PRIORY ROAD PROPERTIES LTD

PRIORY ROAD
ROTHERHAM, S63 8AD

Surface Water Management Report

September 2025

Rev A

icis design limited
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Priory Road

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1.0 Introduction

ICIS Design have prepared this surface water management report in support of a detailed drainage design for the residential development at Priory Road, Bolton Upon Dearne, Rotherham, S63 8AD (hereafter referred to as 'the Site').

This report describes and demonstrates how the surface water run-off rates and volume from the Site will be managed to adhere to National planning policies, regulations, and relevant design guidance, which include:

- National Planning Policy Framework (NPPF), December 2024 (updated February 2025), Paragraphs 162-163 and 182;
- National Planning Practice Guidance (NPPG), released in March 2014 and updated in August 2022;
- National Standards for Sustainable Drainage Systems (SuDS) set out by the Department for Environment, Food & Rural Affairs (DEFRA) (Updated July 2025);
- CIRIA SuDS Manual C753 (2015);
- CIRIA (2010) Planning for SuDS – Making it Happen C687.

And local policies including:

- Barnsley Metropolitan Borough Council (BMBC) Local Plan (Adopted January 2019);
- BMBC Supplementary Planning Document Climate Change Adaption (Adopted July 2023);
- BMBC Preliminary Strategic Flood Risk Assessment (July 2011);
- BMBC Level 1 Strategic Flood Risk Assessment (September 2010).

Subsequently, BMBC, acting as Lead Local Flood Authority (LLFA), need to be satisfied that the design and drainage principles of the proposed development:

- will address the surface water management and risk of flooding within the site;
- will ensure that the drainage is managed and maintained for its lifetime to prevent flooding;
- and will ensure that the development will not increase the risk of flooding to neighbouring land and property.

2.0 National Policy and Water Management Guidance

National Planning Policy Framework (NPPF) and National Planning Practice Guidance (NPPG)

The NPPF (December 2024 – updated February 2025) sets out the Government's planning policies for England and how these should be applied. It provides a framework within which locally prepared plans for housing and other development can be produced. This document is used to form this surface water management report, with particular attention to Paragraphs 162-163 (Planning for Climate Change) and Paragraph 182 (Sustainable Drainage).

NPPG, Paragraph 055 (Reference ID:7-055-20220825) states that sustainable drainage systems (SuDS) are designed to control surface water run off close to where it falls and mimic natural drainage as closely as possible, where they provide opportunities to reduce the causes and impacts of flooding; remove pollutants from urban run-off at source; and to combine water management with green space with benefits for amenity, recreation, and wildlife.

Further to this NPPG, Paragraph 056 (Reference ID:7-056-20220825) states that the aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable which (in order) are into the ground (infiltration); to a surface water body; to a surface water sewer, highway drain, or another drainage system; to a combined sewer.

Flood and Water Management Act (2010)

The Flood and Water Management Act (FWMA) received royal assent in April 2010, aiming to create a simpler and more effective means of managing flood risk and coastal erosion. The FWMA incorporates and implements some of the recommendations from the Pitt Review (2008), following the severe flooding that affected a large area of the UK in 2007. The FWMA also places several new duties and responsibilities on LLFAs regarding the management of local flood risk.

National Standard for SuDS Principles

The principles which underpin the standards and the approach that the surface water management schemes are stated as:

'Principle 1

Surface water drainage systems shall be designed, constructed, maintained and operated following a natural approach to managing water. This should mimic natural drainage, manage surface runoff at or close to the surface and as close to its source as practicable. This approach should also control the flow of runoff and provide a range of additional benefits. It contrasts with traditional drainage techniques, which are based on underground pipes to convey runoff away from the development as quickly as possible. By following this natural approach, surface water shall be utilised as a resource on site with multiple benefits to the environment and society, helping to combat climate change, meet future water needs and protect receiving waters and their associated ecology.

Principle 2

The most effective surface water drainage systems use a series of different drainage features, operating as close to the source of runoff as practicable. These should work as a SuDS management train to control flow rates and reduce volumes of runoff, providing water quality benefits and opportunities to encourage biodiversity and amenity.

Principle 3

This is referred to as the 'SuDS Approach' throughout the standards and is defined as:

- mimicking natural drainage systems and delivering surface water management that recognises the value of rainfall and runoff as a resource
- managing surface water flooding and the rates and volumes of runoff from developments now and in the future
- contributing to cleansing diffuse particulate and chemical substances that may be found in surface water runoff
- using drainage features in combination as a management train, which integrates these throughout the development and its landscape to help create healthy and resilient spaces for people and habitats for wildlife
- managing runoff close to its source, prioritising features that lie on the surface and incorporate vegetation
- meeting the requirements for delivering multiple benefit SuDS over the lifetime of the development by planning for a changing climate and ensuring long-term maintenance
- being sustainable, considering both construction and long-term maintenance and the additional environmental and social benefits afforded by the system.

Principle 4

Surface water management should be considered at the very earliest stages of site appraisal, planning and design to support and be integrated with:

- the existing topography, hydrology and watercourses on the site
- the water supply strategy
- the layout of the roads, buildings and public open spaces
- any remediation strategy needed for land contamination associated with existing or previous land uses
- any biodiversity, amenity and green infrastructure delivery strategy
- climate resilience options for the development

Principle 5

Planning of a new site layout should be informed by the requirements of the surface water management systems to both effectively drain and ensure all areas of the site are served by SuDS where possible. Opportunities should be maximised to help cleanse runoff prior to discharge to the water environment of diffuse particulate and chemical substances that may have been entrained. Consideration of the presence of any existing watercourses, ditches and other drainage features, both within and adjoining the site, should inform proposals. By doing so, biodiversity, amenity and cost-effectiveness can be maximised. This should be done by using areas of land throughout the development for a range of multifunctional purposes in addition to surface water management (for example, landscaping, recreational areas, streets and rainwater harvesting).

Principle 6

Conveyance systems should follow the natural drainage routes through the site, resulting in exceedance routes doing the same. This ensures exceedance flows can be captured further downstream and minimises the risk to buildings and people. The design process should include professional planning, urban design, landscape and ecology considerations delivered in an integrated and co-ordinated way. This will deliver the greatest amenity and biodiversity outcomes from these standards.

Principle 7

Development design should take account of existing flood risk policies in local plans, alongside local flood risk management strategies (LFRMS), the relevant local authority adopted SuDS guidance, any flood risk assessments, surface water management plans, the flood risk management plan and the river basin management plan (RBMP).

Principle 8

Early engagement with the local planning authority (LPA) should be undertaken to agree design, construction, operation and maintenance considerations to support an efficient application process. The LPA should be able to direct the applicant to relevant local plans, strategies and guidance'.

BMBC Local Plan

Policy CC4 SuDS states:

'All major development will be expected to use Sustainable Drainage Systems (SuDS) to manage surface water drainage, unless it can be demonstrated that all types of SuDS are inappropriate.

The Council will also promote the use of SuDS on minor development.

To enable the Council to determine the suitability of a proposed SuDS scheme:

Outline Planning applications must be supported by a conceptual drainage plan and SuDS design statement; and

Detailed Planning applications must be supported by a detailed drainage plan and SuDS design statement, which should contain information on how the SuDS will operate, be managed and maintained for the lifetime of the development'.

3.0 Site Setting and Description

Site Location

The Site is in a residential area of Bolton Upon Dearne, is approximately 500m west of Bolton Upon Dearne train station, and as shown on the Site location plan in Appendix A, is bound by residential dwellings and gardens to the north, Priory Road to the west, Station Road to the south, and residential dwellings and gardens to the east.

The postcode at the Site is S63 8AD, with the co-ordinates being E: 445200, N: 402705.

Existing Site and Topography

The Site, in a pre-development state (as shown in Appendix B), consists of a church to the centre, with parking and access areas to the east and undeveloped areas to the west.

In terms of topography, the Site has a general fall towards the north-east boundary (adjacent to Priory Road), with the levels from approximately 40.190m AOD to 38.620m AOD.

Proposed Development

As detailed on the plans in Appendix C, the Site, in a post development state, will consist of the demolition of the existing church and the erection of 6 new dwellings. 4 dwellings are to be built along the southern boundary, with the remaining 2 dwellings being built along the noerth-east boundary.

There will be a new access road and parking the centre of the Site, with each new dwellings have patio areas leading to gardens to the rear.

Ground Conditions

A Phase 2 Geo-Environmental Site Investigation report was produced by Brownfield Solutions Ltd in October 2024, which, via a series of window sample, shows the ground to predominantly consists of made ground over coarse sand. (see Appendix C).

Infiltration tests were conducted at the Site (east and west of proposed car park location), which found the infiltration rates being between 2.270×10^{-4} m/s (0.817 m/hr) and 1.976×10^{-4} m/s (0.711 m/hr). The rates are deemed acceptable for surface water discharge to ground, with the lowest figure of 0.711 m/hr being used for surface water management calculations.

Waterbodies / Rivers / Canals

There are no known waterbodies, rivers or canals near the Site, with the nearest being Crane Well Dike and the River Dearne approximatively 1.5km to the east and west, respectively .

Existing Drainage

The Yorkshire Water asset plan in Appendix E shows that the neatest sewers are a 225mm surface water and 22mm combined water sewer in Priory Road to the west, which flow in a northerly direction.

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Drainage surveys within the Site found that there are surface and foul water networks taking the flows from the church building, which flow to the north-east boundary, and are believed to discharge / connect to the sewers.

Note that the surface water sewer is shown to be within the Site boundary, but it is believed (via trial pit surveys) that this is not the case, with the sewer being within the road.

Surface Water Management Areas

The Site boundary area is approximately 1,160m² / 0.116 ha.

The Site in a pre-development state consists of the church building which equates to 280m² / 0.028 ha with the remaining parking, access and undeveloped areas equating to 880m² / 0.088 ha. Surveys show a drainage networks taking the surface water run-off from the church building only, and therefore the Site has a pre-development surface water run-off area (to the sewer) of **0.028 ha.**

The Site in a post developed state will consist of the new dwellings, access and parking areas, and patio areas which equate to approximately 900m² / 0.090 ha, with the remaining garden and small landscape areas equating to 260m² / 0.026 ha.

Surface water run-off from the garden area will discharge off the Site at a natural / greenfield rates, and therefore, the Site has a surface water management area of **0.090 ha.**

5.0 Surface Water Run-Off Destination

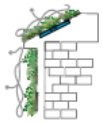
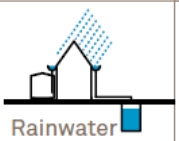
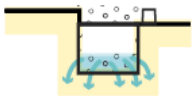
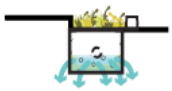
The feasibility of surface water run-off to the priority receptors are assessed and reported as follows:

Run-Off Destination (in order of Priority)	Feasible / Required	Comment / Description
Discharge to Ground	**Yes**	Window samples taken at the Site, shows the ground to predominantly consists of mad ground over coarse sand. Infiltration tests via 2 trail pits show the infiltration rates being between 0.817 m/hr and (0.711 m/hr), which are deemed acceptable for surface water discharge to ground. The lowest figure of 0.711 m/hr being used for surface water management calculations.
Discharge to Surface Water Body	No	There are no known waterbodies near the Site, and therefore discharge to waterbody is not feasible.
Discharge to Surface Water Sewer	No	There is a 225mm surface water sewer within Priory Road (west of the Site). However, discharge to this sewer is not required as the ground is deemed to be acceptable for surface water discharge.
Discharge to Highway Drain or Other	No	There are no known highway or other drains near to the development site. Therefore, discharging the surface water run-off to a highway or other drain is not feasible.
Discharge to Combined Water Sewer	No	There is a 225mm surface water sewer within Priory Road (west of the Site). However, discharge to this sewer is not required as the ground is deemed to be acceptable for surface water discharge.

6.0 SuDS Hierarchy

To reduce the surface water run-off rate, SuDS methods are to be introduced to the post development design.

In accordance with the DEFRA Non-Statutory Technical Standards for Sustainable Drainage Systems (March 2015), the SuDS methods that could potentially be used are detailed below:

	Description	Setting	Required area
 Green roofs	A planted soil layer is constructed on the roof of a building to create a living surface. Water is stored in the soil layer and absorbed by vegetation.	 Building	Building integrated.
 Rainwater harvesting	Rainwater is collected from the roof of a building or from other paved surfaces and stored in an overground or underground tank for treatment and reuse locally. Water could be used for toilet flushing and irrigation.	 Building	Water storage (underground or above ground).
 Soakaway	A soakaway is designed to allow water to quickly soak into permeable layers of soil. Constructed like a dry well, an underground pit is dug filled with gravel or rubble. Water can be piped to a soakaway where it will be stored and allowed to gradually seep into the ground.	 Open space	Dependant on runoff volumes and soils.
 Filter Strip	Filter strips are grassed or planted areas that runoff is allowed to run across to promote infiltration and cleansing.	 Open space	Minimum length 5 metres.
Permeable paving	Paving which allows water to soak through. Can be in the form of paving blocks with gaps between solid blocks or porous paving where water filters through the block itself. Water can be stored in the sub-base beneath or allowed to infiltrate into ground below.	 Street/open space	Can typically drain double its area.
 Bioretention area	A vegetated area with gravel and sand layers below designed to channel, filter and cleanse water vertically. Water can infiltrate into the ground below or drain to a perforated pipe and be conveyed elsewhere. Bioretention systems can be integrated with tree-pits or gardens.	 Street/open space	Typically surface area is 5-10% of drained area with storage below.

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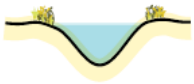
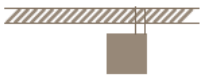
	Description	Setting	Required area
 Swale	Swales are vegetated shallow depressions designed to convey and filter water. These can be 'wet' where water gathers above the surface, or 'dry' where water gathers in a gravel layer beneath. Can be lined or unlined to allow infiltration.	 Street/open space	Account for width to allow safe maintenancce typically 2-3 metres wide.
 Hardscape storage	Hardscape water features can be used to store run-off above ground within a constructed container. Storage features can be integrated into public realm areas with a more urban character.	 Open space	Could be above or below ground and sized to storage need.
 Pond / Basin	Ponds can be used to store and treat water. 'Wet' ponds have a constant body of water and run-off is additional, while 'dry' ponds are empty during periods without rainfall. Ponds can be designed to allow infiltration into the ground or to store water for a period of time before discharge.	 Open space	Dependant on runoff volumes and soils.
 Wetland	Wetlands are shallow vegetated water bodies with a varying water level. Specially selected plant species are used to filter water. Water flows horizontally and is gradually treated before being discharged. Wetlands can be integrated with a natural or hardscape environment.	 Open space	Typically 5-15% of drainage area to provide good treatment.
 Underground storage	Water can be stored in tanks, gravel or plastic crates beneath the ground to provide attenuation.	 Open space	Dependant on runoff volumes and soils.

The feasibility of the above SuDS methods for the proposed development are summarised thus:

SuDS Method	Feasible / Required	Description
Livings Roofs	No	The new dwellings have pithed roofs and therefore not suitable for this SuDS method.
Rainwater Harvesting	**Yes**	Water butts can be installed at each of the dwellings where surface water can be re-used for irrigation.
Soakaways / Infiltration Structure	**Yes**	Window samples taken at the Site, shows the ground to predominantly consists of mad ground over coarse sand. Infiltration tests via 2 trail pits show the infiltration rates being between 0.817 m/hr and (0.711 m/hr), which are deemed acceptable for surface water discharge to ground., and for soakaways to be used. The lowest figure of 0.711 m/hr being used for surface water management calculations.

Filter Strips	**Yes**	Filter drain systems can be formed along the edge of the patio area and steps. The filter drains will be formed of a 300x300mm, 20mm no fine granular filled trench housing a perforated pipe. The surface water run-off from the patio and step areas to the rear of the dwellings will discharge onto the filter drain, will not infiltrate directly to ground (made ground at formation level), but will convey the surface water to the main network. Filter drains will reduce the surface water run-off rates and act as a pollutant control at source.
Permeable Surfacing	**Yes**	Permeable surfacing can be formed in the parking bay areas of the Site. The permeable surfacing will be built over a 300mm deep sub-base formed of 20mm no fines aggregate and wrapped in a permeable membrane. Surface water will not discharge to ground (made ground at formation level) but will also be conveyed to the main drainage network via a perforated pipe within the sub-base material. Permeable surfacing will reduce the surface water run-off rates and act as a pollutant control at source.
Swale / Ponds / Bioretention Areas	No	The garden areas are to be used as private amenity spaces for each of dwelling with other landscape areas being small and used for planting. Therefore, there are no suitable locations for swales, ponds or bioretention areas.
Underground Storage (Cellular Units)	**Yes**	The surface water run-off from the Site will be greater than the surface water infiltration rate to ground. Therefore, there will be a requirement to have underground storage for storm events up to 1 in 30-year; and to suitable sized so that the volume of water during the 1 in 100-year storm event is kept a minimum at surface level, where it can be contained on site.

7.0 Surface Water Management Calculations

Surface Water Network Calculations

The calculations to determine the post development surface water run-off rates and required infiltration structure volume, are based on the post development surface water run-off area of 0.090 ha, the rainfall data given by the FEH 2022 (shown as FEH 2013 in MicroDrainage, but 2022 used), and a run-off coefficient (Cv) of 1.0.

Climate Change

The NPPF makes it a planning requirement to account for climate change in the proposed design. The recommended allowances are taken from the Environment Agency guidance summarised in Figure 1 below.

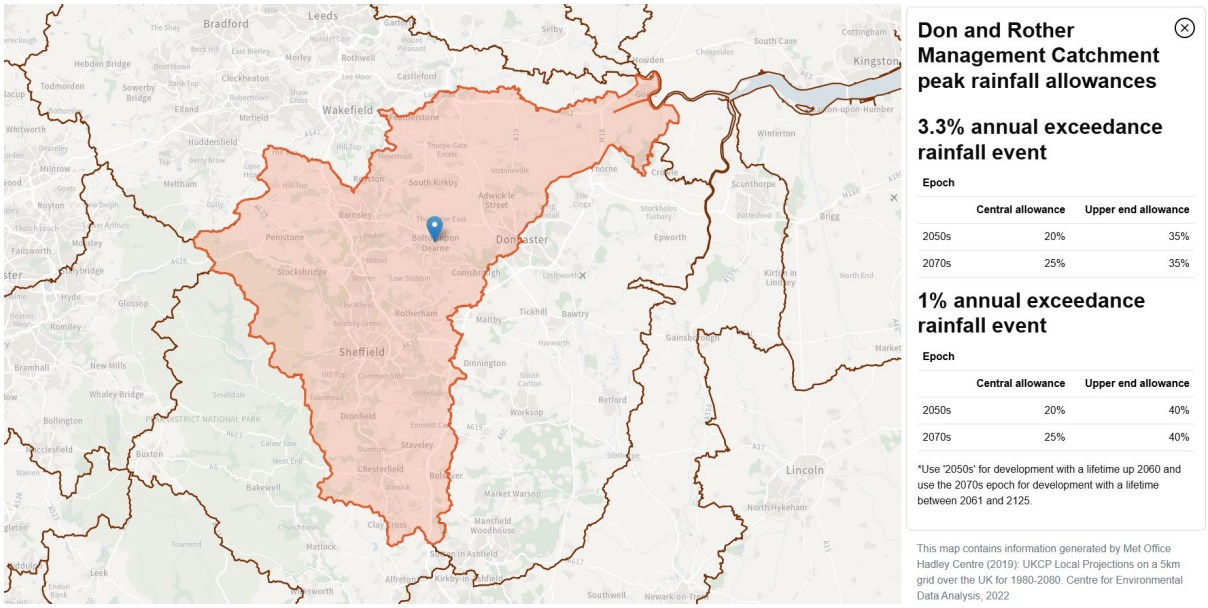


Figure 1 - DEFRA – Climate Change Allowances

The lifetime of the Site is likely to be beyond 2061, and therefore the Epoch 2070's is to be used with Upper End Allowance. Therefore, the climate change allowance for the surface water run-off will be **35%** and **40%** for the 30-year and 100-year storm respectively.

This will be shown as Climate Change in MicroDrainage Calculations (Appendix G).

Surface Water Drainage Network Details

As shown on the below ground drainage layouts in Appendix F, the proposed surface water network will consist of 150mm to 225mm diameter pipes, 460mm inspection and silt trap chambers, a 1200mm diameter manhole with 500mm sump, water butts, filter drains, permeable surfacing, and an infiltration tank in the form of cellular units.

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The surface water run-off from the dwelling roof areas will discharge to the main network via water butts and trapped gullies (containing 5mm of water); the surface water run-off from the parking areas will discharge to the main network via permeable surfacing systems; and the surface water run-off from the patio and step areas will discharge to the main network via the filter drains.

The surface water network will flow towards the central parking area and into the infiltration structure formed of cellular units. Surface water will be attenuated within the cellular units as the surface water infiltrates to ground via the sides and base of the structure.

Infiltration and Attenuation Design Calculations

The infiltration structures, in the form of cellular units, will be appropriately sized to:

- infiltrate the surface water run-off to ground in an appropriate time period (half drain in 24 hours);
- prevent flooding for storm events up to and including the 1 in 30-year storm event (including 35% climate change);
- and for only minor flooding (which is controlled) to occur during the 1 in 100-year storm event (including 40% climate change).

The required infiltration structure designs, to meet the required half drain time and suitable attenuation to prevent flooding, are detailed in the MicroDrainage calculations in Appendix G. Details of which are as follows:

Infiltration Tank Design Criteria

SW Catchment Area	-	0.090 ha
Ground Infiltration Rate	-	0.711 m/hr
Infiltration Tank Length	-	9.00m
Infiltration Tank Width	-	3.50m
Infiltration Tank Area	-	31.50m^2
Infiltration Tank Depth	-	1.20m
Infiltration Tank Volume	-	37.80m^3
Infiltration Tank Porosity	-	0.95
Attenuation Volume	-	35.90m^3

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Infiltration Tank Calculation Results

Critical Storm	-	100-year + 40% climate change, 60-minute winter
1 in 2-Year Half Drain Time	-	17-Minutes
1 in 30-Year + CC Half Drain Time	-	53-Minutes
1 in 100-Year + CC Half Drain Time	-	65-Minutes
1 in 2-Year + CC Event Flooding	-	None
1 in 30-Year + CC Event Flooding	-	None
1 in 100-Year + CC Event Flooding	-	None

The MicroDrainage calculations in Appendix G, shows that the surface water network and infiltration tank is adequately sized so that half the surface water volume to discharge to ground within a 24-hour period, with no flooding up to and including the 100-year + 40% climate change storm event.

Note that the MicroDrainage calculations show a flow control of 1mm diameter and a mock outfall to simulate no surface water flows from the network (discharge 0.0 l/s), but to ensure all surface water is simulated as discharging to ground via the cellular units.

8.0 Maintenance Requirements

Details of the maintenance required, and the parties to carry out the maintenance of all drainage aspects, to ensure that the SuDS methods are working affectively, and subsequently reducing the risk of flooding on the Site, are set out below.

Drainage Responsibilities

The management and maintenance of the surface water drainage networks and SuDS features within the Site and plot boundaries will be by contractors appointed by the owners / residents of each of the new dwellings, where payments of the works will form part of the property deeds and / or rental agreements.

A copy of the drainage design layout / details and a drainage maintenance / management document will be handed to the occupants on completion of the property purchase, where they will be made aware of the features within their plot and wider development / open area, and responsibility to maintain the drainage features shown on said drawings and details.

Maintenance and Management Document on Completion

The document produced, and handed to the owners of the new properties, will state the following:

'The owners & parties with responsibilities for the surface water drainage system on this development will comprise of the following stakeholders:

Private House Owners

All of which is clearly defined on the below ground drainage layout included within your handover pack & property deeds package.

As you are a house owner on this development you have responsibilities for the maintenance of the surface water drainage system which fall within the extent of the title which you own as well as in the 'open areas' (central access and car park areas) defined within the 'development boundary'.

Failure to maintain or removal of surface water drainage features may result in civil litigation with neighbouring owners if flooding occurs as a result.

Surface water drainage pipes, inspection chambers, filter drains, water butts within the title of your property are owned by you as the owner & as such responsibility for maintenance / repairs & replacement are yours as the house owner. Private drainage is identified as any drainage within your plot boundary.

Surface water mains drainage pipe, permeable surfacing and infiltration tanks, in the form of cellular units, are in the 'one area' of the Site, and are the responsibility of all dwelling owners.

Payments for any repairs to the drainage within the 'open areas' are to be taken as communal sums between the dwellings and are to be given to an appointed contractor to carry out necessary maintenance / repairs & replacement of drainage features.

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The operation and frequency of the maintenance and management set out in this report and as shown on the drainage layout are to be carried out as follows:

Drainage Networks, Water Butts and Cellular Units

Operation	***Frequency***
Inspect and identify any areas that are not operating correctly, if required, take remedial actions	*Monthly for 3 months, then six monthly*
Debris removal from manholes (where may cause risk performance)	*Monthly*
Where rainfall into network from above, check surface or filter for blockage or silt, algae, or other matter by jetting	*As required, but at least twice a year*
Remove sediment from pipework by jetting.	*Annually or as required*
Repair/check all inlets, outlets, and overflow pipes	*As required*
Inspect/check all inlets, outlets, and overflow pipes to ensure that they are in good condition and operating as designed	*Annually and after large storms*

Filter Drains and Permeable Surfacing

Operation	***Frequency***
Inspect and identify any areas that are not operating correctly, if required, take remedial actions	*Monthly for 3 months, then six monthlies*
Debris removal from on surface of permeable surfacing and filter drains or near system (where may cause risk performance)	*Monthly*
Rainfall infiltration into permeable surfacing and filter drains is ensured working effectively.	*As required, but at least twice a year*

Linked and Further Maintenance and Maintenance Activities

The maintenance of the drainage network and SuDS features are to be linked with the wider site maintenance for the new residential landscaped / garden areas.

9.0 Exceedance Event

In the event of an extreme storm event (greater than 100-year + 40% climate change) flooding of the drainage network could occur.

Surface water flow paths will follow existing and proposed ground topography, where water will flow towards the north-west boundary of the Site, and will flow into Priory Road.

Surface water will flow away from the new dwellings (ground floor levels 150mm higher than external levels) and will not flow towards any other buildings or properties prior to discharge onto Priory Road.

Flood water will be contained within the road due to the road having a gradient (flows in channels in a northerly direction) and upstand kerbs being present. Therefore, in an exceedance event, flood risk to properties within or near the Site will not increase.

10.0 Water Quality

The level of water treatment for the pollutant areas of the Site (retail roof) is to be assessed against the details set out in Ciria SuDS Manual C753. Chapter 26 sets out the Pollution Hazard Indices for different land classifications, and how to calculate that against the SuDS mitigation indices to show suitable levels of treatment.

Pollutant Hazard

C753 Table 26.2 Pollution Hazard Level	=	Low (residential parking and patio areas)

C753 Table 26.2 Pollution Hazard Index:

Total Suspended Solid (TSS)	=	0.5
Metals	=	0.4
Hydrocarbons	=	0.4
Pollution Hazard Index	=	1.30

Pollutant Mitigation

Mitigation Measures:

Permeable Surfacing

The lowest of the Pollutant Mitigation Indices:

Total Suspended Solid (TSS)	=	0.7
Metals	=	0.6
Hydrocarbons	=	0.7
SuDS Mitigation Indices	=	**2.00**

The mitigation indices are the equivalent to the pollution hazard index, and therefore suitable water quality is achieved.

Note: Surface water run-off from residential roof to have very low pollutants, and will flow through trapped gullies and water butts prior to discharge to main drainage network. Therefore, roof surface water run-off will not affect the water quality.

11.0 Foul Water Drainage Strategy

The strategy for the foul water is to discharge by gravity via the existing foul water manhole / outfall pipe to the combined water sewer network in Priory Road, at a peak rate of 0.3 l/s.

12.0 Development Management and Construction Phase

Construction Environment Management Plan

Full details of the construction environment management plan (CEMP) has to be confirmed by the chosen contractor appointed for the development. However, it will conform to the requirements of CIRIA 753 – The SuDS Manual – Chapter 31, and will include:

Construction Access

The main construction traffic will access the site from the western boundary (Priory Road). Suitable protection measures such as concrete slab will be placed over the cellular units if not avoided.

Sediments and Traps

Sediment basins and traps are to be installed before any site earthworks take place, with further sediment traps and silt fences being installed as the earthworks progress. This will keep sediment contained on site at appropriate locations.

Main Surface Water Run-Off Systems

A temporary infiltration trench/pit and sediment trap will be built prior to further construction on the site. Temporary inlet and outlet protection measures and appropriate silt traps are to be installed to prevent silt ingress into the main drainage network, which will be accessed via exisiting lateral drain connections until the permanent soakaway is installed.

Run-Off Control Measures

Run-off control measures are to be used in conjunction with sediment traps to divert water around planned earthworks areas to remove silts. Any surface water upstream of the site is to be diverted around the development areas, and to discharge to the infiltration pit.

Clearing and Earthworks

Clearing and earthworks will only start when adequate erosion and sediment control measures are in place. Once the development areas are cleared, earthworks will follow immediately to ensure that the ground cover can be re-established quickly. Adjacent land to that being developed will be left undisturbed for as long as possible.

Surface Stabilisation Measures

Surface stabilisation measures will be applied to completed areas, channels ditches and other disturbed areas after the land is cleared and profiled. Permanent stabilisation measures will be installed as soon as possible after final profiling.

Construction of Permeable Surfacing and Filter Drains

Construction of the permeable surfacing and filter drains are to be left to the later stages of construction. Unsuitable sediment is to be removed from surfacing prior to installation of sand binder layer and paving.

12.0 Conclusion / Summary

SuDS Principles and Discharge Destination

All feasible SuDS methods, and surface water discharge destination have been assessed, with the feasible SuDS methods being water butts, filter drains, permeable surfacing systems and infiltration tank in the form of cellular units, with the surface water destination being to ground.

Infiltration Structure

The surface water network and infiltration tank (cellular units) are adequately sized so that half the surface water volume will discharge to ground within a 24-hour period, with no flooding up to and including the 100-year + 40% climate change storm event.

Management and Maintenance

The management and maintenance of the surface water drainage networks and SuDS features within the Site will be by contractors appointed by the owners / residents of the residential units, where payments of the works will form part of the property deeds and / or rental agreement.

Water Quality

The level of water treatment for the pollutant areas of the site is to be assessed against the details set out in Ciria SuDS Manual C753. Chapter 26, the SuDS methods will be adequate to ensure water quality from pollutant areas of the development sites.

Development Management and Construction Phase

A temporary infiltration structure (trench and pit) is to be constructed to control water discharge from the site until the permanent works are available for connection. This will ensure that the surface water discharge is managed during the first phase of the build.

Full details of the construction environment management plan (CEMP) have to be confirmed by the chosen contractor who has been appointed for the development. However, the CEMP will conform to the requirements of CIRIA 753 – The SuDS Manual – Chapter 31.

Priory Road

Appendix A – Location Plan

1:1000

20m 0 20m 40m 60m 80m 100m

General Notes:

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7. The recipient is responsible for verifying the correctness and completeness of the information issued. This should be done by consulting all relevant associated documents including but not limited to information provided by the Civil / Structural Engineer, MEP Engineer(s), Fire Engineer, Acoustician, Highways Consultant, Flood Risk Assessor, Party Wall Assessor and any other project designers / consultants supplied during the course of the project and by confirming dimensions on site.
8. It is the responsibility of the recipient to ensure they have the most up to date information.
9. If altered or added to in any way, all references to Design Stor Ltd. must be removed and those making the changes assume total responsibility for the information thereon.

Stor_

Priory Road, Barnsley	Drawn	TE	
Location Plan	Checked	-	
Eagle Properties & Development Ltd.	Date	20/10/24	

Scale (@ A4) 1:1000	Project Number	24-019	Drawing Number	AL-10-002	
Rev. -	Drawing Status	Planning			

Priory Road

Appendix B – Existing Site Plan

General Notes:

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8. It is the responsibility of the recipient to ensure they have the most up to date information.
9. If altered or added to in any way, all references to Design Stor Ltd. must be removed and those making the changes assume total responsibility for the information thereon.

Stor_

Project

Priory Road

Drawing Title

Existing Site Plan

Client

Eagle Properties & Development Ltd.

Drawn	Checked	Date
TE	-	14/10/24

Scale (@ A1)	Project Number
1 : 200	24-019

Drawing Number	Rev.
AL-10-001	-

Drawing Status

Planning

Rev	Description	Date

Appendix C – Proposed Site Plan

General Notes:

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2. Partial Service: Any discrepancies with site or other information is to be advised to the Architect / Designer and direction and / or approval is to be sought before the implementation of the detail.
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4. Do not scale off drawings. Any measurements taken from information which is not dimensioned on the electronic copy are at the risk of the recipient.
5. For the purpose of coordination, all relevant parties must check this information prior to implementation and report any discrepancies to the Architect / Designer. The information must solely and only be used for the coordination and/or construction of the current project.
6. The copyright of the original documents belongs to Design Stor Ltd. The information is only for use in preparation of documents for this project. The information issued may be confidential and must not be used other than by the intended recipient.
7. The recipient is responsible for verifying the correctness and completeness of the information issued. This should be done by consulting all relevant associated documents including but not limited to information provided by the Civil / Structural Engineer, MEP Engineer(s), Fire Engineer, Acoustician, Highways Consultant, Flood Risk Assessor, Party Wall Assessor and any other project designers / consultants supplied during the course of the project and by confirming dimensions on site.
8. It is the responsibility of the recipient to ensure they have the most up to date information.
9. If altered or added to in any way, all references to Design Stor Ltd. must be removed and those making the changes assume total responsibility for the information thereon.

Orange hatched areas indicate private, secure cycle storage areas at rate of 1 bike per bedroom.

Stor_

Project

Priory Road

Drawing Title

Proposed Site Plan

Client

Eagle Properties & Development Ltd.

Drawn	Checked	Date
TE	-	14/10/24

Scale (@ A1)	Project Number
1 : 200	24-019

Drawing Number	Rev.
AL-20-101	A

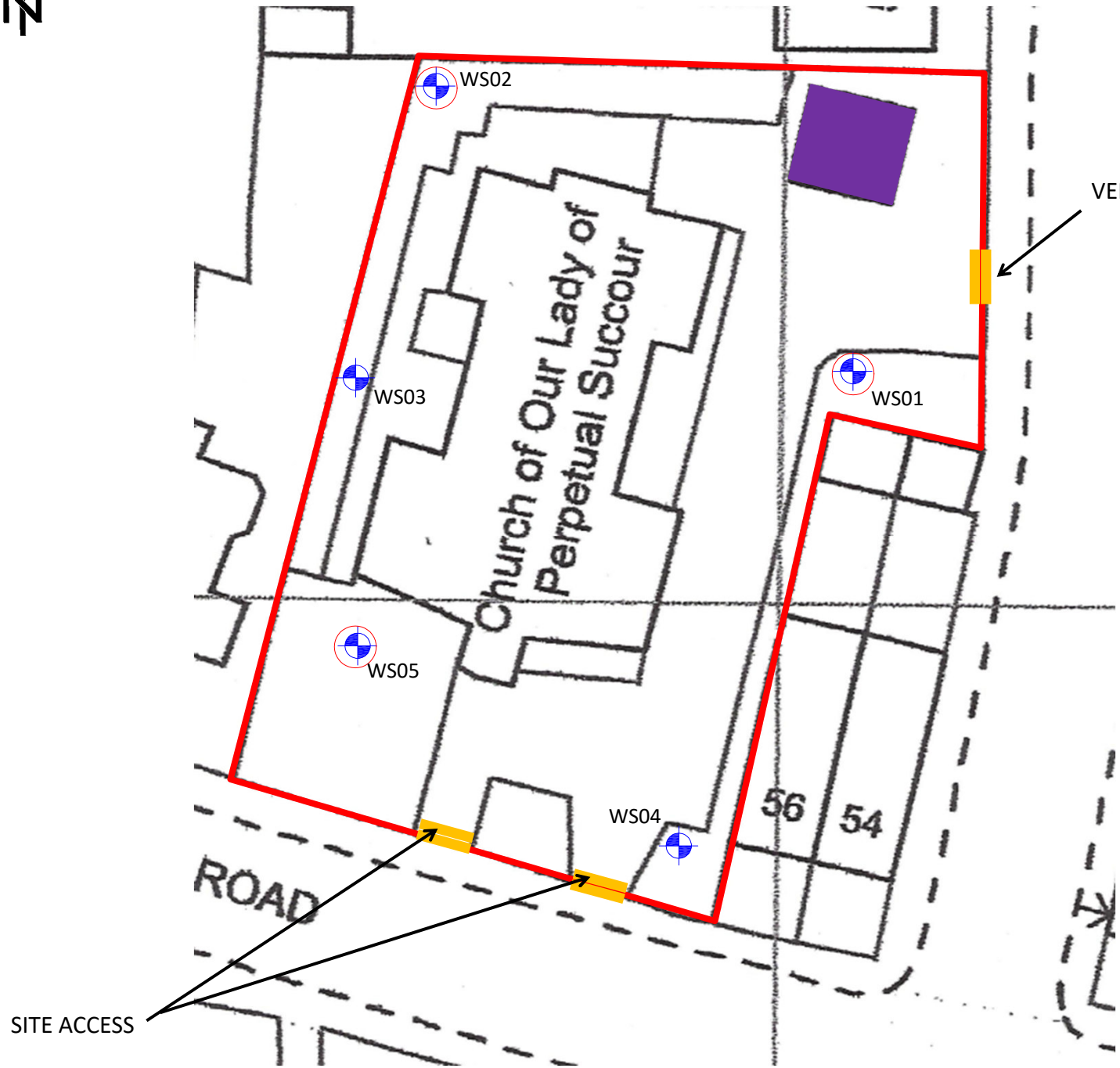
Drawing Status

Planning

Rev	Description	Date
A	Site layout amended to suit LPA / Highways comments: Parking provision increased to 2 per property. Rear gardens reduced to accomodate parking. Vehicular access amended. Shared play area added. Bin pads added to rear of pavement on Station Road and Priory Road. Orange hatched areas indicate private, secure cycle storage areas at rate of 1 bike per bedroom.	31/03/25

Priory Road

Appendix D – Ground Investigation Data



KEY

- APPROXIMATE SITE BOUNDARY
- GATE
- CONCRETE PAD
- WINDOW SAMPLE BOREHOLE
- BOREHOLE INSTALLATION

NOTES

1. ALL DIMENSIONS TO BE CHECKED ON SITE BEFORE COMMENCING WORKS. ANY DISCREPANCIES ARE TO BE REPORTED TO THE ARCHITECT & ENGINEER FOR VERIFICATION. FIGURED DIMENSIONS ONLY ARE TO BE TAKEN FROM THIS DRAWING.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS REPORTS. THIS DRAWING IS COPYRIGHT OF BSL.
3. DRAWING NOT FOR CONSTRUCTION PURPOSES.

REV	DATE	DESCRIPTION	BY	CKD

BROWNFIELD SOLUTIONS LTD
GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE

CLIENT
ACUTE CIVIL ENGINEERING LTD

PROJECT TITLE
PRIORY ROAD, ROTHERHAM

DRAWING TITLE
EXPLORATORY HOLE LOCATION PLAN

DRAWING No.	REVISION	SCALE	DATE
C5893/02	-	NTS	08/10/24

DRAWN BY	CHECKED BY
KB	DMG

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.
WS01
Sheet 1 of 1

PROJECT NO:	C5893	**CO-ORDS:**	**Hole Type** WS
PROJECT NAME:	PRIORY ROAD, ROTHERHAM	**LEVEL:**	**Scale** 1:30
CLIENT:	ACUTE CIVIL ENGINEERING	**DATES:** 04/10/24	**Logged** KB / **Checked** DMG

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
					0.20			MADE GROUND: Grassed over brown slightly clayey slightly gravelly fine to coarse sand. Gravel is fine to medium sub-angular to sub-rounded sandstone. Rootlets throughout.
					0.60			MADE GROUND: Brown slightly gravelly fine to coarse sand. Gravel is fine to coarse sub-angular to sub-rounded brick, concrete and sandstone.
					0.90			Brown clayey fine to coarse SAND.
		1.20	SPT	N=44 (5,8/10,10,12,12)				Dense yellow brown slightly clayey slightly gravelly fine to coarse SAND. Gravel is fine to medium sub-angular to sub-rounded sandstone.
		2.00	SPT	N≥50 (8,10/50 for 220mm)	2.00			Extremely weak yellow brown destructured SANDSTONE.
					2.37			End of Borehole at 2.37m

1.0
2.0
3.0
4.0
5.0
6.0

Remarks

1. Service clearance undertaken by BSL engineer using GPR and EM techniques.
2. No groundwater encountered.
3. Borehole terminated at 2.37m bgl due to SPT refusal.
4. Standpipe installed to 2.00m bgl comprising 1.00m plain and 1.00m slotted pipe.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.
WS02
Sheet 1 of 1

PROJECT NO:	C5893	**CO-ORDS:**	**Hole Type** WS
PROJECT NAME:	PRIORY ROAD, ROTHERHAM	**LEVEL:**	**Scale** 1:30
CLIENT:	ACUTE CIVIL ENGINEERING	**DATES:** 04/10/24	**Logged** KB / **Checked** DMG

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
					0.20			MADE GROUND: Grassed over brown slightly clayey slightly gravelly fine to coarse sand. Gravel is fine to medium sub-angular to sub-rounded sandstone. Rootlets throughout.
					0.75			MADE GROUND: Brown slightly gravelly fine to coarse sand. Gravel is fine to coarse sub-angular to sub-rounded brick, concrete, ceramic and sandstone.
					1.10			Brown clayey fine to coarse SAND.
		1.20	SPT	N=23 (3,3/3,3,7,10)				Medium dense yellow brown slightly clayey slightly gravelly fine to coarse SAND. Gravel is fine to medium sub-angular to sub-rounded sandstone.
								1.50m bgl Firm sandy clay for 110mm
		2.00	SPT	N≥50 (3,7/50 for 135mm)	2.00			Extremely weak yellow brown destructured SANDSTONE.
					2.29			End of Borehole at 2.28m

1.0 2.0 3.0 4.0 5.0 6.0

Remarks

1. Service clearance undertaken by BSL engineer using GPR and EM techniques.
2. No groundwater encountered.
3. Borehole terminated at 2.29m bgl due to SPT refusal.
4. Standpipe installed to 2.00m bgl comprising 1.00m plain and 1.00m slotted pipe.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.
WS03
Sheet 1 of 1

PROJECT NO:	C5893	**CO-ORDS:**	**Hole Type** WS
PROJECT NAME:	PRIORY ROAD, ROTHERHAM	**LEVEL:**	**Scale** 1:30
CLIENT:	ACUTE CIVIL ENGINEERING	**DATES:** 04/10/24	**Logged** KB / **Checked** DMG

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
					0.20			MADE GORUND: Grassed over brown slightly clayey slightly gravelly fine to coarse sand. Gravel is fine to medium sub-angular to sub-rounded sandstone. Rootlets throughout.
					0.55			MADE GROUND: Brown slightly gravelly fine to coarse sand. Gravel is fine to coarse sub-angular to sub-rounded brick, charcoal, ceramic and sandstone.
					0.80			Brown clayey fine to coarse SAND.
		1.20	SPT	N=15 (3,3/3,4,4,4)				Medium dense yellow brown slightly clayey slightly gravelly fine to coarse SAND. Gravel is fine to medium sub-angular to sub-rounded sandstone.
		2.00	SPT	N≥50 (4,5/50 for 145mm)	2.00			Extremely weak yellow brown destructured SANDSTONE.
					2.30			End of Borehole at 2.30m

1.0
2.0
3.0
4.0
5.0
6.0

Remarks

1. Service clearance undertaken by BSL engineer using GPR and EM techniques.
2. No groundwater encountered.
3. Borehole terminated at 2.30m bgl due to SPT refusal.
4. Borehole backfilled with arisings.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.
WS04
Sheet 1 of 1

PROJECT NO:	C5893	**CO-ORDS:**	**Hole Type** WS
PROJECT NAME:	PRIORY ROAD, ROTHERHAM	**LEVEL:**	**Scale** 1:30
CLIENT:	ACUTE CIVIL ENGINEERING	**DATES:** 04/10/24	**Logged** KB / **Checked** DMG

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.20			MADE GROUND: Grassed over brown slightly clayey slightly gravelly fine to coarse sand. Gravel is fine to medium sub-angular to sub-rounded sandstone. Rootlets throughout.
					0.60			MADE GROUND: Brown slightly gravelly fine to coarse sand. Gravel is fine to coarse sub-angular to sub-rounded brick, ceramic and sandstone.
					0.80			Brown clayey fine to coarse SAND.
		1.20	SPT	N=22 (4,4/4,4,7,7)				Medium dense yellow brown slightly clayey slightly gravelly fine to coarse SAND. Gravel is fine to medium sub-angular to sub-rounded sandstone.
		2.00	SPT	N≥50 (7,14/50 for 135mm)	2.00			Extremely weak yellow brown destructured SANDSTONE.
					2.29			End of Borehole at 2.28m

1.0
2.0
3.0
4.0
5.0
6.0

Remarks

1. Service clearance undertaken by BSL engineer using GPR and EM techniques.
2. No groundwater encountered.
3. Borehole terminated at 2.29m bgl due to SPT refusal.
4. Borehole backfilled with arisings.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.
WS05
Sheet 1 of 1

PROJECT NO:	C5893	**CO-ORDS:**	**Hole Type** WS
PROJECT NAME:	PRIORY ROAD, ROTHERHAM	**LEVEL:**	**Scale** 1:30
CLIENT:	ACUTE CIVIL ENGINEERING	**DATES:** 04/10/24	**Logged** KB / **Checked** DMG

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
					0.20			MADE GROUND: Grassed over brown slightly clayey slightly gravelly fine to coarse sand. Gravel is fine to medium sub-angular to sub-rounded sandstone. Rootlets throughout.
					0.85			MADE GROUND: Brown slightly gravelly fine to coarse sand with a low cobble content. Gravel is fine to coarse sub-angular to sub-rounded brick, ceramic, glass and sandstone. Cobbles are of brick up to 110mm in diameter.
		1.20	SPT	N=16 (1,3/3,4,4,5)				Medium dense brown to yellow brown slightly clayey slightly gravelly fine to coarse SAND. Gravel is fine to medium sub-angular to sub-rounded sandstone.
		2.00	SPT	N≥50 (25 for 70mm/50 for 40mm)	2.00			Extremely weak yellow brown destructured SANDSTONE.
					2.11			End of Borehole at 2.11m

1.0
2.0
3.0
4.0
5.0
6.0

Remarks

1. Service clearance undertaken by BSL engineer using GPR and EM techniques.
2. No groundwater encountered.
3. Borehole terminated at 2.11m bgl due to SPT refusal.
4. Standpipe installed to 2.00m bgl comprising 1.00m plain and 1.00m slotted pipe.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

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Stor_

Project
Priory Road

Drawing Title
Proposed Site Plan

Client
Eagle Properties & Development Ltd.

Drawn	Checked	Date
TE	-	14/10/24

Scale (@ A1)	Project Number
1 : 200	24-019

Drawing Number	Rev.
AL-20-101	-

Drawing Status
Planning

Rev	Description	Date

SOIL INFILTRATION RATE CALCULATIONS

TP1 Test 1,2,3

Base of Pit – 37.522m AOD

Test	Time(mins)
1	172
2	222
3	268

Client:	Eagle Property & Developments Ltd
Site:	Priory Road, Bolton-Upon-Dearne, Barnsley
Site ref:	40227
Status:	DRAFT
Test Type:	Percolation Test – Part H Cl 1.34-1.37

Trial pit dimensions		
Width(m)	Length(m)	Depth(m)
0.30	0.30	0.30

Depth from water level at start of test to bottom of pit =	0.3
75% effective depth of test pit =	0.15

Enter Assumed Void Ratio (fraction of 1, where 1 equates to open pit. 0.3 to stone fill and 0 equates to no voids)	1

75% effective depth(m)	=	0.225
25% effective depth(m)	=	0.075

Ave Time at 75% depth(mins)	=	0
Ave Time at 25% depth(mins)	=	220

Volume outflowing, V_{p75-25} = 0.0135

Area, a_{p50} = 0.27

Time, T_{75-25} = 220

Infiltration Rate, F = 2.27E-04 m/s

Test pit emptied greater than 75% total prior to filling test 2. Test 3 conducted following day 13/05/25 from empty pit

SOIL INFILTRATION RATE CALCULATIONS

TP2 Test 1,2,3

Base of Pit – 37.522m AOD

Test	Time(mins)
1	142
2	294
3	322

Client:	Eagle Property & Developments Ltd
Site:	Priory Road, Bolton-Upon-Dearne, Barnsley
Site ref:	40227
Status:	DRAFT
Test Type:	Percolation Test – Part H Cl 1.34-1.37

Trial pit dimensions		
Width(m)	Length(m)	Depth(m)
0.30	0.30	0.30

Depth from water level at start of test to bottom of pit =	0.3
75% effective depth of test pit =	0.15

Enter Assumed Void Ratio (fraction of 1, where 1 equates to open pit. 0.3 to stone fill and 0 equates to no voids)	1

75% effective depth(m)	=	0.225
25% effective depth(m)	=	0.075

Ave Time at 75% depth(mins)	=	0
Ave Time at 25% depth(mins)	=	253

Volume outflowing, V_{p75-25} = 0.0135

Area, a_{p50} = 0.27

Time, T_{75-25} = 253

Infiltration Rate, F = 1.976E-04 m/s

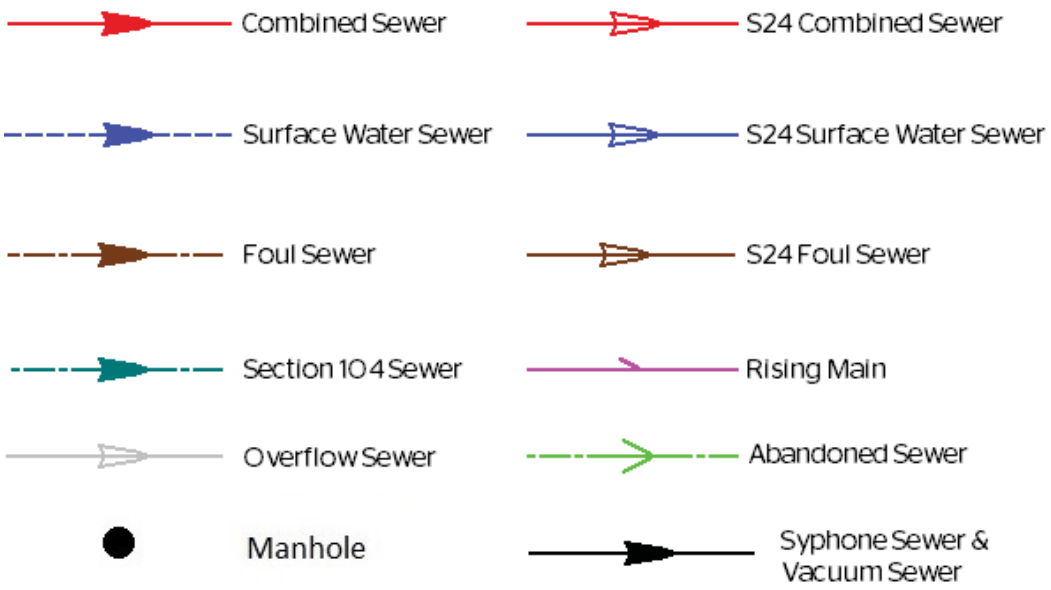
Test pit emptied greater than 75% total prior to filling test 2. Test 3 conducted following day 13/05/25 from empty pit

Priory Road

Appendix E – Yorkshire Water Sewer Plan

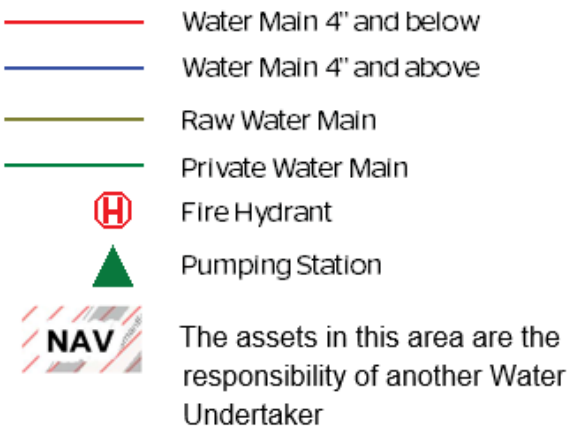
Property Identfier

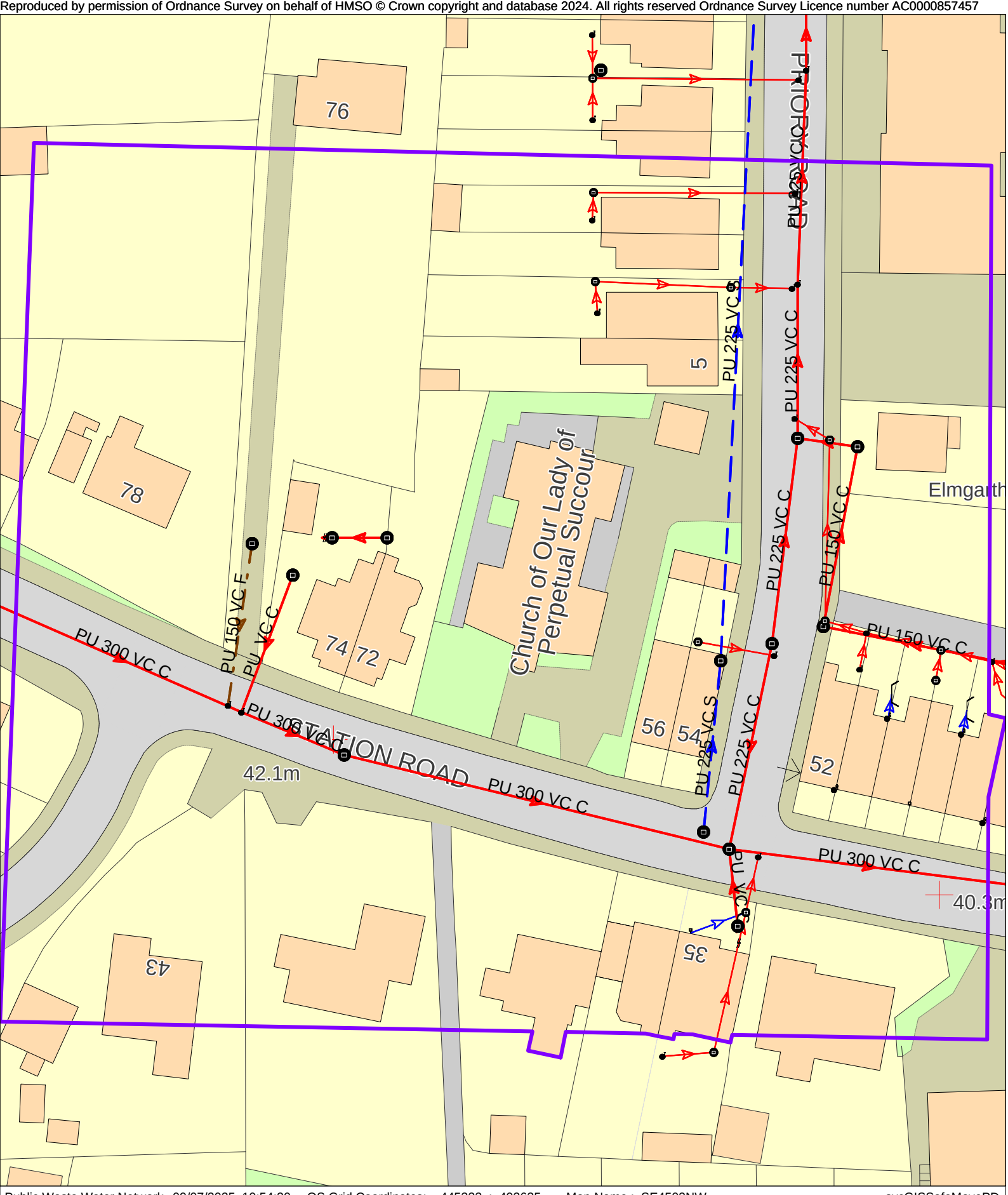
Sewer Legend



Please note that the direction of flow arrows may not always appear depending on the scale of the map.

Water Legend

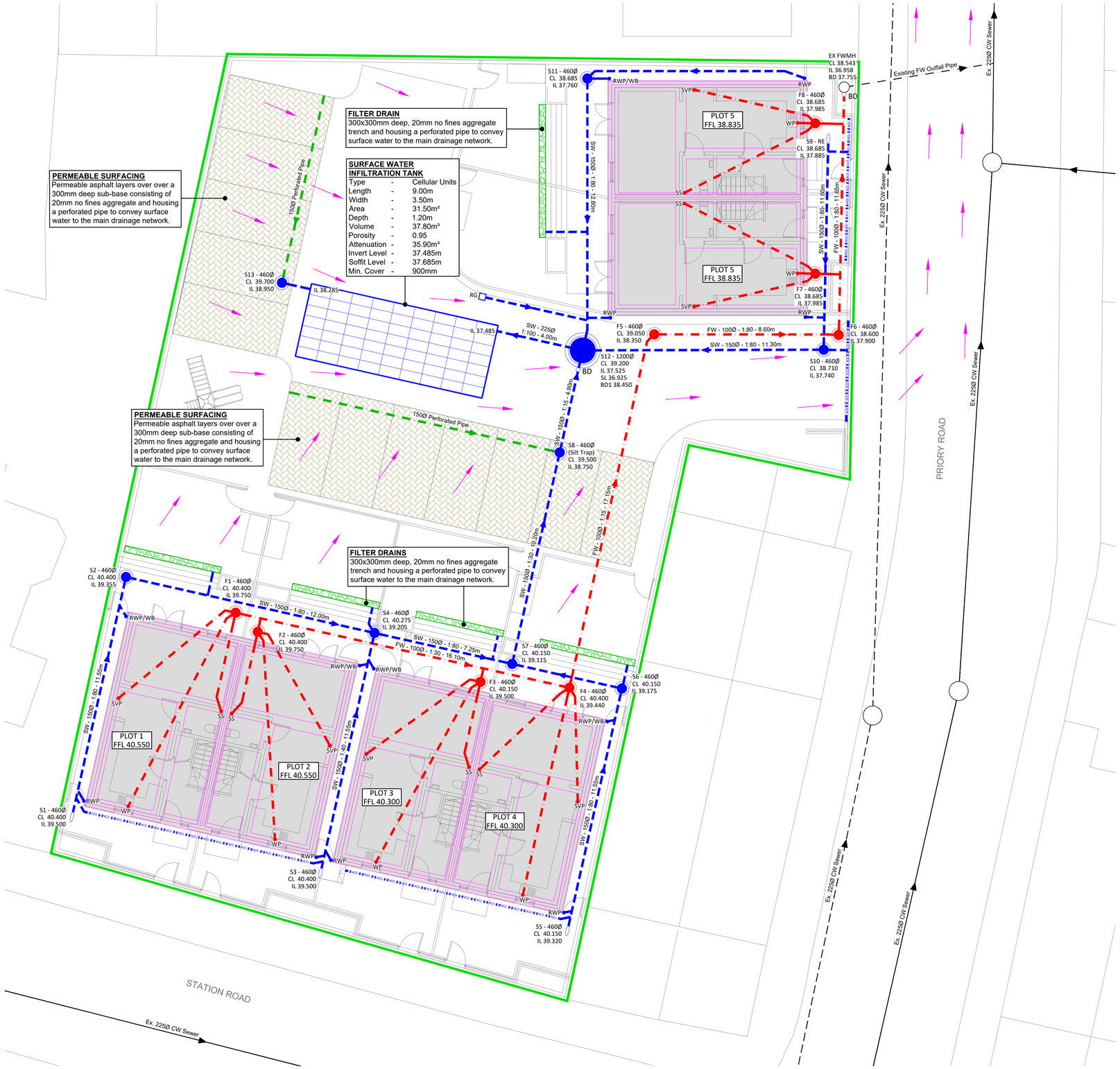




Public Waste Water Network 09/07/2025 10:54:20 OS Grid Coordinates: 445323 : 402635 Map Name : SE4502NW svcGISSafeMovePD

Priory Road

Appendix F – Below Ground Drainage Layout and Details



General Drainage Notes:

Existing details shown on this drawing including kerblines, existing drains, chambers, sewers, pipework, stub connections where new connections, diversions or abandonment are shown, invert levels and pipe sizes shall be checked and confirmed to the engineer prior to the commencement of any works. Any discrepancies shall be reported to the engineer for action prior to any new construction.

All drainage works shall be carried out in accordance with the requirements of the local authority and in conjunction with all relevant British Standards and Codes of Practice

All drainage shall comply with the typical drainage construction details and the requirements of BS EN 752.

Access covers and frames shall comply with the loadings specified and to BS EN 124 and kitemarked or if recessed covers are specified then in accordance with FACTA association equivalent.

The proposed building outlines shown on this drawing are for information only. Refer to Architects plans for precise location setting out information and details.

All underslab drainage shall be clear of foundations unless shown otherwise with long radius bends kept to a minimum and used where unavoidable.

All private drainage pipework for foul and surface water systems have been designed on the basis of UPVC to BS EN 1401-1, unless noted otherwise.

Where new drainage is situated within 5 metres of new or existing trees the pipework shall be encased in concrete to reduce the risk of root ingress.

Concrete encasement of the pipework shall be required where the vertical clearance between two pipes crossing is less than 300mm.

All existing drainage shall be assumed to be 'live' and shall be maintained at all times during the works. Existing drainage shall be reconnected to the new drainage system unless proven to be redundant for abandonment. All existing drainage to be abandoned shall be sealed by appropriate means.

Upon completion all new drainage installation together with any existing drainage retained shall be jetted and CCTV surveyed upon completion. Contractor to ensure that the drainage system is fully operational, free of excess debris/silt and all identified faults rectified.

HEALTH & SAFETY: The works shall be carried out by specialist competent and experienced contractors. All operatives shall have received full and appropriate training with appropriate qualifications for the operations they are required to undertake. All work shall be carried out in accordance with the relevant Health & Safety Regulations.

Surface Water Exceedance Note

In the event of an extreme storm event (greater than 100-year + 40% climate change) flooding of the drainage network could occur.

Surface water flow paths will follow existing and proposed ground topography, where water will flow towards the north-west boundary of the Site, and will flow into Priory Road.

Surface water will flow away from the new dwellings (ground floor levels 150mm higher than external levels) and will not flow towards any other buildings or properties prior to discharge onto Priory Road.

Flood water will be contained within the road due to the road having a gradient (flows in channels in a northerly direction) and upstand kerbs being present.

Therefore, in an exceedance event, flood risk to properties within or near the Site will not increase.

N

Site Specific Drainage Notes:

Any existing drainage within the development site to remain live and to be diverted if required. Existing sewer location, size and depths, to which the networks are connecting / discharging, to be confirmed prior to the commencement of any drainage work.

Proposed rainwater and foul down pipe locations to be confirmed prior to the commencement of any drainage works. Design subject to change.

External levels and subsequent cover levels and gully / channel drain locations to be confirmed by Architect prior to commencement of any drainage works. Design subject to change.

Tree protection areas and subsequent feasibility of outfall drainage networks in existing access road to be confirmed.

Foul water discharge subject to Yorkshire Water s and local authority approval. No drainage work to commence until Section 106 agreement and approval notice is given.

All foul water pipes to be 100Ø, and all surface water pipes to be 150Ø U.S.O

Foul water down pipes invert level 550mm below finished floor level U.S.O

Rainwater pipes to have invert level of 750mm below finished floor level U.S.O

Drainage Specifications

Foul water pipes to be Polypipe to BS EN 1401-1 or similar

Surface water pipes to be Polypipe Ridgidrain or similar

Manholes by FP McCann or similar

Infiltration tank to be WAVIN AquaCell Core-R or similar

Inspection chambers and silt trap chambers to be Polypipe or similar

Channel drain to be ACO M150D 0.0 or similar

Drainage Key:

- Proposed Surface Water Drainage
- Proposed Perforated Pipe
- Proposed Foul Water Drainage
- Existing Surface Water Sewer
- Existing Foul Water Drainage
- Existing Combined Water Sewer
- RWP — Rainwater Pipe
- RWP/WB — Rainwater Pipe with Water Butt
- SVP — Soil Vent Pipe
- SS — Stub Stack
- WP — Kitchen Sink Waste Pipe
- Channel Drains
- RG — Road Gullies
- Filter Drains
- Permeable Surfacing
- Exceedance Flow Routes
- Development Boundary

Rev	P02		
Number	6000		
Level	00		
Zone	XX		
Type	DR		
Role	C		

Rev.	Description	Date
P02	Drainage Networks Amended	11.09.2025
P01	Planning Condition Discharge	22.08.2025

Project: Priory Road, Rotherham

Client: Priory Road Properties Ltd.

Drawn	Checked	Approved	Date	Scale @ A1
DW	RS	GC	08/25	1:100

Drawing Title: Below Ground Drainage Layout

Drawing Status: PRELIMINARY

Project No. 11452 – C – DR – XX – 00 – 6000 – P01 Drawing No. Revision

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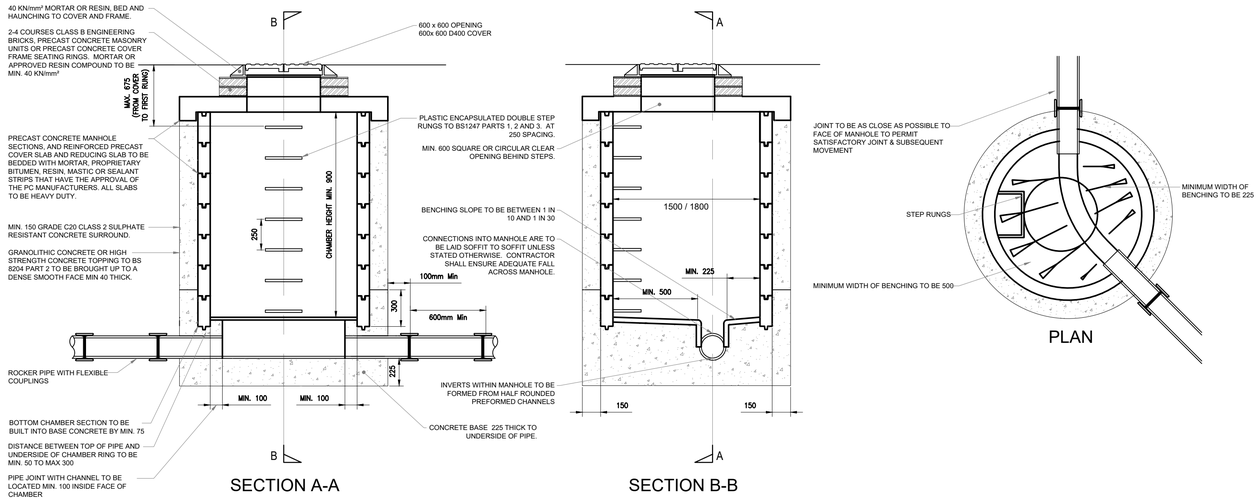
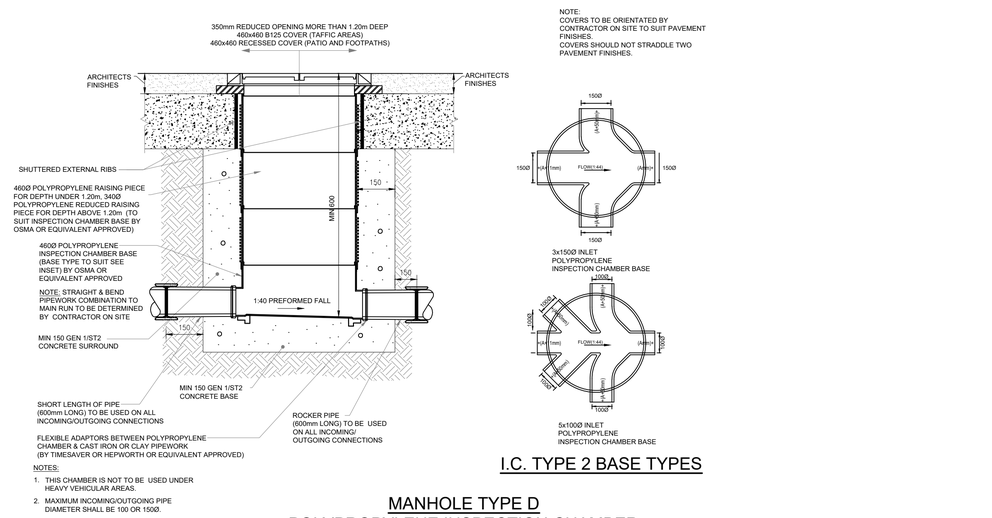
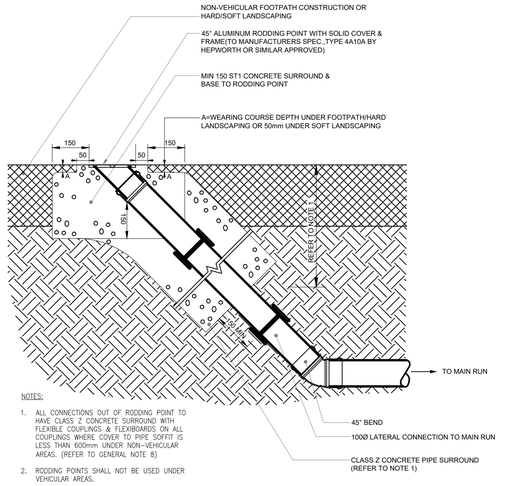


MANHOLE TYPE B
CIRCULAR PRECAST CONCRETE MANHOLE DETAIL
(DEPTH MORE THAN 1.50m TO PIPE SOFFIT)

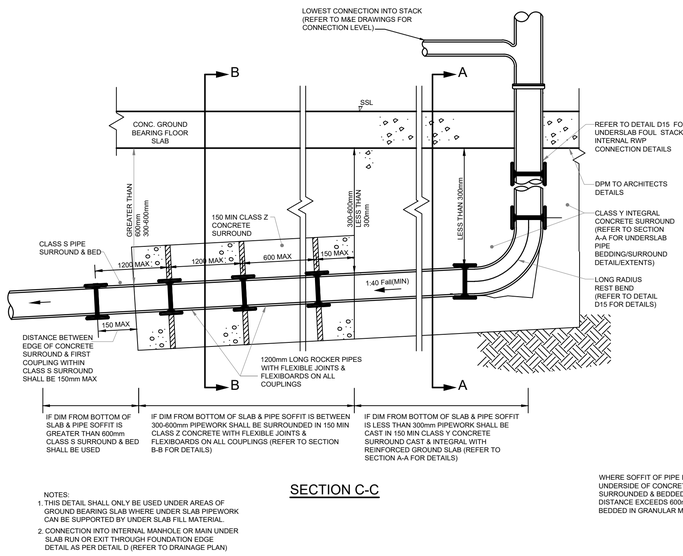


MANHOLE TYPE D
POLYPROPYLENE INSPECTION CHAMBER
(MAXIMUM DEPTH 3.00m)

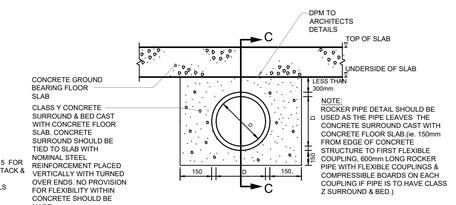
I.C. TYPE 2 BASE TYPES



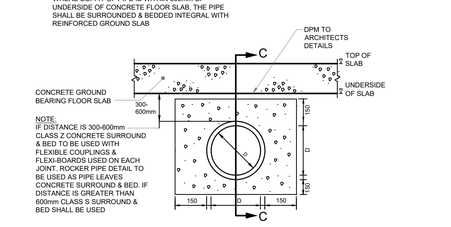
RODDING EYE DETAIL



SECTION C-C

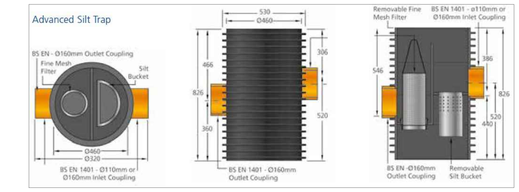


SECTION A-A
WHERE DISTANCE BETWEEN PIPE SOFFIT & UNDERSIDE OF CONCRETE GROUND BEARING FLOOR SLAB/GROUND BEAM IS LESS THAN 300mm

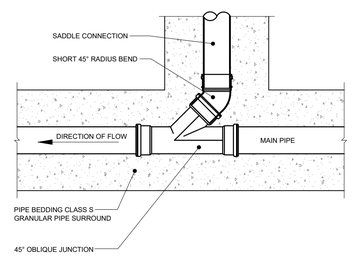


SECTION B-B
WHERE DISTANCE BETWEEN PIPE SOFFIT & UNDERSIDE OF CONCRETE GROUND BEARING FLOOR SLAB/GROUND BEAM IS GREATER THAN 300mm

FOUL AND RAINWATER PIPE
TYPICAL UNDERSLAB PIPE BEDDING DETAILS FOR PIPEWORK UNDER STRUCTURAL SLAB
(FOR ALL UNDER SLAB PIPE DEPTHS)



SILT TRAP CHAMBER DETAIL



TYPICAL 45° PIPE JUNCTION CONNECTION DETAIL

Rev	P01
Number	6001
Level	00
Zone	XX
Type	DR
Role	C

P01 Planning Condition Discharge 11.09.2025
Rev. Description Date

Project: Priory Road, Rotherham
Client: Priory Road Properties Ltd.

Drawn	Checked	Approved	Date	Scale @ A1
DW	RS	GC	09/25	N.T.S

Drawing Title: Below Ground Drainage Details Sheet 1
Drawing Status: P R E L I M I N A R Y

Project No.	Drawing No.	Revision
11452 – C – DR – XX – 00 – 6001 – P01		

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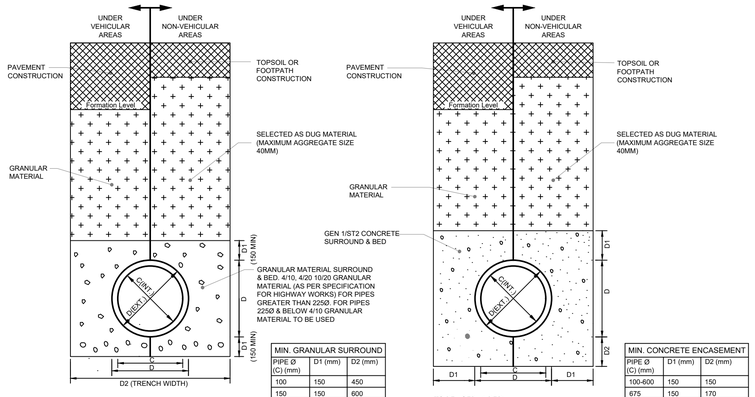


TO BE USED UNDER:

1. VEHICULAR AREAS WHERE COVER TO PIPE SOFFIT IS GREATER THAN 900mm.
2. ALL NON-VEHICULAR AREAS WHERE COVER TO PIPE SOFFIT IS GREATER THAN 600mm.

NOTE:
ALL PIPEWORK SHALL HAVE FLEXIBLE COUPLINGS

MIN. GRANULAR SURROUND		
PIPE Ø (C) (mm)	D1 (mm)	D2 (mm)
100	150	450
150	150	600
225	150	700
300	150	850
375	200	1050
450	200	1150
525	200	1200
600	200	1350
675	200	1450
750	200	1500

CLASS S PIPE BEDDING & SURROUND (TO BE USED FOR PLASTIC, VITRIFIED CLAY & CONCRETE PIPEWORK)

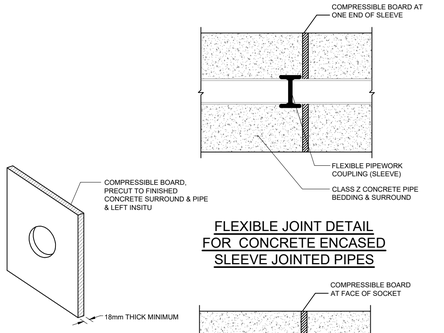
TO BE USED UNDER:

1. VEHICULAR AREAS WHERE COVER TO PIPE SOFFIT IS EQUAL TO OR LESS THAN 900mm.
2. ALL NON-VEHICULAR AREAS WHERE COVER TO PIPE SOFFIT IS EQUAL TO OR LESS THAN 600mm.

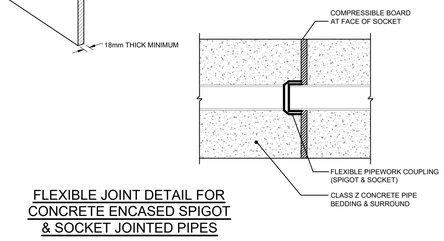
NOTE:
ALL PIPEWORK WITH CLASS Z (GEN 3/ST4) CONCRETE SURROUND SHALL HAVE FLEXIBLE COUPLINGS WITH FLEXI-BOARDS ON ALL JOINTS (REFER TO DETAIL D8)

MIN. CONCRETE ENCASEMENT		
PIPE Ø (C) (mm)	D1 (mm)	D2 (mm)
100-600	150	150
675	150	170
750	150	190
825	150	210
900	150	225
975	150	250
1050	150	270
1200	170	300
1350	180	350
1500	200	375
1650	220	420

CLASS Z PIPE BEDDING & SURROUND (TO BE USED FOR PLASTIC, VITRIFIED CLAY & CONCRETE PIPEWORK)

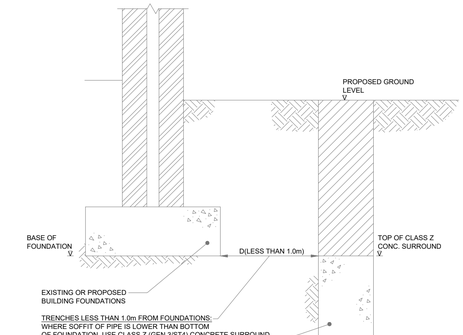


FLEXIBLE JOINT DETAIL FOR CONCRETE ENCASED SLEEVE JOINTED PIPES

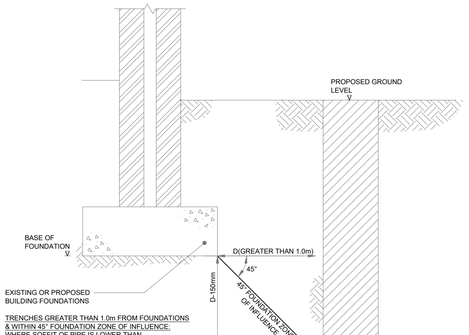


FLEXIBLE JOINT DETAIL FOR CONCRETE ENCASED SPIGOT & SOCKET JOINTED PIPES

FLEXIBLE JOINT DETAIL FOR CONCRETE ENCASED PIPES (TO B.S. 1142)

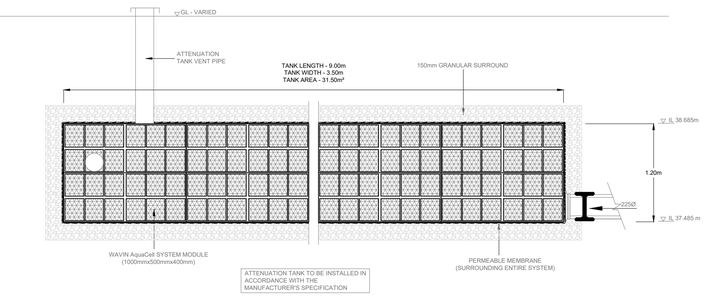


DRAINAGE TRENCH LESS THAN 1.0m FROM EXISTING/PROPOSED FOUNDATIONS

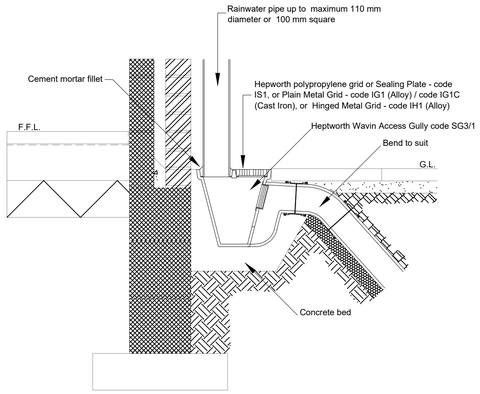


DRAINAGE TRENCH GREATER THAN 1.0m FROM EXISTING/PROPOSED FOUNDATIONS

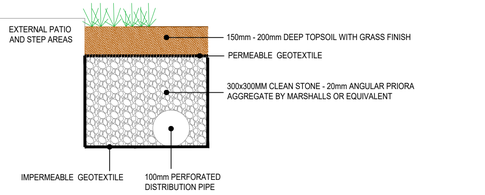
PIPE PROTECTION ADJACENT TO EXISTING/PROPOSED FOUNDATIONS



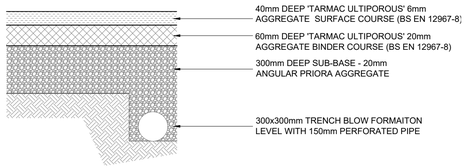
INFILTRATION TANK DETAIL



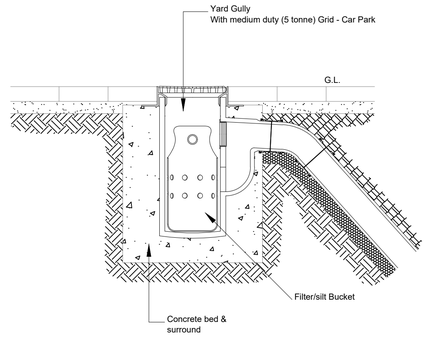
RAINWATER PIPE TO GULLY DETAIL



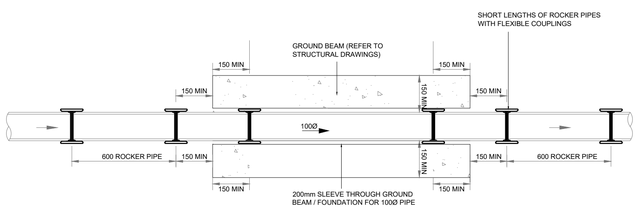
FILTER DRAIN DETAIL (LANDSCAPE AREA ADJACENT TO PAVING)



PERMEABLE SURFACING DRAINAGE DETAIL



TYPICAL YARD GULLY DETAIL (CAR PARK AREAS)



TYPICAL PIPE THROUGH GROUND BEAM / FOUNDATION DETAIL

Rev	P01
Number	6002
Level	00
Zone	XX
Type	DR
Role	C

P01 Planning Condition Discharge 11.09.2025
Rev. Description Date

Project
Priory Road, Rotherham

Client
Priory Road Properties Ltd.

Drawn	Checked	Approved	Date	Scale @ A1
DW	RS	GC	09/25	N.T.S

Drawing Title
Below Ground Drainage Details
Sheet 2

Drawing Status
P R E L I M I N A R Y

Project No. 11452 | Drawing No. C - DR - XX - 00 - 6002 | Revision P01

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Priory Road

Appendix G – Surface Water Network Calculations

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 445390 402710 SE 45390 02710
Data Type	Point
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	1.000
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.000
Maximum Backdrop Height (m)	0.000
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.049	4-8	0.016	8-12	0.014	12-16	0.011

Total Area Contributing (ha) = 0.090

Total Pipe Volume (m³) = 2.164

Network Design Table for Storm

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	11.550	0.145	79.7	0.006	15.00	0.0	0.600	o	150	Pipe/Conduit	
1.001	12.000	0.150	80.0	0.004	0.00	0.0	0.600	o	150	Pipe/Conduit	
2.000	11.550	0.295	39.2	0.014	15.00	0.0	0.600	o	150	Pipe/Conduit	
1.002	7.250	0.090	80.6	0.005	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)
1.000	50.00	15.17	39.500	0.006	0.0	0.0	0.0	1.13	19.9	1.1
1.001	50.00	15.35	39.355	0.010	0.0	0.0	0.0	1.12	19.9	1.8
2.000	50.00	15.12	39.500	0.014	0.0	0.0	0.0	1.61	28.5	2.5
1.002	50.00	15.46	39.205	0.029	0.0	0.0	0.0	1.12	19.8	5.2

Network Design Table for Storm

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
3.000	11.550	0.145	79.7	0.006	15.00	0.0	0.600	o	150	Pipe/Conduit	
3.001	4.700	0.060	78.3	0.005	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.003	10.200	0.365	27.9	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.004	4.900	0.300	16.3	0.012	0.00	0.0	0.600	o	150	Pipe/Conduit	
4.000	11.600	0.145	80.0	0.002	15.00	0.0	0.600	o	150	Pipe/Conduit	
4.001	11.300	0.140	80.7	0.012	0.00	0.0	0.600	o	150	Pipe/Conduit	
5.000	12.800	0.160	80.0	0.012	15.00	0.0	0.600	o	150	Pipe/Conduit	
1.005	4.000	0.040	100.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
6.000	1.800	0.665	2.7	0.012	15.00	0.0	0.600	o	150	Pipe/Conduit	
1.006	1.000	0.010	100.0	0.000	0.00	0.0	0.600	o	225	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)
3.000	50.00	15.17	39.320	0.006	0.0	0.0	0.0	1.13	19.9	1.1
3.001	50.00	15.24	39.175	0.011	0.0	0.0	0.0	1.14	20.1	2.0
1.003	50.00	15.55	39.115	0.040	0.0	0.0	0.0	1.91	33.8	7.2
1.004	50.00	15.58	38.750	0.052	0.0	0.0	0.0	2.50	44.3	9.4
4.000	50.00	15.17	37.885	0.002	0.0	0.0	0.0	1.12	19.9	0.4
4.001	50.00	15.34	37.740	0.014	0.0	0.0	0.0	1.12	19.8	2.5
5.000	50.00	15.19	37.760	0.012	0.0	0.0	0.0	1.12	19.9	2.2
1.005	50.00	15.63	37.525	0.078	0.0	0.0	0.0	1.31	52.0	14.1
6.000	50.00	15.00	38.950	0.012	0.0	0.0	0.0	6.17	109.1	2.2
1.006	50.00	15.64	37.485	0.090	0.0	0.0	0.0	1.31	52.0	16.2

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S1	40.400	0.900	Open Manhole	150	1.000	39.500	150				
S2	40.400	1.045	Open Manhole	460	1.001	39.355	150	1.000	39.355	150	
S3	40.400	0.900	Open Manhole	150	2.000	39.500	150				
S4	40.275	1.070	Open Manhole	460	1.002	39.205	150	1.001	39.205	150	
								2.000	39.205	150	
S5	40.150	0.830	Open Manhole	150	3.000	39.320	150				
S6	40.150	0.975	Open Manhole	460	3.001	39.175	150	3.000	39.175	150	
S7	40.150	1.035	Open Manhole	460	1.003	39.115	150	1.002	39.115	150	
								3.001	39.115	150	
S8	39.500	0.750	Open Manhole	460	1.004	38.750	150	1.003	38.750	150	
S9	38.685	0.800	Open Manhole	150	4.000	37.885	150				
S10	38.685	0.945	Open Manhole	460	4.001	37.740	150	4.000	37.740	150	
S1	38.685	0.925	Open Manhole	460	5.000	37.760	150				
S12	39.200	1.675	Open Manhole	1200	1.005	37.525	225	1.004	38.450	150	850
								4.001	37.600	150	
								5.000	37.600	150	
S13	39.700	0.750	Open Manhole	460	6.000	38.950	150				
Inf. Tank	39.200	1.715	Open Manhole	1	1.006	37.485	225	1.005	37.485	225	
								6.000	38.285	150	725
S13	39.200	1.725	Open Manhole	1200		OUTFALL		1.006	37.475	225	

No coordinates have been specified, layout information cannot be produced.

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	150	S1	40.400	39.500	0.750	Open Manhole	150
1.001	o	150	S2	40.400	39.355	0.895	Open Manhole	460
2.000	o	150	S3	40.400	39.500	0.750	Open Manhole	150
1.002	o	150	S4	40.275	39.205	0.920	Open Manhole	460
3.000	o	150	S5	40.150	39.320	0.680	Open Manhole	150
3.001	o	150	S6	40.150	39.175	0.825	Open Manhole	460
1.003	o	150	S7	40.150	39.115	0.885	Open Manhole	460
1.004	o	150	S8	39.500	38.750	0.600	Open Manhole	460
4.000	o	150	S9	38.685	37.885	0.650	Open Manhole	150
4.001	o	150	S10	38.685	37.740	0.795	Open Manhole	460
5.000	o	150	S1	38.685	37.760	0.775	Open Manhole	460
1.005	o	225	S12	39.200	37.525	1.450	Open Manhole	1200
6.000	o	150	S13	39.700	38.950	0.600	Open Manhole	460
1.006	o	225	Inf. Tank	39.200	37.485	1.490	Open Manhole	1

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	11.550	79.7	S2	40.400	39.355	0.895	Open Manhole	460
1.001	12.000	80.0	S4	40.275	39.205	0.920	Open Manhole	460
2.000	11.550	39.2	S4	40.275	39.205	0.920	Open Manhole	460
1.002	7.250	80.6	S7	40.150	39.115	0.885	Open Manhole	460
3.000	11.550	79.7	S6	40.150	39.175	0.825	Open Manhole	460
3.001	4.700	78.3	S7	40.150	39.115	0.885	Open Manhole	460
1.003	10.200	27.9	S8	39.500	38.750	0.600	Open Manhole	460
1.004	4.900	16.3	S12	39.200	38.450	0.600	Open Manhole	1200
4.000	11.600	80.0	S10	38.685	37.740	0.795	Open Manhole	460
4.001	11.300	80.7	S12	39.200	37.600	1.450	Open Manhole	1200
5.000	12.800	80.0	S12	39.200	37.600	1.450	Open Manhole	1200
1.005	4.000	100.0	Inf. Tank	39.200	37.485	1.490	Open Manhole	1
6.000	1.800	2.7	Inf. Tank	39.200	38.285	0.765	Open Manhole	1
1.006	1.000	100.0	S13	39.200	37.475	1.500	Open Manhole	1200

Network Classifications for Storm

PN	USMH Name	Pipe Dia (mm)	Min Cover Depth (m)	Max Cover Depth (m)	Pipe Type	MH Dia (mm)	MH Width (mm)	MH Ring Depth (m)	MH Type
1.000	S1	150	0.750	0.895	Unclassified	150	0	0.750	Unclassified
1.001	S2	150	0.895	0.920	Unclassified	460	0	0.895	Unclassified
2.000	S3	150	0.750	0.920	Unclassified	150	0	0.750	Unclassified
1.002	S4	150	0.885	0.920	Unclassified	460	0	0.920	Unclassified
3.000	S5	150	0.680	0.825	Unclassified	150	0	0.680	Unclassified
3.001	S6	150	0.825	0.885	Unclassified	460	0	0.825	Unclassified
1.003	S7	150	0.600	0.885	Unclassified	460	0	0.885	Unclassified
1.004	S8	150	0.600	0.600	Unclassified	460	0	0.600	Unclassified
4.000	S9	150	0.650	0.795	Unclassified	150	0	0.650	Unclassified
4.001	S10	150	0.795	1.450	Unclassified	460	0	0.795	Unclassified
5.000	S1	150	0.775	1.450	Unclassified	460	0	0.775	Unclassified
1.005	S12	225	1.450	1.490	Unclassified	1200	0	1.450	Unclassified
6.000	S13	150	0.600	0.765	Unclassified	460	0	0.600	Unclassified
1.006	Inf. Tank	225	1.490	1.500	Unclassified	1	0	1.490	Unclassified

Simulation Criteria for Storm

Volumetric Runoff Coeff	1.000	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Offline Controls	0	Number of Time/Area Diagrams	0
Number of Online Controls	1	Number of Storage Structures	1	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH	Summer Storms	Yes
Return Period (years)	100	Winter Storms	No
FEH Rainfall Version	2013	Cv (Summer)	1.000
Site Location GB 445390 402710 SE 45390 02710		Cv (Winter)	0.840
Data Type	Point	Storm Duration (mins)	30

Storage Structures for Storm

Cellular Storage Manhole: Inf. Tank, DS/PN: 1.006

Invert Level (m) 37.485 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.77136 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.77136

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	31.5	31.5	1.200	31.5	58.4	1.201	0.0	58.5

Manhole Headloss for Storm

PN	US/MH Name	US/MH Headloss
1.000	S1	0.500
1.001	S2	0.500
2.000	S3	0.500
1.002	S4	0.500
3.000	S5	0.500
3.001	S6	0.500
1.003	S7	0.500
1.004	S8	0.500
4.000	S9	0.500
4.001	S10	0.500
5.000	S1	0.500
1.005	S12	0.500
6.000	S13	0.500
1.006	Inf. Tank	0.500

Volume Summary (Static)

Length Calculations based on Centre-Centre

Pipe Number	USMH Name	Manhole Volume (m³)	Pipe Volume (m³)	Storage Structure Volume (m³)	Total Volume (m³)
1.000	S1	0.016	0.204	0.000	0.220
1.001	S2	0.174	0.212	0.000	0.386
2.000	S3	0.016	0.204	0.000	0.220
1.002	S4	0.178	0.128	0.000	0.306
3.000	S5	0.015	0.204	0.000	0.219
3.001	S6	0.162	0.083	0.000	0.245
1.003	S7	0.172	0.180	0.000	0.352
1.004	S8	0.125	0.087	0.000	0.211
4.000	S9	0.014	0.205	0.000	0.219
4.001	S10	0.157	0.200	0.000	0.357
5.000	S1	0.154	0.226	0.000	0.380
1.005	S12	1.894	0.159	0.000	2.053
6.000	S13	0.125	0.032	0.000	0.156
1.006	Inf. Tank	0.000	0.040	35.920	35.960
Total		3.201	2.164	35.920	41.284

Volume Summary (Static)

Length Calculations based on True Length

Pipe Number	USMH Name	Manhole Volume (m³)	Pipe Volume (m³)	Storage Structure Volume (m³)	Total Volume (m³)
1.000	S1	0.016	0.199	0.000	0.215
1.001	S2	0.174	0.204	0.000	0.378
2.000	S3	0.016	0.199	0.000	0.215
1.002	S4	0.178	0.120	0.000	0.298
3.000	S5	0.015	0.199	0.000	0.213
3.001	S6	0.162	0.075	0.000	0.237
1.003	S7	0.172	0.172	0.000	0.344
1.004	S8	0.125	0.072	0.000	0.197
4.000	S9	0.014	0.200	0.000	0.214
4.001	S10	0.157	0.185	0.000	0.342
5.000	S1	0.154	0.212	0.000	0.365
1.005	S12	1.894	0.135	0.000	2.030
6.000	S13	0.125	0.028	0.000	0.152
1.006	Inf. Tank	0.000	0.016	35.920	35.936
Total		3.201	2.014	35.920	41.135

2 year Return Period Summary of Critical Results by Flow Capacity Ratio (Rank 1) for Storm

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 Coeffiecient	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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model		FEH	Data Type Point
FEH Rainfall Version		2013	Cv (Summer) 1.000
Site Location	GB 445390 402710 SE 45390 02710		Cv (Winter) 1.000

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	OFF

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 35, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
1.000	S1	30 Summer	2	+0%					39.518	-0.132	0.000
1.001	S2	30 Summer	2	+0%					39.380	-0.125	0.000
2.000	S3	30 Summer	2	+0%					39.522	-0.128	0.000
1.002	S4	30 Summer	2	+0%					39.249	-0.106	0.000
3.000	S5	30 Summer	2	+0%					39.338	-0.132	0.000
3.001	S6	15 Summer	2	+0%					39.205	-0.120	0.000
1.003	S7	30 Summer	2	+0%					39.154	-0.111	0.000
1.004	S8	15 Summer	2	+0%					38.794	-0.106	0.000
4.000	S9	30 Summer	2	+0%	30/15 Summer				37.893	-0.142	0.000
4.001	S10	15 Summer	2	+0%	30/15 Summer				37.775	-0.115	0.000
5.000	S1	30 Summer	2	+0%	30/15 Summer				37.785	-0.125	0.000
1.005	S12	15 Summer	2	+0%	30/15 Summer				37.621	-0.129	0.000
6.000	S13	30 Summer	2	+0%					38.965	-0.135	0.000
1.006	Inf. Tank	30 Summer	2	+0%	30/15 Summer				37.648	-0.062	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S1	0.03			0.6	OK	
1.001	S2	0.06			1.2	OK	
2.000	S3	0.05			1.4	OK	
1.002	S4	0.19			3.2	OK	
3.000	S5	0.03			0.6	OK	
3.001	S6	0.08			1.3	OK	
1.003	S7	0.15			4.5	OK	

2 year Return Period Summary of Critical Results by Flow Capacity Ratio (Rank 1) for Storm

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.004	S8	0.18			6.3	OK	
4.000	S9	0.01			0.2	OK	
4.001	S10	0.12			2.1	OK	
5.000	S1	0.07			1.2	OK	
1.005	S12	0.32			9.5	OK	
6.000	S13	0.02			1.2	OK	
1.006	Inf. Tank	0.00		17	0.0	OK	

30 year Return Period Summary of Critical Results by Flow Capacity Ratio (Rank 1) for Storm

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 Coeffiecient	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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model		FEH	Data Type Point
FEH Rainfall Version		2013	Cv (Summer) 1.000
Site Location	GB 445390 402710 SE 45390 02710		Cv (Winter) 1.000

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	OFF

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 35, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
1.000	S1	30 Summer	30	+35%					39.532	-0.118	0.000
1.001	S2	15 Summer	30	+35%					39.404	-0.101	0.000
2.000	S3	30 Summer	30	+35%					39.542	-0.108	0.000
1.002	S4	15 Summer	30	+35%					39.295	-0.060	0.000
3.000	S5	30 Summer	30	+35%					39.352	-0.118	0.000
3.001	S6	15 Summer	30	+35%					39.234	-0.091	0.000
1.003	S7	15 Summer	30	+35%					39.194	-0.071	0.000
1.004	S8	15 Summer	30	+35%					38.845	-0.055	0.000
4.000	S9	30 Summer	30	+35%	30/15 Summer				38.224	0.189	0.000
4.001	S10	15 Summer	30	+35%	30/15 Summer				38.064	0.174	0.000
5.000	S1	30 Summer	30	+35%	30/15 Summer				38.226	0.316	0.000
1.005	S12	15 Summer	30	+35%	30/15 Summer				38.063	0.313	0.000
6.000	S13	30 Summer	30	+35%					38.977	-0.123	0.000
1.006	Inf. Tank	60 Winter	30	+35%	30/15 Summer				38.283	0.573	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S1	0.11			1.9	OK	
1.001	S2	0.24			4.3	OK	
2.000	S3	0.17			4.4	OK	
1.002	S4	0.66			11.1	OK	
3.000	S5	0.11			1.9	OK	
3.001	S6	0.32			4.9	OK	
1.003	S7	0.53			16.0	OK	

30 year Return Period Summary of Critical Results by Flow Capacity Ratio (Rank 1) for Storm

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.004	S8	0.71			24.2	OK	
4.000	S9	0.03			0.6	SURCHARGED	
4.001	S10	0.49			8.8	SURCHARGED	
5.000	S1	0.21			3.7	SURCHARGED	
1.005	S12	1.16			34.8	SURCHARGED	
6.000	S13	0.07			3.8	OK	
1.006	Inf. Tank	0.00		53	0.0	SURCHARGED	

100 year Return Period Summary of Critical Results by Flow Capacity Ratio (Rank 1) for Storm

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 Coeffiecient	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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FEH	Data Type	Point
FEH Rainfall Version	2013	Cv (Summer)	1.000
Site Location	GB 445390 402710 SE 45390 02710	Cv (Winter)	1.000

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	OFF

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 35, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
1.000	S1	30 Summer	100	+40%					39.537	-0.113	0.000
1.001	S2	15 Summer	100	+40%					39.413	-0.092	0.000
2.000	S3	30 Summer	100	+40%					39.549	-0.101	0.000
1.002	S4	15 Summer	100	+40%					39.315	-0.040	0.000
3.000	S5	30 Summer	100	+40%					39.357	-0.113	0.000
3.001	S6	15 Summer	100	+40%					39.244	-0.081	0.000
1.003	S7	15 Summer	100	+40%					39.210	-0.055	0.000
1.004	S8	15 Summer	100	+40%					38.866	-0.034	0.000
4.000	S9	30 Summer	100	+40%	30/15 Summer				38.526	0.491	0.000
4.001	S10	15 Summer	100	+40%	30/15 Summer				38.298	0.408	0.000
5.000	S1	30 Summer	100	+40%	30/15 Summer				38.529	0.619	0.000
1.005	S12	15 Summer	100	+40%	30/15 Summer				38.297	0.547	0.000
6.000	S13	30 Summer	100	+40%					38.982	-0.118	0.000
1.006	Inf. Tank	60 Winter	100	+40%	30/15 Summer				38.658	0.948	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S1	0.14			2.6	OK	
1.001	S2	0.32			5.7	OK	
2.000	S3	0.23			6.0	OK	
1.002	S4	0.87			14.8	OK	
3.000	S5	0.14			2.6	OK	
3.001	S6	0.43			6.6	OK	
1.003	S7	0.71			21.3	OK	

100 year Return Period Summary of Critical Results by Flow Capacity Ratio (Rank 1) for Storm

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.004	S8	0.94			32.3	OK	
4.000	S9	0.04			0.8	FLOOD RISK	
4.001	S10	0.60			10.7	SURCHARGED	
5.000	S1	0.26			4.8	FLOOD RISK	
1.005	S12	1.47			43.9	SURCHARGED	
6.000	S13	0.10			5.1	OK	
1.006	Inf. Tank	0.00		65	0.0	SURCHARGED	