

19-7688 - Land at Wood Farm, Stanton Lane – Main Site

Wood Farm Holdings Ltd.

Flood Risk Assessment Drainage Statement

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Issue 8

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Issue Record

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- The date on which the final report is delivered

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Executive Summary

This Flood Risk Assessment (FRA) is in support of a planning application for a development on a 32.59ha development site off Stanton Lane Ellistown, Coalville. The development will provide buildings for employment purposes and associated access roads. The proposed development will comprise of warehouse units of varying sizes with associated service yards, car parking and ancillary offices with a combined impermeable area of 18.025ha.

This Flood Risk Assessment is carried out in accordance with the Strategic Flood Risk Assessment for Hinckley and Bosworth Council (2019), BS 8533:2011, National Planning Policy Framework (NPPF), Planning Practice Guidance (PPG), Environment Agency (EA) Advice for Development and following the guidance in CIRIA C624, C697 & C753.

The proposed development site is located in Flood Zone 1, an area with a low probability of flooding.

The assessment found that the risk of flooding from fluvial, pluvial, groundwater and tidal sources are low. It is considered that the proposed development, with the inclusion of the SuDS drainage systems described in Section 4 of this assessment, will not increase the risk of surface water flooding in the wider catchment.

It is considered that if the SuDS systems and mitigation described in this report are implemented, then there is no residual flood risk to be mitigated for the proposed development.

The surface water strategy is to collect the run off from the impermeable areas of the site into a drainage system that includes SUDs features and restrict the discharge to the equivalent current greenfield run off rate, as prescribed in CIRIA SuDS Manual Guide. It is proposed to limit the discharge from the site to the greenfield mean annual run off rate of 79.2 l/s for storm events up to and including the 100-year event + climate change. Attenuated flows will be stored in attenuation pond(s). The surface water network will be designed for the 1 in 100-year event plus 40% allowance for climate change for events, up to a six-hour duration.

<i>Site Location:</i>	The site is located to the South east of the B585 West Lane where it runs into Victoria Road at an approximate National grid reference of E: 444,650, N: 310,403 and nearest postcode of LE67 1FF. The site is bound to north by woodland and Stanton Lane to the south. Cliffe Hill Quarry (Midlands Quarry Products) and the Mineral Railway is located to the North of the woodland. A Power Transmission & Distribution site is located to the south east of the site. The site is approximately 4.2km to the southeast of Coalville and 2km southeast of Ellistown. Bardon Hill is located approximately 500m to the north of the site. The site can be accessed from either the M1 J22 or the A42 J13 via the A511.
<i>Size and Current Land Use:</i>	The site is currently used for agriculture as part of Wood Farm, Ellistown and has an approximate plan area of 32.59 Hectares.
<i>Proposed Development:</i>	The proposed development comprises warehouse units with ancillary offices and associated access roads, car parking and service yards.
<i>EA Flood Zone Classification:</i>	The site is in Flood Zone 1 - Land having a less than 1 in 1000-year probability of flooding from rivers or seas in any given year.
<i>Lead Local Flood Authority:</i>	Lead Local Flood Authority (LLFA) - Leicestershire County Council
<i>Fluvial Flood Risk:</i>	The site is shown on GOV.UK Flood Risk from rivers and sea map at very low risk of flooding from rivers and sea. Less than 0.1%.
<i>Tidal Flood Risk:</i>	Tidal Flood Risk for the site is very low.
<i>Surface Water Pluvial Flood Risk:</i>	Flood risk from surface water, which is shown on GOV.UK mapping, shows that the site is at a very low risk; Very low risk means that each year this area has a chance of flooding of less than 0.1%. Low risk means that each year this area has a chance of flooding of between 0.1% and 1%.

1. Introduction

Complete Design Partnership Ltd. has been instructed by Wood Farm Holdings to prepare this Flood Risk Assessment. This Flood Risk Assessment (FRA) is in support of a planning application for a development on a 32.59 hectare greenfield site off Stanton Lane Ellistown, Coalville, to provide buildings for employment purposes and associated infrastructure. The proposed development comprises of warehouse units of varying sizes with service yards, car parks and ancillary offices with a combined impermeable area of 18.025ha.

The site is located to the South east of the B585 West Lane where it runs into Victoria Road at an approximate National grid reference of E: 444,650, N: 310,403 and nearest postcode of LE67 1FF. The site is bound to north by woodland and Stanton Lane to the south. Cliffe Hill Quarry (Midlands Quarry Products) and the Mineral Railway is located to the North of the woodland. A Power Transmission & Distribution site is located to the south east of the site. The site is approximately 4.2km to the southeast of Coalville and 2km southeast of Ellistown. Bardon Hill is located approximately 500m to the north of the site.

The site can be accessed from either the M1 J22 or the A42 J13 via the A511.



Figure 1: Site Location

This Flood Risk Assessment is carried out in accordance with the Strategic Flood Risk Assessment for Hinckley and Bosworth Council (2019), BS 8533:2011, National Planning Policy Framework (NPPF), Planning Practice Guidance (PPG), Environment Agency (EA) Advice for Development and following the guidance in CIRIA C624, C697 & C753.

The site is located in Flood Zone 1 at very low risk from Fluvial, Pluvial Flooding and not shown to be at risk of flooding from reservoirs.

1.1 Reference Data

The following documents form part of this assessment (Table 1):

Table 1: Reference Data

Document	Prepared by:	Reference/No.
Site Layout Plan	Michael Sparks Associates	30865-PL-301 E
Topographical Survey	Greenhatch Group	32465-T
Proposed Drainage Strategy	CDP Ltd	SK0010

Existing topographical survey data and levels of both the site and Road are shown on the Topographical Survey drawing. Copies of drawings are included in Appendix A.

1.2 Climate change

Research by the Environment Agency (EA) shows that over the coming years, the probability of occurrence of severe flooding will increase. The EA and guidance from the SFRA set out recommendations for contingency allowances for climate change. Table 2 summarises the two possible scenarios for future increases in rainfall intensity, 'Central' and 'Upper End', both of which are considered to understand the impact. The allowances are included for a development with a design life horizon up to 2115.

Table 2: Recommended national precautionary sensitivity ranges for peak rainfall intensities

Scenario	Total potential change anticipated for 2015-2039	Total potential change anticipated for 2040-2069	Total potential change anticipated for 2070-2115
Upper End	10%	20%	40%
Central	5%	10%	20%

The design life of the buildings will be 50 years and will therefore extend beyond 2069. Therefore, a climate change allowance of 40% on rainfall will need to be included in the detailed drainage design.

2. Background to the site

2.1 General

The proposed site is located to the south of Bardon Hill, a mainly industrial area and immediately southeast of the B585 - West Lane. The exiting Bardon 2 development site is located to the northwest of the site and is bound by Stanton Lane to the south. Cliffe Hill Quarry and the Mineral Railway is located to the northeast and a solar farm to the southwest of the development site. The site consists of existing agricultural land on Wood Farm, Stanton Lane, Ellistown, Coalville.

The topographical survey data shows that the site slopes steeply from the northern boundary to the southern and western boundaries, with levels ranging between 193.032m AOD and 160.36m AOD.

2.2 Hydrology

An unnamed ordinary watercourse (Figure 2) is located to the south of the development site, as confirmed by the LLFA. The ordinary watercourse flows in a southerly direction and eventually outfalls into the Rothley Brook. Rothley Brook drains the existing site and much of the area to the south & south-east of the site. The head of one of the tributary branches of Rothley Brook is located within Bagworth Wood, approximately 500m to the south of the site. An extract from the SFRA mapping below shows site in relation to the river networks.

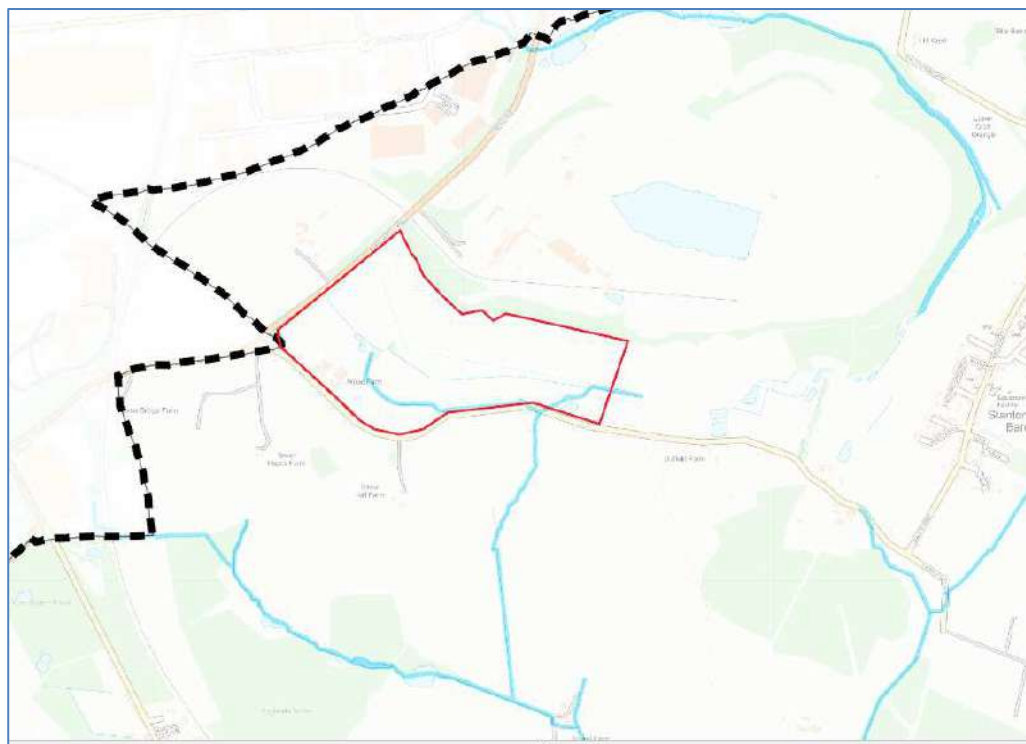


Figure 2: Ordinary Watercourse from SFRA

2.3 Geology

The (British Geology Survey) BGS UK Geology viewer shows that the site is within an area of; Superficial deposits of, Oadby Member which BGS describes as: *“Diamicton, grey, weathering brown, characterised by Cretaceous and Jurassic rock fragments; subordinate lenses of sand and gravel, clay*

and silt. Clay, brown to grey, and silty clay, with chalk and flint fragments” which is variable up to 20m and typically 1-7 metres thick. The underlying bedrock of Edwalton Member is described as: “Conformable, at the abrupt upward transition from structureless, reddish brown and greenish grey mottled, gypsiferous mudstone at the top of the Edwalton Member to the lowest fine to medium-grained sandstone bed of the Arden Sandstone Formation”.

Preliminary borehole logs from the site confirms that the site consist of Clay varying between firm to very stiff in parts. With the potential high levels of clay in the soil it is considered that it is unlikely to rely on infiltration as the main method of draining the site. The logs suggest that downward migration of water is considered unlikely to be readily occurring based on the generally cohesive nature of the ground. It is therefore considered that discharge of surface water to the ground via direct infiltration will not be suitable on this site.

This will be confirmed within the site investigation report which will include BRE365 permeability testing.

2.4 Flood Data

2.4.1 Fluvial flooding

The proposed development site is located in Flood Zone 1 at low risk of fluvial flooding from rivers and sea. Figure 3 shows the sites GOV.UK Flood Map for planning and Figure 4 shows the site in relation to the EA Risk of flooding, from Rivers and Sea, which highlights the existing ditch drainage network.

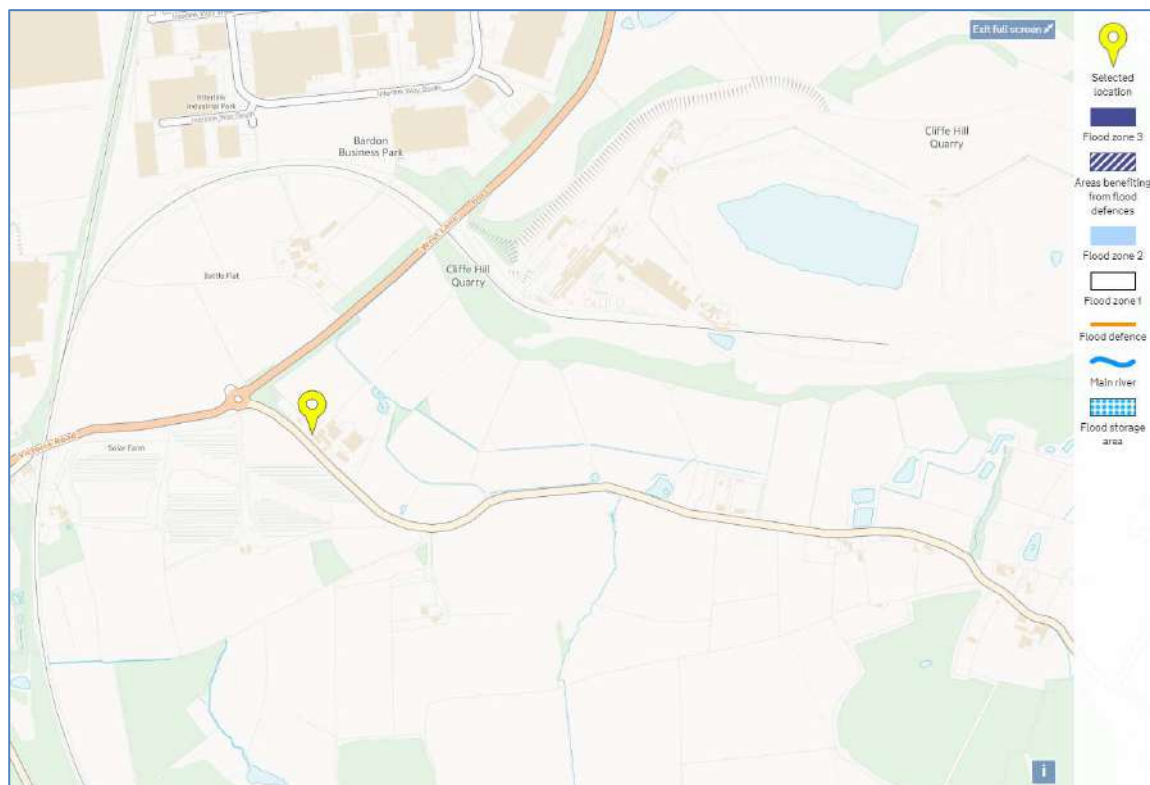


Figure 3: GOV.UK Flood Map for Planning

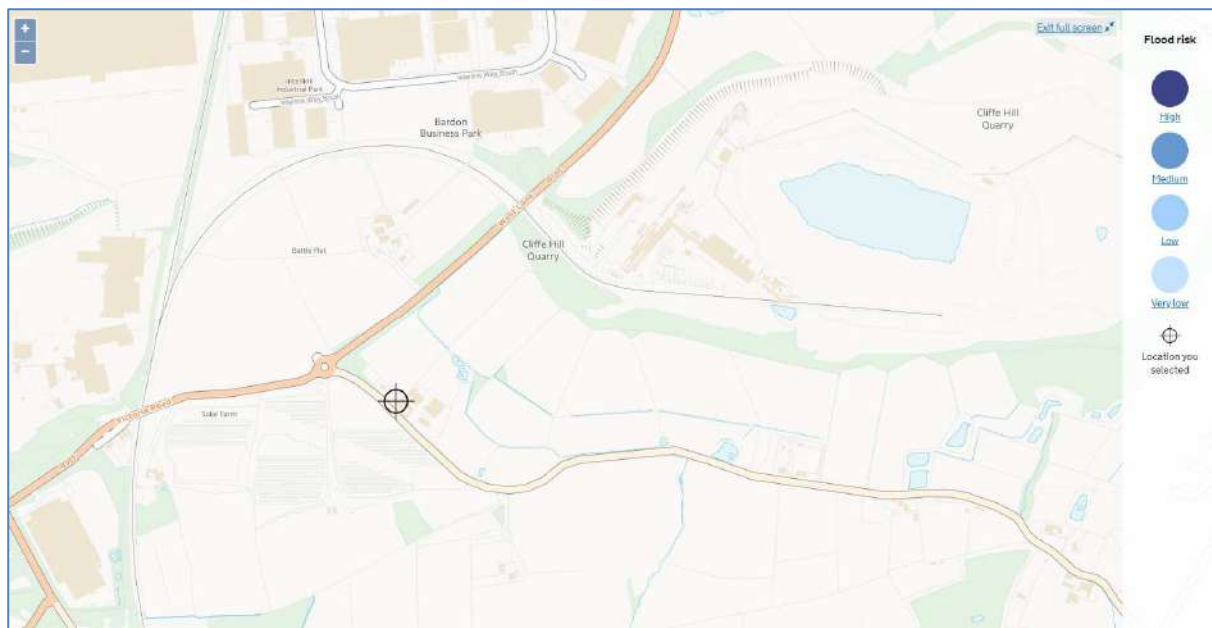


Figure 4: GOV.UK Flood Risk from Rivers and Sea

2.4.2 Historical flooding

No records of historic flooding on this site were found during the investigations for this report. Leicestershire County Council's Infrastructure Planning (Flood Risk Management) team has records of the following flooding incidents within close proximity to the site.

- Flooding of public right of way (R18) as a result of blockage to the drainage system/watercourse within Horse pool Grane industrial estate. Cliffe Hill Road, Stanton Under Bardon. (0.81km from site).

It is advised that not all instances of flooding are reported to Leicestershire County Council and as such, there may be a history of flooding for which we have no recorded evidence.

2.4.3 Surface water (Pluvial) flooding

The GOV.UK Surface Water Flood mapping shows the risk of surface water flooding on site to be low.

No historic flood event records have been discovered during the writing of this report.

From inspecting both the topographical survey and the risk from surface water flooding plans, it can be seen that, the areas at risk of flooding coincide with the existing land drainage features throughout the site. The drainage features are indicated by the localised areas of lower laying land. This is also highlighted on the flood maps where the existing land drainage network(s) can be seen.

The low-lying areas of the site are shown to be at low risk of flooding and will be managed within the proposed drainage design and recontouring of the site, thus mitigating the chance of flooding on site and downstream.

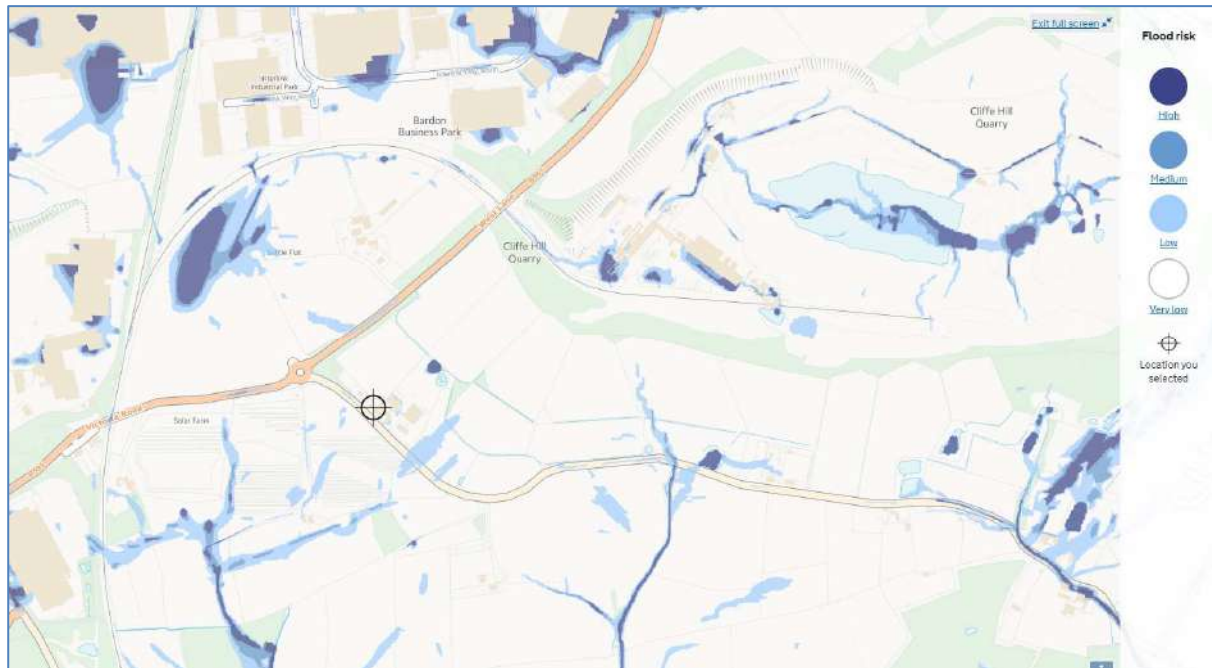


Figure 5: GOV.UK Surface Water Flood Map

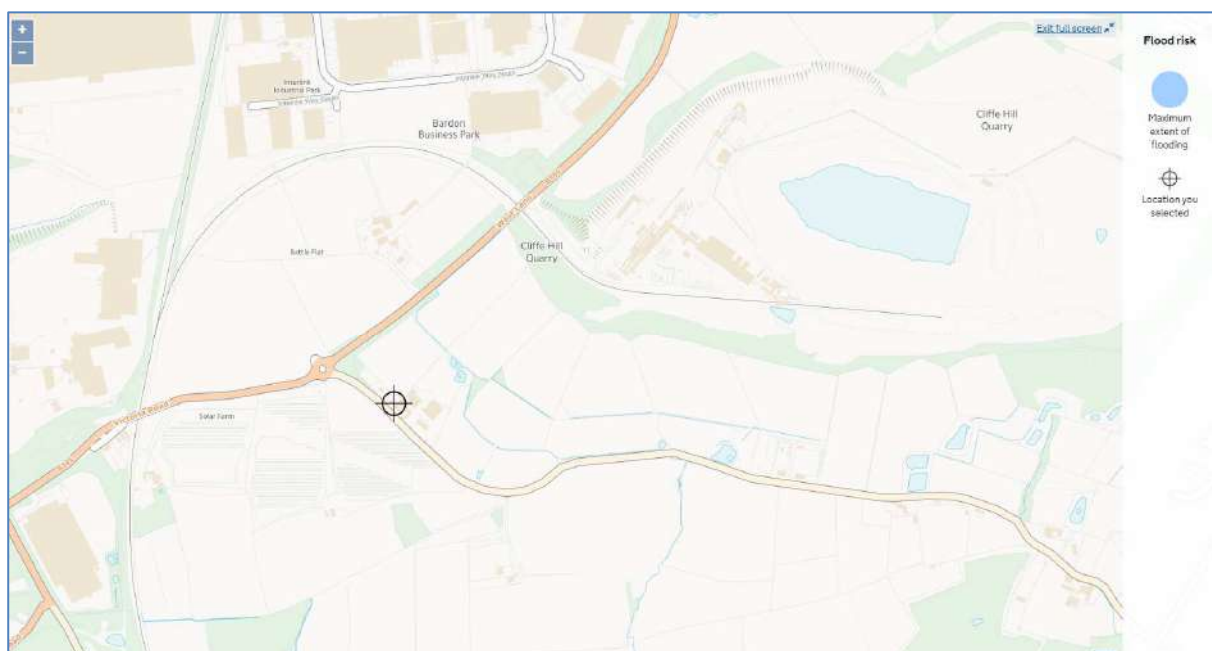


Figure 6: GOV.UK Flood Risk from Reservoir Flood Map

2.5 Existing drainage

The Rothley Brook drains the existing site and much of the area to the south/south-east of the site. The head of one of the tributary branches of Rothley Brook is located approximately 500m to the south of the site within Bagworth Wood. The Rothley Brook flows east to confluence with the River Soar, approximately 15km east of the site, to the north of Leicester.

Extract from historical mapping (2006 OS 1:10,000 map for the area) showing the land drainage channels flowing south from the site.

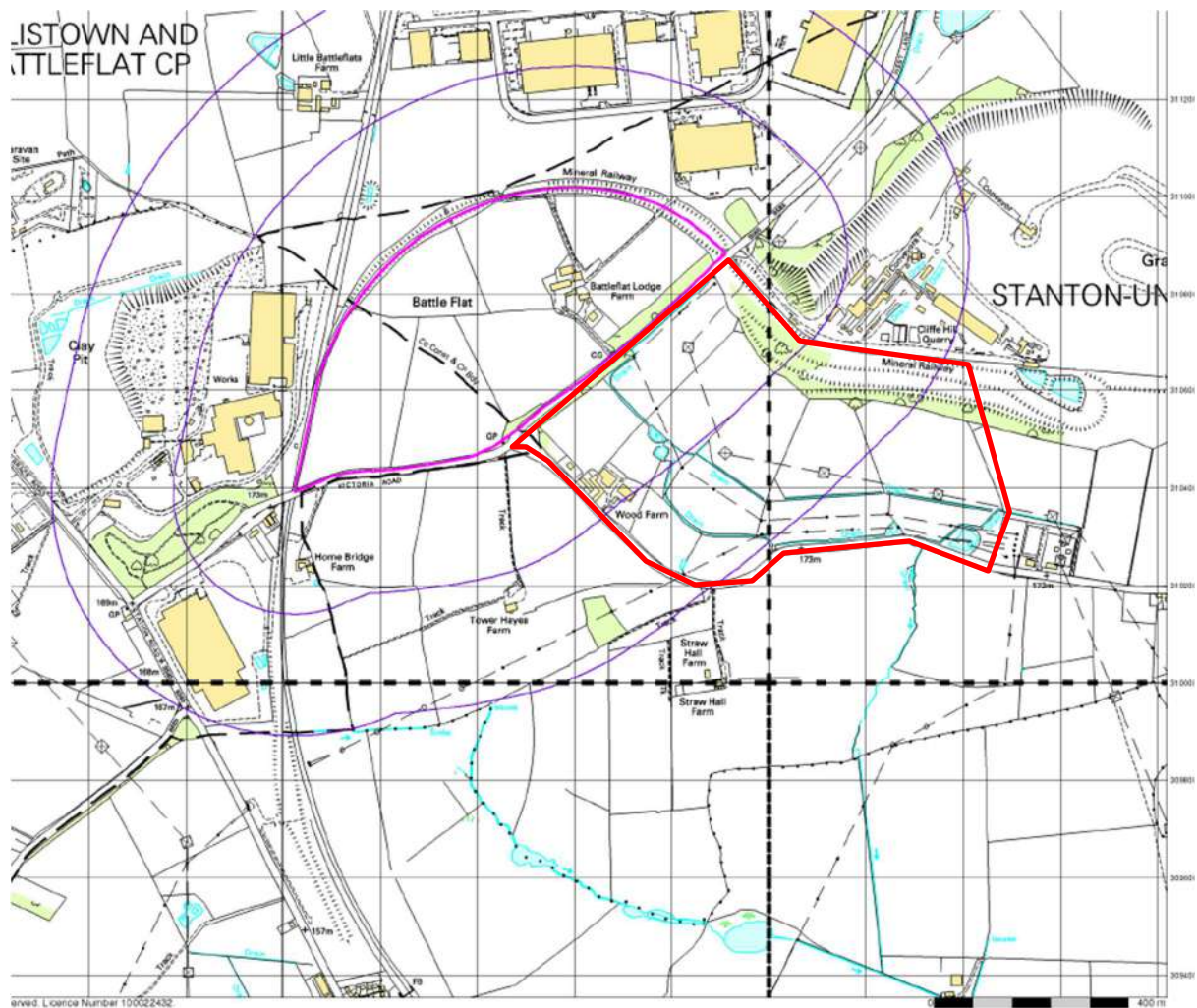


Figure 7: OS Mapping 2006 1:10,000

OS Mapping of the site, in figure 7 above, shows existing land drainage channels and flow directions.

Existing 900mmØ surface water pipes from the quarry run through the site and discharges into the unnamed Ordinary Watercourse located to the south of the site (Figure 8). The location and invert level information of the existing pipes are shown on the drainage strategy drawing in Appendix A.



Figure 8: Location of existing SW pipe from quarry

2.6 Existing impermeable area

The site currently consists of approximately 32.59 hectare of greenfield land which includes small areas of farm buildings with yard and vehicular parking. The site currently has a primary agricultural use and has a land drainage system of swales, ditches and ponds.

2.7 Sequential Test

The proposed development is located within Flood Zone 1. The proposed development is classified as “Less Vulnerable” for warehouse units which are entirely in Flood Zone 1. It therefore meets the compatibility requirements set out in Table 5 of the GOV.UK Guidance for Flood Risk and Coastal change shown over the page. It is considered that the proposals satisfy the requirements of the Sequential Test.

Flood risk vulnerability classification (see table 2)		Essential infrastructure	Water compatible	Highly vulnerable	More vulnerable	Less vulnerable
Flood zone (see table 1)	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test required	✓	✓
	Zone 3a	Exception Test required	✓	×	Exception Test required	✓
	Zone 3b functional floodplain	Exception Test required	✓	×	×	×

Key: ✓ Development is appropriate.
× Development should not be permitted.

Figure 9: GOV.UK Table 5 - Flood risk vulnerability and flood zone compatibility

3. Proposed Development

3.1 Description

The proposed development on the 32.59ha site will comprise of buildings which will be used for category B2 and/or B8 employment with associated service yards, car parks and ancillary offices. The new units will be served by new access roads off West Lane and Stanton Lane.

3.2 Impermeable area

The proposed impermeable area has been measured from the Architect's layout and measures 18.025ha. The large earthwork embankments immediately north of the site access road have been included in the model to test the robustness of the system. The embankments, ponds and remaining areas will be landscaped. The proposed development is therefore approximately 56% impermeable.

The LLFA requires sensitivity testing of 10% increase in impermeable areas to allow for urban creep. It is unlikely that any additional areas can be developed on site due to the proposed levels and topography of the site along with the earth embankments and pond. However, to test the robustness of the system the earthwork embankment areas were included in the calculations which is largely exaggerated considering the banks will be landscaped. It is therefore considered that more than the required sensitivity testing for the site has been incorporated in the calculations.

3.3 Proposed levels

The proposed levels of the external areas and buildings finished floor levels (FFL) are shown on the Drainage Strategy drawing (Appendix A). The levels are preliminary and subject move +/- 500mm to suit the final cut/fill design, but are expected to commensurate with the existing levels to tie in with Stanton and West Lanes levels for access to the site.

3.4 Proposed drainage

It is proposed to discharge the foul water drainage from this development to the STW public foul sewer via an existing connection to the rising main installed during the previous Bardon 2 development, located on the opposite side of West lane (an allowance for this was included within the design and application to STW for the Bardon2 Development). STW have confirmed that there shouldn't be any adverse hydraulic impact on the public foul network as a result of this connection for the foul discharge from the site. (See CDP - Proposed Drainage Strategy Drawing – 19-7688-SK0010 in Appendix A)

Storm water attenuation in combination with a number of flow controls will be used, as appropriate, to ensure that the proposed discharge from the site is limited to the greenfield mean annual run off rate of 79.2 l/s for all events up to the 100-year event. An allowance for climate change will need to be made in accordance with NPPF. Discharging of the surface water via infiltration is not considered appropriate because of the unsuitable underlying strata described in Section 2.6 of this document, this will be confirmed during the future site investigation.

During early consultation with the LLFA it was confirmed that an unnamed Ordinary Watercourse (Figure 2) is located to the south of the site, which eventually outfalls into Rothley Brook. A drainage survey found an existing surface water network running through the site which discharges into the ordinary watercourse. It is proposed to discharge the surface water from the impermeable areas of the site into the existing surface water sewer at attenuated flows rates as described above.

Site drainage should be designed following the guidance in Sewers for Adoption and the Planning Policy Guidance. Site drainage should be designed such that there is:

- No above ground flooding for the 1 in 30-year event; and
- No flooding of buildings for the 1 in 100-year event, including an allowance for climate change.

4. Drainage Design Considerations

The drainage strategy was developed following the recommendations in PPG and NPPF.

Surface water drainage design will need to incorporate an allowance for climate change.

Sustainable drainage systems (SuDS) will need to be used as appropriate. The following principles should be considered for the drainage strategy/design:

- Sustainable Drainage Systems (SuDS) to be used
- Attenuation storage in the form of open pond(s) designed for the 100-year storm event including climate change.
- Discharge to the existing surface water drain to be limited to 79.2 L/s (Qbar)
- Discharge from the individual units on the development site to be via a bypass separator(s).

4.1 Sustainable Drainage Systems (SuDS)

Sustainable Drainage Systems (SuDS) are designed to manage the environmental risks resulting from urban runoff and contribute to environmental enhancement, wherever possible. The aim of SuDS is to mimic a natural catchment as closely as possible by managing storm water in the following hierarchy of techniques:

1. Prevention – through site layout and design to prevent runoff and pollution, and incorporate rainwater re-use and harvesting;
2. Source control – control of runoff at or near its source, e.g. permeable pavements and soakaway;
3. Site control – management of runoff by routing to permeable areas or soakaway;
4. Regional control – management of runoff by storage prior to discharge to a water course or sewer.

The use of SuDS provides a significant contribution towards more sustainable development since they:

- address environmental impacts at source, rather than downstream;
- attenuate surface runoff rates, reducing the impact of urbanisation on flooding;
- protect or enhance water quality;
- can be engineered to be sympathetic to the environmental setting and the needs of the local community;
- provide opportunities for ecological habitat creation; and
- can encourage natural groundwater recharge.

Table 3 below summarises SuDS systems and their sustainability characteristics:

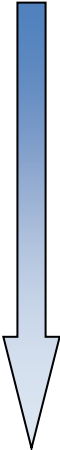
	SuDS system	Flood reduction	Pollution Reduction	Landscape & Wildlife benefit
Most sustainable 	Green roofs	•	•	•
	Basins and ponds	•	•	•
	Filter strips and swales	•	•	•
	Infiltration devices	•	•	
	Permeable surfaces and filter drains	•	•	
Least sustainable	Tanked systems	•		

Table 3: Sustainability of SuDS techniques

Principles of sustainable drainage will be applied for the site by the use of an attenuation pond and flow control(s) to limit the rate of discharge from the proposed development to greenfield rates. The surface water drainage attenuation will need to be designed for the 1 in 100-year event + 40% for climate change.

Infiltration of the storm water is not considered appropriate because the underlying strata as described in Section 2.6.

Table 4 below shows a summary of the feasibility of different SuDS techniques for the proposed development site:

SuDS Technique	Physical Constraints	Feasible	Unfeasible	Comments
Green roofs	Requires flat or minimal slope to roofs. Limited value for runoff attenuation in comparison to other techniques.		●	Not considered feasible on this development.
Rainwater harvesting	Can use above-ground or below-ground storage tanks		●	Not feasible for site demand.
Balancing ponds	Permanent pond with storage above the resting level of the pond. Require sufficient space and suitable topography.	●		Used as part of the current layout of site.
Soakaways and infiltration trenches	Require infiltration rates of 1×10^{-6} m/s or greater. Level of groundwater to be considered where water table known to be high.		●	Assumed to be not feasible due to the underlying strata.
Infiltration basins/swales	Applicable for attenuation and treatment of surface runoff by infiltration. Require slope of no more than 4-10% and can be used as soakaways.		●	Assumed to be not feasible due to the underlying strata.
Permeable Pavement	Most efficient on level sites. Can be designed for infiltration or as reservoir/storage system.		● ●	Infiltration assumed to be not feasible due to the underlying strata. Reservoir/storage system could be located in car park areas and access road.
Non-infiltration swales	Used as carrier ditch.		●	Used as part of the current layout of site.
Filter drains	Used as carrier drain, usually alongside roads, paths, etc.		●	Not appropriate to layout of site.
Underground storage tank/oversized pipes	Used to provide storage of storm water. Outflow usually regulated by flow control design. Need to be located under external areas such as access road, car park, landscaping.		●	Could be located under car park areas, service yard and access road.

Table 4: SuDS feasibility matrix

4.2 SuDS storm water management and storage volume

The Windes calculations, indicates that for the impermeable area of 18.025ha, which includes 1.695ha for sensitivity testing, attenuation storage volume of approximately 21500m³ will be required to attenuate the 1 in 100-year rainfall event (up to 6 hours), including a 40% allowance for climate change. The attenuation size required is based on Qbar run off rates of 79.2 l/s for events up to and including the 100-year event.

This is a preliminary estimate and all storage volumes given in this report are calculated assuming zero infiltration from the attenuation pond into the sub soil.

4.3 Pollution Prevention

Class 1 Bypass separators with internal alarm systems should be installed as advised in the Pollution Prevention Guidelines PPG3 prior to discharging into the existing water course.

5. Typical Maintenance Plan

5.1 General Drainage Maintenance

Providing the safety guidelines herewith are followed, inspections and simple maintenance from ground level can be carried out by non-skilled operatives.

It is strongly recommended that maintenance involving “man entry” is only carried out by specialist contractors, who will have the correct training and safety equipment.

It is usually worth lifting manhole covers periodically to keep the covers free and to look for debris and tell-tale signs of imminent problems. Regular inspections and periodic cleaning are required on Drainage Channels, Silt Pits, Catch Pits, Storage Attenuation, Manhole Chambers, Flow Control Devices and Grease Traps.

It is recommended that cause be investigated and the system cleaned by pressure jetting specialists (where required) if signs of the following are found:

- Ragging on step irons which usually mean that the pipes surcharge occasionally
- Mud or silt in a manhole which probably indicate a restriction downstream
- Detritus on the benching could be a sign of rats or of deterioration of the fabric of the manhole.
- Grease, which is a major cause of blockages.

The notes below should be read in conjunction with any manufacturer’s literature.

5.2 Drainage Safety Issues

Work on drainage systems expose personnel to serious Health and Safety Hazards These include but may not be limited to the following:

- Lifting heavy loads (manhole covers)
- The risk of injury through dropping heavy loads
- The risk of falling into chambers
- Biohazards from pathogenic bacteria e.g. Weil’s disease
- Poisonous- asphyxiating- and explosive gasses.
- Drowning.

These hazards can be addressed by the following simple rules:

- Never work alone
- Never enter a confined space such as a manhole unless trained and equipped to do so with gas detectors, breathing equipment and a recovery team assisting.
- Always use well-fitting lifting keys etc.
- Always use the correct Personal Protective Equipment (PPE) e.g. gloves, goggles, coveralls etc.
- Always fence unattended open manholes.

In addition, it should be noted that the location of some drainage apparatus may expose maintenance personnel to other hazards e.g. vehicles manoeuvring. In general, it is advised that maintenance works (other than simple inspections) be carried out by specialist contractors unless specially trained personnel are available.

5.3 Drainage Channels

Open Channels with removable gratings

The outlet boxes trap silt and sometimes oil. They can be emptied by either a vacuum tanker or by hand with a ladle. These boxes are the first line of defence keeping the underground drains clean. It is therefore important and cost effective to clean them out regularly. Material removed from them is likely to be contaminated and should be disposed of at a suitably licensed tip.

The gratings act to stiffen the channel and the channel edging. It is therefore essential to check that all channel gratings are replaced (and fixed where appropriate). The fixings may be bolts or patent clips depending upon the range of channels installed.

5.4 Catch pits

Catch Pits are deeper than silt pits and usually cannot be emptied by hand from the surface. They are installed on Surface Water systems to provide access for rodding and to trap silt. They need to be emptied when the silt depth is half the sump depth or greater. Emptying can usually be done by a vacuum tanker, possibly assisted by hosing.

5.5 Ponds

Pond(s) should be inspected for signs of pollution every six months and be cleared of any litter, debris and excessive vegetation growth on an annual basis or more frequently if required. Inlet and outlet structures to be inspected every six months or after severe storm events and be cleared of debris held on screens, etc.

5.6 Storage Tanks

Over a period of time all attenuation tanks will have a very gradual build-up of silt, the level of build-up needs to be monitored and from this information the frequency of inspection can be decided. A gully sucker can be used to remove any silt build up or this can be done manually. The tank inspection needs to be carried out by someone who has successfully completed a confined space training course.

Any specific requirements from the tank supplier should also be included within the final O and M Manual

5.7 Flow Control Device

It is recommended that flow control chambers should be inspected during Spring and Autumn and cleaned to ensure the flow control orifice is kept free of debris.

Any specific requirements from the flow control supplier should also be included within the final O and M Manual

5.8 Petrol Interceptor

Petrol interceptor should be cleaned and maintained in accordance with the manufactures specifications. All relevant Health and Safety legislation, guidance, manufacturers specifications etc. along with potential hazards, should be taken into account and included in the Health and Safety File & Contractor's Manual.

5.9 Ongoing Management

Residual Hazards and Provision for Safe Access for Inspection, Maintenance and Cleaning etc. - Site Works and Infrastructure

Cleaning of drains, manholes attenuation tank and channel drains

- Only to be carried out by competent, suitably trained qualified and authorised persons.
- A Permit-to-Work system must be in place.
- All necessary checks for hazardous atmospheres must be carried out.
- All necessary protection to openings must be provided e.g. warning signs, lights, barriers etc.
- Attenuation tank and channel drains need to be maintained cleaned and inspected as per the manufacturer's guidance.
- All maintenance should be in accordance with the method statement as provided by the maintenance contractor.

All general, regular cleaning and maintenance is to be carried out in accordance with all relevant health and safety legislation, guidance, etc. and take into account the potential hazards identified in the Health and Safety File or Contractor's Manuals.

Care should be taken to safeguard the health and safety of the building occupiers' staff and the public. Where appropriate, emergency procedures and first aid facilities must be established and agreed with the building occupier prior to work commencing.

A maintenance and management company will be appointed by Mountpark in future. Until such time Mountpark can be contacted as appropriate.

Contact: Marc Moran (Tel: +44 207 478 3333)

7th Floor, Swan House, 17-19 Stratford Place

London

W1C 1BQ

5.10 Hazards Associated with Materials Used on Site

Specification of materials on site should be provided by the Main Contractor. It is our view that there should be no hazards associated with materials on site, but a statement from the Contractor should be obtained to verify this.

Typical Drainage & SuDS Maintenance Schedule		
Operation & Maintenance Activity	Headwalls	SuDS Feature
Regular Maintenance		
Inspection & Reporting (monthly as required)	●	●
Litter and Debris Removal (monthly as required)	●	●
Grass cutting (monthly)		●
Weeds and invasive Plant Control	●	●
Shrub Management and pruning		●
Inspect bankside vegetation and remove nuisance plants (first 3 years) (monthly)		●
Inspect silt accumulation rates, establish removal frequencies & undertake contamination testing (half-yearly)	●	●
Hand cut aquatic plants (annually)		●
Remove 25% of bank vegetation from waters edge, a minimum of 1m above water level.		●
Tidy all dead growth & Tree maintenance (annually)		●
Remove sediment from planting and 1 quadrant of pond (every 5 years or as required)		●
Occasional Maintenance		
Sediment Management. Remove sediment when capacity is reduced by 20%. (Rarely – every 20 -25 years)		●
Silt removal	●	
Remedial Maintenance		
Structural Rehabilitation/Repair	As Required	
Repair erosion		As Required
Replant		As Required
Aerate Pond		As Required
Re-align rip-rap		As Required

Table 5: Typical Drainage & SuDS Maintenance Schedule

Typical Drainage & SuDS Inspection Checklist	
Activity	Observation
Are inlets or outlets blocked?	OK/Action Required
Does any part of the system appear to be leaking (in or out)?	OK/Action Required
Is the surrounding vegetation healthy and well kept?	OK/Action Required
Is maintenance access unimpeded?	OK/Action Required
Is there evidence of poor water quality (algae/oils/milky froth/odour/unusual colourings)?	OK/Action Required
Is there evidence of sediment build-up?	OK/Action Required
Is there evidence of oil accumulation?	OK/Action Required
Is there evidence of ponding above permeable surface?	OK/Action Required
Is there evidence of structural damage that requires repair?	OK/Action Required
Is there any evidence of regular or unplanned overtopping flooding or ponding?	OK/Action Required
Is water flowing freely through the network?	OK/Action Required
Are there any concerns that require further investigation?	OK/Action Required
Recommended maintenance or re-inspection for the following 12 months	
Items Requiring Immediate Maintenance	
Items Requiring Immediate Further Inspection	
Items Requiring More Regular Inspections	

Table 6: Drainage & SuDS Inspection List

6. Flood Risk Assessment

The following sources of flooding have been considered for the site:

- Fluvial flooding from streams, springs, sewers and culverts
- Pluvial/surface water flooding
- Groundwater flooding
- Tidal Flooding

6.1 Risk of fluvial flooding, and flooding from reservoirs, canals and other artificial sources to the proposed development

The proposed development site is located in Flood Zone 1 at low risk of flooding from rivers and sea.

This study has not identified any significant reports of historic flooding at the site.

The proposed development will not contribute higher volumes of surface water as described in Section 3.4. than the proposed discharge rate.

Overall, it is considered that the proposed development is at low risk to of flooding from fluvial or other artificial sources.

6.2 Risk of pluvial flooding to the proposed development

The GOV.UK Surface Water Flood shows risk of surface water flooding as very low on the site. No historic flood events are recorded.

The proposed buildings, car parks and yard surface water drainage will be designed including allowance for climate change. Site drainage should be designed following the guidance in Sewers for Adoption and the Planning Policy Guidance. Site drainage should be designed such that there is:

- No above ground flooding for the 1 in 30-year event; and
- No flooding of buildings for the 1 in 100-year event, including a 20% allowance for climate change.

It is considered that the risk of flooding to the site from the existing sewers are low.

It is proposed that Sustainable Drainage Systems (SuDS) to control surface water runoff from the development, should be in the form of attenuation storage. Design of these should allow for future climate change in accordance with PPG. This is described in Section 4.

Following implementation of these measures it is considered that the risk of surface water flooding to the proposed development is low. In summary:

- Risk of surface water flooding to the new buildings, yards and car park are considered low.

6.3 Risk of groundwater flooding to the proposed development

It is also considered that during excavation of future foundations or services, it is possible that site groundwater ingress could occur into excavations if they are to remain open for any length of time.

It is recommended that dewatering equipment is kept on standby, during excavation for foundations and drainage. It should be appreciated that groundwater levels can vary throughout the year, depending on the season.

Based on this information it is considered that the risk of flooding from this source is low.

6.4 Risk of tidal flooding to the proposed development

The proposed development site lies in an area shown on the GOV.UK flood map as Zone 1 at low risk of tidal flooding.

It is therefore considered that the risk of tidal flooding to the proposed development is low.

6.5 Effect of development on wider catchment

The drainage design should include the use of SuDS drainage. Drainage design will include a 20% allowance on rainfall for climate change as prescribed by the LLFA. The discharge rates to the existing watercourse will need to be limited to the calculated existing greenfield discharge rates of 73.8 L/s up to 1-year event, 174.3 L/s for the 30-year rainfall event and 228.7 l/s up to the 100-year event. It is considered that the proposed development, with the inclusion of the SuDS drainage systems described in Section 4, will not increase the risk of surface water flooding in the wider catchment.

6.6 Mitigation of residual flood risk

If the SuDS systems and mitigation described in this report are implemented, then there is no residual flood risk to be mitigated for the proposed development.

7. Conclusions and recommendations

This Flood Risk Assessment (FRA) is in support of a planning application for a development on a 32.59ha development site off Stanton Lane Ellistown, Coalville. The development will provide buildings for employment purposes and associated access roads. The proposed development will comprise of warehouse units of varying sizes with associated service yards, car parking and ancillary offices with a combined impermeable area of 18.025ha.

The proposed development site is located in Flood Zone 1 which is classed at low risk of fluvial flooding on the GOV.UK Risk of Flooding from Rivers and Sea Flood map.

The surface water strategy is to collect the run off from the impermeable areas of the site into a drainage system that includes SUDs features and restrict the discharge to the equivalent current greenfield run off rates. This will be done by the use of an attenuation pond(s) and the use of flow control devise(s), that will restrict the flow accordingly.

The principles of sustainable drainage will need to be applied for the site drainage by the use of an attenuation pond, with flow control to limit rate of discharge from the proposed development, designed for the 1 in 100-year event + 40% climate change allowance. The discharge rates to the existing outfall will be limited to a Q_{bar} rate of 79.2 L/s for rainfall events and up to and including the 100-year event, to suit the LLFA requirements.

It is therefore considered that the proposed development will not increase the risk of flooding in the wider catchment.

8. References

1. BS 8533:2011 Assessing and Managing flood risk in development – Code of practice.
2. BS 7533-13:2000 Pavements constructed with clay, natural stone or concrete pavers.
3. CIRIA C624 development and flood risk guidance for the construction industry. CIRIA. London 2004.
4. CIRIA C697 The SuDS Manual. London 2007.
5. CIRIA C753 v6 The SuDS Manual. London 2015.
6. Environment Agency - Flood Maps for Planning. Updated August 2019.
7. Hinckley and Bosworth Borough Council Strategic Flood Risk Assessment. JBA. July 2019
8. National Planning Policy Framework 2012. Department for Communities and Local Government. March 2012.
9. Planning Policy Statement 25: development and Flood Risk, Communities and Local Government, TSO, March 2010.
10. Planning Policy Statement 25: Development and Flood Risk Practice Guide, Communities and Local Government, TSO, December 2009.
11. Planning Practice Guidance. Department for Communities and Local Government. March 2014
12. PPG3 Pollution Prevention Guidelines. Environment Agency. 2006.
13. Sewers for Adoption. 7th Edition. Wrc. 2012.

Appendix A: Supporting drawings

Document	Prepared by:	Reference/No.
Site Layout Plan	Michael Sparks Associates	30865-PL-301 E
Topographical Survey	Greenhatch Group	32465-T
Proposed Drainage Strategy	CDP Ltd	SK0010
Site Pond Sections and Attenuation	CDP Ltd	SK0018

NOTES:

SUBJECT TO STATUTORY CONSENTS

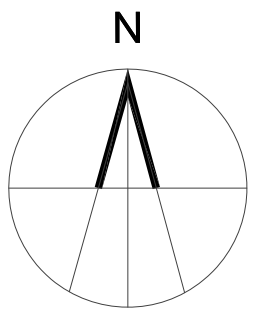
SUBJECT TO SURVEY

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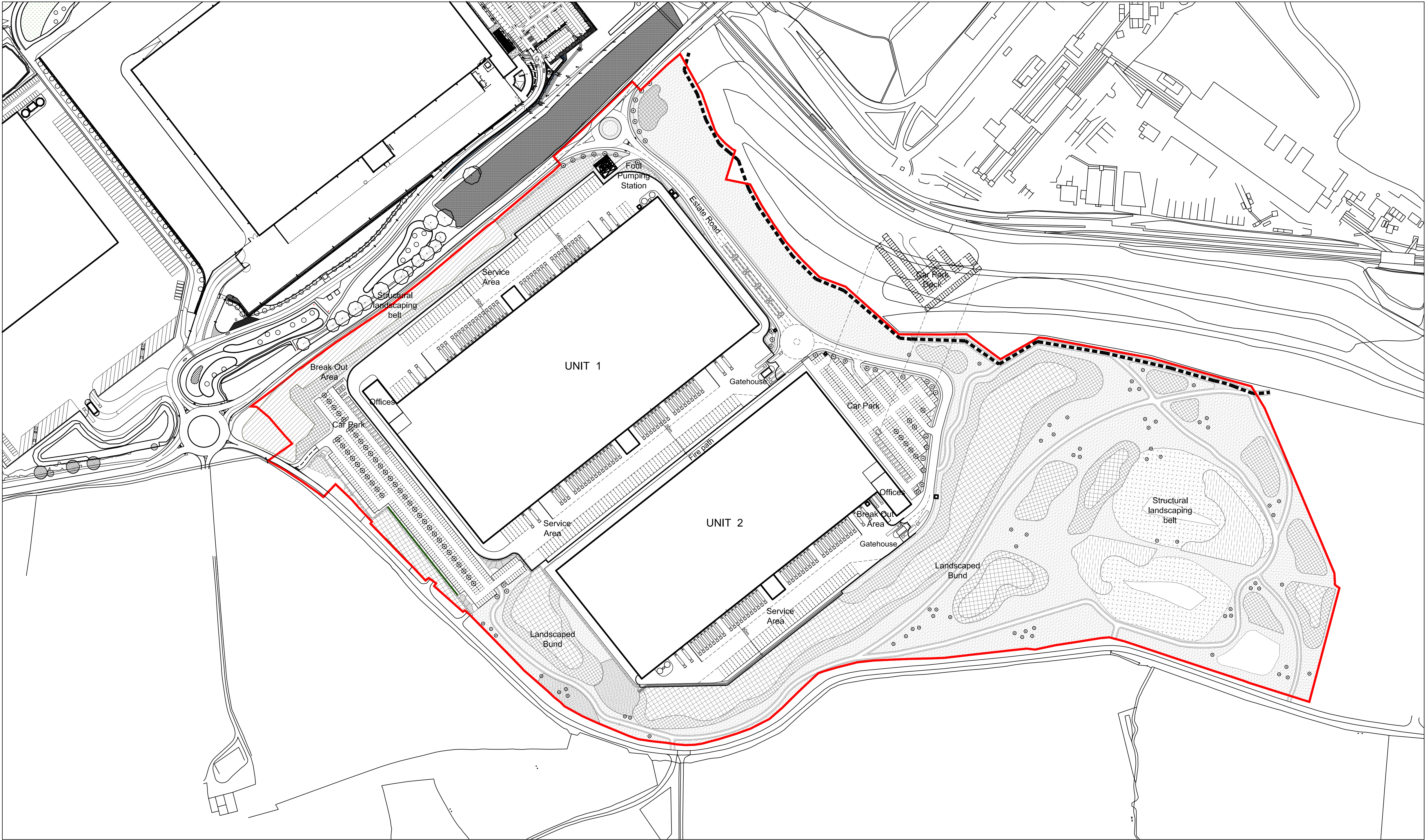
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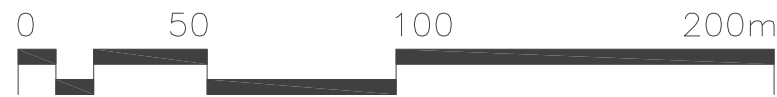
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01
301

SITE LAYOUT PLAN

1:2000



E	DEC 2022	LANDSCAPING AMENDED	PW	PW
D	NOV 2022	SUBSTATIONS & GAS KIOSKS ADDED	PW	PW
C	NOV 2022	CARPARKING & YARD TO UNIT 1 AMENDED	PW	PW
B	NOV 2022	CARPARKING & YARD TO UNIT 1 AMENDED	PW	PW
A	NOV 2022	UNITS UPDATED	PW	PW
-	NOV 2022	FIRST ISSUE	PW	PW

FOR PLANNING

REV	DATE	NOTE	DRAW	CHK
-----	------	------	------	-----



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LONDON SW6 4TU

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FAX 020 7736 3896
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mountpark

TITLE

LAND AT WOOD FARM, STANTON LANE

DRAWING

SITE LAYOUT PLAN

CLIENT

WOOD FARM HOLDINGS

DATE	SCALE	DRAWN
NOV 2022	1:2000@A1	IN
STATUS		CHECKED
PLANNING		MS/PW

DRAWING NUMBER

30865 - PL - 301 E



Station	Eastings	Northing	Level
GH1	445458.9610	101236.2450	167.610 00
GH2	445298.0170	101234.6570	160.644 00
GH3	445458.9610	101236.2450	167.610 00
GH4	445321.5420	101483.7710	175.717 00
GH5	445127.9270	101560.0470	182.807 00
GH6	445125.0780	101333.1760	171.256 00
GH7	445038.7070	101605.8560	185.149 00
GH8	444684.0170	101646.3050	191.162 00
GH9	444874.1270	101691.9900	186.122 00
GH10	444881.8150	101638.4140	181.071 00
GH11	444601.0490	101406.4070	171.985 00
GH12	444478.7070	101229.5820	171.985 00
GH13	444770.6170	101229.5820	171.985 00
GH14	444892.7340	101195.7860	172.610 00
GH15	444976.5100	101222.3860	172.304 00
GH16	445043.7070	101272.5300	173.003 00
GH17	445043.7070	101272.5300	173.003 00
GH60	444927.0276	101308.6324	179.803 00
GH100	444667.3880	101504.1010	174.675 00
GH110	444549.1520	101479.0390	173.632 00
GH120	444549.1520	101479.0390	173.632 00
GH111A	444587.7610	101597.7460	172.304 00
GH112A	444735.6760	101734.0780	173.935 00

OS Note:
Some services may have been omitted due to parked vehicles.
The Ordnance Survey tile is to be used as a guide only.

OS Buildings Surveyed Buildings

This survey has been orientated to the Ordnance Survey (O.S.) National Grid OSGR26(15) via Global Navigation Satellite

A true OSGB36 coordinate has been established near to the site centre via a transformation using the OSTN15GB & OSGM15GB transformation models.

The survey has been correlated to this point and a further one or more OSGB36 (15) points established to create a true O.S.

No scale factor has been applied to the survey therefore the coordinates shown are arbitrary & not true O.S. Coordinates which have a scale factor applied.

Please refer to Survey Station Table to enable establishment of the on-site grid and datum.

[illegible]

Rev	Date	Description	Drawn	Q. Rev
-----	------	-------------	-------	--------



▣ Topographical Surveys ▣ Site Engineering ▣ Utility / CCTV Surveys	▣ Measured Building Surveys ▣ 3D Laser Scanning ▣ Revit & BIM Models
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--	---	---

CLIENT
**Michael Sparks
Associates**

PROJECT

**Wood Farm
Stanton Lane
Ellistown, LE67 1FF**

TITLE	Topographical Survey
-------	-------------------------

SCALE	DATE
A0@ 1:1250	24.01.19

DRAWN	QUALITY REF
SS	GH4379

Level datum	See note
-------------	----------

Grid orientation	See note
Job number	32465

Drawing No.	Rev.
32465_T	0

Comments

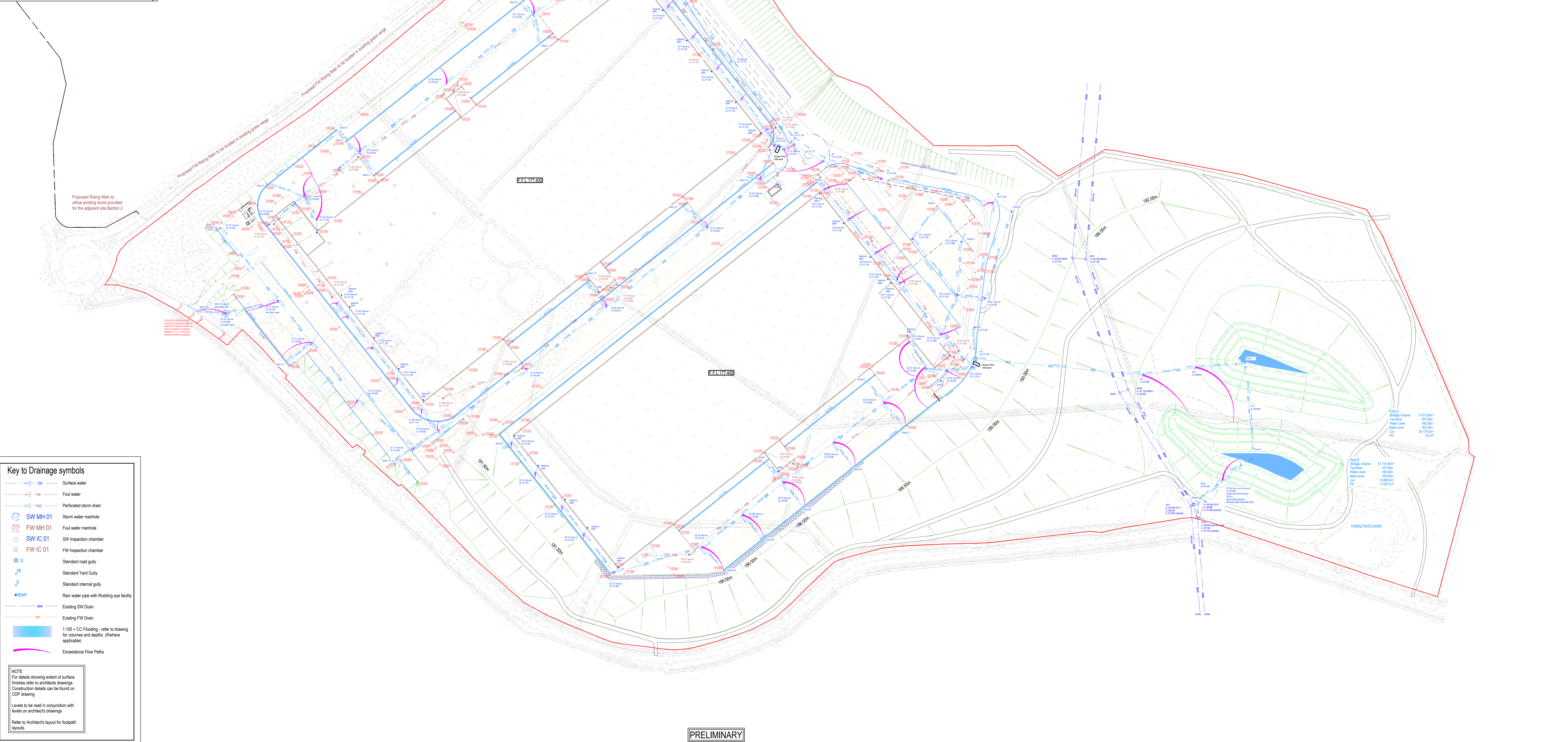
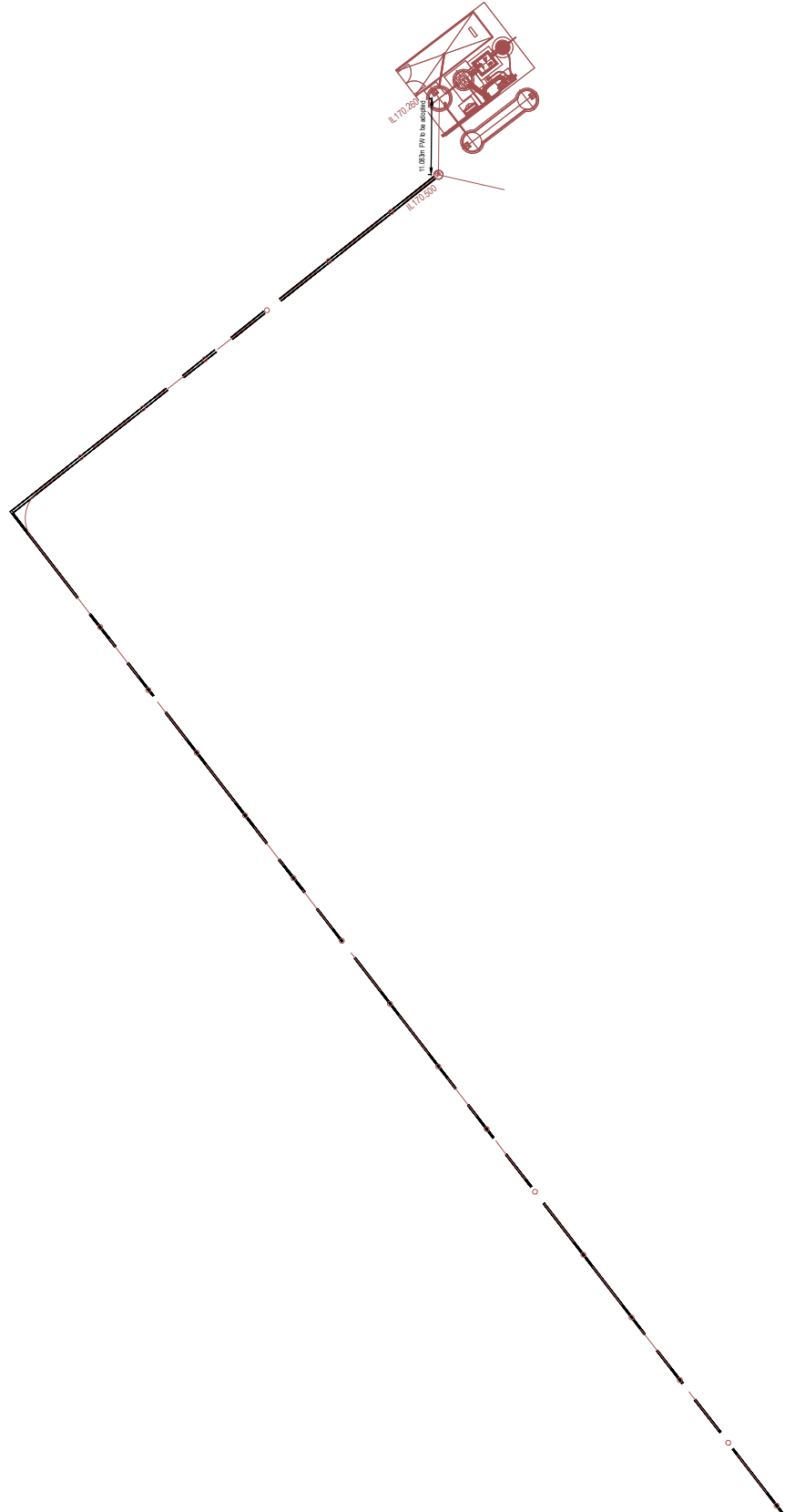
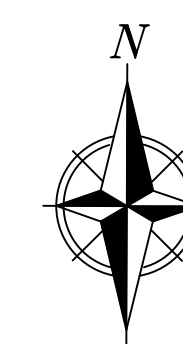
This plan should only be used for its original purpose. Greenhatch Group accepts no responsibility for this plan if supplied to any party other than the original client.

All dimensions should be checked on site prior to design and construction.

Drainage information (where applicable) has been visually inspected from the surface and therefore should be treated as approximate only.

Notes:





DO NOT SCALE DRAWING
Dimensions provided are indicative only, and should be confirmed and read in conjunction with the Architect's construction drawings at such times as they are available, and/or from site measurement.
All setting out to be in accordance with the Architect's drawings, any ambiguities to be raised prior to construction.

RESIDUAL RISK REGISTER			
No	Description of Hazard	Control Measures	Action By
	Standard construction		

P8	CK	Exceedance flow paths shown	16.06.23
P7	CK	Updated to suit latest layout	09.12.22
P6	CK	Updated to suit latest layout	24.10.22
P5	CK	Updated to suit LLFA comments	04.06.21
P4	CK	Preliminary issue	02.03.21
P3	AM	Preliminary issue	13.02.20
P2	AM	Preliminary issue	05.02.20
P1	AM	Preliminary issue	07.02.20
Rev	By	Details	Date

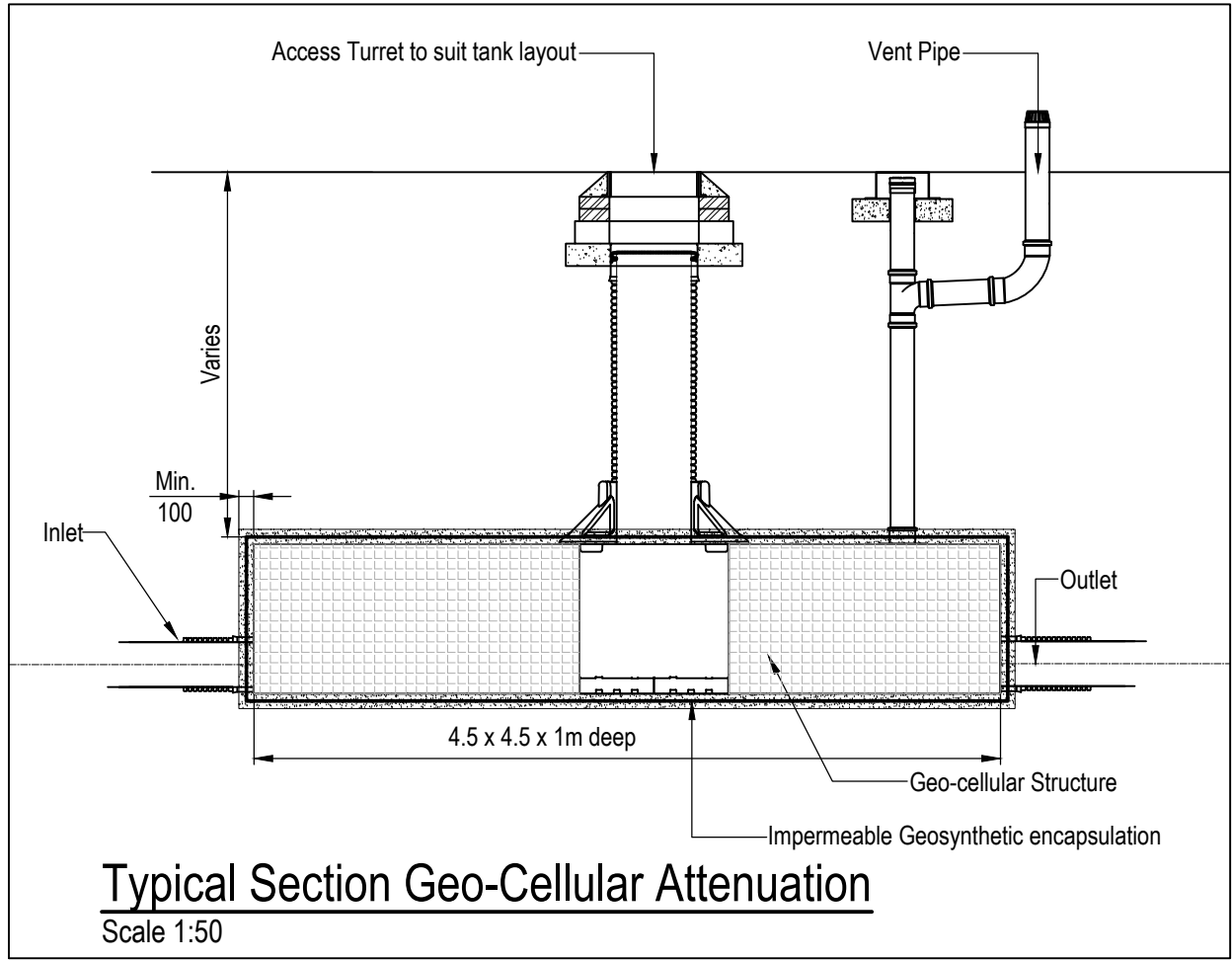
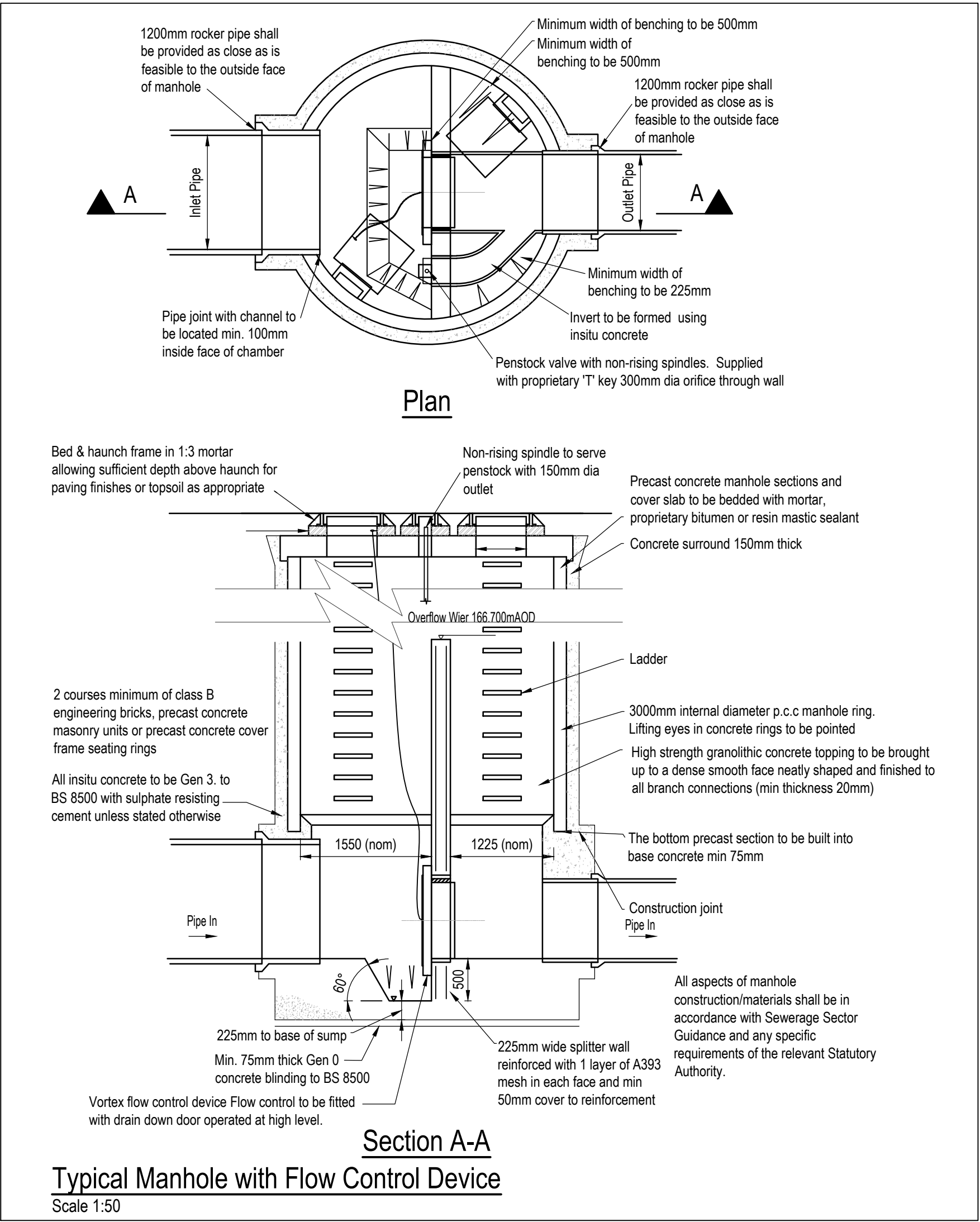
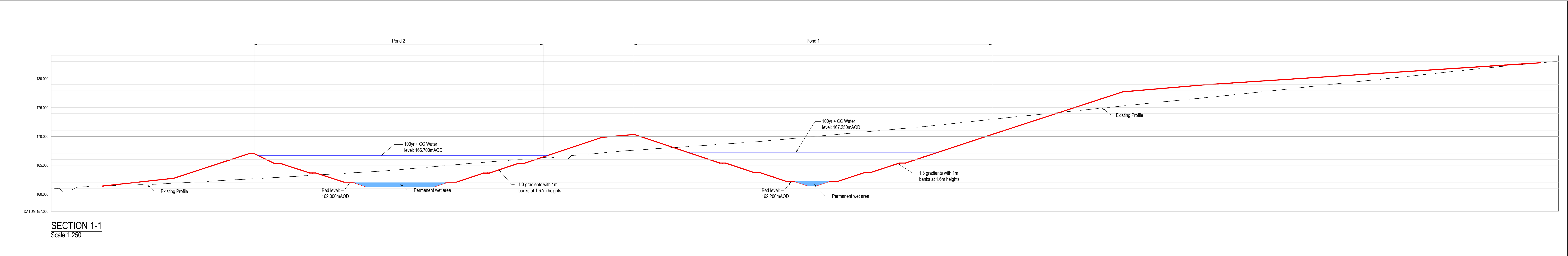
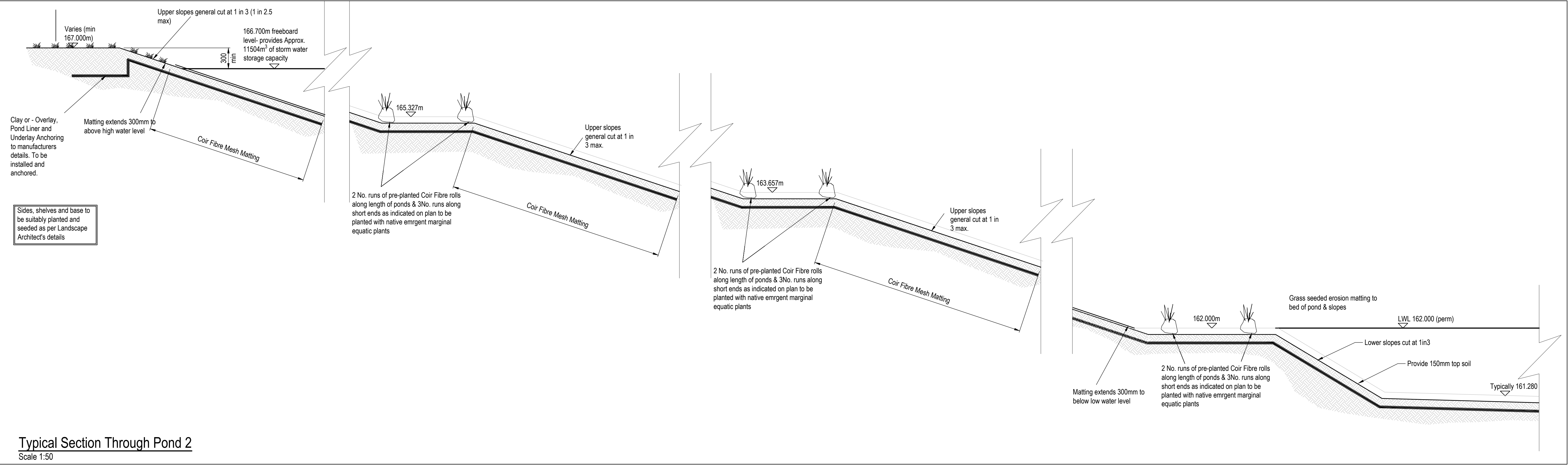
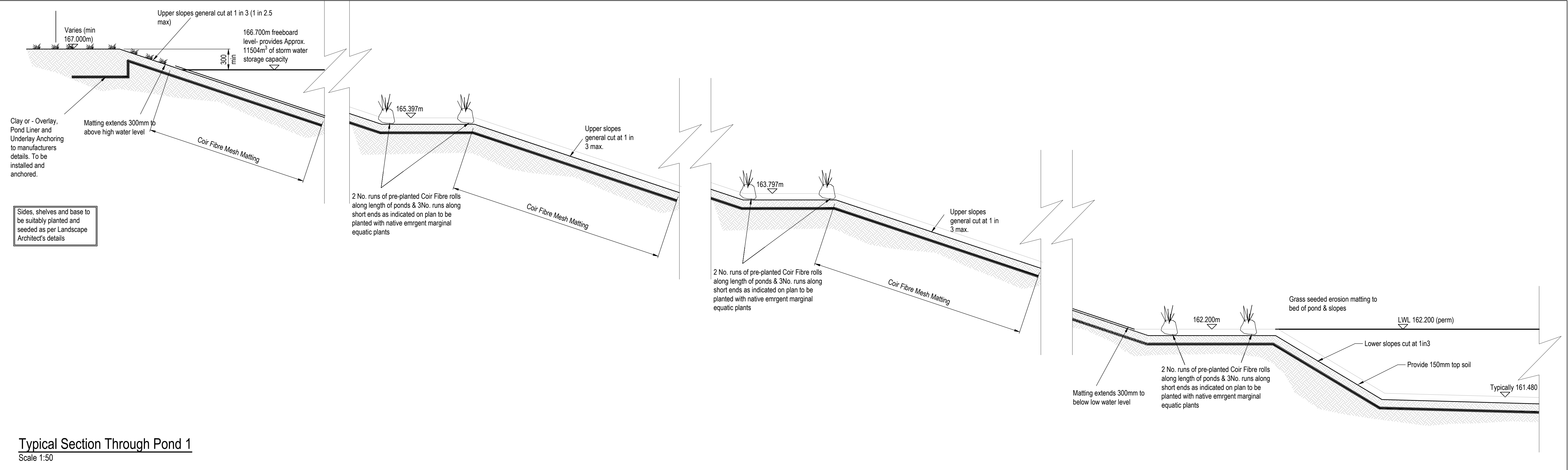


COMPLETE DESIGN
PARTNERSHIP LTD

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Client:	Wood Farm Holdings
Project:	Bardon 3

Drawing Title:	Proposed Drainage Strategy
Date:	Feb 20
Scale:	1:1,000 @ A0
Drawn:	AM
Chkd:	
Drawing No:	19-7688 - SK0010
Issue:	P
Rev:	8



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All setting out to be in accordance with the Architect's drawings, any ambiguities to be raised prior to construction.

RESIDUAL RISK REGISTER			
No.	Description of Hazard	Control Measures	Action By
1	Standard construction		

P2 CK Attenuation and Flow Control details added
P1 CK Preliminary Issue
Rev By Details

20.06.23
23.01.23
Date

Rev By

Details

Date

CD
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Client:
Wood Farm Holdings

Project:
Bardon 3

Drawing Title:
Site Pond Sections
& Attenuation

Date: January 23

Scale: 1:250 @ A0

Drawn: CK

Chkd:

Drawing No.

19-7688 - SK0018

Issue

Rev:

P

2

(P=Preliminary, T=Tender, C=Construction, R=Record)

Appendix B: Rural Runoff Calculator

Document	Prepared by:	No.
Micro Drainage Surface Water Calculations	CDP	-
Rural Runoff Calculator	CDP	-

Complete Design Partnership Ltd		Page 0
Charford Lodge	7688	
Rock Hill	Bardon 3	
Bromsgrove B61 7LH	—	
Date 16/06/2023	Designed by ck	
File 7688 SW Netw1_RevJ.MDX	Checked by	
Innovyze	Network 2020.1.3	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for SW NETWORK 1_REVC.SWS

Pipe Sizes SW NETWORK 1_RevB Manhole Sizes SW NETWORK 1_RevB

FEH Rainfall Model	
Return Period (years)	100
FEH Rainfall Version	1999
Site Location GB 443750 311300 SK 43750 11101	
C (1km)	-0.027
D1 (1km)	0.359
D2 (1km)	0.361
D3 (1km)	0.256
E (1km)	0.305
F (1km)	2.414
Maximum Rainfall (mm/hr)	100
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
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)	750

Designed with Level Soffits

Time Area Diagram for SW NETWORK 1_REVC.SWS

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.555	4-8	7.548	8-12	6.290	12-16	3.442	16-20	0.190

Total Area Contributing (ha) = 18.026

Total Pipe Volume (m³) = 2901.222

Network Design Table for SW NETWORK 1_REVC.SWS

« - Indicates pipe capacity < flow

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
S1.000	33.472	0.700	47.8	0.293	5.00	0.0	0.600	o	450	Pipe/Conduit	
S1.001	91.449	1.364	67.0	0.580	0.00	0.0	0.600	o	600	Pipe/Conduit	
S1.002	72.553	0.311	233.3	0.660	0.00	0.0	0.600	o	750	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	E I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	100.00	5.19	177.964	0.293	0.0	0.0	0.0	2.95	468.5	79.4
S1.001	100.00	5.70	177.114	0.873	0.0	0.0	0.0	2.98	841.8	236.4
S1.002	100.00	6.36	175.600	1.533	0.0	0.0	0.0	1.83	807.6	415.2

Complete Design Partnership Ltd		Page 1
Charford Lodge	7688	
Rock Hill	Bardon 3	
Bromsgrove B61 7LH	—	
Date 16/06/2023	Designed by ck	
File 7688 SW Netw1_RevJ.MDX	Checked by	
Innovyze	Network 2020.1.3	

Network Design Table for SW NETWORK 1_REVC.SWS

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
S2.000	34.295	0.318	107.8	0.108	5.00	0.0	0.600	o	300	Pipe/Conduit	
S3.000	19.572	0.763	25.7	0.256	5.00	0.0	0.600	o	300	Pipe/Conduit	
S4.000	33.040	0.581	56.9	0.045	5.00	0.0	0.600	o	300	Pipe/Conduit	
S2.001	51.779	0.160	323.6	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	
S5.000	19.941	0.132	151.1	0.188	5.00	0.0	0.600	o	300	Pipe/Conduit	
S6.000	13.038	0.650	20.1	0.238	5.00	0.0	0.600	o	300	Pipe/Conduit	
S7.000	23.408	0.720	32.5	0.343	5.00	0.0	0.600	o	375	Pipe/Conduit	
S2.002	82.599	0.120	688.3	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	
S2.003	82.592	0.120	688.3	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	
S8.000	21.968	0.773	28.4	0.188	5.00	0.0	0.600	o	300	Pipe/Conduit	
S9.000	13.367	0.598	22.4	0.291	5.00	0.0	0.600	o	300	Pipe/Conduit	
S2.004	75.018	0.137	547.6	0.200	0.00	0.0	0.600	o	900	Pipe/Conduit	
S10.000	19.201	0.026	738.5	0.136	5.00	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)
S2.000	100.00	5.38	175.467	0.108	0.0	0.0	0.0	1.51	107.0	29.2
S3.000	100.00	5.10	175.912	0.256	0.0	0.0	0.0	3.12	220.3	69.3
S4.000	100.00	5.26	175.730	0.045	0.0	0.0	0.0	2.09	147.7	12.2
S2.001	100.00	5.87	174.549	0.409	0.0	0.0	0.0	1.74	1104.5	110.8
S5.000	100.00	5.26	174.625	0.188	0.0	0.0	0.0	1.28	90.3	50.9
S6.000	100.00	5.06	174.675	0.238	0.0	0.0	0.0	3.53	249.3	64.5
S7.000	100.00	5.12	174.150	0.343	0.0	0.0	0.0	3.19	352.0	92.9
S2.002	100.00	7.03	172.830	1.178	0.0	0.0	0.0	1.19	754.9	319.0
S2.003	100.00	8.19	172.710	1.178	0.0	0.0	0.0	1.19	754.9	319.0
S8.000	100.00	5.12	174.625	0.188	0.0	0.0	0.0	2.96	209.3	50.9
S9.000	100.00	5.07	174.450	0.291	0.0	0.0	0.0	3.34	236.1	78.8
S2.004	100.00	9.13	172.590	1.857	0.0	0.0	0.0	1.33	847.3	502.9
S10.000	100.00	5.68	174.725	0.136	0.0	0.0	0.0	0.47	18.8	36.8

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Network Design Table for SW NETWORK 1_REVC.SWS

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
S2.005	27.439	0.040	686.0	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	
S2.006	29.496	0.039	756.3	0.297	0.00	0.0	0.600	o	900	Pipe/Conduit	
S2.007	29.500	0.039	756.4	0.479	0.00	0.0	0.600	o	975	Pipe/Conduit	
S2.008	29.500	0.039	756.4	0.479	0.00	0.0	0.600	o	975	Pipe/Conduit	
S2.009	29.001	0.039	743.6	0.575	0.00	0.0	0.600	o	1050	Pipe/Conduit	
S2.010	29.083	0.039	745.7	0.479	0.00	0.0	0.600	o	1125	Pipe/Conduit	
S2.011	13.404	0.020	670.2	0.238	0.00	0.0	0.600	o	1125	Pipe/Conduit	
S11.000	3.091	0.082	37.7	0.077	5.00	0.0	0.600	o	225	Pipe/Conduit	
S11.001	69.358	0.404	171.7	0.065	0.00	0.0	0.600	o	300	Pipe/Conduit	
S12.000	20.980	0.199	105.4	0.052	5.00	0.0	0.600	o	225	Pipe/Conduit	
S12.001	40.049	0.397	100.9	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S11.002	39.892	0.165	241.8	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
S13.000	22.803	0.104	219.3	0.254	5.00	0.0	0.600	o	300	Pipe/Conduit	
S11.003	54.499	0.111	491.0	0.147	0.00	0.0	0.600	o	525	Pipe/Conduit	
S11.004	54.792	0.111	493.6	0.181	0.00	0.0	0.600	o	525	Pipe/Conduit	
S14.000	18.055	0.035	515.9	0.118	5.00	0.0	0.600	o	300	Pipe/Conduit	
S11.005	22.376	0.067	334.0	0.119	0.00	0.0	0.600	o	600	Pipe/Conduit	
S15.000	12.872	0.032	402.3	0.479	5.00	0.0	0.600	o	975	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)
S2.005	100.00	9.52	172.453	1.993	0.0	0.0	0.0	1.19	756.2	539.8
S2.006	100.00	9.95	172.413	2.290	0.0	0.0	0.0	1.13	719.8	620.2
S2.007	100.00	10.37	172.298	2.769	0.0	0.0	0.0	1.19	887.8	749.9
S2.008	100.00	10.78	172.259	3.248	0.0	0.0	0.0	1.19	887.8	879.6
S2.009	100.00	11.16	172.145	3.823	0.0	0.0	0.0	1.26	1087.5	1035.4
S2.010	100.00	11.54	172.030	4.302	0.0	0.0	0.0	1.31	1301.0	1165.1
S2.011	100.00	11.70	171.991	4.540	0.0	0.0	0.0	1.38	1373.0	1229.5
S11.000	100.00	5.02	173.145	0.077	0.0	0.0	0.0	2.14	85.0	20.9
S11.001	100.00	5.99	172.988	0.142	0.0	0.0	0.0	1.20	84.6	38.5
S12.000	100.00	5.27	172.125	0.052	0.0	0.0	0.0	1.27	50.6	14.1
S12.001	100.00	5.79	171.926	0.052	0.0	0.0	0.0	1.30	51.8	14.1
S11.002	100.00	6.45	171.229	0.194	0.0	0.0	0.0	1.44	310.9	52.5
S13.000	100.00	5.36	173.500	0.254	0.0	0.0	0.0	1.06	74.8	68.8
S11.003	100.00	7.36	171.064	0.595	0.0	0.0	0.0	1.00	217.4	161.1
S11.004	100.00	8.27	170.953	0.776	0.0	0.0	0.0	1.00	216.8	210.2
S14.000	100.00	5.44	172.950	0.118	0.0	0.0	0.0	0.69	48.5	32.0
S11.005	100.00	8.55	170.767	1.013	0.0	0.0	0.0	1.33	375.2	274.3
S15.000	100.00	5.13	175.470	0.479	0.0	0.0	0.0	1.64	1220.9	129.7

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Network Design Table for SW NETWORK 1_REVC.SWS

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
S15.001	29.500	0.051	578.4	0.568	0.00	0.0	0.600	o	975	Pipe/Conduit	
S15.002	29.500	0.039	756.4	0.479	0.00	0.0	0.600	o	975	Pipe/Conduit	
S15.003	29.083	0.039	745.7	0.479	0.00	0.0	0.600	o	975	Pipe/Conduit	
S15.004	20.215	0.032	631.7	0.239	0.00	0.0	0.600	o	975	Pipe/Conduit	
S11.006	80.394	0.098	820.3	0.000	0.00	0.0	0.600	o	975	Pipe/Conduit	
S11.007	75.181	0.106	709.3	0.359	0.00	0.0	0.600	o	1050	Pipe/Conduit	
S16.000	23.283	0.139	167.5	0.188	5.00	0.0	0.600	o	300	Pipe/Conduit	
S11.008	95.326	0.098	972.7	0.476	0.00	0.0	0.600	o	1125	Pipe/Conduit	
S17.000	24.086	0.144	167.3	0.188	5.00	0.0	0.600	o	300	Pipe/Conduit	
S11.009	53.420	0.097	550.7	0.241	0.00	0.0	0.600	o	1125	Pipe/Conduit	
S18.000	4.342	0.032	135.7	0.060	5.00	0.0	0.600	o	375	Pipe/Conduit	
S11.010	27.050	0.036	751.4	0.000	0.00	0.0	0.600	o	1125	Pipe/Conduit	
S2.012	7.127	0.010	712.7	0.000	0.00	0.0	0.600	o	1500	Pipe/Conduit	
S2.013	10.178	0.047	216.6	0.000	0.00	0.0	0.600	o	1500	Pipe/Conduit	
S1.003	30.554	0.044	694.4	0.252	0.00	0.0	0.600	o	1575	Pipe/Conduit	
S1.004	57.257	0.044	1301.3	0.063	0.00	0.0	0.600	o	1650	Pipe/Conduit	
S1.005	70.714	0.075	942.9	0.248	0.00	0.0	0.600	o	1650	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)
S15.001	100.00	5.49	175.438	1.047	0.0	0.0	0.0	1.36	1016.6	283.6
S15.002	100.00	5.91	175.387	1.526	0.0	0.0	0.0	1.19	887.8	413.3
S15.003	100.00	6.31	175.348	2.005	0.0	0.0	0.0	1.20	894.2	543.0
S15.004	100.00	6.57	175.309	2.244	0.0	0.0	0.0	1.30	972.4	607.7
S11.006	100.00	9.72	170.325	3.257	0.0	0.0	0.0	1.14	852.2	882.1
S11.007	100.00	10.70	170.152	3.616	0.0	0.0	0.0	1.29	1113.7	979.3
S16.000	100.00	5.32	174.625	0.188	0.0	0.0	0.0	1.21	85.7	50.9
S11.008	100.00	12.09	169.971	4.280	0.0	0.0	0.0	1.14	1137.6	1159.1
S17.000	100.00	5.33	174.625	0.188	0.0	0.0	0.0	1.21	85.7	50.9
S11.009	100.00	12.67	169.874	4.709	0.0	0.0	0.0	1.53	1515.9	1275.3
S18.000	100.00	5.05	175.275	0.060	0.0	0.0	0.0	1.55	171.6	16.2
S11.010	100.00	13.02	169.777	4.769	0.0	0.0	0.0	1.30	1296.0	1291.6
S2.012	100.00	13.09	169.366	9.309	0.0	0.0	0.0	1.60	2825.6	2521.1
S2.013	100.00	13.15	169.356	9.309	0.0	0.0	0.0	2.91	5144.3	2521.1
S1.003	100.00	13.45	169.234	11.094	0.0	0.0	0.0	1.67	3252.2	3004.5
S1.004	100.00	14.22	169.115	11.157	0.0	0.0	0.0	1.25	2675.7	3021.6
S1.005	100.00	15.02	169.071	11.405	0.0	0.0	0.0	1.47	3148.1	3088.8

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Network Design Table for SW NETWORK 1_REVC.SWS

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
S1.006	93.329	0.129	723.5	0.325	0.00	0.0	0.600	o	1650	Pipe/Conduit	
S1.007	22.878	0.030	762.6	0.000	0.00	0.0	0.600	o	1650	Pipe/Conduit	
S19.000	30.481	0.060	508.0	0.040	5.00	0.0	0.600	o	150	Pipe/Conduit	
S19.001	54.871	0.356	154.1	0.136	0.00	0.0	0.600	o	300	Pipe/Conduit	
S20.000	2.761	0.061	45.3	0.017	5.00	0.0	0.600	o	150	Pipe/Conduit	
S20.001	40.903	0.777	52.6	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S21.000	67.540	2.084	32.4	0.166	5.00	0.0	0.600	o	300	Pipe/Conduit	
S21.001	19.372	0.080	242.2	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S19.002	31.071	0.102	304.6	0.090	0.00	0.0	0.600	o	375	Pipe/Conduit	
S22.000	8.088	0.015	539.2	0.107	5.00	0.0	0.600	o	600	Pipe/Conduit	
S22.001	28.526	0.064	445.7	0.231	0.00	0.0	0.600	o	600	Pipe/Conduit	
S22.002	32.000	0.064	500.0	0.562	0.00	0.0	0.600	o	900	Pipe/Conduit	
S22.003	25.494	0.034	749.8	0.654	0.00	0.0	0.600	o	900	Pipe/Conduit	
S22.004	3.343	0.004	835.8	0.460	0.00	0.0	0.600	o	900	Pipe/Conduit	
S22.005	48.670	0.069	705.4	0.157	0.00	0.0	0.600	o	900	Pipe/Conduit	
S19.003	34.689	0.045	770.9	0.000	0.00	0.0	0.600	o	1050	Pipe/Conduit	
S23.000	3.147	0.250	12.6	0.157	5.00	0.0	0.600	o	300	Pipe/Conduit	
S23.001	28.518	0.100	285.2	0.231	0.00	0.0	0.600	o	900	Pipe/Conduit	
S23.002	32.000	0.077	415.6	0.460	0.00	0.0	0.600	o	900	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)
S1.006	100.00	15.94	168.995	11.730	0.0	0.0	0.0	1.68	3597.5	3176.8
S1.007	100.00	16.17	168.866	11.730	0.0	0.0	0.0	1.64	3503.4	3176.8
S19.000	100.00	6.16	175.820	0.040	0.0	0.0	0.0	0.44	7.8«	10.8
S19.001	100.00	6.88	175.610	0.176	0.0	0.0	0.0	1.26	89.3	47.7
S20.000	100.00	5.03	176.599	0.017	0.0	0.0	0.0	1.50	26.5	4.6
S20.001	100.00	5.52	176.538	0.017	0.0	0.0	0.0	1.39	24.6	4.6
S21.000	100.00	5.41	176.999	0.166	0.0	0.0	0.0	2.77	195.9	45.0
S21.001	100.00	5.73	174.915	0.166	0.0	0.0	0.0	1.01	71.1	45.0
S19.002	100.00	7.38	174.685	0.449	0.0	0.0	0.0	1.03	114.1«	121.6
S22.000	100.00	5.13	175.370	0.107	0.0	0.0	0.0	1.04	294.5	29.0
S22.001	100.00	5.54	175.355	0.338	0.0	0.0	0.0	1.15	324.3	91.5
S22.002	100.00	5.93	174.991	0.900	0.0	0.0	0.0	1.39	887.1	243.7
S22.003	100.00	6.30	174.927	1.554	0.0	0.0	0.0	1.14	722.9	420.9
S22.004	100.00	6.35	174.893	2.014	0.0	0.0	0.0	1.08	684.4	545.4
S22.005	100.00	7.04	174.889	2.171	0.0	0.0	0.0	1.17	745.6	588.0
S19.003	100.00	7.85	173.908	2.620	0.0	0.0	0.0	1.23	1067.9	709.6
S23.000	100.00	5.01	175.740	0.157	0.0	0.0	0.0	4.45	314.9	42.5
S23.001	100.00	5.27	174.815	0.388	0.0	0.0	0.0	1.85	1177.2	105.1
S23.002	100.00	5.62	174.715	0.848	0.0	0.0	0.0	1.53	973.8	229.7

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Network Design Table for SW NETWORK 1_REVC.SWS

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
S23.003	26.115	0.042	621.8	0.507	0.00	0.0	0.600	o	900	Pipe/Conduit	
S23.004	36.281	0.050	725.6	0.460	0.00	0.0	0.600	o	900	Pipe/Conduit	
S23.005	67.829	0.574	118.2	0.231	0.00	0.0	0.600	o	900	Pipe/Conduit	
S24.000	23.419	0.603	38.8	0.218	5.00	0.0	0.600	o	300	Pipe/Conduit	
S23.006	38.740	0.077	503.1	0.000	0.00	0.0	0.600	o	1200	Pipe/Conduit	
S25.000	23.306	0.680	34.3	0.079	5.00	0.0	0.600	o	300	Pipe/Conduit	
S23.007	38.740	0.077	503.1	0.000	0.00	0.0	0.600	o	1200	Pipe/Conduit	
S26.000	20.102	0.253	79.5	0.205	5.00	0.0	0.600	o	300	Pipe/Conduit	
S27.000	23.626	0.757	31.2	0.146	5.00	0.0	0.600	o	300	Pipe/Conduit	
S23.008	47.760	0.096	497.5	0.000	0.00	0.0	0.600	o	1200	Pipe/Conduit	
S28.000	23.296	0.853	27.3	0.134	5.00	0.0	0.600	o	300	Pipe/Conduit	
S23.009	47.760	0.096	497.5	0.000	0.00	0.0	0.600	o	1200	Pipe/Conduit	
S29.000	20.103	0.949	21.2	0.205	5.00	0.0	0.600	o	300	Pipe/Conduit	
S30.000	23.356	0.949	24.6	0.311	5.00	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)
S23.003	100.00	5.97	174.638	1.355	0.0	0.0	0.0	1.25	794.6	367.0
S23.004	100.00	6.49	174.597	1.815	0.0	0.0	0.0	1.16	735.0	491.5
S23.005	100.00	6.88	174.546	2.046	0.0	0.0	0.0	2.88	1833.2	554.1
S24.000	100.00	5.15	175.100	0.218	0.0	0.0	0.0	2.53	178.9	59.0
S23.006	100.00	7.27	173.597	2.264	0.0	0.0	0.0	1.66	1878.6	613.1
S25.000	100.00	5.14	175.100	0.079	0.0	0.0	0.0	2.69	190.5	21.4
S23.007	100.00	7.66	173.520	2.343	0.0	0.0	0.0	1.66	1878.6	634.5
S26.000	100.00	5.19	174.596	0.205	0.0	0.0	0.0	1.77	124.8	55.5
S27.000	100.00	5.14	175.100	0.146	0.0	0.0	0.0	2.82	199.7	39.5
S23.008	100.00	8.14	173.443	2.694	0.0	0.0	0.0	1.67	1889.2	729.6
S28.000	100.00	5.13	175.100	0.134	0.0	0.0	0.0	3.02	213.5	36.3
S23.009	100.00	8.61	173.347	2.828	0.0	0.0	0.0	1.67	1889.2	765.9
S29.000	100.00	5.10	175.100	0.205	0.0	0.0	0.0	3.43	242.5	55.5
S30.000	100.00	5.12	175.100	0.311	0.0	0.0	0.0	3.18	224.9	84.2

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Network Design Table for SW NETWORK 1_REVC.SWS

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
S23.010	39.902	0.080	498.8	0.000	0.00	0.0	0.600	o	1200	Pipe/Conduit	
S31.000	24.118	0.169	142.7	0.276	5.00	0.0	0.600	o	300	Pipe/Conduit	
S23.011	14.959	0.025	598.4	0.000	0.00	0.0	0.600	o	1200	Pipe/Conduit	
S23.012	20.013	0.040	500.3	0.000	0.00	0.0	0.600	o	1200	Pipe/Conduit	
S19.004	7.165	0.010	716.5	0.056	0.00	0.0	0.600	o	1275	Pipe/Conduit	
S1.008	124.258	3.711	33.5	0.000	0.00	0.0	0.600	o	1650	Pipe/Conduit	
S1.009	39.656	0.055	721.0	0.000	0.00	0.0	0.600	o	1875	Pipe/Conduit	
S1.010	36.896	0.050	737.9	0.000	0.00	0.0	0.600	o	1875	Pipe/Conduit	
S1.011	35.515	0.134	265.0	0.000	0.00	0.0	0.600	o	1875	Pipe/Conduit	
S1.012	32.312	0.066	489.6	0.000	0.00	0.0	0.600	o	1875	Pipe/Conduit	
S1.013	30.247	0.077	392.8	0.000	0.00	0.0	0.600	o	1875	Pipe/Conduit	
S1.014	5.317	0.023	231.2	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.015	22.966	0.150	153.1	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
S32.000	102.379	1.385	73.9	0.000	5.00	500.0	0.600	o	900	Pipe/Conduit	
S32.001	98.179	1.325	74.1	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	
S1.016	9.914	0.840	11.8	0.000	0.00	0.0	0.600	o	900	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)
S23.010	100.00	9.01	173.251	3.344	0.0	0.0	0.0	1.67	1886.8	905.6
S31.000	100.00	5.31	175.975	0.276	0.0	0.0	0.0	1.31	92.9	74.7
S23.011	100.00	9.17	173.171	3.620	0.0	0.0	0.0	1.52	1721.4	980.4
S23.012	100.00	9.37	173.146	3.620	0.0	0.0	0.0	1.67	1883.9	980.4
S19.004	100.00	9.46	173.106	6.296	0.0	0.0	0.0	1.44	1842.2	1705.1
S1.008	100.00	16.44	168.836	18.026	0.0	0.0	0.0	7.87	16823.0	4881.9
S1.009	100.00	16.80	164.900	18.026	0.0	0.0	0.0	1.82	5032.3	4881.9
S1.010	100.00	17.14	162.250	18.026	0.0	0.0	0.0	1.80	4973.9	4881.9
S1.011	100.00	17.34	162.200	18.026	0.0	0.0	0.0	3.01	8323.0	4881.9
S1.012	100.00	17.58	162.066	18.026	0.0	0.0	0.0	2.21	6114.4	4881.9
S1.013	100.00	17.78	162.000	18.026	0.0	0.0	0.0	2.47	6830.2	4881.9
S1.014	100.00	5.07	161.923	0.000	79.2	0.0	0.0	1.33	212.0	79.2
S1.015	100.00	5.30	159.400	0.000	79.2	0.0	0.0	1.64	260.9	79.2
S32.000	100.00	5.47	161.190	0.000	500.0	0.0	0.0	3.65	2320.0	500.0
S32.001	100.00	5.92	159.805	0.000	500.0	0.0	0.0	3.64	2317.2	500.0
S1.016	100.00	5.94	158.480	0.000	579.2	0.0	0.0	9.15	5818.7	579.2

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Manhole Schedules for SW NETWORK 1 REVC.SWS

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S1	179.614	1.650	Open Manhole	1350	S1.000	177.964	450				
S2	178.877	1.763	Open Manhole	1500	S1.001	177.114	600	S1.000	177.264	450	
S3	177.409	1.809	Open Manhole	1800	S1.002	175.600	750	S1.001	175.750	600	
S1.1A	176.965	1.498	Open Manhole	1200	S2.000	175.467	300				
S1.1B	177.333	1.421	Open Manhole	1200	S3.000	175.912	300				
SAco1.3	176.530	0.800	Open Manhole	1200	S4.000	175.730	300				
S1.1	176.918	2.369	Open Manhole	1800	S2.001	174.549	900	S2.000	175.149	300	
								S3.000	175.149	300	
								S4.000	175.149	300	
SAco1.4	176.050	1.425	Open Manhole	1200	S5.000	174.625	300				
SAco1.5	176.050	1.375	Open Manhole	1200	S6.000	174.675	300				
SAco1.6	175.775	1.625	Open Manhole	1350	S7.000	174.150	375				
S1.2	176.255	3.425	Open Manhole	1800	S2.002	172.830	900	S2.001	174.389	900	1559
								S5.000	174.493	300	1063
								S6.000	174.025	300	595
								S7.000	173.430	375	75
S1.3a	176.255	3.545	Open Manhole	1800	S2.003	172.710	900	S2.002	172.710	900	
SAco1.7	176.050	1.425	Open Manhole	1200	S8.000	174.625	300				
SAco1.8	176.050	1.600	Open Manhole	1200	S9.000	174.450	300				
S1.3	176.254	3.664	Open Manhole	1800	S2.004	172.590	900	S2.003	172.590	900	
								S8.000	173.852	300	662
								S9.000	173.852	300	662
SAco1.9	176.525	1.800	Open Manhole	1200	S10.000	174.725	225				
S1.4	176.795	4.342	Open Manhole	1800	S2.005	172.453	900	S2.004	172.453	900	
								S10.000	174.699	225	1571
S1.5	177.145	4.732	Open Manhole	1800	S2.006	172.413	900	S2.005	172.413	900	
S1.6	177.145	4.847	Open Manhole	1800	S2.007	172.298	975	S2.006	172.374	900	1
S1.7	177.145	4.886	Open Manhole	1800	S2.008	172.259	975	S2.007	172.259	975	
S1.8	177.145	5.000	Open Manhole	1800	S2.009	172.145	1050	S2.008	172.220	975	
S1.9	177.145	5.115	Open Manhole	1800	S2.010	172.030	1125	S2.009	172.106	1050	1
S1.10	177.145	5.154	Open Manhole	1800	S2.011	171.991	1125	S2.010	171.991	1125	
SAco1.10	176.050	2.905	Open Manhole	1200	S11.000	173.145	225				
S1.13	176.030	3.042	Open Manhole	1200	S11.001	172.988	300	S11.000	173.063	225	
SAco1.11	173.185	1.060	Open Manhole	1200	S12.000	172.125	225				
S1.23	173.600	1.674	Open Manhole	1200	S12.001	171.926	225	S12.000	171.926	225	
S1.14	176.100	4.871	Open Manhole	1500	S11.002	171.229	525	S11.001	172.584	300	1130
								S12.001	171.529	225	
SAco1.12	175.280	1.780	Open Manhole	1200	S13.000	173.500	300				
S1.15	176.050	4.986	Open Manhole	1500	S11.003	171.064	525	S11.002	171.064	525	
								S13.000	173.396	300	2107
S1.16	176.050	5.097	Open Manhole	1500	S11.004	170.953	525	S11.003	170.953	525	
SAco1.13	175.000	2.050	Open Manhole	1200	S14.000	172.950	300				
S1.17	175.635	4.868	Open Manhole	1500	S11.005	170.767	600	S11.004	170.842	525	
								S14.000	172.915	300	1848

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MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S1.24	177.130	1.660	Open Manhole	1800	S15.000	175.470	975				
S1.25	177.130	1.692	Open Manhole	1800	S15.001	175.438	975	S15.000	175.438	975	
S1.26	177.130	1.743	Open Manhole	1800	S15.002	175.387	975	S15.001	175.387	975	
S1.27	177.130	1.782	Open Manhole	1800	S15.003	175.348	975	S15.002	175.348	975	
S1.28	177.080	1.771	Open Manhole	1800	S15.004	175.309	975	S15.003	175.309	975	
S1.18	176.620	6.295	Open Manhole	1800	S11.006	170.325	975	S11.005	170.700	600	
								S15.004	175.277	975	4952
S1.19	176.500	6.348	Open Manhole	1800	S11.007	170.152	1050	S11.006	170.227	975	
SAco1.14	176.050	1.425	Open Manhole	1200	S16.000	174.625	300				
S1.20	176.510	6.539	Open Manhole	1800	S11.008	169.971	1125	S11.007	170.046	1050	
								S16.000	174.486	300	3690
SAco1.15	176.050	1.425	Open Manhole	1200	S17.000	174.625	300				
S1.21	176.525	6.652	Open Manhole	1800	S11.009	169.874	1125	S11.008	169.873	1125	
								S17.000	174.481	300	3782
SAco1.16	176.825	1.550	Open Manhole	1350	S18.000	175.275	375				
S1.22	176.910	7.133	Open Manhole	1800	S11.010	169.777	1125	S11.009	169.777	1125	
								S18.000	175.243	375	4716
S1.11	177.185	7.819	Open Manhole	1800	S2.012	169.366	1500	S2.011	171.971	1125	2230
								S11.010	169.741	1125	
S1.12	177.050	7.694	Open Manhole	1800	S2.013	169.356	1500	S2.012	169.356	1500	
S4a	177.130	7.896	Open Manhole	1800	S1.003	169.234	1575	S1.002	175.289	750	5230
								S2.013	169.309	1500	
S4	177.125	8.010	Open Manhole	1800	S1.004	169.115	1650	S1.003	169.190	1575	
S5	177.270	8.199	Open Manhole	1800	S1.005	169.071	1650	S1.004	169.071	1650	
S6	177.760	8.765	Open Manhole	1800	S1.006	168.995	1650	S1.005	168.996	1650	1
S7	177.323	8.457	Open Manhole	1800	S1.007	168.866	1650	S1.006	168.866	1650	
SAco2.1	177.840	2.020	Open Manhole	1200	S19.000	175.820	150				
S2.1	177.100	1.490	Open Manhole	1200	S19.001	175.610	300	S19.000	175.760	150	
SAco2.2	177.840	1.241	Open Manhole	1200	S20.000	176.599	150				
S2.2	177.780	1.242	Open Manhole	1200	S20.001	176.538	150	S20.000	176.538	150	
SAcoOS	178.424	1.425	Open Manhole	1200	S21.000	176.999	300				
SOS1	177.325	2.410	Open Manhole	1200	S21.001	174.915	300	S21.000	174.915	300	
S2.3	177.355	2.670	Open Manhole	1350	S19.002	174.685	375	S19.001	175.254	300	494
								S20.001	175.761	150	851
								S21.001	174.835	300	75
SAco2.8	177.070	1.700	Open Manhole	1500	S22.000	175.370	600				
S2.7	177.155	1.800	Open Manhole	1500	S22.001	175.355	600	S22.000	175.355	600	
S2.8	177.155	2.164	Open Manhole	1800	S22.002	174.991	900	S22.001	175.291	600</	

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MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S2.13	177.270	2.455	Open Manhole	1800	S23.001	174.815	900	S23.000	175.490	300	75
S2.14	177.270	2.555	Open Manhole	1800	S23.002	174.715	900	S23.001	174.715	900	
S2.15	177.270	2.632	Open Manhole	1800	S23.003	174.638	900	S23.002	174.638	900	
S2.16	177.270	2.674	Open Manhole	1800	S23.004	174.597	900	S23.003	174.596	900	
S2.17	177.260	2.714	Open Manhole	1800	S23.005	174.546	900	S23.004	174.547	900	1
SAco2.5A	175.900	0.800	Open Manhole	1200	S24.000	175.100	300				
S2.18	176.315	2.718	Open Manhole	1800	S23.006	173.597	1200	S23.005	173.972	900	75
								S24.000	174.497	300	
SAco2.5B	175.900	0.800	Open Manhole	1200	S25.000	175.100	300				
S2.18A	176.290	2.770	Open Manhole	1800	S23.007	173.520	1200	S23.006	173.520	1200	
								S25.000	174.420	300	
SAco2.4	176.050	1.454	Open Manhole	1200	S26.000	174.596	300				
SAco2.5	175.900	0.800	Open Manhole	1200	S27.000	175.100	300				
S2.19	176.290	2.847	Open Manhole	1800	S23.008	173.443	1200	S23.007	173.443	1200	
								S26.000	174.343	300	
								S27.000	174.343	300	
SAco2.7A	175.900	0.800	Open Manhole	1200	S28.000	175.100	300				
S2.20A	176.290	2.943	Open Manhole	1800	S23.009	173.347	1200	S23.008	173.347	1200	
								S28.000	174.247	300	
SAco2.6	176.050	0.950	Open Manhole	1200	S29.000	175.100	300				
SAco2.7	175.900	0.800	Open Manhole	1200	S30.000	175.100	300				
S2.20	176.290	3.039	Open Manhole	1800	S23.010	173.251	1200	S23.009	173.251	1200	
								S29.000	174.151	300	
								S30.000	174.151	300	
S2.23	177.400	1.425	Open Manhole	1200	S31.000	175.975	300				
S2.21	177.260	4.089	Open Manhole	1800	S23.011	173.171	1200	S23.010	173.171	1200	
								S31.000	175.806	300	1735
S2.22	177.035	3.889	Open Manhole	1800	S23.012	173.146	1200	S23.011	173.146	1200	
S2.5	177.075	3.969	Open Manhole	1800	S19.004	173.106	1275	S19.003	173.863	1050	532
								S23.012	173.106	1200	
S8	177.140	8.304	Open Manhole	1800	S1.008	168.836	1650	S1.007	168.836	1650	
								S19.004	173.096	1275	3885
S9	167.680	2.780	Open Manhole	1800	S1.009	164.900	1875	S1.008	165.125	1650	
S10	169.990	7.740	Open Manhole	1800	S1.010	162.250	1875	S1.009	164.845	1875	2595
SPond 1	167.000	4.800	Open Manhole	1800	S1.011	162.200	1875	S1.010	162.200	1875	
S11	169.695	7.629	Open Manhole	1800	S1.012	162.066	1875	S1.011	162.066	1875	
SPond 2	167.000	5.000	Open Manhole	1800	S1.013	162.000	1875	S1.012	162.000	1875	
S12	167.000	5.077	Open Manhole	3000	S1.014	161.923	450	S1.013	161.923	1875	
S12A	167.000	7.600	Open Manhole	1350	S1.015	159.400	450	S			

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Manhole Schedules for SW NETWORK 1_REVC.SWS

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S1	444859.249	310740.465	444859.249	310740.465	Required	
S2	444884.209	310718.462	444884.209	310718.462	Required	
S3	444937.266	310644.035	444937.266	310644.035	Required	
S1.1A	444593.753	310522.781	444593.753	310522.781	Required	
S1.1B	444629.178	310526.506	444629.178	310526.506	Required	
SACo1.3	444589.517	310555.269	444589.517	310555.269	Required	
S1.1	444620.613	310544.104	444620.613	310544.104	Required	
SACo1.4	444673.547	310560.665	444673.547	310560.665	Required	
SACo1.5	444651.048	310584.518	444651.048	310584.518	Required	
SACo1.6	444644.514	310592.748	444644.514	310592.748	Required	
S1.2	444661.167	310576.297	444661.167	310576.297	Required	
S1.3a	444725.861	310627.652	444725.861	310627.652	Required	
SACo1.7	444795.718	310657.653	444795.718	310657.653	Required	
SACo1.8	444780.132	310687.381	444780.132	310687.381	Required	
S1.3	444790.548	310679.004	444790.548	310679.004	Required	
SACo1.9	444831.358	310728.084	444831.358	310728.084	Required	
S1.4	444850.216	310724.473	444850.216	310724.473	Required	
S1.5	444872.331	310708.231	444872.331	310708.231	Required	

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Manhole Schedules for SW NETWORK 1_REVC.SWS

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S1.6	444890.670	310685.129	444890.670	310685.129	Required	
S1.7	444909.011	310662.024	444909.011	310662.024	Required	
S1.8	444927.354	310638.920	444927.354	310638.920	Required	
S1.9	444945.385	310616.206	444945.385	310616.206	Required	
S1.10	444963.467	310593.429	444963.467	310593.429	Required	
SAcol.10	444554.479	310520.003	444554.479	310520.003	Required	
S1.13	444557.569	310520.070	444557.569	310520.070	Required	
SAcol.11	444540.712	310457.878	444540.712	310457.878	Required	
S1.23	444561.663	310456.775	444561.663	310456.775	Required	
S1.14	444600.693	310465.748	444600.693	310465.748	Required	
SAcol.12	444607.637	310420.327	444607.637	310420.327	Required	
S1.15	444625.496	310434.505	444625.496	310434.505	Required	
S1.16	444659.382	310391.821	444659.382	310391.821	Required	
SAcol.13	444687.464	310344.894	444687.464	310344.894	Required	
S1.17	444701.282	310356.515	444701.282	310356.515	Required	
S1.24	444644.472	310463.960	444644.472	310463.960	Required	
S1.25	444652.475	310453.879	444652.475	310453.879	Required	
S1.26	444670.817	310430.774	444670.817	310430.774	Required	

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Manhole Schedules for SW NETWORK 1 REVC.SWS

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S1.27	444689.159	310407.669	444689.159	310407.669	Required	
S1.28	444707.241	310384.892	444707.241	310384.892	Required	
S1.18	444719.810	310369.060	444719.810	310369.060	Required	
S1.19	444785.569	310415.308	444785.569	310415.308	Required	
SAcol.14	444830.159	310479.946	444830.159	310479.946	Required	
S1.20	444844.688	310461.753	444844.688	310461.753	Required	
SAcol.15	444902.110	310537.066	444902.110	310537.066	Required	
S1.21	444919.685	310520.596	444919.685	310520.596	Required	
SAcol.16	444954.653	310557.743	444954.653	310557.743	Required	
S1.22	444958.905	310556.865	444958.905	310556.865	Required	
S1.11	444969.808	310581.620	444969.808	310581.620	Required	
S1.12	444976.330	310578.748	444976.330	310578.748	Required	
S4a	444982.194	310587.067	444982.194	310587.067	Required	
S4	445007.789	310570.380	445007.789	310570.380	Required	
S5	445063.036	310555.343	445063.036	310555.343	Required	
S6	445131.571	310537.923	445131.571	310537.923	Required	
S7	445117.950	310445.593	445117.950	310445.593	Required	
SAco2.1	445090.404	310536.643	445090.404	310536.643	Required	

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Manhole Schedules for SW NETWORK 1 REVC.SWS

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S2.1	445072.482	310511.988	445072.482	310511.988	Required	
SACo2.2	445110.010	310512.168	445110.010	310512.168	Required	
S2.2	445108.511	310509.849	445108.511	310509.849	Required	
SACoOS	445145.759	310532.392	445145.759	310532.392	Required	
SOS1	445125.910	310467.834	445125.910	310467.834	Required	
S2.3	445106.572	310468.992	445106.572	310468.992	Required	
SACo2.8	445000.867	310554.115	445000.867	310554.115	Required	
S2.7	445007.227	310549.118	445007.227	310549.118	Required	
S2.8	445024.960	310526.775	445024.960	310526.775	Required	
S2.9	445044.856	310501.712	445044.856	310501.712	Required	
S2.10	445060.709	310481.746	445060.709	310481.746	Required	
S2.11	445062.787	310479.129	445062.787	310479.129	Required	
S2.12	445093.036	310441.024	445093.036	310441.024	Required	
SACo2.3	444770.955	310359.603	444770.955	310359.603	Required	
S2.13	444774.036	310360.244	444774.036	310360.244	Required	
S2.14	444791.767	310337.908	444791.767	310337.908	Required	
S2.15	444811.663	310312.845	444811.663	310312.845	Required	
S2.16	444827.900	310292.391	444827.900	310292.391	Required	

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Manhole Schedules for SW NETWORK 1_REVC.SWS

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S2.17	444850.458	310263.975	444850.458	310263.975	Required	
SAco2.5A	444931.917	310266.007	444931.917	310266.007	Required	
S2.18	444915.616	310282.821	444915.616	310282.821	Required	
SAco2.5B	444960.445	310288.653	444960.445	310288.653	Required	
S2.18A	444945.958	310306.909	444945.958	310306.909	Required	
SAco2.4	444963.801	310346.736	444963.801	310346.736	Required	
SAco2.5	444990.963	310312.468	444990.963	310312.468	Required	
S2.19	444976.299	310330.992	444976.299	310330.992	Required	
SAco2.7A	445028.186	310342.437	445028.186	310342.437	Required	
S2.20A	445013.706	310360.686	445013.706	310360.686	Required	
SAco2.6	445038.613	310406.125	445038.613	310406.125	Required	
SAco2.7	445065.679	310372.122	445065.679	310372.122	Required	
S2.20	445051.112	310390.379	445051.112	310390.379	Required	
S2.23	445069.796	310435.779	445069.796	310435.779	Required	
S2.21	445082.360	310415.193	445082.360	310415.193	Required	
S2.22	445097.296	310414.362	445097.296	310414.362	Required	
S2.5	445117.238	310416.041	445117.238	310416.041	Required	
S8	445119.671	310422.780	445119.671	310422.780	Required	

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MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S9	445243.380	310411.086	445243.380	310411.086	Required	
S10	445282.689	310416.319	445282.689	310416.319	Required	
SPond 1	445319.435	310419.641	445319.435	310419.641	Required	
S11	445322.633	310384.270	445322.633	310384.270	Required	
SPond 2	445325.543	310352.089	445325.543	310352.089	Required	
S12	445302.546	310332.441	445302.546	310332.441	Required	
S12A	445298.456	310329.043	445298.456	310329.043	Required	
SMH2	445200.972	310497.471	445200.972	310497.471	Required	
SMH2B	445232.497	310400.066	445232.497	310400.066	Required	
SCP1	445280.668	310314.517	445280.668	310314.517	Required	
SCP1A	445283.939	310305.158			No Entry	

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PIPELINE SCHEDULES for SW NETWORK 1_REVC.SWS

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)
S1.000	o	450	S1	179.614	177.964	1.200	Open Manhole	1350
S1.001	o	600	S2	178.877	177.114	1.163	Open Manhole	1500
S1.002	o	750	S3	177.409	175.600	1.059	Open Manhole	1800
S2.000	o	300	S1.1A	176.965	175.467	1.198	Open Manhole	1200
S3.000	o	300	S1.1B	177.333	175.912	1.121	Open Manhole	1200
S4.000	o	300	SACo1.3	176.530	175.730	0.500	Open Manhole	1200
S2.001	o	900	S1.1	176.918	174.549	1.469	Open Manhole	1800
S5.000	o	300	SACo1.4	176.050	174.625	1.125	Open Manhole	1200
S6.000	o	300	SACo1.5	176.050	174.675	1.075	Open Manhole	1200
S7.000	o	375	SACo1.6	175.775	174.150	1.250	Open Manhole	1350
S2.002	o	900	S1.2	176.255	172.830	2.525	Open Manhole	1800
S2.003	o	900	S1.3a	176.255	172.710	2.645	Open Manhole	1800
S8.000	o	300	SACo1.7	176.050	174.625	1.125	Open Manhole	1200
S9.000	o	300	SACo1.8	176.050	174.450	1.300	Open Manhole	1200

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)
S1.000	33.472	47.8	S2	178.877	177.264	1.163	Open Manhole	1500
S1.001	91.449	67.0	S3	177.409	175.750	1.059	Open Manhole	1800
S1.002	72.553	233.3	S4a	177.130	175.289	1.091	Open Manhole	1800
S2.000	34.295	107.8	S1.1	176.918	175.149	1.469	Open Manhole	1800
S3.000	19.572	25.7	S1.1	176.918	175.149	1.469	Open Manhole	1800
S4.000	33.040	56.9	S1.1	176.918	175.149	1.469	Open Manhole	1800
S2.001	51.779	323.6	S1.2	176.255	174.389	0.966	Open Manhole	1800
S5.000	19.941	151.1	S1.2	176.255	174.493	1.462	Open Manhole	1800
S6.000	13.038	20.1	S1.2	176.255	174.025	1.930	Open Manhole	1800
S7.000	23.408	32.5	S1.2	176.255	173.430	2.450	Open Manhole	1800
S2.002	82.599	688.3	S1.3a	176.255	172.710	2.645	Open Manhole	1800
S2.003	82.592	688.3	S1.3	176.254	172.590	2.764	Open Manhole	1800
S8.000	21.968	28.4	S1.3	176.254	173.852	2.102	Open Manhole	1800
S9.000	13.367	22.4	S1.3	176.254	173.852	2.102	Open Manhole	1800

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PIPELINE SCHEDULES for SW NETWORK 1_REVC.SWS

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)
S2.004	o	900	S1.3	176.254	172.590	2.764	Open Manhole	1800
S10.000	o	225	SACo1.9	176.525	174.725	1.575	Open Manhole	1200
S2.005	o	900	S1.4	176.795	172.453	3.442	Open Manhole	1800
S2.006	o	900	S1.5	177.145	172.413	3.832	Open Manhole	1800
S2.007	o	975	S1.6	177.145	172.298	3.872	Open Manhole	1800
S2.008	o	975	S1.7	177.145	172.259	3.911	Open Manhole	1800
S2.009	o	1050	S1.8	177.145	172.145	3.950	Open Manhole	1800
S2.010	o	1125	S1.9	177.145	172.030	3.990	Open Manhole	1800
S2.011	o	1125	S1.10	177.145	171.991	4.029	Open Manhole	1800
S11.000	o	225	SACo1.10	176.050	173.145	2.680	Open Manhole	1200
S11.001	o	300	S1.13	176.030	172.988	2.742	Open Manhole	1200
S12.000	o	225	SACo1.11	173.185	172.125	0.835	Open Manhole	1200
S12.001	o	225	S1.23	173.600	171.926	1.449	Open Manhole	1200
S11.002	o	525	S1.14	176.100	171.229	4.346	Open Manhole	1500
S13.000	o	300	SACo1.12	175.280	173.500	1.480	Open Manhole	1200
S11.003	o	525	S1.15	176.050	171.064	4.461	Open Manhole	1500
S11.004	o	525	S1.16	176.050	170.953	4.572	Open Manhole	1500

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)
S2.004	75.018	547.6	S1.4	176.795	172.453	3.442	Open Manhole	1800
S10.000	19.201	738.5	S1.4	176.795	174.699	1.871	Open Manhole	1800
S2.005	27.439	686.0	S1.5	177.145	172.413	3.832	Open Manhole	1800
S2.006	29.496	756.3	S1.6	177.145	172.374	3.871	Open Manhole	1800
S2.007	29.500	756.4	S1.7	177.145	172.259	3.911	Open Manhole	1800
S2.008	29.500	756.4	S1.8	177.145	172.220	3.950	Open Manhole	1800
S2.009	29.001	743.6	S1.9	177.145	172.106	3.989	Open Manhole	1800
S2.010	29.083	745.7	S1.10	177.145	171.991	4.029	Open Manhole	1800
S2.011	13.404	670.2	S1.11	177.185	171.971	4.089	Open Manhole	1800
S11.000	3.091	37.7	S1.13	176.030	173.063	2.742	Open Manhole	1200
S11.001	69.358	171.7	S1.14	176.100	172.584	3.216	Open Manhole	1500
S12.000	20.980	105.4	S1.23	173.600	171.926	1.449	Open Manhole	1200
S12.001	40.049	100.9	S1.14	176.100	171.529	4.346	Open Manhole	1500
S11.002	39.892	241.8	S1.15	176.050	171.064	4.461	Open Manhole	1500
S13.000	22.803	219.3	S1.15	176.050	173.396	2.354	Open Manhole	1500
S11.003	54.499	491.0	S1.16	176.050	170.953	4.572	Open Manhole	1500
S11.004	54.792	493.6	S1.17	175.635	170.842	4.268	Open Manhole	1500

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PIPELINE SCHEDULES for SW NETWORK 1_REVC.SWS

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)
S14.000	o	300	SACo1.13	175.000	172.950	1.750	Open Manhole	1200
S11.005	o	600	S1.17	175.635	170.767	4.268	Open Manhole	1500
S15.000	o	975	S1.24	177.130	175.470	0.685	Open Manhole	1800
S15.001	o	975	S1.25	177.130	175.438	0.717	Open Manhole	1800
S15.002	o	975	S1.26	177.130	175.387	0.768	Open Manhole	1800
S15.003	o	975	S1.27	177.130	175.348	0.807	Open Manhole	1800
S15.004	o	975	S1.28	177.080	175.309	0.796	Open Manhole	1800
S11.006	o	975	S1.18	176.620	170.325	5.320	Open Manhole	1800
S11.007	o	1050	S1.19	176.500	170.152	5.298	Open Manhole	1800
S16.000	o	300	SACo1.14	176.050	174.625	1.125	Open Manhole	1200
S11.008	o	1125	S1.20	176.510	169.971	5.414	Open Manhole	1800
S17.000	o	300	SACo1.15	176.050	174.625	1.125	Open Manhole	1200
S11.009	o	1125	S1.21	176.525	169.874	5.526	Open Manhole	1800
S18.000	o	375	SACo1.16	176.825	175.275	1.175	Open Manhole	1350
S11.010	o	1125	S1.22	176.910	169.777	6.008	Open Manhole	1800

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)
S14.000	18.055	515.9	S1.17	175.635	172.915	2.420	Open Manhole	1500
S11.005	22.376	334.0	S1.18	176.620	170.700	5.320	Open Manhole	1800
S15.000	12.872	402.3	S1.25	177.130	175.438	0.717	Open Manhole	1800
S15.001	29.500	578.4	S1.26	177.130	175.387	0.768	Open Manhole	1800
S15.002	29.500	756.4	S1.27	177.130	175.348	0.807	Open Manhole	1800
S15.003	29.083	745.7	S1.28	177.080	175.309	0.796	Open Manhole	1800
S15.004	20.215	631.7	S1.18	176.620	175.277	0.368	Open Manhole	1800
S11.006	80.394	820.3	S1.19	176.500	170.227	5.298	Open Manhole	1800
S11.007	75.181	709.3	S1.20	176.510	170.046	5.414	Open Manhole	1800
S16.000	23.283	167.5	S1.20	176.510	174.486	1.724	Open Manhole	1800
S11.008	95.326	972.7	S1.21	176.525	169.873	5.527	Open Manhole	1800
S17.000	24.086	167.3	S1.21	176.525	174.481	1.744	Open Manhole	1800
S11.009	53.420	550.7	S1.22	176.910	169.777	6.008	Open Manhole	1800
S18.000	4.342	135.7	S1.22	176.910	175.243	1.292	Open Manhole	1800
S11.010	27.050	751.4	S1.11	177.185	169.741	6.319	Open Manhole	1800

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PIPELINE SCHEDULES for SW NETWORK 1_REVC.SWS

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)
S2.012	o	1500	S1.11	177.185	169.366	6.319	Open Manhole	1800
S2.013	o	1500	S1.12	177.050	169.356	6.194	Open Manhole	1800
S1.003	o	1575	S4a	177.130	169.234	6.321	Open Manhole	1800
S1.004	o	1650	S4	177.125	169.115	6.360	Open Manhole	1800
S1.005	o	1650	S5	177.270	169.071	6.549	Open Manhole	1800
S1.006	o	1650	S6	177.760	168.995	7.115	Open Manhole	1800
S1.007	o	1650	S7	177.323	168.866	6.807	Open Manhole	1800
S19.000	o	150	SACo2.1	177.840	175.820	1.870	Open Manhole	1200
S19.001	o	300	S2.1	177.100	175.610	1.190	Open Manhole	1200
S20.000	o	150	SACo2.2	177.840	176.599	1.091	Open Manhole	1200
S20.001	o	150	S2.2	177.780	176.538	1.092	Open Manhole	1200
S21.000	o	300	SACoOS	178.424	176.999	1.125	Open Manhole	1200
S21.001	o	300	SOS1	177.325	174.915	2.110	Open Manhole	1200
S19.002	o	375	S2.3	177.355	174.685	2.295	Open Manhole	1350
S22.000	o	600	SACo2.8	177.070	175.370	1.100	Open Manhole	1500
S22.001	o	600	S2.7	177.155	175.355	1.200	Open Manhole	1500
S22.002	o	900	S2.8	177.155	174.991	1.264	Open Manhole	1800
S22.003	o	900	S2.9	177.155	174.927	1.328	Open Manhole	1800
S22.004	o	900	S2.10	177.300	174.893	1.507	Open Manhole	1800

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)
S2.012	7.127	712.7	S1.12	177.050	169.356	6.194	Open Manhole	1800
S2.013	10.178	216.6	S4a	177.130	169.309	6.321	Open Manhole	1800
S1.003	30.554	694.4	S4	177.125	169.190	6.360	Open Manhole	1800
S1.004	57.257	1301.3	S5	177.270	169.071	6.549	Open Manhole	1800
S1.005	70.714	942.9	S6	177.760	168.996	7.114	Open Manhole	1800
S1.006	93.329	723.5	S7	177.323	168.866	6.807	Open Manhole	1800
S1.007	22.878	762.6	S8	177.140	168.836	6.654	Open Manhole	1800
S19.000	30.481	508.0	S2.1	177.100	175.760	1.190	Open Manhole	1200
S19.001	54.871	154.1	S2.3	177.355	175.254	1.801	Open Manhole	1350
S20.000	2.761	45.3	S2.2	177.780	176.538	1.092	Open Manhole	1200
S20.001	40.903	52.6	S2.3	177.355	175.761	1.444	Open Manhole	1350
S21.000	67.540	32.4	SOS1	177.325	174.915	2.110	Open Manhole	1200
S21.001	19.372	242.2	S2.3	177.355	174.835	2.220	Open Manhole	1350
S19.002	31.071	304.6	S2.12	177.300	174.583	2.342	Open Manhole	1800
S22.000	8.088	539.2	S2.7	177.155	175.355	1.200	Open Manhole	1500
S22.001	28.526	445.7	S2.8	177.155	175.291	1.264	Open Manhole	1800
S22.002	32.000	500.0	S2.9	177.155	174.927	1.328	Open Manhole	1800
S22.003	25.494	749.8	S2.10	177.300	174.893	1.507	Open Manhole	1800
S22.004	3.343	835.8	S2.11	177.300	174.889	1.511	Open Manhole	1800

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PIPELINE SCHEDULES for SW NETWORK 1_REVC.SWS

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)
S22.005	o	900	S2.11	177.300	174.889	1.511	Open Manhole	1800
S19.003	o	1050	S2.12	177.300	173.908	2.342	Open Manhole	1800
S23.000	o	300	S2.13	177.195	175.740	1.155	Open Manhole	1200
S23.001	o	900	S2.13	177.270	174.815	1.555	Open Manhole	1800
S23.002	o	900	S2.14	177.270	174.715	1.655	Open Manhole	1800
S23.003	o	900	S2.15	177.270	174.638	1.732	Open Manhole	1800
S23.004	o	900	S2.16	177.270	174.597	1.773	Open Manhole	1800
S23.005	o	900	S2.17	177.260	174.546	1.814	Open Manhole	1800
S24.000	o	300	S2.18	175.900	175.100	0.500	Open Manhole	1200
S23.006	o	1200	S2.18	176.315	173.597	1.518	Open Manhole	1800
S25.000	o	300	S2.18A	175.900	175.100	0.500	Open Manhole	1200
S23.007	o	1200	S2.18A	176.290	173.520	1.570	Open Manhole	1800
S26.000	o	300	S2.19	176.050	174.596	1.154	Open Manhole	1200
S27.000	o	300	S2.19	175.900	175.100	0.500	Open Manhole	1200
S23.008	o	1200	S2.19	176.290	173.443	1.647	Open Manhole	1800

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)
S22.005	48.670	705.4	S2.12	177.300	174.820	1.580	Open Manhole	1800
S19.003	34.689	770.9	S2.5	177.075	173.863	2.162	Open Manhole	1800
S23.000	3.147	12.6	S2.13	177.270	175.490	1.480	Open Manhole	1800
S23.001	28.518	285.2	S2.14	177.270	174.715	1.655	Open Manhole	1800
S23.002	32.000	415.6	S2.15	177.270	174.638	1.732	Open Manhole	1800
S23.003	26.115	621.8	S2.16	177.270	174.596	1.774	Open Manhole	1800
S23.004	36.281	725.6	S2.17	177.260	174.547	1.813	Open Manhole	1800
S23.005	67.829	118.2	S2.18	176.315	173.972	1.443	Open Manhole	1800
S24.000	23.419	38.8	S2.18	176.315	174.497	1.518	Open Manhole	1800
S23.006	38.740	503.1	S2.18A	176.290	173.520	1.570	Open Manhole	1800
S25.000	23.306	34.3	S2.18A	176.290	174.420	1.570	Open Manhole	1800
S23.007	38.740	503.1	S2.19	176.290	173.443	1.647	Open Manhole	1800
S26.000	20.102	79.5	S2.19	176.290	174.343	1.647	Open Manhole	1800
S27.000	23.626	31.2	S2.19	176.290	174.343	1.647	Open Manhole	1800
S23.008	47.760	497.5	S2.20A	176.290	173.347	1.743	Open Manhole	1800

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PIPELINE SCHEDULES for SW NETWORK 1_REVC.SWS

Upstream Manhole

PN	Hyd	Diam	MH	C.Level	I.Level	D.Depth	MH	MH DIAM., L*W
	Sect	(mm)	Name	(m)	(m)	(m)	Connection	(mm)
S28.000	o	300	SAco2.7A	175.900	175.100	0.500	Open Manhole	1200
S23.009	o	1200	S2.20A	176.290	173.347	1.743	Open Manhole	1800
S29.000	o	300	SAco2.6	176.050	175.100	0.650	Open Manhole	1200
S30.000	o	300	SAco2.7	175.900	175.100	0.500	Open Manhole	1200
S23.010	o	1200	S2.20	176.290	173.251	1.839	Open Manhole	1800
S31.000	o	300	S2.23	177.400	175.975	1.125	Open Manhole	1200
S23.011	o	1200	S2.21	177.260	173.171	2.889	Open Manhole	1800
S23.012	o	1200	S2.22	177.035	173.146	2.689	Open Manhole	1800
S19.004	o	1275	S2.5	177.075	173.106	2.694	Open Manhole	1800
S1.008	o	1650	S8	177.140	168.836	6.654	Open Manhole	1800
S1.009	o	1875	S9	167.680	164.900	0.905	Open Manhole	1800
S1.010	o	1875	S10	169.990	162.250	5.865	Open Manhole	1800
S1.011	o	1875	SPond 1	167.000	162.200	2.925	Open Manhole	1800
S1.012	o	1875	S11	169.695	162.066	5.754	Open Manhole	1800
S1.013	o	1875	SPond 2	167.000	162.000	3.125	Open Manhole	1800
S1.014	o	450	S12	167.000	161.923	4.627	Open Manhole	3000
S1.015	o	450	S12A	167.000	159.400	7.150	Open Manhole	1350

Downstream Manhole

PN	Length	Slope	MH	C.Level	I.Level	D.Depth	MH	MH DIAM., L*W
	(m)	(1:X)	Name	(m)	(m)	(m)	Connection	(mm)
S28.000	23.296	27.3	S2.20A	176.290	174.247	1.743	Open Manhole	1800
S23.009	47.760	497.5	S2.20	176.290	173.251	1.839	Open Manhole	1800
S29.000	20.103	21.2	S2.20	176.290	174.151	1.839	Open Manhole	1800
S30.000	23.356	24.6	S2.20	176.290	174.151	1.839	Open Manhole	1800
S23.010	39.902	498.8	S2.21	177.260	173.171	2.889	Open Manhole	1800
S31.000	24.118	142.7	S2.21	177.260	175.806	1.154	Open Manhole	1800
S23.011	14.959	598.4	S2.22	177.035	173.146	2.689	Open Manhole	1800
S23.012	20.013	500.3	S2.5	177.075	173.106	2.769	Open Manhole	1800
S19.004	7.165	716.5	S8	177.140	173.096	2.769	Open Manhole	1800
S1.008	124.258	33.5	S9	167.680	165.125	0.905	Open Manhole	1800
S1.009	39.656	721.0	S10	169.990	164.845	3.270	Open Manhole	1800
S1.010	36.896	737.9	SPond 1	167.000	162.200	2.925	Open Manhole	1800
S1.011	35.515	265.0	S11	169.695	162.066	5.754	Open Manhole	1800
S1.012	32.312	489.6	SPond 2	167.000	162.000	3.125	Open Manhole	1800
S1.013	30.247	392.8	S12	167.000	161.923	3.202	Open Manhole	3000
S1.014	5.317	231.2	S12A	167.000	161.900	4.650	Open Manhole	1350
S1.015	22.966	153.1	SCP1	164.200	159.250	4.500	Open Manhole	1800

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PIPELINE SCHEDULES for SW NETWORK 1_REVC.SWS

Upstream Manhole

PN	Hyd	Diam	MH	C.Level	I.Level	D.Depth	MH	MH DIAM., L*W
	Sect	(mm)	Name	(m)	(m)	(m)	Connection	(mm)
S32.000	o	900	SMH2	186.042	161.190	23.952	Open Manhole	1800
S32.001	o	900	SMH2B	168.280	159.805	7.575	Open Manhole	1800
S1.016	o	900	SCP1	164.200	158.480	4.820	Open Manhole	1800

Downstream Manhole

PN	Length	Slope	MH	C.Level	I.Level	D.Depth	MH	MH DIAM., L*W
	(m)	(1:X)	Name	(m)	(m)	(m)	Connection	(mm)
S32.000	102.379	73.9	SMH2B	168.280	159.805	7.575	Open Manhole	1800
S32.001	98.179	74.1	SCP1	164.200	158.480	4.820	Open Manhole	1800
S1.016	9.914	11.8	SCP1A	160.340	157.640	1.800	Open Manhole	1800

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Area Summary for SW NETWORK 1_REVC.SWS

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.293	0.293	0.293
1.001	-	-	100	0.580	0.580	0.580
1.002	-	-	100	0.660	0.660	0.660
2.000	-	-	100	0.108	0.108	0.108
3.000	-	-	100	0.256	0.256	0.256
4.000	-	-	100	0.045	0.045	0.045
2.001	-	-	100	0.000	0.000	0.000
5.000	-	-	100	0.188	0.188	0.188
6.000	-	-	100	0.238	0.238	0.238
7.000	-	-	100	0.343	0.343	0.343
2.002	-	-	100	0.000	0.000	0.000
2.003	-	-	100	0.000	0.000	0.000
8.000	-	-	100	0.188	0.188	0.188
9.000	-	-	100	0.291	0.291	0.291
2.004	-	-	100	0.200	0.200	0.200
10.000	-	-	100	0.136	0.136	0.136
2.005	-	-	100	0.000	0.000	0.000
2.006	-	-	100	0.297	0.297	0.297
2.007	-	-	100	0.479	0.479	0.479
2.008	-	-	100	0.479	0.479	0.479
2.009	-	-	100	0.575	0.575	0.575
2.010	-	-	100	0.479	0.479	0.479
2.011	-	-	100	0.238	0.238	0.238
11.000	-	-	100	0.077	0.077	0.077
11.001	-	-	100	0.065	0.065	0.065
12.000	-	-	100	0.052	0.052	0.052
12.001	-	-	100	0.000	0.000	0.000
11.002	-	-	100	0.000	0.000	0.000
13.000	-	-	100	0.254	0.254	0.254
11.003	-	-	100	0.147	0.147	0.147
11.004	-	-	100	0.181	0.181	0.181
14.000	-	-	100	0.118	0.118	0.118
11.005	-	-	100	0.119	0.119	0.119
15.000	-	-	100	0.479	0.479	0.479
15.001	-	-	100	0.568	0.568	0.568
15.002	-	-	100	0.479	0.479	0.479
15.003	-	-	100	0.479	0.479	0.479
15.004	-	-	100	0.239	0.239	0.239
11.006	-	-	100	0.000	0.000	0.000
11.007	-	-	100	0.359	0.359	0.359
16.000	-	-	100	0.188	0.188	0.188
11.008	-	-	100	0.476	0.476	0.476
17.000	-	-	100	0.188	0.188	0.188
11.009	-	-	100	0.241	0.241	0.241
18.000	-	-	100	0.060	0.060	0.060
11.010	-	-	100	0.000	0.000	0.000
2.012	-	-	100	0.000	0.000	0.000
2.013	-	-	100	0.000	0.000	0.000
1.003	-	-	100	0.252	0.252	0.252
1.004	-	-	100	0.063	0.063	0.063
1.005	-	-	100	0.248	0.248	0.248
1.006	-	-	100	0.325	0.325	0.325
1.007	-	-	100	0.000	0.000	0.000
19.000	-	-	100	0.040	0.040	0.040
19.001	-	-	100	0.136	0.136	0.136
20.000	-	-	100	0.017	0.017	0.017
20.001	-	-	100	0.000	0.000	0.000
21.000	-	-	100	0.166	0.166	0.166
21.001	-	-	100	0.000	0.000	0.000
19.002	-	-	100	0.090	0.090	0.090

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Area Summary for SW NETWORK 1_REVC.SWS

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
22.000	-	-	100	0.107	0.107	0.107
22.001	-	-	100	0.231	0.231	0.231
22.002	-	-	100	0.562	0.562	0.562
22.003	-	-	100	0.654	0.654	0.654
22.004	-	-	100	0.460	0.460	0.460
22.005	-	-	100	0.157	0.157	0.157
19.003	-	-	100	0.000	0.000	0.000
23.000	-	-	100	0.157	0.157	0.157
23.001	-	-	100	0.231	0.231	0.231
23.002	-	-	100	0.460	0.460	0.460
23.003	-	-	100	0.507	0.507	0.507
23.004	-	-	100	0.460	0.460	0.460
23.005	-	-	100	0.231	0.231	0.231
24.000	-	-	100	0.218	0.218	0.218
23.006	-	-	100	0.000	0.000	0.000
25.000	-	-	100	0.079	0.079	0.079
23.007	-	-	100	0.000	0.000	0.000
26.000	-	-	100	0.205	0.205	0.205
27.000	-	-	100	0.146	0.146	0.146
23.008	-	-	100	0.000	0.000	0.000
28.000	-	-	100	0.134	0.134	0.134
23.009	-	-	100	0.000	0.000	0.000
29.000	-	-	100	0.205	0.205	0.205
30.000	-	-	100	0.311	0.311	0.311
23.010	-	-	100	0.000	0.000	0.000
31.000	-	-	100	0.276	0.276	0.276
23.011	-	-	100	0.000	0.000	0.000
23.012	-	-	100	0.000	0.000	0.000
19.004	-	-	100	0.056	0.056	0.056
1.008	-	-	100	0.000	0.000	0.000
1.009	-	-	100	0.000	0.000	0.000
1.010	-	-	100	0.000	0.000	0.000
1.011	-	-	100	0.000	0.000	0.000
1.012	-	-	100	0.000	0.000	0.000
1.013	-	-	100	0.000	0.000	0.000
1.014	-	-	100	0.000	0.000	0.000
1.015	-	-	100	0.000	0.000	0.000
32.000	-	-	100	0.000	0.000	0.000
32.001	-	-	100	0.000	0.000	0.000
1.016	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				18.026	18.026	18.026

Free Flowing Outfall Details for SW NETWORK 1_REVC.SWS

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
S1.016	SCP1A	160.340	157.640	0.000	1800	0

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Simulation Criteria for SW NETWORK 1 REVC.SWS

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	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 Online Controls	3	Number of Storage Structures	3
		Number of Time/Area Diagrams	0
		Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH	E (1km)	0.305
Return Period (years)	100	F (1km)	2.414
FEH Rainfall Version	1999	Summer Storms	No
Site Location GB 443750 311300 SK 43750 11101		Winter Storms	Yes
C (1km)	-0.027	Cv (Summer)	0.750
D1 (1km)	0.359	Cv (Winter)	0.840
D2 (1km)	0.361	Storm Duration (mins)	15
D3 (1km)	0.256		

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Online Controls for SW NETWORK 1_REVC.SWS

Non Return Valve Manhole: S1.23, DS/PN: S12.001, Volume (m³): 2.7

Non Return Valve Manhole: S1.14, DS/PN: S11.002, Volume (m³): 15.0

Complex Manhole: SPond 2, DS/PN: S1.013, Volume (m³): 97.0

Hydro-Brake® Optimum

Unit Reference	MD-SHE-0308-7920-4500-7920
Design Head (m)	4.500
Design Flow (l/s)	79.2
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	308
Invert Level (m)	162.000
Minimum Outlet Pipe Diameter (mm)	Site Specific Design (Contact Hydro International)
Suggested Manhole Diameter (mm)	Site Specific Design (Contact Hydro International)

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	4.500	78.8	Kick-Flo®	2.649	61.0
Flush-Flo™	1.282	78.3	Mean Flow over Head Range	—	68.6

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	9.3	0.800	75.2	2.000	74.6	4.000	74.4	7.000	97.7
0.200	31.6	1.000	77.4	2.200	72.0	4.500	78.8	7.500	101.0
0.300	54.3	1.200	78.2	2.400	68.2	5.000	83.0	8.000	104.3
0.400	63.3	1.400	78.1	2.600	62.8	5.500	86.9	8.500	107.4
0.500	67.7	1.600	77.5	3.000	64.8	6.000	90.6	9.000	110.4
0.600	71.0	1.800	76.3	3.500	69.8	6.500	94.2	9.500	113.4

Weir

Discharge Coef 0.100 Width (m) 3.000 Invert Level (m) 166.700

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Storage Structures for SW NETWORK 1_REVC.SWS

Cellular Storage Manhole: S1.23, DS/PN: S12.001

Invert Level (m) 171.926 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	20.0	0.0	1.000	20.0	0.0	1.001	0.0	0.0

Tank or Pond Manhole: SPond 1, DS/PN: S1.011

Invert Level (m) 162.200

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	686.3	1.598	1755.0	3.198	3150.0
1.597	1545.0	3.197	2890.0	4.800	4490.0

Tank or Pond Manhole: SPond 2, DS/PN: S1.013

Invert Level (m) 162.000

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	967.4	1.658	2223.9	3.328	3885.4
1.657	1974.1	3.327	3591.9	5.000	4914.0

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Manhole Headloss for SW NETWORK 1_REVC.SWS

PN	US/MH Name	US/MH Headloss
S1.000	S1	0.500
S1.001	S2	0.500
S1.002	S3	0.500
S2.000	S1.1A	0.500
S3.000	S1.1B	0.500
S4.000	SAco1.3	0.500
S2.001	S1.1	0.500
S5.000	SAco1.4	0.500
S6.000	SAco1.5	0.500
S7.000	SAco1.6	0.500
S2.002	S1.2	0.500
S2.003	S1.3a	0.500
S8.000	SAco1.7	0.500
S9.000	SAco1.8	0.500
S2.004	S1.3	0.500
S10.000	SAco1.9	0.500
S2.005	S1.4	0.500
S2.006	S1.5	0.500
S2.007	S1.6	0.500
S2.008	S1.7	0.500
S2.009	S1.8	0.500
S2.010	S1.9	0.500
S2.011	S1.10	0.500
S11.000	SAco1.10	0.500
S11.001	S1.13	0.500
S12.000	SAco1.11	0.500
S12.001	S1.23	0.500
S11.002	S1.14	0.500
S13.000	SAco1.12	0.500
S11.003	S1.15	0.500
S11.004	S1.16	0.500
S14.000	SAco1.13	0.500
S11.005	S1.17	0.500
S15.000	S1.24	0.500
S15.001	S1.25	0.500
S15.002	S1.26	0.500
S15.003	S1.27	0.500
S15.004	S1.28	0.500
S11.006	S1.18	0.500
S11.007	S1.19	0.500
S16.000	SAco1.14	0.500
S11.008	S1.20	0.500
S17.000	SAco1.15	0.500
S11.009	S1.21	0.500
S18.000	SAco1.16	0.500
S11.010	S1.22	0.500
S2.012	S1.11	0.500
S2.013	S1.12	0.500
S1.003	S4a	0.500
S1.004	S4	0.500
S1.005	S5	0.500
S1.006	S6	0.500
S1.007	S7	0.500
S19.000	SAco2.1	0.500
S19.001	S2.1	0.500
S20.000	SAco2.2	0.500
S20.001	S2.2	0.500
S21.000	SAcoOS	0.500
S21.001	SOS1	0.500
S19.002	S2.3	0.500

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Manhole Headloss for SW NETWORK 1_REVC.SWS

PN	US/MH Name	US/MH Headloss
S22.000	SAco2.8	0.500
S22.001	S2.7	0.500
S22.002	S2.8	0.500
S22.003	S2.9	0.500
S22.004	S2.10	0.500
S22.005	S2.11	0.500
S19.003	S2.12	0.500
S23.000	SAco2.3	0.500
S23.001	S2.13	0.500
S23.002	S2.14	0.500
S23.003	S2.15	0.500
S23.004	S2.16	0.500
S23.005	S2.17	0.500
S24.000	SAco2.5A	0.500
S23.006	S2.18	0.500
S25.000	SAco2.5B	0.500
S23.007	S2.18A	0.500
S26.000	SAco2.4	0.500
S27.000	SAco2.5	0.500
S23.008	S2.19	0.500
S28.000	SAco2.7A	0.500
S23.009	S2.20A	0.500
S29.000	SAco2.6	0.500
S30.000	SAco2.7	0.500
S23.010	S2.20	0.500
S31.000	S2.23	0.500
S23.011	S2.21	0.500
S23.012	S2.22	0.500
S19.004	S2.5	0.500
S1.008	S8	0.500
S1.009	S9	0.500
S1.010	S10	0.500
S1.011	SPond 1	0.500
S1.012	S11	0.500
S1.013	SPond 2	0.500
S1.014	S12	0.500
S1.015	S12A	0.500
S32.000	SMH2	0.500
S32.001	SMH2B	0.500
S1.016	SCP1	0.500

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW NETWORK
1_REVC.SWS

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 Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 3 Number of Storage Structures 3 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH D3 (1km) 0.256
 FEH Rainfall Version 1999 E (1km) 0.305
 Site Location GB 443750 311300 SK 43750 11101 F (1km) 2.414
 C (1km) -0.027 Cv (Summer) 0.750
 D1 (1km) 0.359 Cv (Winter) 0.840
 D2 (1km) 0.361

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

 Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water	Surcharged
									Level (m)	Depth (m)
S1.000	S1	15 Winter	1	+0%					178.054	-0.360
S1.001	S2	15 Winter	1	+0%					177.249	-0.465
S1.002	S3	15 Winter	1	+0%	100/15 Summer				175.835	-0.515
S2.000	S1.1A	15 Winter	1	+0%					175.540	-0.227
S3.000	S1.1B	15 Winter	1	+0%	100/15 Summer				175.993	-0.219
S4.000	SAcol.3	15 Winter	1	+0%					175.769	-0.261
S2.001	S1.1	15 Winter	1	+0%	100/15 Winter				174.685	-0.764
S5.000	SAcol.4	15 Winter	1	+0%	100/15 Summer				174.736	-0.189
S6.000	SAcol.5	15 Winter	1	+0%	100/15 Summer				174.751	-0.224
S7.000	SAcol.6	15 Winter	1	+0%	100/15 Summer				174.243	-0.282
S2.002	S1.2	15 Winter	1	+0%	100/15 Summer				173.136	-0.594
S2.003	S1.3a	15 Winter	1	+0%	100/15 Summer				173.017	-0.593
S8.000	SAcol.7	15 Winter	1	+0%	100/15 Summer				174.695	-0.230
S9.000	SAcol.8	15 Winter	1	+0%	100/15 Summer				174.537	-0.213
S2.004	S1.3	15 Winter	1	+0%	100/15 Summer				172.928	-0.562
S10.000	SAcol.9	30 Summer	1	+0%	30/15 Summer				174.950	0.000
S2.005	S1.4	15 Winter	1	+0%	100/15 Summer				172.852	-0.501
S2.006	S1.5	15 Winter	1	+0%	100/15 Summer				172.806	-0.507
S2.007	S1.6	30 Winter	1	+0%	100/15 Summer				172.740	-0.533
S2.008	S1.7	30 Winter	1	+0%	100/15 Summer				172.690	-0.544
S2.009	S1.8	30 Winter	1	+0%	100/15 Summer				172.621	-0.574
S2.010	S1.9	30 Winter	1	+0%	100/15 Summer				172.562	-0.593
S2.011	S1.10	30 Winter	1	+0%	100/15 Summer				172.518	-0.598
S11.000	SAcol.10	15 Winter	1	+0%	100/15 Summer				173.219	-0.151

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW NETWORK
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PN	US/MH Name	Flooded		Half Drain		Pipe	Status	Level Exceeded
		Volume (m³)	Flow / Overflow Cap. (l/s)	Time (mins)	Flow (l/s)			
S1.000	S1	0.000	0.09		35.6		OK	
S1.001	S2	0.000	0.12		89.8		OK	
S1.002	S3	0.000	0.21		153.6		OK	
S2.000	S1.1A	0.000	0.13		13.0		OK	
S3.000	S1.1B	0.000	0.16		31.2		OK	
S4.000	SAco1.3	0.000	0.04		5.4		OK	
S2.001	S1.1	0.000	0.06		50.2		OK	
S5.000	SAco1.4	0.000	0.29		22.6		OK	
S6.000	SAco1.5	0.000	0.14		29.0		OK	
S7.000	SAco1.6	0.000	0.14		41.8		OK	
S2.002	S1.2	0.000	0.20		132.2		OK	
S2.003	S1.3a	0.000	0.17		112.1		OK	
S8.000	SAco1.7	0.000	0.12		22.9		OK	
S9.000	SAco1.8	0.000	0.18		35.4		OK	
S2.004	S1.3	0.000	0.19		142.9		OK	
S10.000	SAco1.9	0.000	1.04		13.2		OK	
S2.005	S1.4	0.000	0.29		142.7		OK	
S2.006	S1.5	0.000	0.33		153.4		OK	
S2.007	S1.6	0.000	0.30		168.7		OK	
S2.008	S1.7	0.000	0.34		190.1		OK	
S2.009	S1.8	0.000	0.33		220.6		OK	
S2.010	S1.9	0.000	0.31		242.4		OK	
S2.011	S1.10	0.000	0.51		252.8		OK	
S11.000	SAco1.10	0.000	0.23		9.4		OK	

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW NETWORK
1_REVC.SWS

PN	US/MH		Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level	Surcharged Depth
	Name	Storm							(m)	(m)
S11.001	S1.13	15 Winter	1	+0%	100/15 Summer				173.079	-0.209
S12.000	SAco1.11	15 Winter	1	+0%	100/15 Summer				172.181	-0.169
S12.001	S1.23	15 Winter	1	+0%	100/15 Summer				171.975	-0.176
S11.002	S1.14	15 Winter	1	+0%	30/15 Winter				171.341	-0.413
S13.000	SAco1.12	15 Winter	1	+0%	30/15 Summer				173.645	-0.155
S11.003	S1.15	15 Winter	1	+0%	30/15 Summer				171.275	-0.314
S11.004	S1.16	15 Winter	1	+0%	30/15 Summer				171.177	-0.301
S14.000	SAco1.13	15 Winter	1	+0%	100/15 Summer				173.085	-0.165
S11.005	S1.17	15 Winter	1	+0%	30/15 Summer				170.996	-0.371
S15.000	S1.24	15 Winter	1	+0%	100/15 Summer				175.823	-0.622
S15.001	S1.25	15 Winter	1	+0%	100/15 Summer				175.818	-0.595
S15.002	S1.26	15 Winter	1	+0%	100/15 Summer				175.803	-0.559
S15.003	S1.27	15 Winter	1	+0%	100/15 Summer				175.769	-0.554
S15.004	S1.28	15 Winter	1	+0%	100/15 Summer				175.713	-0.571
S11.006	S1.18	15 Winter	1	+0%	100/15 Summer				170.738	-0.562
S11.007	S1.19	15 Winter	1	+0%	100/15 Summer				170.565	-0.637
S16.000	SAco1.14	15 Winter	1	+0%	100/15 Summer				174.738	-0.187
S11.008	S1.20	30 Winter	1	+0%	100/15 Summer				170.430	-0.666
S17.000	SAco1.15	15 Winter	1	+0%	100/15 Summer				174.738	-0.187
S11.009	S1.21	30 Winter	1	+0%	100/15 Summer				170.321	-0.678
S18.000	SAco1.16	15 Winter	1	+0%					175.342	-0.308
S11.010	S1.22	30 Winter	1	+0%	100/15 Summer				170.243	-0.659
S2.012	S1.11	30 Winter	1	+0%	100/15 Summer				169.973	-0.893
S2.013	S1.12	30 Winter	1	+0%	100/15 Summer				169.884	-0.972
S1.003	S4a	30 Winter	1	+0%	100/15 Summer				169.859	-0.950
S1.004	S4	30 Winter	1	+0%	100/15 Summer				169.782	-0.983
S1.005	S5	30 Winter	1	+0%	100/15 Summer				169.703	-1.018
S1.006	S6	30 Winter	1	+0%	100/15 Summer				169.613	-1.032
S1.007	S7	30 Winter	1	+0%	100/15 Summer				169.535	-0.981
S19.000	SAco2.1	15 Winter	1	+0%	30/15 Summer				175.909	-0.061
S19.001	S2.1	15 Winter	1	+0%	100/15 Summer				175.706	-0.204
S20.000	SAco2.2	15 Winter	1	+0%					176.636	-0.113
S20.001	S2.2	15 Winter	1	+0%					176.568	-0.120
S21.000	SAcoOS	15 Winter	1	+0%	100/15 Winter				177.065	-0.234
S21.001	SOS1	15 Winter	1	+0%	30/15 Summer				175.033	-0.182
S19.002	S2.3	15 Winter	1	+0%	30/15 Summer				174.871	-0.189
S22.000	SAco2.8	15 Winter	1	+0%	100/15 Summer				175.514	-0.456
S22.001	S2.7	15 Winter	1	+0%	100/15 Summer				175.505	-0.450
S22.002	S2.8	15 Winter	1	+0%	100/15 Summer				175.340	-0.551
S22.003	S2.9	15 Winter	1	+0%	30/15 Winter				175.322	-0.505
S22.004	S2.10	15 Winter	1	+0%	30/15 Winter				175.259	-0.534
S22.005	S2.11	15 Winter	1	+0%	100/15 Summer				175.239	-0.550
S19.003	S2.12	15 Winter	1	+0%	100/15 Summer				174.314	-0.644
S23.000	SAco2.3	15 Winter	1	+0%	100/15 Summer				175.818	-0.222
S23.001	S2.13	15 Winter	1	+0%	100/15 Summer				175.019	-0.696
S23.002	S2.14	15 Winter	1	+0%	100/15 Summer				175.006	-0.609
S23.003	S2.15	15 Winter	1	+0%	100/15 Summer				174.982	-0.556
S23.004	S2.16	15 Winter	1	+0%	100/15 Summer				174.929	-0.568
S23.005	S2.17	15 Winter	1	+0%	100/15 Summer				174.749	-0.697
S24.000	SAco2.5A	15 Winter	1	+0%	100/15 Summer				175.183	-0.217
S23.006	S2.18	15 Winter	1	+0%	100/15 Summer				173.956	-0.841
S25.000	SAco2.5B	15 Winter	1	+0%	100/15 Winter				175.146	-0.254
S23.007	S2.18A	15 Winter	1	+0%	30/15 Summer				173.891	-0.829
S26.000	SAco2.4	15 Winter	1	+0%	100/15 Summer				174.694	-0.202
S27.000	SAco2.5	15 Winter	1	+0%	100/15 Winter				175.164	-0.236
S23.008	S2.19	15 Winter	1	+0%	30/15 Winter				173.834	-0.809

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW NETWORK
1_REVC.SWS

PN	US/MH Name	Flooded		Half Drain		Pipe		Level Exceeded
		Volume (m³)	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	
S11.001	S1.13	0.000	0.20			16.1	OK	
S12.000	SACo1.11	0.000	0.14			6.3	OK	
S12.001	S1.23	0.000	0.11		8	5.3	OK	
S11.002	S1.14	0.000	0.08			20.6	OK	
S13.000	SACo1.12	0.000	0.46			30.7	OK	
S11.003	S1.15	0.000	0.30			59.6	OK	
S11.004	S1.16	0.000	0.37			72.6	OK	
S14.000	SACo1.13	0.000	0.41			14.3	OK	
S11.005	S1.17	0.000	0.31			90.1	OK	
S15.000	S1.24	0.000	0.09			53.3	OK	
S15.001	S1.25	0.000	0.13			98.0	OK	
S15.002	S1.26	0.000	0.23			132.0	OK	
S15.003	S1.27	0.000	0.29			164.7	OK	
S15.004	S1.28	0.000	0.36			181.9	OK	
S11.006	S1.18	0.000	0.35			259.6	OK	
S11.007	S1.19	0.000	0.28			262.5	OK	
S16.000	SACo1.14	0.000	0.30			22.6	OK	
S11.008	S1.20	0.000	0.27			263.6	OK	
S17.000	SACo1.15	0.000	0.30			22.6	OK	
S11.009	S1.21	0.000	0.22			265.8	OK	
S18.000	SACo1.16	0.000	0.07			7.3	OK	
S11.010	S1.22	0.000	0.36			265.4	OK	
S2.012	S1.11	0.000	0.38			499.0	OK	
S2.013	S1.12	0.000	0.23			498.6	OK	
S1.003	S4a	0.000	0.30			570.7	OK	
S1.004	S4	0.000	0.26			562.9	OK	
S1.005	S5	0.000	0.23			554.8	OK	
S1.006	S6	0.000	0.19			548.1	OK	
S1.007	S7	0.000	0.37			544.2	OK	
S19.000	SACo2.1	0.000	0.65			4.9	OK	
S19.001	S2.1	0.000	0.22			18.9	OK	
S20.000	SACo2.2	0.000	0.13			2.1	OK	
S20.001	S2.2	0.000	0.09			2.1	OK	
S21.000	SACoOS	0.000	0.11			19.9	OK	
S21.001	SOS1	0.000	0.32			20.1	OK	
S19.002	S2.3	0.000	0.49			49.5	OK	
S22.000	SACo2.8	0.000	0.07			12.8	OK	
S22.001	S2.7	0.000	0.14			36.9	OK	
S22.002	S2.8	0.000	0.13			87.6	OK	
S22.003	S2.9	0.000	0.34			145.2	OK	
S22.004	S2.10	0.000	0.35			181.8	OK	
S22.005	S2.11	0.000	0.32			194.5	OK	
S19.003	S2.12	0.000	0.32			235.9	OK	
S23.000	SACo2.3	0.000	0.15			19.1	OK	
S23.001	S2.13	0.000	0.05			41.7	OK	
S23.002	S2.14	0.000	0.11			81.6	OK	
S23.003	S2.15	0.000	0.24			126.7	OK	
S23.004	S2.16	0.000	0.29			163.2	OK	
S23.005	S2.17	0.000	0.12			181.4	OK	
S24.000	SACo2.5A	0.000	0.17			26.4	OK	
S23.006	S2.18	0.000	0.14			195.3	OK	
S25.000	SACo2.5B	0.000	0.06			9.6	OK	
S23.007	S2.18A	0.000	0.14			193.4	OK	
S26.000	SACo2.4	0.000	0.23			24.9	OK	
S27.000	SACo2.5	0.000	0.10			17.8	OK	

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW NETWORK
1_REVC.SWS

PN	US/MH Name	Flooded	Flow / Overflow		Half Drain	Pipe	Level	
		Volume (m³)	Flow Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Exceeded
S23.008	S2.19	0.000	0.14			203.0	OK	

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW NETWORK
1_REVC.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S28.000	SACO2.7A	15 Winter	1	+0%	100/15 Winter				175.160
S23.009	S2.20A	15 Winter	1	+0%	30/15 Winter				173.780
S29.000	SACO2.6	15 Winter	1	+0%	100/15 Winter				175.169
S30.000	SACO2.7	15 Winter	1	+0%	100/15 Summer	100/15 Winter			175.189
S23.010	S2.20	15 Winter	1	+0%	30/15 Winter				173.740
S31.000	S2.23	15 Winter	1	+0%	30/15 Summer				176.109
S23.011	S2.21	15 Winter	1	+0%	30/15 Winter				173.714
S23.012	S2.22	15 Winter	1	+0%	30/15 Winter				173.687
S19.004	S2.5	15 Winter	1	+0%	100/15 Summer				173.670
S1.008	S8	30 Winter	1	+0%					169.096
S1.009	S9	30 Winter	1	+0%	100/15 Summer				165.556
S1.010	S10	600 Winter	1	+0%	30/360 Winter				163.115
S1.011	SPond 1	600 Winter	1	+0%	30/240 Winter				163.102
S1.012	S11	600 Winter	1	+0%	30/180 Winter				163.082
S1.013	SPond 2	600 Winter	1	+0%	30/180 Winter				163.067
S1.014	S12	600 Winter	1	+0%					162.181
S1.015	S12A	600 Winter	1	+0%					159.584
S32.000	SMH2	15 Summer	1	+0%					161.488
S32.001	SMH2B	15 Summer	1	+0%					160.105
S1.016	SCP1	600 Winter	1	+0%					158.802

PN	US/MH Name	Surcharged Flooded			Half Drain		Pipe	Level	
		Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Exceeded
S28.000	SACO2.7A	-0.240	0.000	0.09			16.2	OK	
S23.009	S2.20A	-0.767	0.000	0.14			200.5	OK	
S29.000	SACO2.6	-0.231	0.000	0.12			24.9	OK	
S30.000	SACO2.7	-0.211	0.000	0.19			37.6	OK	1
S23.010	S2.20	-0.711	0.000	0.15			212.0	OK	
S31.000	S2.23	-0.166	0.000	0.40			33.2	OK	
S23.011	S2.21	-0.657	0.000	0.34			223.6	OK	
S23.012	S2.22	-0.659	0.000	0.23			229.4	OK	
S19.004	S2.5	-0.711	0.000	0.44			418.5	OK	
S1.008	S8	-1.390	0.000	0.06			840.8	OK	
S1.009	S9	-1.219	0.000	0.27			840.9	OK	
S1.010	S10	-1.010	0.000	0.09			268.5	OK	
S1.011	SPond 1	-0.973	0.000	0.04			187.9	OK	
S1.012	S11	-0.859	0.000	0.05			183.2	OK	
S1.013	SPond 2	-0.808	0.000	0.02			76.3	OK	
S1.014	S12	-0.192	0.000	0.62			76.3	OK	
S1.015	S12A	-0.266	0.000	0.35			76.3	OK	
S32.000	SMH2	-0.602	0.000	0.24			500.2	OK	
S32.001	SMH2B	-0.600	0.000	0.24			500.0	OK	
S1.016	SCP1	-0.578	0.000	0.28			576.3	OK	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW NETWORK
1_REVC.SWS

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 Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 3 Number of Storage Structures 3 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH D3 (1km) 0.256
 FEH Rainfall Version 1999 E (1km) 0.305
 Site Location GB 443750 311300 SK 43750 11101 F (1km) 2.414
 C (1km) -0.027 Cv (Summer) 0.750
 D1 (1km) 0.359 Cv (Winter) 0.840
 D2 (1km) 0.361

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

 Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water	Surcharged
									Level (m)	Depth (m)
S1.000	S1	15 Winter	30	+0%					178.126	-0.288
S1.001	S2	15 Winter	30	+0%					177.376	-0.338
S1.002	S3	15 Winter	30	+0%	100/15 Summer				176.077	-0.273
S2.000	S1.1A	15 Winter	30	+0%					175.605	-0.162
S3.000	S1.1B	15 Winter	30	+0%	100/15 Summer				176.067	-0.145
S4.000	SAcol.3	15 Winter	30	+0%					175.802	-0.228
S2.001	S1.1	15 Winter	30	+0%	100/15 Winter				174.803	-0.646
S5.000	SAcol.4	15 Winter	30	+0%	100/15 Summer				174.855	-0.070
S6.000	SAcol.5	15 Winter	30	+0%	100/15 Summer				174.818	-0.157
S7.000	SAcol.6	15 Winter	30	+0%	100/15 Summer				174.325	-0.200
S2.002	S1.2	15 Winter	30	+0%	100/15 Summer				173.730	0.000
S2.003	S1.3a	15 Winter	30	+0%	100/15 Summer				173.610	0.000
S8.000	SAcol.7	15 Winter	30	+0%	100/15 Summer				174.757	-0.168
S9.000	SAcol.8	15 Winter	30	+0%	100/15 Summer				174.616	-0.134
S2.004	S1.3	15 Winter	30	+0%	100/15 Summer				173.490	0.000
S10.000	SAcol.9	15 Winter	30	+0%	30/15 Summer				175.168	0.218
S2.005	S1.4	15 Winter	30	+0%	100/15 Summer				173.353	0.000
S2.006	S1.5	15 Winter	30	+0%	100/15 Summer				173.295	-0.018
S2.007	S1.6	15 Winter	30	+0%	100/15 Summer				173.227	-0.046
S2.008	S1.7	15 Winter	30	+0%	100/15 Summer				173.171	-0.063
S2.009	S1.8	15 Winter	30	+0%	100/15 Summer				173.103	-0.092
S2.010	S1.9	15 Winter	30	+0%	100/15 Summer				173.033	-0.122
S2.011	S1.10	15 Winter	30	+0%	100/15 Summer				172.973	-0.143
S11.000	SAcol.10	15 Winter	30	+0%	100/15 Summer				173.291	-0.079

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW NETWORK
1_REVC.SWS

PN	US/MH Name	Flooded		Half Drain		Pipe Flow (l/s)	Status	Level Exceeded
		Volume (m ³)	Flow / Cap.	Overflow (l/s)	Time (mins)			
S1.000	S1	0.000	0.28			114.0	OK	
S1.001	S2	0.000	0.39			302.3	OK	
S1.002	S3	0.000	0.72			513.9	OK	
S2.000	S1.1A	0.000	0.42			41.3	OK	
S3.000	S1.1B	0.000	0.52			99.5	OK	
S4.000	SAco1.3	0.000	0.13			17.4	OK	
S2.001	S1.1	0.000	0.18			160.0	OK	
S5.000	SAco1.4	0.000	0.92			72.2	OK	
S6.000	SAco1.5	0.000	0.46			92.5	OK	
S7.000	SAco1.6	0.000	0.44			133.3	OK	
S2.002	S1.2	0.000	0.63			419.7	OK	
S2.003	S1.3a	0.000	0.43			281.7	OK	
S8.000	SAco1.7	0.000	0.40			73.1	OK	
S9.000	SAco1.8	0.000	0.58			113.1	OK	
S2.004	S1.3	0.000	0.49			362.7	OK	
S10.000	SAco1.9	0.000	4.14			52.5	SURCHARGED	
S2.005	S1.4	0.000	0.82			399.0	OK	
S2.006	S1.5	0.000	0.92			427.8	OK	
S2.007	S1.6	0.000	0.83			468.2	OK	
S2.008	S1.7	0.000	0.92			516.9	OK	
S2.009	S1.8	0.000	0.94			630.6	OK	
S2.010	S1.9	0.000	0.90			706.1	OK	
S2.011	S1.10	0.000	1.49			735.8	OK	
S11.000	SAco1.10	0.000	0.74			29.9	OK	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW NETWORK
1_REVC.SWS

PN	US/MH		Return Period	Climate Change	First (X)		First (Y)		First (Z)		Overflow	Water Level	Surcharged Depth
	Name	Storm			Surcharge	Flood	Overflow	Act.	(m)	(m)		(m)	(m)
S11.001	S1.13	15 Winter	30	+0%	100/15 Summer							173.175	-0.113
S12.000	SAco1.11	15 Winter	30	+0%	100/15 Summer							172.230	-0.120
S12.001	S1.23	15 Winter	30	+0%	100/15 Summer							172.023	-0.128
S11.002	S1.14	15 Winter	30	+0%	30/15 Winter							171.775	0.021
S13.000	SAco1.12	15 Winter	30	+0%	30/15 Summer							173.918	0.118
S11.003	S1.15	15 Winter	30	+0%	30/15 Summer							171.645	0.056
S11.004	S1.16	15 Winter	30	+0%	30/15 Summer							171.536	0.058
S14.000	SAco1.13	15 Winter	30	+0%	100/15 Summer							173.250	0.000
S11.005	S1.17	15 Winter	30	+0%	30/15 Summer							171.393	0.026
S15.000	S1.24	15 Winter	30	+0%	100/15 Summer							176.445	0.000
S15.001	S1.25	15 Winter	30	+0%	100/15 Summer							176.413	0.000
S15.002	S1.26	15 Winter	30	+0%	100/15 Summer							176.362	0.000
S15.003	S1.27	15 Winter	30	+0%	100/15 Summer							176.312	-0.011
S15.004	S1.28	15 Winter	30	+0%	100/15 Summer							176.236	-0.048
S11.006	S1.18	15 Summer	30	+0%	100/15 Summer							171.300	0.000
S11.007	S1.19	15 Winter	30	+0%	100/15 Summer							171.015	-0.187
S16.000	SAco1.14	15 Winter	30	+0%	100/15 Summer							174.861	-0.064
S11.008	S1.20	30 Winter	30	+0%	100/15 Summer							170.884	-0.212
S17.000	SAco1.15	15 Winter	30	+0%	100/15 Summer							174.860	-0.065
S11.009	S1.21	30 Winter	30	+0%	100/15 Summer							170.768	-0.231
S18.000	SAco1.16	15 Winter	30	+0%								175.398	-0.252
S11.010	S1.22	30 Winter	30	+0%	100/15 Summer							170.687	-0.215
S2.012	S1.11	30 Winter	30	+0%	100/15 Summer							170.606	-0.260
S2.013	S1.12	30 Winter	30	+0%	100/15 Summer							170.412	-0.444
S1.003	S4a	30 Winter	30	+0%	100/15 Summer							170.386	-0.423
S1.004	S4	30 Winter	30	+0%	100/15 Summer							170.315	-0.450
S1.005	S5	30 Winter	30	+0%	100/15 Summer							170.214	-0.507
S1.006	S6	30 Winter	30	+0%	100/15 Summer							170.096	-0.549
S1.007	S7	30 Winter	30	+0%	100/15 Summer							169.990	-0.526
S19.000	SAco2.1	15 Winter	30	+0%	30/15 Summer							176.153	0.183
S19.001	S2.1	15 Winter	30	+0%	100/15 Summer							175.820	-0.090
S20.000	SAco2.2	15 Winter	30	+0%								176.668	-0.081
S20.001	S2.2	15 Winter	30	+0%								176.592	-0.096
S21.000	SAcoOS	15 Winter	30	+0%	100/15 Winter							177.121	-0.178
S21.001	SOS1	15 Winter	30	+0%	30/15 Summer							175.322	0.107
S19.002	S2.3	15 Winter	30	+0%	30/15 Summer							175.240	0.180
S22.000	SAco2.8	15 Summer	30	+0%	100/15 Summer							175.970	0.000
S22.001	S2.7	15 Winter	30	+0%	100/15 Summer							175.955	0.000
S22.002	S2.8	15 Winter	30	+0%	100/15 Summer							175.891	0.000
S22.003	S2.9	15 Winter	30	+0%	30/15 Winter							175.833	0.006
S22.004	S2.10	15 Winter	30	+0%	30/15 Winter							175.797	0.004
S22.005	S2.11	15 Winter	30	+0%	100/15 Summer							175.765	-0.024
S19.003	S2.12	15 Winter	30	+0%	100/15 Summer							174.837	-0.121
S23.000	SAco2.3	15 Winter	30	+0%	100/15 Summer							175.889	-0.151
S23.001	S2.13	15 Winter	30	+0%	100/15 Summer							175.536	-0.179
S23.002	S2.14	15 Winter	30	+0%	100/15 Summer							175.485	-0.130
S23.003	S2.15	15 Winter	30	+0%	100/15 Summer							175.430	-0.108
S23.004	S2.16	15 Winter	30	+0%	100/15 Summer							175.374	-0.123
S23.005	S2.17	15 Winter	30	+0%	100/15 Summer							174.944	-0.502
S24.000	SAco2.5A	15 Winter	30	+0%	100/15 Summer							175.257	-0.143
S23.006	S2.18	15 Summer	30	+0%	100/15 Summer							174.797	0.000
S25.000	SAco2.5B	15 Winter	30	+0%	100/15 Winter							175.187	-0.213
S23.007	S2.18A	15 Summer	30	+0%	30/15 Summer							174.722	0.002
S26.000	SAco2.4	15 Winter	30	+0%	100/15 Summer							174.789	-0.107
S27.000	SAco2.5	15 Winter	30	+0%	100/15 Winter							175.217	-0.183
S23.008	S2.19	15 Winter	30	+0%	30/15 Winter							174.648	0.005

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW NETWORK
1_REVC.SWS

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S11.001	S1.13	0.000	0.70			56.9	OK	
S12.000	SACo1.11	0.000	0.43			20.0	OK	
S12.001	S1.23	0.000	0.38		7	18.8	OK	
S11.002	S1.14	0.000	0.25			68.3	SURCHARGED	
S13.000	SACo1.12	0.000	1.48			98.2	SURCHARGED	
S11.003	S1.15	0.000	0.97			190.6	SURCHARGED	
S11.004	S1.16	0.000	1.18			229.4	SURCHARGED	
S14.000	SACo1.13	0.000	1.30			45.4	OK	
S11.005	S1.17	0.000	0.99			287.5	SURCHARGED	
S15.000	S1.24	0.000	0.28			165.2	OK	
S15.001	S1.25	0.000	0.43			316.8	OK	
S15.002	S1.26	0.000	0.77			434.5	OK	
S15.003	S1.27	0.000	0.98			551.8	OK	
S15.004	S1.28	0.000	1.20			605.1	OK	
S11.006	S1.18	0.000	1.06			779.8	OK	
S11.007	S1.19	0.000	0.87			820.2	OK	
S16.000	SACo1.14	0.000	0.95			72.0	OK	
S11.008	S1.20	0.000	0.79			779.6	OK	
S17.000	SACo1.15	0.000	0.94			72.0	OK	
S11.009	S1.21	0.000	0.67			796.3	OK	
S18.000	SACo1.16	0.000	0.23			23.3	OK	
S11.010	S1.22	0.000	1.10			809.5	OK	
S2.012	S1.11	0.000	1.09			1444.3	OK	
S2.013	S1.12	0.000	0.67			1444.2	OK	
S1.003	S4a	0.000	0.91			1712.6	OK	
S1.004	S4	0.000	0.77			1690.2	OK	
S1.005	S5	0.000	0.70			1661.3	OK	
S1.006	S6	0.000	0.57			1643.5	OK	
S1.007	S7	0.000	1.10			1637.1	OK	
S19.000	SACo2.1	0.000	1.98			14.8	SURCHARGED	
S19.001	S2.1	0.000	0.82			69.6	OK	
S20.000	SACo2.2	0.000	0.43			6.6	OK	
S20.001	S2.2	0.000	0.28			6.6	OK	
S21.000	SACoOS	0.000	0.34			63.4	OK	
S21.001	SOS1	0.000	1.02			63.0	SURCHARGED	
S19.002	S2.3	0.000	1.67			169.2	SURCHARGED	
S22.000	SACo2.8	0.000	0.20			34.4	OK	
S22.001	S2.7	0.000	0.44			114.1	OK	
S22.002	S2.8	0.000	0.41			273.4	OK	
S22.003	S2.9	0.000	1.08			455.4	SURCHARGED	
S22.004	S2.10	0.000	1.10			575.9	SURCHARGED	
S22.005	S2.11	0.000	1.00			605.9	OK	
S19.003	S2.12	0.000	1.01			747.3	OK	
S23.000	SACo2.3	0.000	0.49			61.0	OK	
S23.001	S2.13	0.000	0.17			147.4	OK	
S23.002	S2.14	0.000	0.39			286.6	OK	
S23.003	S2.15	0.000	0.82			427.9	OK	
S23.004	S2.16	0.000	0.99			561.2	OK	
S23.005	S2.17	0.000	0.40			623.0	OK	
S24.000	SACo2.5A	0.000	0.53			84.5	OK	
S23.006	S2.18	0.000	0.46			619.4	OK	
S25.000	SACo2.5B	0.000	0.18			30.7	OK	
S23.007	S2.18A	0.000	0.39			532.0	SURCHARGED	
S26.000	SACo2.4	0.000	0.73			79.5	OK	
S27.000	SACo2.5	0.000	0.32			56.7	OK	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW NETWORK
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PN	US/MH Name	Flooded	Flow / Overflow		Half Drain	Pipe	Status	Level
		Volume (m³)	Flow Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)		Exceeded
S23.008	S2.19	0.000	0.39			552.7	SURCHARGED	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW NETWORK
1_REVC.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S28.000	SACO2.7A	15 Winter	30	+0%	100/15 Winter				175.207
S23.009	S2.20A	15 Winter	30	+0%	30/15 Winter				174.548
S29.000	SACO2.6	15 Winter	30	+0%	100/15 Winter				175.228
S30.000	SACO2.7	15 Winter	30	+0%	100/15 Summer	100/15 Winter			175.270
S23.010	S2.20	15 Winter	30	+0%	30/15 Winter				174.454
S31.000	S2.23	15 Winter	30	+0%	30/15 Summer				176.379
S23.011	S2.21	15 Winter	30	+0%	30/15 Winter				174.427
S23.012	S2.22	15 Winter	30	+0%	30/15 Winter				174.404
S19.004	S2.5	15 Winter	30	+0%	100/15 Summer				174.381
S1.008	S8	30 Winter	30	+0%					169.313
S1.009	S9	30 Winter	30	+0%	100/15 Summer				166.148
S1.010	S10	720 Winter	30	+0%	30/360 Winter				164.240
S1.011	SPond 1	720 Winter	30	+0%	30/240 Winter				164.239
S1.012	S11	720 Winter	30	+0%	30/180 Winter				164.238
S1.013	SPond 2	720 Winter	30	+0%	30/180 Winter				164.237
S1.014	S12	720 Winter	30	+0%					162.185
S1.015	S12A	600 Summer	30	+0%					159.587
S32.000	SMH2	15 Summer	30	+0%					161.488
S32.001	SMH2B	15 Summer	30	+0%					160.105
S1.016	SCP1	720 Summer	30	+0%					158.803

PN	US/MH Name	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S28.000	SACO2.7A	-0.193	0.000	0.28			52.1	OK	
S23.009	S2.20A	0.001	0.000	0.38			540.3	SURCHARGED	
S29.000	SACO2.6	-0.172	0.000	0.38			79.7	OK	
S30.000	SACO2.7	-0.130	0.000	0.60			120.5	OK	1
S23.010	S2.20	0.003	0.000	0.42			576.3	SURCHARGED	
S31.000	S2.23	0.104	0.000	1.28			106.2	SURCHARGED	
S23.011	S2.21	0.056	0.000	0.90			592.1	SURCHARGED	
S23.012	S2.22	0.058	0.000	0.61			618.2	SURCHARGED	
S19.004	S2.5	0.000	0.000	1.26			1189.5	OK	
S1.008	S8	-1.173	0.000	0.19			2607.2	OK	
S1.009	S9	-0.627	0.000	0.83			2606.2	OK	
S1.010	S10	0.115	0.000	0.18			535.7	SURCHARGED	
S1.011	SPond 1	0.164	0.000	0.07			346.0	SURCHARGED	
S1.012	S11	0.297	0.000	0.09			337.5	SURCHARGED	
S1.013	SPond 2	0.362	0.000	0.02			78.3	SURCHARGED	
S1.014	S12	-0.188	0.000	0.64			78.3	OK	
S1.015	S12A	-0.263	0.000	0.36			78.3	OK	
S32.000	SMH2	-0.602	0.000	0.24			500.2	OK	
S32.001	SMH2B	-0.600	0.000	0.24			500.0	OK	
S1.016	SCP1	-0.577	0.000	0.28			578.3	OK	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW
NETWORK 1_REVC.SWS

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 Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 3 Number of Storage Structures 3 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH D3 (1km) 0.256
 FEH Rainfall Version 1999 E (1km) 0.305
 Site Location GB 443750 311300 SK 43750 11101 F (1km) 2.414
 C (1km) -0.027 Cv (Summer) 0.750
 D1 (1km) 0.359 Cv (Winter) 0.840
 D2 (1km) 0.361

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

 Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water	Surcharged
									Level (m)	Depth (m)
S1.000	S1	15 Winter	100	+40%					178.215	-0.199
S1.001	S2	15 Winter	100	+40%					177.601	-0.113
S1.002	S3	15 Winter	100	+40%	100/15 Summer				176.713	0.363
S2.000	S1.1A	15 Winter	100	+40%					175.692	-0.075
S3.000	S1.1B	15 Winter	100	+40%	100/15 Summer				176.367	0.155
S4.000	SAcol.3	15 Winter	100	+40%					175.837	-0.193
S2.001	S1.1	15 Winter	100	+40%	100/15 Winter				175.468	0.019
S5.000	SAcol.4	15 Winter	100	+40%	100/15 Summer				175.652	0.727
S6.000	SAcol.5	15 Winter	100	+40%	100/15 Summer				175.704	0.729
S7.000	SAcol.6	15 Winter	100	+40%	100/15 Summer				175.724	1.199
S2.002	S1.2	15 Winter	100	+40%	100/15 Summer				175.423	1.693
S2.003	S1.3a	15 Winter	100	+40%	100/15 Summer				175.307	1.697
S8.000	SAcol.7	15 Winter	100	+40%	100/15 Summer				175.475	0.550
S9.000	SAcol.8	15 Winter	100	+40%	100/15 Summer				175.667	0.917
S2.004	S1.3	15 Winter	100	+40%	100/15 Summer				175.218	1.728
S10.000	SAcol.9	15 Winter	100	+40%	30/15 Summer				175.983	1.033
S2.005	S1.4	15 Winter	100	+40%	100/15 Summer				175.000	1.647
S2.006	S1.5	15 Winter	100	+40%	100/15 Summer				174.803	1.490
S2.007	S1.6	15 Winter	100	+40%	100/15 Summer				174.554	1.281
S2.008	S1.7	15 Winter	100	+40%	100/15 Summer				174.308	1.074
S2.009	S1.8	15 Winter	100	+40%	100/15 Summer				173.993	0.798
S2.010	S1.9	15 Winter	100	+40%	100/15 Summer				173.665	0.510
S2.011	S1.10	15 Winter	100	+40%	100/15 Summer				173.361	0.245
S11.000	SAcol.10	15 Winter	100	+40%	100/15 Summer				175.192	1.822

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW
NETWORK 1_REVC.SWS

PN	US/MH Name	Flooded Volume (m³)	Flow / Overflow Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	0.000	0.59		242.1	OK	
S1.001	S2	0.000	0.81		631.0	OK	
S1.002	S3	0.000	1.51		1077.5	SURCHARGED	
S2.000	S1.1A	0.000	0.89		87.8	OK	
S3.000	S1.1B	0.000	1.09		208.4	SURCHARGED	
S4.000	SAco1.3	0.000	0.27		36.9	OK	
S2.001	S1.1	0.000	0.36		327.7	SURCHARGED	
S5.000	SAco1.4	0.000	1.90		149.7	SURCHARGED	
S6.000	SAco1.5	0.000	0.95		191.6	SURCHARGED	
S7.000	SAco1.6	0.000	0.83		249.8	FLOOD RISK	
S2.002	S1.2	0.000	1.10		725.4	SURCHARGED	
S2.003	S1.3a	0.000	0.95		625.5	SURCHARGED	
S8.000	SAco1.7	0.000	0.84		155.2	SURCHARGED	
S9.000	SAco1.8	0.000	1.18		228.5	SURCHARGED	
S2.004	S1.3	0.000	1.25		919.5	SURCHARGED	
S10.000	SAco1.9	0.000	8.55		108.4	SURCHARGED	
S2.005	S1.4	0.000	2.05		999.9	SURCHARGED	
S2.006	S1.5	0.000	2.35		1098.2	SURCHARGED	
S2.007	S1.6	0.000	2.22		1252.0	SURCHARGED	
S2.008	S1.7	0.000	2.53		1423.3	SURCHARGED	
S2.009	S1.8	0.000	2.55		1713.0	SURCHARGED	
S2.010	S1.9	0.000	2.39		1879.1	SURCHARGED	
S2.011	S1.10	0.000	4.00		1968.5	SURCHARGED	
S11.000	SAco1.10	0.000	1.42		57.4	SURCHARGED	

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Innovyze	Network 2020.1.3	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW
NETWORK 1_REVC.SWS

PN	US/MH		Return Period	Climate Change	First (X)		First (Y)		First (Z)		Overflow	Water Level	Surcharged Depth
	Name	Storm			Surcharge	Flood	Overflow	Act.	(m)	(m)			
S11.001	S1.13	15 Winter	100	+40%	100/15 Summer							175.087	1.799
S12.000	SAco1.11	15 Winter	100	+40%	100/15 Summer							172.682	0.332
S12.001	S1.23	15 Winter	100	+40%	100/15 Summer							172.680	0.529
S11.002	S1.14	15 Winter	100	+40%	30/15 Winter							174.986	3.232
S13.000	SAco1.12	15 Winter	100	+40%	30/15 Summer							175.108	1.308
S11.003	S1.15	15 Winter	100	+40%	30/15 Summer							174.891	3.302
S11.004	S1.16	15 Winter	100	+40%	30/15 Summer							174.771	3.293
S14.000	SAco1.13	15 Winter	100	+40%	100/15 Summer							174.577	1.327
S11.005	S1.17	15 Winter	100	+40%	30/15 Summer							174.545	3.178
S15.000	S1.24	15 Winter	100	+40%	100/15 Summer							177.065	0.620
S15.001	S1.25	15 Winter	100	+40%	100/15 Summer							177.045	0.632
S15.002	S1.26	15 Winter	100	+40%	100/15 Summer							176.991	0.629
S15.003	S1.27	15 Winter	100	+40%	100/15 Summer							176.873	0.550
S15.004	S1.28	15 Winter	100	+40%	100/15 Summer							176.570	0.286
S11.006	S1.18	15 Winter	100	+40%	100/15 Summer							174.413	3.113
S11.007	S1.19	15 Winter	100	+40%	100/15 Summer							174.057	2.855
S16.000	SAco1.14	15 Winter	100	+40%	100/15 Summer							175.355	0.430
S11.008	S1.20	15 Winter	100	+40%	100/15 Summer							173.740	2.644
S17.000	SAco1.15	15 Winter	100	+40%	100/15 Summer							175.365	0.440
S11.009	S1.21	15 Winter	100	+40%	100/15 Summer							173.363	2.364
S18.000	SAco1.16	15 Winter	100	+40%								175.463	-0.187
S11.010	S1.22	15 Winter	100	+40%	100/15 Summer							173.046	2.144
S2.012	S1.11	15 Winter	100	+40%	100/15 Summer							172.711	1.845
S2.013	S1.12	15 Winter	100	+40%	100/15 Summer							172.351	1.495
S1.003	S4a	15 Winter	100	+40%	100/15 Summer							171.986	1.177
S1.004	S4	15 Winter	100	+40%	100/15 Summer							171.592	0.827
S1.005	S5	15 Winter	100	+40%	100/15 Summer							171.245	0.524
S1.006	S6	15 Winter	100	+40%	100/15 Summer							170.905	0.260
S1.007	S7	15 Winter	100	+40%	100/15 Summer							170.569	0.053
S19.000	SAco2.1	15 Winter	100	+40%	30/15 Summer							177.629	1.659
S19.001	S2.1	15 Winter	100	+40%	100/15 Summer							176.906	0.996
S20.000	SAco2.2	15 Winter	100	+40%								176.712	-0.037
S20.001	S2.2	15 Winter	100	+40%								176.622	-0.066
S21.000	SAcoOS	15 Winter	100	+40%	100/15 Winter							177.387	0.088
S21.001	SOS1	15 Winter	100	+40%	30/15 Summer							176.479	1.264
S19.002	S2.3	15 Winter	100	+40%	30/15 Summer							176.182	1.122
S22.000	SAco2.8	15 Winter	100	+40%	100/15 Summer							176.864	0.894
S22.001	S2.7	15 Winter	100	+40%	100/15 Summer							176.854	0.899
S22.002	S2.8	15 Winter	100	+40%	100/15 Summer							176.795	0.904
S22.003	S2.9	15 Winter	100	+40%	30/15 Winter							176.737	0.910
S22.004	S2.10	15 Winter	100	+40%	30/15 Winter							176.511	0.718
S22.005	S2.11	15 Winter	100	+40%	100/15 Summer							176.123	0.334
S19.003	S2.12	15 Winter	100	+40%	100/15 Summer							175.185	0.227
S23.000	SAco2.3	15 Winter	100	+40%	100/15 Summer							176.499	0.459
S23.001	S2.13	15 Winter	100	+40%	100/15 Summer							176.300	0.585
S23.002	S2.14	15 Winter	100	+40%	100/15 Summer							176.242	0.627
S23.003	S2.15	15 Winter	100	+40%	100/15 Summer							176.205	0.667
S23.004	S2.16	15 Winter	100	+40%	100/15 Summer							176.127	0.630
S23.005	S2.17	15 Winter	100	+40%	100/15 Summer							175.896	0.450
S24.000	SAco2.5A	15 Winter	100	+40%	100/15 Summer							175.815	0.415
S23.006	S2.18	15 Winter	100	+40%	100/15 Summer							175.614	0.817
S25.000	SAco2.5B	15 Winter	100	+40%	100/15 Winter							175.601	0.201
S23.007	S2.18A	15 Winter	100	+40%	30/15 Summer							175.550	0.830
S26.000	SAco2.4	15 Winter	100	+40%	100/15 Summer							175.630	0.734
S27.000	SAco2.5	15 Winter	100	+40%	100/15 Winter							175.637	0.237
S23.008	S2.19	15 Winter	100	+40%	30/15 Winter							175.473	0.830

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW
NETWORK 1_REVC.SWS

PN	US/MH Name	Flooded Volume (m³)	Flow / Overflow Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S11.001	S1.13	0.000	1.28		103.6	SURCHARGED	
S12.000	SACo1.11	0.000	0.86		39.6	SURCHARGED	
S12.001	S1.23	0.000	1.22	5	60.0	SURCHARGED	
S11.002	S1.14	0.000	0.34		90.7	SURCHARGED	
S13.000	SACo1.12	0.000	3.05		201.5	FLOOD RISK	
S11.003	S1.15	0.000	1.62		316.0	SURCHARGED	
S11.004	S1.16	0.000	2.07		404.7	SURCHARGED	
S14.000	SACo1.13	0.000	2.75		96.1	SURCHARGED	
S11.005	S1.17	0.000	1.90		550.7	SURCHARGED	
S15.000	S1.24	0.000	0.63		375.3	FLOOD RISK	
S15.001	S1.25	0.000	1.02		747.2	FLOOD RISK	
S15.002	S1.26	0.000	1.92		1081.3	FLOOD RISK	
S15.003	S1.27	0.000	2.47		1397.3	FLOOD RISK	
S15.004	S1.28	0.000	3.10		1565.9	SURCHARGED	
S11.006	S1.18	0.000	2.62		1926.7	SURCHARGED	
S11.007	S1.19	0.000	2.06		1935.0	SURCHARGED	
S16.000	SACo1.14	0.000	2.02		153.5	SURCHARGED	
S11.008	S1.20	0.000	2.03		1993.7	SURCHARGED	
S17.000	SACo1.15	0.000	2.01		153.5	SURCHARGED	
S11.009	S1.21	0.000	1.72		2052.0	SURCHARGED	
S18.000	SACo1.16	0.000	0.50		49.5	OK	
S11.010	S1.22	0.000	2.78		2053.1	SURCHARGED	
S2.012	S1.11	0.000	2.87		3803.1	SURCHARGED	
S2.013	S1.12	0.000	1.76		3805.0	SURCHARGED	
S1.003	S4a	0.000	2.45		4601.1	SURCHARGED	
S1.004	S4	0.000	2.06		4536.6	SURCHARGED	
S1.005	S5	0.000	1.88		4470.9	SURCHARGED	
S1.006	S6	0.000	1.51		4356.2	SURCHARGED	
S1.007	S7	0.000	2.91		4339.7	SURCHARGED	
S19.000	SACo2.1	0.000	3.80		28.3	FLOOD RISK	
S19.001	S2.1	0.000	1.42		120.0	FLOOD RISK	
S20.000	SACo2.2	0.000	0.90		14.0	OK	
S20.001	S2.2	0.000	0.58		13.9	OK	
S21.000	SACoOS	0.000	0.71		132.3	SURCHARGED	
S21.001	SOS1	0.000	1.99		122.9	SURCHARGED	
S19.002	S2.3	0.000	3.07		310.2	SURCHARGED	
S22.000	SACo2.8	0.000	0.48		82.8	FLOOD RISK	
S22.001	S2.7	0.000	0.98		258.0	SURCHARGED	
S22.002	S2.8	0.000	0.94		626.0	SURCHARGED	
S22.003	S2.9	0.000	2.51		1062.3	SURCHARGED	
S22.004	S2.10	0.000	2.61		1366.7	SURCHARGED	
S22.005	S2.11	0.000	2.39		1447.3	SURCHARGED	
S19.003	S2.12	0.000	2.32		1717.4	SURCHARGED	
S23.000	SACo2.3	0.000	1.00		125.4	SURCHARGED	
S23.001	S2.13	0.000	0.36		306.0	SURCHARGED	
S23.002	S2.14	0.000	0.92		673.8	SURCHARGED	
S23.003	S2.15	0.000	1.96		1018.8	SURCHARGED	
S23.004	S2.16	0.000	2.36		1336.0	SURCHARGED	
S23.005	S2.17	0.000	0.89		1399.7	SURCHARGED	
S24.000	SACo2.5A	0.000	1.05		167.3	FLOOD RISK	
S23.006	S2.18	0.000	1.05		1417.2	SURCHARGED	
S25.000	SACo2.5B	0.000	0.39		65.3	FLOOD RISK	
S23.007	S2.18A	0.000	1.06		1434.0	SURCHARGED	
S26.000	SACo2.4	0.000	1.50		163.4	SURCHARGED	
S27.000	SACo2.5	0.000	0.68		120.4	FLOOD RISK	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW NETWORK 1_REVC.SWS

PN	US/MH Name	Flooded Volume (m³)	Flow / Overflow Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S23.008	S2.19	0.000	1.08		1535.7	SURCHARGED	

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Innovyze	Network 2020.1.3	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW
NETWORK 1_REVC.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S28.000	SAco2.7A	15 Winter	100	+40%	100/15 Winter				175.479
S23.009	S2.20A	15 Winter	100	+40%	30/15 Winter				175.360
S29.000	SAco2.6	15 Winter	100	+40%	100/15 Winter				175.443
S30.000	SAco2.7	15 Winter	100	+40%	100/15 Summer	100/15 Winter			175.900
S23.010	S2.20	15 Winter	100	+40%	30/15 Winter				175.240
S31.000	S2.23	15 Winter	100	+40%	30/15 Summer				177.287
S23.011	S2.21	15 Winter	100	+40%	30/15 Winter				175.108
S23.012	S2.22	15 Winter	100	+40%	30/15 Winter				175.007
S19.004	S2.5	15 Winter	100	+40%	100/15 Summer				174.896
S1.008	S8	15 Winter	100	+40%					169.633
S1.009	S9	15 Winter	100	+40%	100/15 Summer				167.093
S1.010	S10	1440 Winter	100	+40%	30/360 Winter				165.650
S1.011	SPond 1	1440 Winter	100	+40%	30/240 Winter				165.648
S1.012	S11	1440 Winter	100	+40%	30/180 Winter				165.647
S1.013	SPond 2	1440 Winter	100	+40%	30/180 Winter				165.646
S1.014	S12	1440 Winter	100	+40%					162.185
S1.015	S12A	1440 Winter	100	+40%					159.587
S32.000	SMH2	15 Summer	100	+40%					161.488
S32.001	SMH2B	15 Summer	100	+40%					160.105
S1.016	SCP1	1440 Winter	100	+40%					158.803

PN	US/MH Name	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S28.000	SAco2.7A	0.079	0.000	0.58			110.6	SURCHARGED	
S23.009	S2.20A	0.813	0.000	1.10			1568.9	SURCHARGED	
S29.000	SAco2.6	0.043	0.000	0.80			169.1	SURCHARGED	
S30.000	SAco2.7	0.500	0.102	1.14			228.1	FLOOD	1
S23.010	S2.20	0.789	0.000	1.28			1749.4	SURCHARGED	
S31.000	S2.23	1.012	0.000	2.65			218.8	FLOOD RISK	
S23.011	S2.21	0.737	0.000	2.83			1871.4	SURCHARGED	
S23.012	S2.22	0.661	0.000	1.86			1874.8	SURCHARGED	
S19.004	S2.5	0.515	0.000	3.68			3467.7	SURCHARGED	
S1.008	S8	-0.853	0.000	0.47			6635.4	OK	
S1.009	S9	0.318	0.000	2.12			6666.0	SURCHARGED	
S1.010	S10	1.525	0.000	0.20			594.9	SURCHARGED	
S1.011	SPond 1	1.573	0.000	0.11			551.9	SURCHARGED	
S1.012	S11	1.706	0.000	0.15			545.9	SURCHARGED	
S1.013	SPond 2	1.771	0.000	0.02			78.3	SURCHARGED	
S1.014	S12	-0.188	0.000	0.64			78.3	OK	
S1.015	S12A	-0.263	0.000	0.36			78.3	OK	
S32.000	SMH2	-0.602	0.000	0.24			500.2	OK	
S32.001	SMH2B	-0.600	0.000	0.24			500.0	OK	
S1.016	SCP1	-0.577	0.000	0.28			578.3	OK	

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Innovyze Source Control 2020.1		

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	SAAR (mm)	700	Urban	0.000
Area (ha)	18.025	Soil	0.450	Region Number	Region 4

Results l/s

QBAR Rural	79.2
QBAR Urban	79.2
Q100 years	203.5
Q1 year	65.7
Q30 years	155.2
Q100 years	203.5

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Appendix C: LLFA & Severn Trent Correspondence & Sewer Records

Charl Koorts

From: Jack Harriman <Jack.Harriman@leics.gov.uk>
Sent: 28 June 2019 09:33
To: Neil Griffiths
Cc: Jan Blackhall
Subject: RE: 2019/5899/07/FEN- 19-7688 Bardon3 - Planned development at Wood Farm, Stanton Lane, Bardon, Ellistown, Coalville, LE67 1FF

Hi Neil,

Thank you for request for pre-application advice. Following review of the submitted documents, I can confirm the following.

When determining planning applications, the local planning authority should ensure flood risk is not increased elsewhere and only consider development appropriate in areas at risk of flooding where informed by a site-specific flood risk assessment (FRA) confirming it will not put the users of the development at risk. Where a FRA is applicable this should be undertaken in accordance with the National Planning Policy Framework (NPPF) and accompanying Planning Practice Guidance (PPG).

From review of the Flood Map for Planning which shows fluvial flood risk, an unnamed Ordinary Watercourse is located to the South of the site which eventually outfalls into Rothley Brook to the south of the site.

The risk of flooding from surface water map shows areas of the site to be at low risk from surface water flooding with some areas at risk of medium risk.

Other sources of flood risk including (but not limited to) groundwater, canals, reservoirs, sewers, etc. should be considered as part of any forthcoming planning application. The LLFA would recommend reviewing the relevant Strategic Flood Risk Assessment for this area which may contain additional flood risk details.

Leicestershire County Council's Infrastructure Planning (Flood Risk Management) team has records of the following flooding incidents within close proximity to the site.

- Flooding of public right of way (R18) as a result of blockage to the drainage system/watercourse within Horse pool Grane industrial estate. Cliffe Hill Road, Stanton Under Bardon. (0.81km from site).

It is advised that not all instances of flooding are reported to Leicestershire County Council and as such, there may be a history of flooding for which we have no record.

All development has the potential to increase flood risk so it is essential that all forms of flooding are taken into consideration within any flood risk assessment (where required) or planning application. Where there is insufficient information regarding any aspect of risk, the responsibility to investigate falls to the applicant.

Leicestershire County Council as the Lead Local Flood Authority (LLFA) would expect a sequential approach to masterplan development, locating development in areas at lowest risk of flooding. For development within or in close proximity to Flood Zone 2, or the risk of flooding from surface water is medium or high risk as identifies on the risk of flooding from surface water map, the LLFA would expect finished floor levels to be set at a minimum of the highest level of the following;

- 300mm above the general ground level of the site OR
- 600mm above the Flood Zone 2 water level.

In order to deliver safe development, we advise that single storey buildings or ground floor subdivisions with no access to higher floors, should have access to a refuge set above the 1 in 1,000 annual probability (0.1%) in any year

flood level including an allowance for climate change. Basement rooms should have unimpeded access internally to an upper level

From review of the submitted masterplan, the proposed development does not identify the use of any sustainable drainage systems (SuDS) features for surface water drainage. Given the currently undeveloped nature of the site, the LLFA would expect surface water runoff from the site to be suitably managed as per best practice guidance given in the CIRIA C753 The SuDS Manual.

The LLFA would expect any surface water drainage proposal to seek to infiltrate unless demonstrated to be unfeasible. Such demonstration should include infiltration testing in accordance with BRE Digest 365 Soakaway Design.

Should this not be appropriate, the LLFA would expect runoff from site to be discharge to the next most appropriate receptor at rates and volumes no greater than the event specific greenfield values.

Over the lifetime of a development, it is possible that the overall impermeable area contributing to surface water runoff within the site could significantly increase (known as 'urban creep'). Sensitivity testing of a 10% increase in impermeable area should therefore be included where appropriate to ensure that surface water drainage designs can cope with future increases in impermeable areas.

The unnamed Watercourse is classified as an ordinary watercourse; as such consent may be required from Leicestershire County Council in their role as LLFA, under the Land Drainage Act (1991) for any activities within close proximity. Further information on the types of work/structure which require consent together with a template application form can be found on our website under the section 'Regulation of activities on watercourses'.

Leicestershire County Council opposes the culverting of watercourses; however, we recognise there are instances where culverting may be unavoidable. Any applicant will be required to justify the use of culverts and provide information demonstrating that there will be no detrimental effect on flood risk. Please refer to the County Council's Local Flood Risk Management Strategy which contains the culverting policy (Appendix 3) which can also be found on our website.

To safeguard access to watercourses or ditches for future maintenance, inspection and improvement works in the future; clear margins should be provided from the top of banks. A minimum clear margin of 3m should be provided from each top of bank for watercourses less than 2 metres in width, a minimum clear margin of 4.5m should be provided for watercourses 2 metres or greater in width.

The LLFA would expect any future surface water drainage scheme to assess the use of SuDS including but not limited to swales, attenuation basins and permeable paving in line with 'CIRIA C753 The SuDS Manual'. Such above ground SuDS structures would also provide one of the required treatment trains to manage water quality. It should be noted that the LLFA do not consider the use of underground storage tanks or oversize pipes as a suitable treatment train and as such where these are proposed, additional treatment trains should be implemented. Leicestershire County Council, in their role as LLFA, does not adopt SuDS. For enquiries regarding the proposed development and future adoption and maintenance of SuDS features, please direct these to your local District or Borough Council.

Any surface water drainage features should be located within the areas at lowest risk of flooding to ensure they remain operational during an extreme event. Any drainage features should also consider how an extreme event may constrain the discharge from any proposed drainage system and ensure the drainage infrastructure can adequately manage surface water runoff regardless (for example a surcharged outfall).

Where a site-specific flood risk assessment (FRA) is required by NPPF the associated drainage strategy should also provide outline operation and maintenance details along with an indicative proposal of who will maintain any SuDS features over the lifetime of the development.

The LLFA planning checklist and guidance which provides further details can be found [here](#).

If you have any further questions, please do not hesitate to contact us.

Kind regards

Jack Harriman
Technician (Flood Risk Management)
Infrastructure Planning
Leicestershire County Council
Tel: 0116 305 2261

www.flooding@leics.gov.uk

www.leicestershire.gov.uk/planning-and-environment/flooding-and-drainage

From: Eve Godrich
Sent: 11 June 2019 14:07
To: Jack Harriman <Jack.Harriman@leics.gov.uk>
Subject: FW: 19-7688 Bardon3 - Planned development at Wood Farm, Stanton Lane, Bardon, Ellistown, Coalville, LE67 1FF

Hi Jack,

I have assigned this pre-app to you-

2019/5899/07/FEN
Stanton Lane, Bardon
Deadline: 01/07/2019
[L:\DRAINAGE\Statutory Consultee\2019\Pre-Application\North West Leicestershire \(07\)\2019-5899-07 Stanton Lane, Bardon\Correspondence \(dated\)](#)

Kind Regards,

Eve Godrich | Senior Administrative Assistant
Flood Risk Management Team | Environment and Transport | Leicestershire County Council
0116 305 6561
eve.godrich@leics.gov.uk

From: Neil Griffiths [<mailto:NeilG@cdpbroms.co.uk>]
Sent: 10 June 2019 12:56
To: Flooding
Cc: Jan Blackhall
Subject: 19-7688 Bardon3 - Planned development at Wood Farm, Stanton Lane, Bardon, Ellistown, Coalville, LE67 1FF

Hello flooding,

As Leicestershire CC are the LLFA, I am looking for some preplanning drainage strategy advise on our current plans for the a planned development at Wood Farm.
Current planned development site location is at Stanton Lane, Bardon, Ellistown, Coalville, LE67 1FF and is shown below;



The site is currently drained via the head of one of the tributary branches of Rothley Brook which also drains much of the area to the south & south-east of the site.

The Rothley Brook is located approximately 500m to the south of the site within Bagworth Wood.

OS mapping showing the current land drainage system below;



Complete Design Partnership Limited

Consulting Civil and Structural Engineers

Tel: 01527 832307 Email: admin@cdpbroms.co.uk

www.cdpbroms.co.uk

Charford Lodge, 1 Rock Hill, Bromsgrove, B61 7LH

www.cdpbroms.co.uk



Registered in England: 3866200

Registered office: Charford Lodge, Rock Hill, Bromsgrove, Worcestershire B61 7LH

CDP Drawing File Issue Disclaimer

A copy of the drawing(s) in .dwg format is being issued as requested to assist the design/construction process.

The contents contained within the model space of the drawing(s) are not to be relied upon for setting out purposes etc.

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Complete Design
Partnership Ltd,
Charford Lodge,
1 Rockhill,
Bromsgrove,
Worcestershire,
B61 7LH.

FAO: Neil Griffiths

20th May 2019

Dear Mr Griffiths,

**Proposed Residential Development (3 x Warehouses) at:
Wood Farm, Stanton Lane, Ellistown, Coalville, Leicestershire,
LE67 1FF.**

X: 444650 / Y: 310403

I refer to your Development Enquiry Request submitted in respect of the above site. Please find enclosed the sewer records that are included in the fee together with the Supplementary Guidance Notes (SGN) referred to below.

Public Sewers in Site – Required Protection

There are no public sewers crossing the proposed site.

Please note: *On 1st October 2011 many private sewers were transferred into the ownership of Severn Trent Water as public sewers, where two or more properties in separate ownership are served by those sewers. Most of these former private sewers will not be shown on the public sewer records, therefore a full site survey should be carried out prior to any layout design or construction works to identify where these sewers may be and to avoid later delays and possible added costs.*

Severn Trent Water Ltd
Leicester Water Centre
Gorse Hill
Anstey
Leicester
LE7 7GU

Tel: 02477716843
www.stwater.co.uk

Email:
Net.Dev.East@SevernTrent.co.uk

Our ref: 8358578

Foul Water Drainage

Sewer records show a 225mm foul water sewer west of the proposed development on Victoria Road. A gravity connection to this sewer may be achievable and would be acceptable to connect at a new or existing manhole (MH9201) subject to a 106 approval. Please be aware that a connection to this sewer may involve the crossing of third party land in which the appropriate consent must be sought.

Surface Water Drainage

Under the terms of Section H of the Building Regulations 2000, the disposal of surface water by means of soakaways should be considered as the primary method. If this is not practical and no watercourse is available as an alternative, the use of sewerage should be considered. In addition, other sustainable drainage methods should also be explored before a discharge to the public sewerage system is considered.

If these are found to be unsuitable, satisfactory evidence will need to be submitted. The evidence should be either percolation test results or by the submission of a statement from the SI consultant (extract or a supplementary letter).

Subject to the above, sewer records show local small watercourses/drainage ditched within and round the development site. It is advised that surface water drains to this watercourse subject to LLFA approval. The LLFA are the lead flood and surface water authority. It is advised to contact them regarding SW discharge connections, where discharges to a watercourse, culverted watercourse, drainage ditches or to a public sewer close to a river outfall are being considered. Please refer to "Severn Trent Surface Water Guidance Notes" submitted with this response for further information.

Any flows exceeding the proposed rates would need to be appropriately attenuated on site and discharged at a controlled rate. Please submit surface water drainage proposals based on these comments for review when available.

New Connections

For any new connections including the use, reuse and indirect to the public sewerage system, the developer will need to submit Section 106 application. Our Developer Services department are

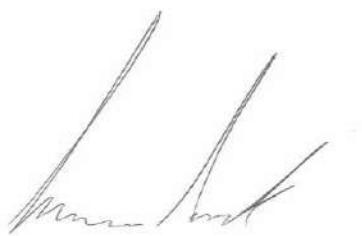
responsible for handling all such enquiries and applications. To contact them for an application form and associated guidance notes please call 0800 707 6600 or download from www.stwater.co.uk

Please quote the above reference number in any future correspondence (including e-mails) with STW Limited. Please send **all correspondence** to the net.dev.east@severntrent.co.uk email inbox address, a response will be made within 15 days.

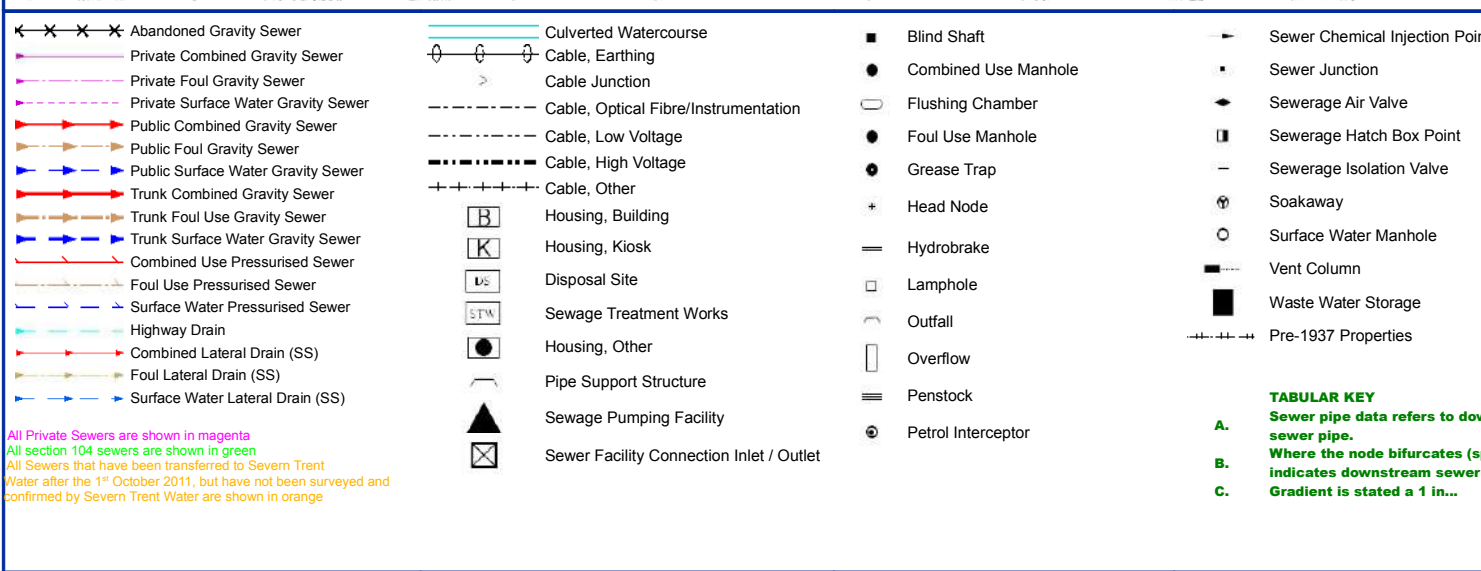
If you require a VAT receipt for the application fee please email MISCINCOME.NC@SEVERNTRENT.CO.UK quoting the above Reference Number.

Please note that Developer Enquiry responses are only valid for 6 months from the date of this letter.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Emma Nowak', written over a faint, light-colored circular stamp.

Emma Nowak.
Asset Protection East.
Asset Management.
Wholesale Operations.



LS OS CEMENT TE BOX CULVERT ON TE TE SEGMENTS (BOLTED) TE SEGMENTS (UNBOLTED) IRON EINFORCED CONCRETE EINFORCED PLASTIC Y IN REGULAR COURSES Y RANDOMLY COURSED ILENE OPYLENE STEEL COMPOSITE YL CHLORIDE IENCED PLASTIC MATRIX REY) IRON IN D CLAY PURPOSE C - COMBINED E - FINAL EFFLUENT F - FOUL L - SLUDGE S - SURFACE WATER	CATEGORIES			Severn Trent Water Limited Asset Data Management PO Box 5344 Coventry CV3 9FT Telephone: 0845 601 6616
	O/S Map scale: Date of issue: Sheet No. 1:10000 20.05.19 1 of 2 This map is centred upon: O / S Grid reference: x : y : 444650 310403			
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