discharge to the canal located south of the proposed site.

We would encourage you to identify and engage with any third party landowner and riparian owner to agree access and discharge rights to the water body if this is not in your ownership.

Highway Drainage

If an evidence based assessment has been carried out and confirms that infiltration is not feasible, we recommend that you investigate the possibility of draining surface water to the highway drain where this ultimately discharges to a watercourse, by contacting the relevant Highway Authority.

Public Sewer

In accordance with the hierarchy of drainage options within the National Planning Practice Guidance, both discharge to ground via infiltration and discharge to a waterbody should be discounted prior to consideration of discharging surface water to the public sewer system. Evidence should be provided to demonstrate how these have been discounted, as outlined in the North West SuDS pro-forma.

Once evidence is provided as outlined above, United Utilities will consider a connection to the 300mm diameter public combined sewer located south of the proposed site at a pass forward flow to be agreed by the Lead Local Flood Authority. United Utilities request that any agreed rate does not exceed the calculated QBar Greenfield rate based on the positively drained impermeable area.

As a Water Company, we have no obligation to accept highway drainage into our public sewer network. However, should your proposals include runoff from highways, we would request that consideration is given to SuDS components that deliver source control are incorporated within the design of the scheme to reduce the volume and frequency of discharges of these flows to the public sewer.

Levels

For low-lying sites, (where the ground level of the site or the level of a basement is below the ground level at the point where the drainage connects to the public sewer), care should be taken to ensure that the property is not at increased risk of flooding. If these circumstances exist, we recommend that you contact us to discuss further. It could affect the detailed design of your site and result in the need to incorporate appropriate mitigating measures in your drainage scheme.

Land drainage / Overland flows / track drainage

United Utilities have no obligation, and furthermore we do not accept land drainage, overland flows or track drainage into the public sewerage network under any circumstances

SuDS

If your development proposal incorporates any SuDS component(s) which interact with a sewer network you plan on offering for adoption to United Utilities; contact should be made with our technical team at your earliest convenience, please complete the 'Section 104 pre-application form : ' and include as much relevant detail as you can. These discussions can help prevent delays later in the development process.

Section 104 Pre application form (1b)

As per the sewerage sector guidance, all SuDS should be designed in accordance with the standards within the Design & construction guidance & the CIRIA SuDS manual (C753)

Codes For Adoption

The new Codes for Adoption are outlined on the Water UK Website. The link below takes you to their webpage:

<https://www.water.org.uk/technical-guidance/developers-services/codes-for-adoption/>

A free copy of the new Design & Construction Guidance can be downloaded via the link below:

<https://www.water.org.uk/sewerage-sector-guidance-approved-documents/>

Existing Wastewater Assets Crossing the Site

According to our public sewer records there are public sewers located within your site boundary. We will require unrestricted access to the sewer for maintenance purposes, we would ask that you maintain a minimum clearance of 6m which is measured 3m from the centre line of the pipe unless there happens to be a formal easement

agreement in place, in which case the specified easement width would apply. If you cannot achieve this then you may wish to consider diverting and or abandoning the public sewer.

Please be aware that any proposed diversion may require modelling. This process may take up to 6 months in order to reach an acceptable design.

Please refer to the link below to obtain full details of the processes involved with sewer diversions:

<https://www.unitedutilities.com/builders-developers/larger-developments/wastewater/sewer-diversions/>

Existing Water Assets Crossing the Site

It is the developer responsibility to identify utilities on-site. Where clean water assets are shown on our records, we recommend that you contact our Water Pre-Development Team, via the following email address:

DeveloperServicesWater@uuplc.co.uk. Further information for this service can be found on our website via the link below:

<https://www.unitedutilities.com/builders-developers/larger-developments/pre-development/water-pre-dev/>

Connection Application

Although we may discuss and agree discharge points and rates in principle, please be aware that you will have to apply for a formal sewer connection. This is so that we can assess the method of construction, Health & Safety requirements and to ultimately inspect the connection when it is made. Details of the application process and the form itself can be obtained from our website by following the link below:

<https://www.unitedutilities.com/builders-developers/wastewater-services/sewer-connections/sewer-connection/>

We recommend that the detailed design should confirm the locations of all utilities in the area and ensure that any proposed drainage solution considers routing and clash checks where required.

If we can be of any further assistance please don't hesitate to contact us further.

Kind regards,

Shoaib.



Shoaib Tauqeer
Developer Engineer
Developer Services & Metering
M: 07876745601
[unitedutilities.com](https://www.unitedutilities.com)

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----- Original Message -----

From: seweradoptions@uuplc.co.uk [seweradoptions@uuplc.co.uk]

Sent: 12/01/2023 09:43

To: pbarrett@ridge.co.uk

Subject: Our reference - 03453598



Good Morning,

PRE DEVELOPMENT APPLICATION AT: Varley Street SEN School
UU Ref - 03453598

Please accept this email as receipt of your application received on 10/01/2023 for the above development. This has now been logged on our system and the job reference is 03453598 we would ask that you quote this reference in all future correspondence.

I have reviewed your application (and attachments) and can confirm this is suitable to be passed to Shoaib for technical assessment. You will receive their response within 8 working days.

Kind regards,
Tonicha Wilde

Did you know we now have a live chat facility available to you between 8am and 5pm Monday to Friday. Just click on the link on our webpage and one of our advisors will be ready to chat to you and help you with your enquiry <https://www.unitedutilities.com/builders-developers/>

If I am unavailable on the number above and you need to speak to someone else, our office number is 0345 072 6067



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APPENDIX F - RIDGE DESIGN DRAWINGS; OUTFALL ALTERNATIVES SKETCH



Varley Street Site – Rochdale Canal Towpath

Notes:

- To achieve either of the above indicated storm drainage routes would involve significant excavation through private plots (owned by others) public highways and the greenery belt at the Rochdale Canal bank. Consequently, traffic disruption in the area is anticipated, as well as potential impact on the existing utilities. Environmental impact to the local greenery and any inhabiting species should also be considered. High construction cost is anticipated, as well as possible failure to agree right of passage with the land owners.

- Vickers Street has a surface level quite close to the site outfall and canal water level; it may prove difficult to meet the required pipe invert levels, gradients and minimum depths for Route 1

- Route 2 site outfall would be significantly deep, since internal drainage network goes against the site slope. Most likely a pumping station would therefore be required, which may have to be accommodated outside the site boundary (i.e. in the public highway corridor). Difficulties in obtaining land for it are anticipated.

- New outfall at Rochdale Canal would be required for either option, which together with the additional flows into the Canal may not be acceptable to the CRT (TBC).

Given the above listed constraints, both of the storm drainage routes would be far too onerous a solution to be considered.

DRAINAGE KEY

- PROPOSED PRIVATE FW DRAIN
- PROPOSED PRIVATE FW PPIC
- PROPOSED WASTE POINT CONNECTION
- PROPOSED PRIVATE SW DRAINAGE
- EXISTING UU COMBINED SEWER

- ASSUMED LIMIT OF WORKS
- SITE BOUNDARY

ALL SVP AND RWP DROP LOCATIONS
TO BE CONFIRMED BY OTHERS

ALL CONNECTIONS TO HAVE ABOVE
GROUND RODDABLE ACCESS

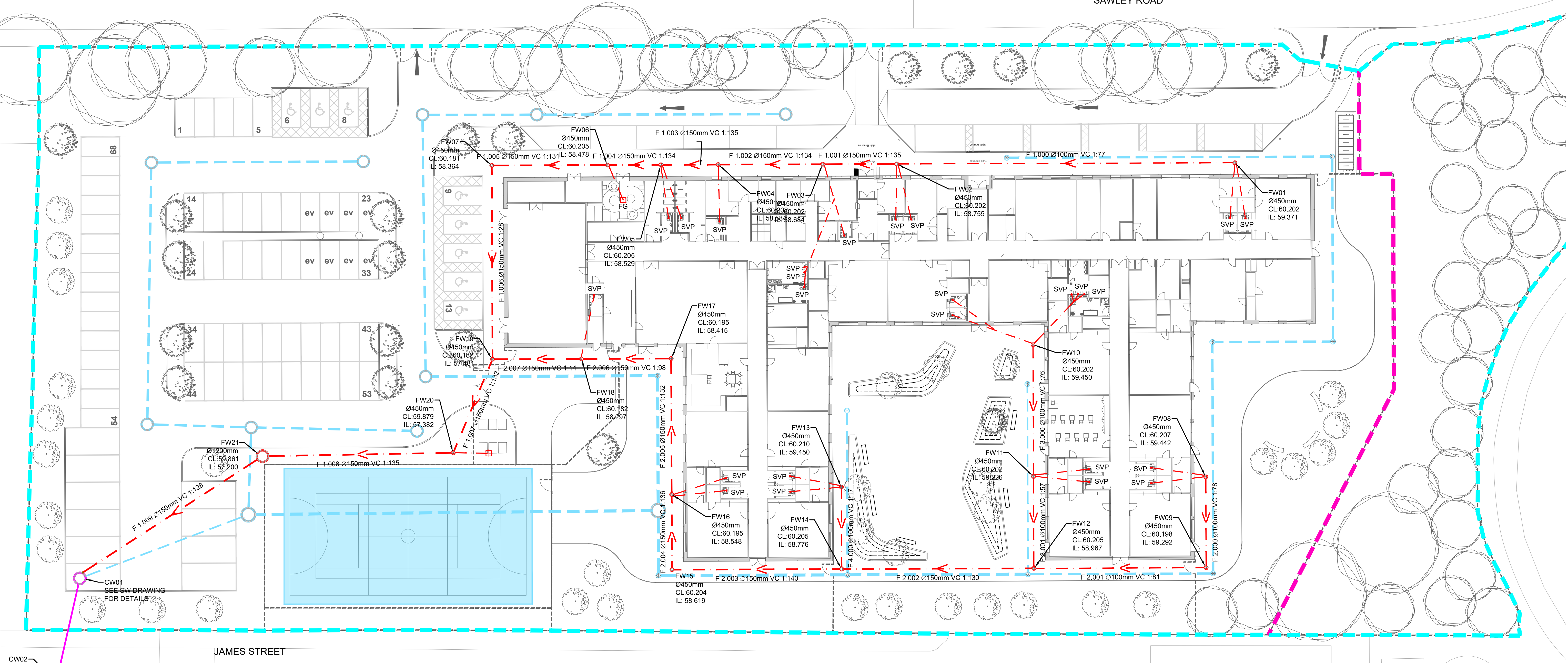
DRAINAGE NOTES

- THE CONTRACTOR SHALL ALLOW FOR THE PROTECTION, TEMPORARY AND PERMANENT SUPPORT AND DIVERSION WORKS AS NECESSARY, TO ALL EXISTING SERVICES TO THE SATISFACTION OF THE PUBLIC UTILITIES.
- THE CONTRACTOR SHALL ALLOW FOR DEALING WITH SURFACE WATER RUN-OFF INTO EXCAVATIONS AND FROM GROUNDWATER BY MEANS OF SUMPS, PUMPS AND DE-WATERING AS APPROPRIATE, IN ORDER TO KEEP THE EXCAVATION AS REASONABLY DRY AS POSSIBLE DURING THE CONSTRUCTION OF THE WORKS.
- ALL PRIVATE DRAINAGE WITHIN THE SITE IS TO COMPLY WITH THE REQUIREMENTS OF BS EN 752 AND BUILDING REGULATIONS PART H, WHERE APPROPRIATE. ALL ADOPTED DRAINAGE SHALL BE DESIGN AND CONSTRUCTED IN ACCORDANCE WITH SEWERS FOR ADOPTION 6th EDITION AND THE ADOPTING AUTHORITIES STANDARD REQUIREMENTS.
- ALL PRIVATE DRAINAGE PIPES TO BE LAID IN TRENCHES BEDDED CLASS 'B' ON SINGLE SIZED AGGREGATE AND BACKFILLED WITH APPROVED SELECTED FILL (40mm DOWN) REUSED FROM EXCAVATED MATERIAL UNDER BUILDINGS AND WHERE COVER TO INVERT IS LESS THAN 1200mm UNDER TRAFFICKED AREAS PIPES TO BE CAST IN CONCRETE (CLASS Z BEDDING), CLASS 'S' BED AND SURROUND MAY BE REQUIRED FOR SEWERS TO BE ADOPTED. REFER TO SPECIFIC DRAWINGS FOR FURTHER INFORMATION.
- SELECTED BACKFILL MATERIAL SHALL CONSIST OF UNIFORM EXCAVATED MATERIAL, FREE FROM STONES LARGER THAN 40mm, CLAY LUMPS LARGER THAN 75mm, TREE ROOTS, CONTAMINATED MATERIAL. SELECTED BACKFILL MATERIAL IS TO BE PLACED IN LAYERS NOT EXCEEDING 150mm THICKNESS. THE MATERIAL SHALL BE COMPACTED TO ACHIEVE NOT LESS THAN 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED IN LABORATORY COMPACTION TESTS. SUFFICIENT TESTING SHALL BE CARRIED OUT, BY THE CONTRACTOR, TO DEMONSTRATE THIS IS ACHIEVED (NUMBER AND FREQUENCY OF TESTING TO BE AGREED WITH SHD). WHERE THE MOISTURE CONTENT OF THE MATERIAL PROHIBITS COMPLIANCE WITH THE ABOVE 6F1 OR SIMILAR IMPORTED MATERIAL SHALL BE USED.
- CONCRETE PROTECTION TO PIPEWORK IS TO BE PROVIDED AS FOLLOWS:
a) ALL PIPEWORK WITHIN PEDESTRIAN/SOFT AREAS WITH LESS THAN 600mm COVER.
b) ALL PIPEWORK SUBJECT TO VEHICULAR OVERRUN WITH LESS THAN 1.2m COVER.
- ALL PIPEWORK WITHIN MANHOLES ARE TO BE LAID SOFFIT TO SOFFIT (U.N.O). ALL CHAMBER INVERT LEVELS ARE FOR THE OUTGOING PIPE LEVELS. BACKDROP PIPEWORK SHALL BE CONNECTED AT SOFFIT TO SOFFIT WITH THE RODDING ACCESS LEVEL SPECIFIED.
- ALL DRAINS TO BE LAID ACCURATELY TO LINE AND LEVEL IN STRICT ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS.
- ANY GRADIENTS OF DRAINS INDICATED ARE INDICATIVE ONLY AND THE CONTRACTOR SHALL INSTALL THE DRAINS TO THE SPECIFIED LEVELS SHOWN FOR EACH MANHOLE (U.N.O). CATCHPIT INVERT LEVELS ARE FOR THE OUTGOING PIPE WITH THE SUMP LEVEL SPECIFIED SEPARATELY.
- CO-ORDINATE SETTING OUT INFORMATION FOR MANHOLES IS TO THE INTERSECTION THE DRAINS AND NOT THE CENTRE OF THE MANHOLE.
- COVER LEVELS OF THE MANHOLES ARE PROVISIONAL AND SUBJECT TO ADJUSTMENT ON SITE TO SUIT THE FINISHED GROUND LEVELS. ALL EXTERNAL WORKS CONSTRUCTION AREAS TO BE AS LOCATED BY THE ARCHITECT.
- MANHOLE COVERS AND FRAMES ARE TO BE IN ACCORDANCE WITH BS EN 124 AND THE FOLLOWING:
a) VEHICULAR AREAS: CLASS D400 (E600 IN VULNERABLE SE RVICE YARD LOCATIONS), DOUBLE TRIANGULAR, 150mm DEEP DUCTILE IRON COVER AND FRAME WITH THREE POINT COVER SEATING, BADGED FW OR SW FOR FOUL OR SURFACE WATER DRAINAGE.
b) PEDESTRIAN AREAS: CLASS B125, 100mm DEEP, BADGED FW OR SW FOR FOUL OR SURFACE WATER DRAINAGE.
- POSITIONS AND SIZES OF ABOVE GROUND FOUL AND SURFACE WATER DRAINAGE CONNECTIONS ARE TO BE CONFIRMED PRIOR TO CONSTRUCTION WITH THE ARCHITECT & M&E ENGINEER.
- GULLY GRATINGS AND STEEL CHANNEL COVERS ARE TO BE IN ACCORDANCE WITH BS EN 124 AS FOLLOWS:
a) AREAS SUBJECT TO VEHICULAR OVERRUN: CLASS D400 MINIMUM.
b) AREAS NOT SUBJECT TO REGULAR VEHICLE OVERRUN (ADJACENT TO KERBS ETC): CLASS C250.
c) GULLY GRATINGS ADJACENT TO KERBS SHALL BE HINGED ON THE SIDE OF THE TRAFFIC DIRECTION (LEFT HAND SIDE).
- ALL BRICKWORK IN CONNECTION WITH DRAINAGE IS TO BE SOLID CLASS B ENGINEERING BRICK TO BS 3921.
- ALL PRECAST CONCRETE PIPES, CHAMBER PRODUCTS AND ROAD GULLIES SHALL BE TO BS 5911 AND BE KITEMARKED.
- ALL DRAINAGE INSITU CONCRETE SHALL BE GEN 3 (U.N.O).
- ALL INSITU AND CONCRETE PRODUCTS SHALL COMPLY WITH THE REQUIREMENTS FOR SULPHATE EXPOSURE IN ACCORDANCE WITH BRE SPECIAL DIGEST 1, CONCRETE IN AGGRESSIVE GROUND (2001) PART 1: TABLE 2.
- UPON COMPLETION OF THE WORKS THE CONTRACTOR SHALL CLEAN ALL DRAINAGE BY JETTING, REMOVING ALL DEBRIS FROM SITE. NO DEBRIS SHALL BE PERMITTED TO ENTER THE EXISTING DRAINAGE SYSTEM.
- CONSTRUCTION JOINTS IN CONCRETE SURROUND MUST NOT BE WITHIN 150mm OF CHAMBER/SHAFT RING JOINTS.
- ROCKER PIPES TO BE SURROUNDED WITH CONCRETE LOCATED 150mm MINIMUM 200mm MAXIMUM FROM THE FIRST

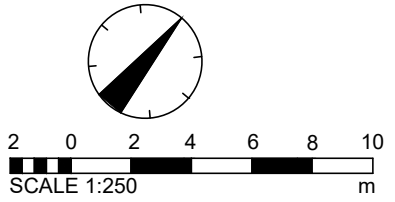
- FLEXIBLE JOINT TO THE MANHOLE WALL.
22. SOFT SPOTS IN THE TRENCH FORMATION SHALL BE REMOVED AND REPLACED WITH GRANULAR BEDDING UNLESS INSTRUCTED OTHERWISE.
23. LATERAL CONNECTIONS IN BETWEEN MANHOLE RUNS SHALL BE FORMED BY USING PURPOSE MADE JUNCTION FITTINGS. BEND FITTINGS SHALL BE PROVIDED WHERE APPROPRIATE TO DIRECT THE FLOW INTO MAIN RUNS.
24. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO LIAISE WITH BUILDING CONTROL FOR APPROVALS, INTERIM INSPECTION, SNAGGING AND FINAL INSPECTIONS OF THEIR WORK.
25. THE CONTRACTOR SHALL CONFIRM THE LOCATION OF ALL EXISTING STATUTORY UNDERTAKERS APPARATUS AND SERVICE CONNECTIONS ADJACENT TO AND CROSSING THE WORKS BY TRIAL PITS PRIOR TO COMMENCING MACHINE DIG.
26. AT THE CONCLUSION OF THE WORKS THE CONTRACTOR SHALL PROVIDE A MARKED UP DRAWING TO RECORD ANY AS BUILT VARIATIONS NOT SHOWN ON THE DRAWINGS.
27. THE DRAINAGE SYSTEM IS NOT DESIGNED TO ACCEPT UNTREATED EFFLUENT FROM A COMMERCIAL KITCHEN CONTAINING GREASE AND OILS. REMOVAL OF GREASE AND OIL SHOULD BE MADE AT SOURCE USING A FLOOR MOUNTED ABOVE GROUND GREASE REMOVAL SYSTEM. IT IS RECOMMENDED THAT A MECHANICAL GREASE REMOVAL SYSTEM BE EMPLOYED FOR THIS PURPOSE NOT A PASSIVE SYSTEM.
28. PIPEWORK TO BE OF THE FOLLOWING MANUFACTURER: 100 / 150 / 225MM DIAMETER HEPCORTH SUPERSLEEVE VITRIFIED CLAY PIPES (40KN/mmm CRUSHING STRENGTH), 300mm+ TO BE CONCRETE CLASS M, ALTERNATIVELY 'POLYSEWER' UPVC DRAINAGE SYSTEM BY POLYPIPE WHEN INSTALLED IN LINE WITH THE MANUFACTURERS RECOMMENDATIONS. FILTER DRAINAGE TO BE PERFORMED HDPE.
29. ALL RWP, WPC & GULLY CONNECTIONS TO BE 100mm DIA UNO & ARE RODDABLE AT LOCATIONS ABOVE GROUND LEVEL.
30. ALL INSPECTION CHAMBERS WITH A DEPTH GREATER THAN 1.2m TO HAVE A 350mm DIAMETER REDUCING PLATE LOCATED BENEATH COVER AND FRAME TO PREVENT ACCESS.

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No	DATE	DRAWN	REV'D ENG.	AMENDMENT
P01		JF	PB	PRELIMINARY ISSUE

STATUS	PURPOSE OF ISSUE
S2	FOR INFORMATION
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CLIENT	ISG
PROJECT	VARLEY STREET, SEN SCHOOL
DRAFTER	JF
ENGINEER	PB

PROPOSED FWS LAYOUT			
SCALE	SHEET	DRAWING No	REV
1:250	A1	VAR-RDG-XX-XX-DR-C-00500	P01

DRAINAGE KEY

- PROPOSED PRIVATE SW DRAINAGE
- PROPOSED PRIVATE SW DRAINAGE
- PROPOSED SW PPIC
- RWP
- PROPOSED RAINWATER PIPE
- G
- PROPOSED PRIVATE ROAD GULLY
- PROPOSED DOOR THRESHOLD ACO
- PROPOSED PRIVATE SW FILTER DRAIN
- PROPOSED ATTENUATION TANK
- PROPOSED PRIVATE FW DRAIN
- EXISTING UU COMBINED SEWER
- PROPOSED DRAINAGE CHANNEL
- ASSUMED LIMIT OF WORKS
- SITE BOUNDARY

ALL SVP AND RWP DROP LOCATIONS TO BE CONFIRMED BY OTHERS

ALL CONNECTIONS TO HAVE ABOVE GROUND RODDABLE ACCESS

DRAINAGE NOTES

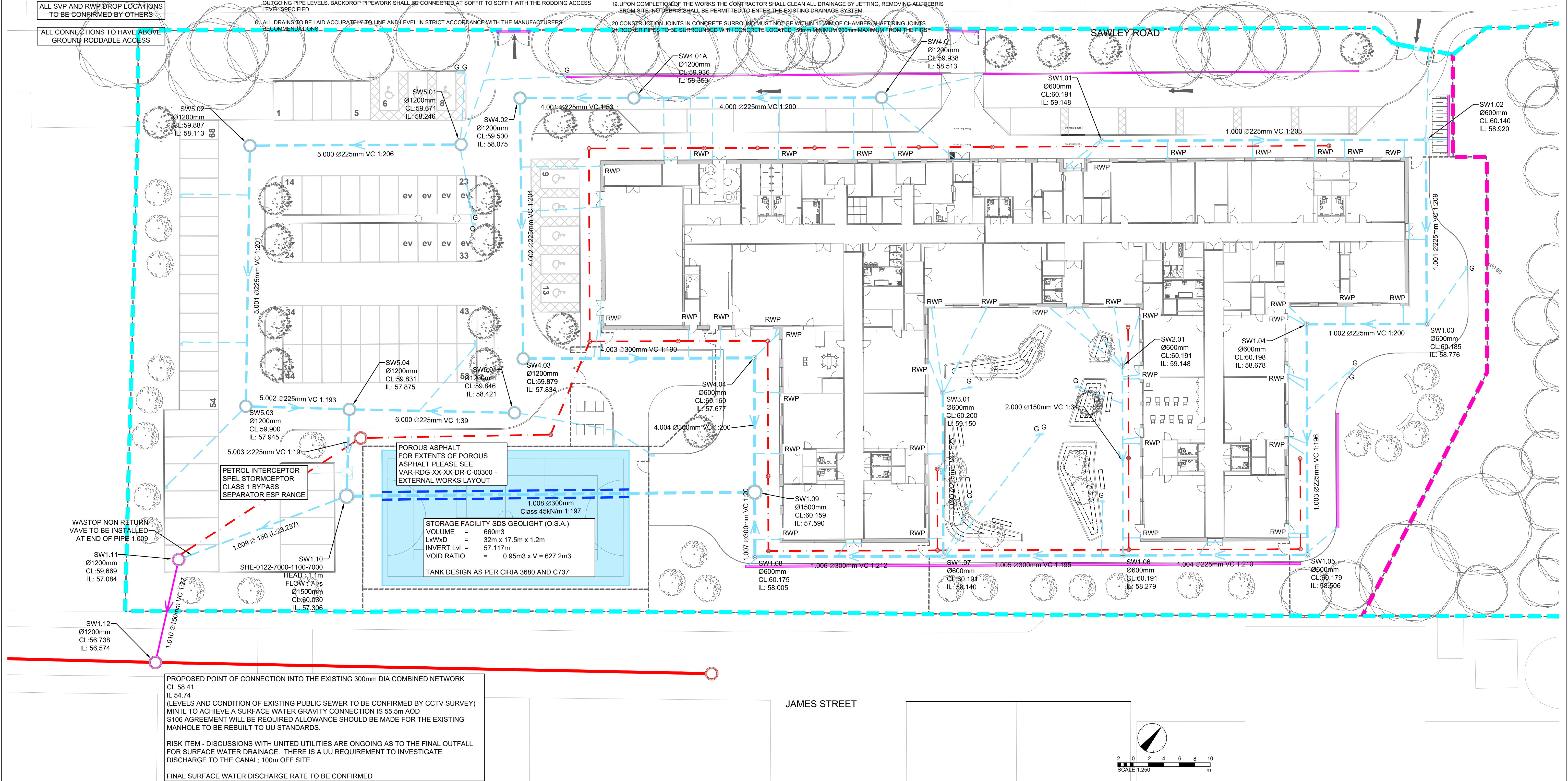
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 - VEHICULAR AREAS: CLASS D400 (E800 IN VULNERABLE SE RVICED YARD LOCATIONS), DOUBLE TRIANGULAR, 150mm DEEP DUCTILE IRON COVER AND FRAME WITH THREE POINT COVER SEATING, BADGED FW OR SW FOR FOUL OR SURFACE WATER DRAINAGE.
 - PEDESTRIAN AREAS: CLASS B125, 100mm DEEP, BADGED FW OR SW FOR FOUL OR SURFACE WATER DRAINAGE.
- POSITIONS AND SIZES OF ABOVE GROUND FOUL AND SURFACE WATER DRAINAGE CONNECTIONS ARE TO BE CONFIRMED PRIOR TO CONSTRUCTION WITH THE ARCHITECT & M&E ENGINEER.
- GULLY GRATINGS AND STEEL CHANNEL COVERS ARE TO BE IN ACCORDANCE WITH BS EN 124 AS FOLLOWS:
 - AREAS SUBJECT TO VEHICULAR OVERRUN, CLASS D400 MINIMUM.
 - AREAS NOT SUBJECT TO REGULAR VEHICLE OVERRUN (ADJACENT TO KERBS ETC); CLASS C250.
 - GULLY GRATINGS ADJACENT TO KERBS SHALL BE HINGED ON THE SIDE OF THE TRAFFIC DIRECTION (LEFT HAND SIDE).
- ALL BRICKWORK IN CONNECTION WITH DRAINAGE IS TO BE SOLID CLASS B ENGINEERING BRICK TO BS 3921.
- ALL PRECAST CONCRETE PIPES, CHAMBER PRODUCTS AND ROAD GULLIES SHALL BE TO BS 5911 AND BE KITEMARKED.
- ALL DRAINAGE INSITU CONCRETE SHALL BE GEN3 (U.N.O).
- ALL INSITU AND CONCRETE PRODUCTS SHALL COMPLY WITH THE REQUIREMENTS FOR SULPHATE EXPOSURE IN ACCORDANCE WITH BRE SPECIAL DIGEST 1, CONCRETE IN AGGRESSIVE GROUND (2001) PART 1: TABLE 2.
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- ROCKER PIPES TO BE SURROUNDED WITH CONCRETE LOCATED 150mm MINIMUM 200mm MAXIMUM FROM THE FIRST

- FLEXIBLE JOINT TO THE MANHOLE WALL.
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 - LATERAL CONNECTIONS IN BETWEEN MANHOLE RUNS SHALL BE FORMED BY USING PURPOSE MADE JUNCTION FITTINGS. BEND FITTINGS SHALL BE PROVIDED WHERE APPROPRIATE TO DIRECT THE FLOW INTO MAIN RUNS.
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 - THE CONTRACTOR SHALL CONFIRM THE LOCATION OF ALL EXISTING STATUTORY UNDERTAKERS APPARATUS AND SERVICE CONNECTIONS ADJACENT TO AND CROSSING THE WORKS BY TRIAL PITS PRIOR TO COMMENCING MACHINE DIG.
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 - PIPEWORK TO BE OF THE FOLLOWING MANUFACTURER: 100 / 150 / 225mm DIAMETER HEPWORTH SUPERSLEEVE VITRIFIED CLAY PIPES (40Nmm CRUSHING STRENGTH), 300mm + TO BE CONCRETE CLASS M. ALTERNATIVELY POLYSEWER UPVC DRAINAGE SYSTEM BY POLYPIPE WHEN INSTALLED IN LINE WITH THE MANUFACTURERS RECOMMENDATIONS. FILTER DRAINAGE TO BE PERFORATED HDPE.
 - ALL RWP, WPC & GULLY CONNECTIONS TO BE 100mm DIA UNO & ARE RODDABLE AT LOCATIONS ABOVE GROUND LEVEL.
 - ALL INSPECTION CHAMBERS WITH A DEPTH GREATER THAN 1.2m TO HAVE A 350mm DIAMETER REDUCING PLATE LOCATED BENEATH COVER AND FRAME TO PREVENT ACCESS.

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No	DATE	DRAWN	REV'D ENG	AMENDMENT

No	DATE	DRAWN	REV'D ENG	AMENDMENT

No	DATE	DRAWN	REV'D ENG	AMENDMENT
P03	15.03.23	JF	PR	PRELIMINARY ISSUE
P02	13.03.23	JF	PR	PRELIMINARY ISSUE
P01		JF	PB	PRELIMINARY ISSUE

STATUS	PURPOSE OF ISSUE
S2	FOR INFORMATION

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RIDGE

CLIENT	PROJECT
ISG	VARLEY STREET, SEN SCHOOL

DRAFTER	ENGINEER
JF	PB

SCALE	SHEET	DRAWING No	REV
1:250	A1	VAR-RDG-XX-XX-DR-C-00501	P03

APPENDIX G – SITE DISCHARGE RATE CALCULATIONS

Critical Summary of Results by Maximum Level (Rank 1)

Pipe Number	US/MH Name	Event	Storm Rank	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Maximum Vol (m ³)	Discharge Vol (m ³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.001	SW1.02	360 minute 100 year Sum	1	60.160	58.989	-0.156	0.000	0.20	0.070	40.762		6.8	OK
1.002	SW1.03	360 minute 100 year Sum	1	60.195	58.871	-0.130	0.000	0.37	0.079	70.525		12.0	OK
1.003	SW1.04	360 minute 100 year Sum	1	60.204	58.794	-0.109	0.000	0.52	0.145	103.519		17.7	OK
1.004	SW1.05	360 minute 100 year Sum	1	60.183	58.623	-0.108	0.000	0.53	0.170	103.520		17.7	OK
2.000	SW2.01	360 minute 100 year Sum	1	60.198	59.190	-0.108	0.000	0.17	0.010	29.763		5.1	OK
1.005	SW1.06	360 minute 100 year Sum	1	60.191	58.401	-0.178	0.000	0.34	0.051	141.046		24.0	OK
3.000	SW3.01	360 minute 100 year Sum	1	60.200	59.208	-0.167	0.000	0.15	0.015	87.347		14.8	OK
1.006	SW1.07	360 minute 100 year Sum	1	60.191	58.302	-0.138	0.000	0.56	0.452	228.392		38.6	OK
1.007	SW1.08	360 minute 100 year Wint	1	60.191	58.291	-0.014	0.000	0.18	1.199	255.779		29.6	OK
4.000	SW4.01	360 minute 100 year Sum	1	59.938	58.584	-0.154	0.000	0.22	0.075	44.644		7.6	OK
4.001	SW4.01A	360 minute 100 year Sum	1	59.945	58.404	-0.173	0.000	0.12	0.118	44.644		7.5	OK
4.002	SW4.02	360 minute 100 year Wint	1	59.500	58.298	-0.001	0.000	0.44	0.454	130.438		15.1	OK
4.003	SW4.03	360 minute 100 year Wint	1	59.883	58.293	0.159	0.000	0.21	1.767	130.427		15.0	SURCHARGED
4.004	SW4.04	360 minute 100 year Wint	1	60.189	58.291	0.314	0.000	0.29	2.328	173.928		19.1	SURCHARGED
1.008	SW1.09	360 minute 100 year Wint	1	60.189	58.288	0.399	0.000	0.69	2.897	460.143		50.8	SURCHARGED
5.000	SW5.01	360 minute 100 year Sum	1	59.671	58.323	-0.148	0.000	0.25	0.081	49.820		8.4	OK
5.001	SW5.02	360 minute 100 year Wint	1	59.907	58.290	-0.048	0.000	0.32	0.691	96.380		11.2	OK
5.002	SW5.03	360 minute 100 year Wint	1	59.900	58.286	0.116	0.000	0.57	1.596	157.974		18.3	SURCHARGED
6.000	SW6.01	360 minute 100 year Sum	1	59.846	58.470	-0.176	0.000	0.11	0.050	48.526		8.2	OK
5.003	SW5.04	360 minute 100 year Wint	1	59.826	58.283	0.183	0.000	0.24	1.378	212.327		24.6	SURCHARGED
1.009	SW1.10	360 minute 100 year Wint	1	59.991	58.279	0.862	0.000	0.47	613.537	619.197	882	7.0	SURCHARGED
1.010	SW1.11	360 minute 100 year Wint	1	59.665	57.125	-0.105	0.000	0.20	0.072	619.180		7.0	OK

r 1+0%

US/MH Name	(DS) Pipe Number	DS/MH Name	Structure Type
SW1.10	1.009		Complex

Clear

Clear All

Details

Invert (m)	59.991	
Pipe No.		Invert
Coming pipe	5.003	57.267 (m)
pe	1.009	57.267 (m)

Complex Details

Invert Level of Structure (m)

57.117

Depth (m)	Volume (m ³)	Depth (m)	Volume (m ³)
0.600	313.5	5.600	672.1
0.800	418.0	5.800	672.1
1.000	522.5	6.000	672.1
1.200	627.0	6.200	672.1
1.400	627.2	6.400	672.1
1.600	627.2	6.600	672.1
1.800	627.2	6.800	672.1
2.000	627.2	7.000	672.1
2.200	627.2	7.200	672.1
2.400	641.2	7.400	672.1
2.600	672.1	7.600	672.1
2.800	672.1	7.800	672.1
3.000	672.1	8.000	672.1
3.200	672.1	8.200	672.1
3.400	672.1	8.400	672.1
3.600	672.1	8.600	672.1
3.800	672.1	8.800	672.1
4.000	672.1	9.000	672.1
4.200	672.1	9.200	672.1
4.400	672.1	9.400	672.1
4.600	672.1	9.600	672.1
4.800	672.1	9.800	672.1
5.000	672.1	10.000	672.1

Edit

Tank Number	DS Pipe Number	US/MH Name	Control Type	Volume (m³)
1	1.009	SW1.10	Hydro-Brake®	8.9



OK

Cancel

Help

Clear

Clear All

Hydro-Brake® Details

Hydro-Brake® Range: Optimum

Invert Level (m): 57.267

Design Head (m): 1.200

Design Flow (l/s): 7.0

Objective: Minimise upstream storage

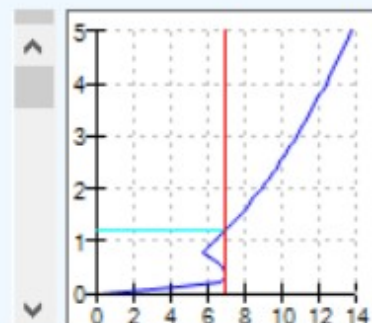
Application: Surface

Sump Available: ☒

Flush-Flo™ (l/s): ☐ 0.0

Unit Reference: MD-SHE-0121-7000-1200-7000

Headloss (m)	Flow (l/s)
0.100	4.3
0.200	6.6
0.300	7.0
0.400	7.0



Network Details

Cover Level (m): 59.991

	Pipe No.	Invert (m)
Lowest Incoming Pipe	5.003	57.267
Outgoing Pipe	1.009	57.267

Calculated by:	Predrag Rajkovic
Site name:	Varley Street
Site location:	Manchester

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details	
Latitude:	53.49155° N
Longitude:	2.21044° W
Reference:	53007637
Date:	Feb 15 2023 07:55

Runoff estimation approach **IH124**

Site characteristics

Total site area (ha):	1.071
-----------------------	-------

Methodology

Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics	Default	Edited
SOIL type:	4	4
HOST class:	N/A	N/A
SPR/SPRHOST:	0.47	0.47

Hydrological characteristics

	Default	Edited
SAAR (mm):	916	916
Hydrological region:	10	10
Growth curve factor 1 year:	0.87	0.87
Growth curve factor 30 years:	1.7	1.7
Growth curve factor 100 years:	2.08	2.08
Growth curve factor 200 years:	2.37	2.37

Notes

(1) Is $Q_{BAR} < 2.0$ l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is $SPR/SPRHOST \leq 0.3$?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates

	Default	Edited
Q_{BAR} (l/s):	7.08	7.08
1 in 1 year (l/s):	6.16	6.16
1 in 30 years (l/s):	12.04	12.04
1 in 100 year (l/s):	14.73	14.73
1 in 200 years (l/s):	16.79	16.79

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement , which can both be found at www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

Registration successful. You are now logged in.

www.uksubs.com | Greenfield runoff tool

Calculated by: Predrag Rajkovic

Site name: Varley Street

Site location: Manchester

Site Details

Latitude: 53.49260° N

Longitude: 2.21073° W

Reference: 674505981

Date: Feb 13 2023 10:52

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Runoff estimation approach IH124

Site characteristics

Total site area (ha): 1.6

Methodology

Q_{BAR} estimation method: Calculate from SPR and SAAR

SPR estimation method: Calculate from SOIL type

Soil characteristics

Default

Edited

SOIL type:

4

4

HOST class:

N/A

N/A

SPR/SPRHOST:

0.47

0.47

Hydrological characteristics

Default

Edited

SAAR (mm):

916

916

Hydrological region:

10

10

Growth curve factor 1 year:

0.87

0.87

Growth curve factor 30 years:

1.7

1.7

Growth curve factor 100 years:

2.08

2.08

Growth curve factor 200 years:

2.37

2.37

Notes

(1) Is $Q_{BAR} < 2.0$ l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is $SPR/SPRHOST \leq 0.3$?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates

Default

Edited

Q_{BAR} (l/s):

10.58

10.58

1 in 1 year (l/s):

9.21

9.21

1 in 30 years (l/s):

17.99

17.99

1 in 100 year (l/s):

22.01

22.01

1 in 200 years (l/s):

25.08

25.08



Greenfield Volume

Greenfield Runoff Volume Input

Rainfall Model **FSR Rainfall** ▼Return Period (Years) **100**Storm Duration (mins) **360**Region **England and Wales** ▼Area (ha) **1.550****Map** M5-60 (mm) **18.000**SAAR (mm) **856**Ratio R **0.361**CWI **120.055**Urban **0.000**Areal Reduction Factor **1.00**SPR **47.000****Calculate**

Results

PR%

49.35Greenfield Runoff
Volume (m³)**454.628**

IH 124

ICP SUDS

ADAS 345

FEH

ReFH2

Greenfield Volume

Greenfield Volume
(ReFH2)

OK

Cancel

Help

APPENDIX H – MICRODRAINAGE CALCULATIONS OUTPUT

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The Cowyards
Blenheim Park, Oxford Road
Woodstock OX20 1QR

Date 10/03/2023 10:49
File PB DRAINAGE.MDX

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Page 0



Designed by Predragrajkovic
Checked by

Network 2020.1

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for SW (PB)

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	41.474	0.207	200.4	0.063	15.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	22.821	0.114	200.2	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.002	15.567	0.078	199.6	0.046	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.003	30.322	0.152	199.5	0.051	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.004	22.851	0.114	200.4	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.000	24.528	0.719	34.1	0.046	15.00	0.0	0.600	o	150	Pipe/Conduit	
1.005	23.703	0.119	199.2	0.012	0.00	0.0	0.600	o	300	Pipe/Conduit	
3.000	21.165	0.935	22.6	0.135	15.00	0.0	0.600	o	225	Pipe/Conduit	
1.006	22.956	0.115	199.6	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.007	8.386	0.415	20.2	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
4.000	32.096	0.160	200.0	0.069	15.00	0.0	0.600	o	225	Pipe/Conduit	
4.001	14.700	0.278	52.9	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
4.002	33.287	0.166	200.5	0.111	0.00	0.0	0.600	o	225	Pipe/Conduit	
4.003	31.391	0.157	199.9	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
4.004	17.380	0.087	199.8	0.060	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	26.02	15.75	59.148	0.063	0.0	0.0	0.0	0.92	36.6	4.4
1.001	25.64	16.16	58.920	0.063	0.0	0.0	0.0	0.92	36.6	4.4
1.002	25.39	16.45	58.776	0.109	0.0	0.0	0.0	0.92	36.7	7.5
1.003	24.92	16.99	58.678	0.160	0.0	0.0	0.0	0.92	36.7	10.8
1.004	24.57	17.41	58.506	0.160	0.0	0.0	0.0	0.92	36.6	10.8
2.000	26.52	15.24	59.148	0.046	0.0	0.0	0.0	1.73	30.6	3.3
1.005	24.29	17.76	58.279	0.218	0.0	0.0	0.0	1.11	78.5	14.3
3.000	26.63	15.13	59.150	0.135	0.0	0.0	0.0	2.76	109.8	9.7
1.006	24.02	18.11	58.140	0.353	0.0	0.0	0.0	1.11	78.4	23.0
1.007	23.99	18.15	58.005	0.353	0.0	0.0	0.0	3.51	248.3	23.0
4.000	26.19	15.58	58.513	0.069	0.0	0.0	0.0	0.92	36.6	4.9
4.001	26.06	15.72	58.353	0.069	0.0	0.0	0.0	1.80	71.7	4.9
4.002	25.50	16.32	58.075	0.180	0.0	0.0	0.0	0.92	36.6	12.4
4.003	25.09	16.79	57.834	0.180	0.0	0.0	0.0	1.11	78.3	12.4
4.004	24.87	17.05	57.677	0.240	0.0	0.0	0.0	1.11	78.4	16.2

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The Cowyards
Blenheim Park, Oxford Road
Woodstock OX20 1QR

Date 10/03/2023 10:49
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Checked by

Network 2020.1

Page 1



STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for SW (PB)

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.008	53.825	0.269	200.1	0.042	0.00	0.0	0.600	o	300	Pipe/Conduit	
5.000	27.350	0.133	205.6	0.077	15.00	0.0	0.600	o	225	Pipe/Conduit	
5.001	33.638	0.168	200.0	0.056	0.00	0.0	0.600	o	225	Pipe/Conduit	
5.002	13.913	0.070	200.0	0.085	0.00	0.0	0.600	o	225	Pipe/Conduit	
6.000	20.892	0.546	38.3	0.075	15.00	0.0	0.600	o	225	Pipe/Conduit	
5.003	11.252	0.608	18.5	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.009	24.341	0.187	130.2	0.069	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.010	10.112	0.506	20.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.008	23.38	18.96	57.590	0.635	0.0	0.0	0.0	1.11	78.3	40.2
5.000	26.26	15.50	58.246	0.077	0.0	0.0	0.0	0.91	36.1	5.5
5.001	25.69	16.11	58.113	0.133	0.0	0.0	0.0	0.92	36.6	9.3
5.002	25.47	16.36	57.945	0.218	0.0	0.0	0.0	0.92	36.6	15.0
6.000	26.59	15.16	58.421	0.075	0.0	0.0	0.0	2.12	84.4	5.4
5.003	25.41	16.42	57.875	0.293	0.0	0.0	0.0	3.06	121.5	20.2
1.009	26.30	15.46	57.267	0.000	7.0	0.0	0.0	0.88	15.5	7.0
1.010	26.23	15.54	57.080	0.000	7.0	0.0	0.0	2.26	40.0	7.0

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<u>Online Controls for SW (PB)</u> <u>Hydro-Brake® Optimum Manhole: SW1.10, DS/PN: 1.009, Volume (m³): 8.9</u> <table><tr><td>Unit Reference</td><td>MD-SHE-0121-7000-1200-7000</td></tr><tr><td>Design Head (m)</td><td>1.200</td></tr><tr><td>Design Flow (l/s)</td><td>7.0</td></tr><tr><td>Flush-Flo™</td><td>Calculated</td></tr><tr><td>Objective</td><td>Minimise upstream storage</td></tr><tr><td>Application</td><td>Surface</td></tr><tr><td>Sump Available</td><td>Yes</td></tr><tr><td>Diameter (mm)</td><td>121</td></tr><tr><td>Invert Level (m)</td><td>57.267</td></tr><tr><td>Minimum Outlet Pipe Diameter (mm)</td><td>150</td></tr><tr><td>Suggested Manhole Diameter (mm)</td><td>1200</td></tr></table> <table><tr><td>Control Points</td><td>Head (m)</td><td>Flow (l/s)</td></tr><tr><td>Design Point (Calculated)</td><td>1.200</td><td>7.0</td></tr><tr><td>Flush-Flo™</td><td>0.351</td><td>7.0</td></tr><tr><td>Kick-Flo®</td><td>0.755</td><td>5.6</td></tr><tr><td>Mean Flow over Head Range</td><td>-</td><td>6.1</td></tr></table> The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated <table><tr><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td></tr><tr><td>0.100</td><td>4.3</td><td>1.200</td><td>7.0</td><td>3.000</td><td>10.8</td><td>7.000</td><td>16.1</td></tr><tr><td>0.200</td><td>6.6</td><td>1.400</td><td>7.5</td><td>3.500</td><td>11.6</td><td>7.500</td><td>16.7</td></tr><tr><td>0.300</td><td>7.0</td><td>1.600</td><td>8.0</td><td>4.000</td><td>12.4</td><td>8.000</td><td>17.2</td></tr><tr><td>0.400</td><td>7.0</td><td>1.800</td><td>8.5</td><td>4.500</td><td>13.1</td><td>8.500</td><td>17.7</td></tr><tr><td>0.500</td><td>6.8</td><td>2.000</td><td>8.9</td><td>5.000</td><td>13.7</td><td>9.000</td><td>18.2</td></tr><tr><td>0.600</td><td>6.6</td><td>2.200</td><td>9.3</td><td>5.500</td><td>14.4</td><td>9.500</td><td>18.7</td></tr><tr><td>0.800</td><td>5.8</td><td>2.400</td><td>9.7</td><td>6.000</td><td>15.0</td><td></td><td></td></tr><tr><td>1.000</td><td>6.4</td><td>2.600</td><td>10.1</td><td>6.500</td><td>15.6</td><td></td><td></td></tr></table>			Unit Reference	MD-SHE-0121-7000-1200-7000	Design Head (m)	1.200	Design Flow (l/s)	7.0	Flush-Flo™	Calculated	Objective	Minimise upstream storage	Application	Surface	Sump Available	Yes	Diameter (mm)	121	Invert Level (m)	57.267	Minimum Outlet Pipe Diameter (mm)	150	Suggested Manhole Diameter (mm)	1200	Control Points	Head (m)	Flow (l/s)	Design Point (Calculated)	1.200	7.0	Flush-Flo™	0.351	7.0	Kick-Flo®	0.755	5.6	Mean Flow over Head Range	-	6.1	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	0.100	4.3	1.200	7.0	3.000	10.8	7.000	16.1	0.200	6.6	1.400	7.5	3.500	11.6	7.500	16.7	0.300	7.0	1.600	8.0	4.000	12.4	8.000	17.2	0.400	7.0	1.800	8.5	4.500	13.1	8.500	17.7	0.500	6.8	2.000	8.9	5.000	13.7	9.000	18.2	0.600	6.6	2.200	9.3	5.500	14.4	9.500	18.7	0.800	5.8	2.400	9.7	6.000	15.0			1.000	6.4	2.600	10.1	6.500	15.6		
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<u>Storage Structures for SW (PB)</u> <u>Complex Manhole: SW1.10, DS/PN: 1.009</u> <u>Cellular Storage</u> Invert Level (m) 57.117 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000 <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Depth (m)</th> <th>Area (m²)</th> <th>Inf. Area (m²)</th> <th>Depth (m)</th> <th>Area (m²)</th> <th>Inf. Area (m²)</th> </tr> </thead> <tbody> <tr> <td>0.000</td> <td>550.0</td> <td>0.0</td> <td>1.201</td> <td>0.0</td> <td>0.0</td> </tr> <tr> <td>1.200</td> <td>550.0</td> <td>0.0</td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <u>Porous Car Park</u> <table style="width: 100%;"> <tr> <td>Infiltration Coefficient Base (m/hr)</td> <td>0.00000</td> <td>Width (m)</td> <td>18.0</td> </tr> <tr> <td>Membrane Percolation (mm/hr)</td> <td>1000</td> <td>Length (m)</td> <td>37.0</td> </tr> <tr> <td>Max Percolation (l/s)</td> <td>185.0</td> <td>Slope (1:X)</td> <td>0.0</td> </tr> <tr> <td>Safety Factor</td> <td>2.0</td> <td>Depression Storage (mm)</td> <td>5</td> </tr> <tr> <td>Porosity</td> <td>0.30</td> <td>Evaporation (mm/day)</td> <td>3</td> </tr> <tr> <td>Invert Level (m)</td> <td>59.447</td> <td>Cap Volume Depth (m)</td> <td>0.225</td> </tr> </table>			Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	0.000	550.0	0.0	1.201	0.0	0.0	1.200	550.0	0.0				Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	18.0	Membrane Percolation (mm/hr)	1000	Length (m)	37.0	Max Percolation (l/s)	185.0	Slope (1:X)	0.0	Safety Factor	2.0	Depression Storage (mm)	5	Porosity	0.30	Evaporation (mm/day)	3	Invert Level (m)	59.447	Cap Volume Depth (m)	0.225
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FOUL SEWERAGE DESIGN

Network Design Table for Foul - Main

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
F1.000	43.615	0.566	77.0	0.000	4	0.0	1.500	o	100	Pipe/Conduit	
F1.001	9.525	0.071	135.0	0.000	4	0.0	1.500	o	150	Pipe/Conduit	
F1.002	13.493	0.100	135.0	0.000	2	0.0	1.500	o	150	Pipe/Conduit	
F1.003	7.386	0.055	135.0	0.000	2	0.0	1.500	o	150	Pipe/Conduit	
F1.004	6.910	0.051	135.0	0.000	2	0.0	1.500	o	150	Pipe/Conduit	
F1.005	15.422	0.114	135.3	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F1.006	25.002	0.883	28.3	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F2.000	11.666	0.150	77.8	0.000	4	0.0	1.500	o	100	Pipe/Conduit	
F2.001	21.405	0.275	77.8	0.000	0	0.0	1.500	o	100	Pipe/Conduit	
F3.000	16.989	0.224	75.8	0.000	8	0.0	1.500	o	100	Pipe/Conduit	
F3.001	11.802	0.209	56.5	0.000	4	0.0	1.500	o	100	Pipe/Conduit	
F2.002	25.507	0.191	133.5	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F4.000	10.511	0.624	16.8	0.000	4	0.0	1.500	o	100	Pipe/Conduit	
F2.003	21.183	0.157	135.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F2.004	9.651	0.071	135.9	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F2.005	17.995	0.133	135.3	0.000	4	0.0	1.500	o	150	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F1.000	59.371	0.000	0.0	4	0.0	12	0.33	0.76	6.0	0.2
F1.001	58.755	0.000	0.0	8	0.0	17	0.32	0.75	13.3	0.4
F1.002	58.684	0.000	0.0	10	0.0	19	0.34	0.75	13.3	0.5
F1.003	58.584	0.000	0.0	12	0.0	21	0.37	0.75	13.3	0.6
F1.004	58.529	0.000	0.0	14	0.0	23	0.38	0.75	13.3	0.6
F1.005	58.478	0.000	0.0	14	0.0	23	0.38	0.75	13.3	0.6
F1.006	58.364	0.000	0.0	14	0.0	16	0.66	1.65	29.2	0.6
F2.000	59.442	0.000	0.0	4	0.0	12	0.33	0.75	5.9	0.2
F2.001	59.292	0.000	0.0	4	0.0	12	0.33	0.75	5.9	0.2
F3.000	59.450	0.000	0.0	8	0.0	17	0.41	0.76	6.0	0.4
F3.001	59.226	0.000	0.0	12	0.0	19	0.52	0.89	7.0	0.6
F2.002	58.967	0.000	0.0	16	0.0	24	0.40	0.76	13.4	0.7
F4.000	59.450	0.000	0.0	4	0.0	9	0.55	1.63	12.8	0.2
F2.003	58.776	0.000	0.0	20	0.0	27	0.43	0.75	13.3	0.9
F2.004	58.619	0.000	0.0	20	0.0	27	0.43	0.75	13.3	0.9
F2.005	58.548	0.000	0.0	24	0.0	30	0.45	0.75	13.3	1.1

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FOUL SEWERAGE DESIGN

Network Design Table for Foul - Main

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F2.006	11.975	0.118	101.5	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F2.007	11.975	0.815	14.7	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F1.007	13.363	0.099	135.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F1.008	24.605	0.182	135.2	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F1.009	29.219	0.216	135.3	0.000	0	0.0	1.500	o	150	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F2.006	58.415	0.000	0.0	24	0.0	27	0.50	0.87	15.4
F2.007	58.297	0.000	0.0	24	0.0	17	0.97	2.29	40.5
F1.007	57.481	0.000	0.0	38	0.0	37	0.52	0.75	13.3
F1.008	57.382	0.000	0.0	38	0.0	37	0.52	0.75	13.3
F1.009	57.200	0.000	0.0	38	0.0	37	0.52	0.75	13.3

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Summary of Critical Results by Maximum Level (Rank 1) for SW (PB)

Simulation Criteria

Areal Reduction Factor 1.000

Additional Flow - % of Total Flow 0.000

Hot Start (mins) 0

MADD Factor * 10m³/ha Storage 2.000

Hot Start Level (mm) 0

Inlet Coefficient 0.800

Manhole Headloss Coeff (Global) 0.500

Flow per Person per Day (l/per/day) 0.000

Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0

Number of Storage Structures 1

Number of Online Controls 1

Number of Time/Area Diagrams 0

Number of Offline Controls 0

Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model

FSR

Ratio R 0.360

Region England and Wales Cv (Summer) 0.750

M5-60 (mm)

18.000 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0

DVD Status ON

Analysis Timestep

Fine Inertia Status ON

DTS Status

OFF

Profile(s)

Summer and Winter

Duration(s) (mins)

15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080

Return Period(s) (years)

1, 30, 100

Climate Change (%)

0, 40, 45

WARNING: Half Drain Time has not been calculated as the structure is too full.

	US/MH					Storm	US/CL	Water	Surcharged	Flooded
PN	Name		Event			Rank	(m)	Level	Depth	Volume
								(m)	(m)	(m³)
1.000	SW1.01	30 minute	100 year	Winter	I+45%	1	60.198	59.978	0.605	0.000
1.001	SW1.02	30 minute	100 year	Winter	I+45%	1	60.160	59.918	0.773	0.000
1.002	SW1.03	30 minute	100 year	Winter	I+45%	1	60.195	59.870	0.869	0.000
1.003	SW1.04	30 minute	100 year	Winter	I+45%	1	60.204	59.795	0.892	0.000
1.004	SW1.05	30 minute	100 year	Winter	I+45%	1	60.183	59.599	0.868	0.000
2.000	SW2.01	30 minute	100 year	Winter	I+45%	1	60.198	59.607	0.309	0.000
1.005	SW1.06	30 minute	100 year	Winter	I+45%	1	60.191	59.444	0.865	0.000
3.000	SW3.01	30 minute	100 year	Winter	I+45%	1	60.200	59.503	0.128	0.000
1.006	SW1.07	30 minute	100 year	Winter	I+45%	1	60.191	59.350	0.910	0.000
1.007	SW1.08	30 minute	100 year	Winter	I+45%	1	60.191	59.134	0.829	0.000
4.000	SW4.01	30 minute	100 year	Winter	I+45%	1	59.938	59.487	0.749	0.000
4.001	SW4.01A	30 minute	100 year	Winter	I+45%	1	59.945	59.435	0.858	0.000
4.002	SW4.02	30 minute	100 year	Winter	I+45%	1	59.500	59.402	1.102	0.000
4.003	SW4.03	30 minute	100 year	Winter	I+45%	1	59.883	59.096	0.963	0.000
4.004	SW4.04	30 minute	100 year	Winter	I+45%	1	60.189	59.001	1.024	0.000
1.008	SW1.09	30 minute	100 year	Winter	I+45%	1	60.189	58.911	1.021	0.000
5.000	SW5.01	15 minute	100 year	Winter	I+45%	1	59.671	58.896	0.425	0.000

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Summary of Critical Results by Maximum Level (Rank 1) for SW (PB)

PN	US/MH Name	Flow / Cap.	Maximum Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	SW1.01	0.59	0.233		20.6	FLOOD RISK
1.001	SW1.02	0.70	1.906		23.3	FLOOD RISK
1.002	SW1.03	0.90	1.192		29.1	SURCHARGED
1.003	SW1.04	1.23	0.910		42.2	SURCHARGED
1.004	SW1.05	1.19	1.489		40.0	SURCHARGED
2.000	SW2.01	0.51	0.128		14.8	SURCHARGED
1.005	SW1.06	0.80	1.635		55.4	SURCHARGED
3.000	SW3.01	0.43	0.098		43.2	SURCHARGED
1.006	SW1.07	1.41	2.789		97.6	SURCHARGED
1.007	SW1.08	0.61	1.898		97.9	SURCHARGED
4.000	SW4.01	0.67	1.096		22.9	SURCHARGED
4.001	SW4.01A	0.39	2.447		24.4	SURCHARGED
4.002	SW4.02	1.38	2.033		47.6	FLOOD RISK
4.003	SW4.03	0.66	2.698		46.8	SURCHARGED
4.004	SW4.04	0.94	2.528		63.1	SURCHARGED
1.008	SW1.09	2.19	3.999		162.3	SURCHARGED
5.000	SW5.01	0.79	0.730		26.3	SURCHARGED

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APPENDIX I – NW SUDS PROFORMA

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 of 0.5 hectares in Critical Drainage Areas.

SECTION 1. APPLICATION & DEVELOPMENT DETAILS

Planning Application Reference <i>(if available)</i>	N/A	
State type of planning application <i>i.e. Pre-application, Outline, Full, Hybrid, Reserved Matters*</i> *Information only required if drainage is to be considered as part of reserved matters application	N/A	
Developer(s) Name:	ISG Construction Ltd.	
Consultant(s) Name:	Ridge and Partners	
Development Address <i>(including postcode)</i>	Land off Sawley Road, Manchester, M40 8DP	
Development Grid Reference <i>(Eastings/Northings)</i>	386127E 399603N	
Total Development Site Area (Ha)	1.55	
Drained Area (Ha)* of Development	1.07	
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>		
Development Type:	1 unit (SEN School)	State Proposed Number of Residential Units / Quantum of commercial floorspace
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, then one of the approaches outlined in Section 24.5 of The SuDS Manual (C753) should be adopted.	☐	

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 1.

Flood Risk Assessment and Drainage Strategy Report

SECTION 2: IMPERMEABLE AREA AND EXISTING DRAINAGE

	Existing (E)	Proposed (P)	Change (P – E)
State Impermeable Area (Ha)	0	1.07	1.07
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.

Flood Risk Assessment and Drainage Strategy Report

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)	0	7	7
1 in 1 Year Event (Approach 1)	0	6.16	7
1 in 30 Year Event	0	12.04	7
1 in 100 Year Event* (Approach 1)	0	14.73	7
* 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)

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

Flood Risk Assessment and Drainage Strategy Report;
Wallingford Greenfield Runoff tool printout in the Appendix G

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

Rainfall Event	Existing Volume (m³)	Greenfield Volume (m³)	Proposed Volume (m³)
1 in 100 Year 6 Hour Event (Approach 1)	0		
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.			Flood Risk Assessment and Drainage Strategy Report

SECTION 5: STORAGE – TECHNICAL STANDARDS S7 AND S8

State climate change allowance used (%)	40% (1 in 30yr) 45% (1 in 100yr)
State housing density (houses per ha)	N/A
State urban creep allowance used (%)	N/A
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>	672
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>	Within a cellular tank storage facility, with a flow control device at downstream end
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>	Within a cellular tank storage facility, with a flow control device at downstream end
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.	Flood Risk Assessment and Drainage Strategy Report
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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 ALL 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 ALL 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 <i>will</i> 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 <i>may</i> 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:	

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 6.	Flood Risk Assessment and Drainage Strategy Report
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² Motorways and trunk roads should follow the guidance and risk assessment process set out in Highways Agency (2009).

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.	
Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 7a.	Flood Risk Assessment and Drainage Strategy Report

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 2228-2: 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 further site specific ground investigation e.g. to consider seasonal variations to groundwater.	☒	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. <i>*Note: Competent person may include a Chartered Engineer, Chartered Geologists, Registered Ground Engineering Professionals (RoGEP).</i>

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	☐ Canal
		☐ Ordinary watercourse	☐ Other water body
If YES - Evidence Required		If NO – Evidence Required Tick <u>ALL</u> 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 third party land is cited as a barrier, you should provide visibility of discussions held to date with the riparian landowner of the waterbody.</i>

Proposed method of surface water discharge		Is this proposed?	
Hierarchy Level 3: To a surface water sewer. N.B. MCC will not accept surface water drainage to a highway drain		Yes	No ✓ N/A
		☐ Surface water sewer	
If YES - Evidence Required		If NO – Evidence Required Tick <u>ALL</u> that apply	
☐	Written correspondence from Water and Sewerage Company regarding proposed connection.	☒	Plan showing nearby sewers 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.	Flood Risk Assessment and Drainage Strategy Report
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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: Petrol Interceptor				

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.	Flood Risk Assessment and Drainage Strategy Report
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SECTION 8: OPERATION AND MAINTENANCE – TECHNICAL STANDARD S12 AND NATIONAL PLANNING POLICY FRAMEWORK

The applicant is responsible for ensuring that ALL components selected in Section 7 can be maintained for the lifetime of the development. The information required below will enable the developer to demonstrate the maintenance arrangements to the Local Planning Authority and will allow the Local Planning Authority to consider how it will be secured (e.g. via planning condition or planning obligation).

	Information Provided?
Management Plan	Yes ☐ No ☒
Evidence Required: Plan/ drawing provided to show the position of the different SuDS components with: - Key included to identify any of the adopting bodies that you will be offering your sustainable drainage components for adoption (<i>relates to maintenance and management arrangements below</i>). - Plan/ drawing to identify any areas where certain activities are prohibited, detailing reasons why.	☐
Action plan for accidental pollutant spillages.	☐

		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> ☐ Local Authority Public Open Space <i>[Refer to local authority policy & check with local authority first]</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.	
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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.

Agent Details			
Completed by	Predrag Rajkovic	Email Address	Predragrajkovic@ridge.co.uk
		Telephone Number(s)	07553 883227
Signed off by	Predrag Rajkovic	Accreditation(s) and/or Qualification(s) of Signatory	BEng CEng MICE
Date (dd/mm/yyyy)	10/03/2023	Company	Ridge

Client Details			
Name	Dan Booth	Company	ISG Construction Ltd.



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