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FOUL AND SURFACE WATER DRAINAGE SCHEME DESIGN REPORT

21/00092/FUL Condition 9, 10 & 17

Proposed Development at The Crimble Restaurant,
Crimble Lane, Heywood, OL11 4AD

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STRUCTURAL | ENVIRONMENTAL | GEOTECHNICAL



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Project:

Partial demolition of former restaurant and bar and conversion and change of use to residential dwelling (C3), and the erection of 5 dwellings (C3), along with access, service routes, hard and soft landscaping and associated works.

Client:

Michael Drogan

Prepared by:

HME Civil Engineering Consultants

Condition Reference:

21/00092/FUL Condition 9 & 10

Date:

23rd January 2026

Site visit date and time:

18th November 2025.

Revision:

00 First Revision

Document Compiled by:



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Membership Number: 74046405



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Introduction

This Drainage Scheme Design Report has been prepared in support of Conditions 9, 10 and 17 of planning consent 21/00092/FUL for the partial demolition of the former Crimble Restaurant, its conversion into a residential dwelling (C3), and the erection of five further dwellings with associated access, landscaping, drainage and external works. The approved conditions requiring this report are listed in the accompanying decision notice issued by Rochdale Borough Council.

This report outlines the foul and surface water drainage strategy including parking areas construction details for the completed development, including:

- Confirmation of compliance with the surface water disposal hierarchy.
- Details of foul water discharge arrangements and connections.
- Evidence confirming infiltration is not feasible.
- Proposed discharge to the existing watercourse.
- Flow restriction, attenuation design and SuDS principles.
- Detailed specification for the design and construction of the associated parking areas.
- Long-term maintenance and management responsibilities.

The report has been produced by HME Civil Engineering Consultants following a detailed site visit and infiltration testing undertaken on 18 November 2025.

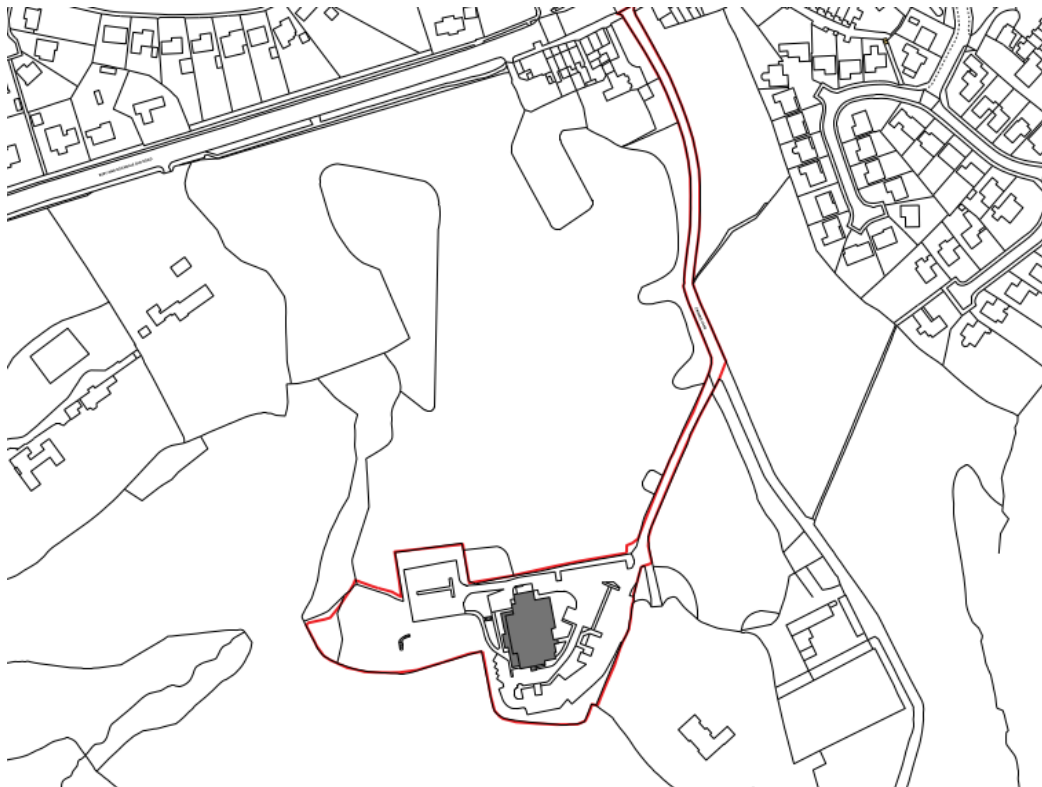


Figure 1 Site Location

1. Planning Condition

This Drainage Scheme Design Report has been prepared specifically to satisfy Condition 9 (Foul Water Drainage), Condition 10 (Surface Water Drainage) and Condition 17 (Parking Areas Drainage & Construction Specification) of planning approval 21/00092/FUL, as issued by Rochdale Borough Council on 1 July 2024. The full wording of both conditions is reproduced below in accordance with best practice for drainage compliance reporting.

1.1. Condition 9 – Foul Water Drainage (Full Text of Condition)

Condition 9 on the Decision Notice states:

“No development, excluding site clearance, remediation and ground preparation works, shall take place until a foul water drainage scheme has been submitted to and approved by the Local Planning Authority. The development shall take place in accordance with the approved scheme.”

Reason:

“To prevent an increased risk of flooding as a result of the development and to ensure satisfactory disposal of foul water from the site in accordance with Policy G8 of the adopted Rochdale Core Strategy, saved Policy EM/7 of the adopted Rochdale Unitary Development Plan and the National Planning Policy Framework.

Reason for pre-commencement condition: “Drainage infrastructure will need to be implemented prior to commencement of above ground works and a scheme therefore needs to be agreed in advance of the same.”

Condition 9 requires the developer to provide:

- A complete foul water drainage scheme, covering both new on-site infrastructure and connection to the existing network.
- Confirmation of how foul effluent will be managed, including pumping requirements, pipe routing, standards of construction and ownership.
- Evidence that the scheme prevents any increased risk of flooding or surcharging of the foul system.
- Confirmation that the scheme complies with relevant national and local policy, including Building Regulations Part H and Local Plan Policy G8.
- Submission before commencement of above-ground works.

This report demonstrates compliance with Condition 9 by:

- Proposing a private foul pumping station, similar to the existing arrangement, which historically served the former restaurant and hotel.
- Providing a new private foul network serving all six dwellings and discharging into the retained pumping station.
- Maintaining the established legal and operational arrangement where the rising main downstream of the pump station (outside the property boundary) remains a United Utilities (UU) adopted asset.

- Confirming that all new foul drainage will be installed to UU standards and a Section 106 application is being progressed.
- Ensuring flows do not exceed historical discharge rates.
- Providing full details of responsibilities, ownership arrangements and long-term maintenance.

As such, the foul drainage proposals fully satisfy Condition 9.

1.2. Condition 10 – Surface Water Drainage (Full Text of Condition)

Condition 10 states:

“No development shall take place until a surface water drainage scheme including surface water from access road, parking areas and buildings has been submitted to and approved in writing by the local planning authority.”

The drainage scheme must be in accordance with the NPPF hierarchy, in the following order:

- *into the ground (infiltration);*
- *to a surface water body;*
- *to a surface water sewer, highway drain, or another drainage system;*
- *to a combined sewer.*

The surface water drainage scheme shall include:

- (i) An investigation of the hierarchy of drainage options, including ground condition assessment and infiltration potential;
- (ii) Background calculations (Micro Drainage) used for drainage design;
- (iii) Details of flow attenuation, including permeable paving construction where relevant;
- (iv) A Maintenance Document explaining long-term management arrangements.

Implementation:

“The duly approved scheme shall be implemented prior to the first occupation of each dwelling hereby permitted and retained thereafter.”

Reason:

“To prevent an increased risk of flooding as a result of the development and to ensure satisfactory disposal of surface water in accordance with Policy G8 EM/7 and the NPPF.”

Reason for pre-commencement condition:

“Drainage infrastructure will need to be implemented prior to commencement of above ground works and a scheme therefore needs to be agreed in advance of the same.”

Condition 10 requires the surface water scheme to demonstrate:

1. Compliance with the full SuDS hierarchy, starting with infiltration.
2. Technical evidence confirming whether infiltration is feasible.
3. Evidence supporting the selected discharge route (in this case the watercourse).

4. Site-specific hydraulic modelling showing the system can attenuate a 1 in 100-year event + 40% climate change.
5. A complete maintenance and management plan for the lifetime of the development.
6. Details covering all areas: roofs, drives, hardstanding, parking courts and the new access.

This report satisfies Condition 10 by providing:

- BRE 365 infiltration testing showing infiltration is not feasible anywhere on site (max 350 mm drop in 6 hours).
- Confirmation that the next hierarchy option — discharge to watercourse — is appropriate, achievable and historically established.
- Evidence of an existing legal agreement for discharge across third-party land.
- A modern design incorporating:
 - Attenuation storage sized for 1:100-year + 40% climate change;
 - Flow restriction to acceptable runoff rates;
 - A controlled discharge to the watercourse.
- A complete maintenance and management plan, with responsibility allocated to property owners through legal title documentation.

The drainage proposals therefore fully satisfy Condition 10.

1.3. Condition 17 – Parking Areas Drainage & Construction Specification

Condition 17 states:

“No part of the development shall be occupied until a detailed specification for the design and construction of the associated parking areas, including detail of the surface water drainage strategy and surfacing materials, has been submitted to and approved by the Local Planning Authority. The parking areas shown on the approved plans shall be constructed in accordance with the approved details before the associated development is first occupied, and shall be retained thereafter for their intended purpose.”

Reason:

“In order that there is adequate provision for vehicles to be parked clear of the highway in the interests of highway safety and the free flow of traffic and to ensure the suitable disposal of surface water in order to comply with the requirements of policies T2, DM1 and G8 of the adopted Rochdale Core Strategy, saved policies EM/7 and EM/8 of the Rochdale Unitary Development Plan and the National Planning Policy Framework.”

The proposed development includes private driveways, shared service areas and allocated parking bays serving the six dwellings. The parking areas have been designed to:

- Provide safe off-highway parking for all units;
- Prevent surface water run-off onto Crimble Lane;
- Ensure long-term durability under domestic vehicle loading;
- Align with the overall drainage strategy approved under Conditions 9 and 10.

2. Foul Water Drainage

The existing site contains a private foul water pumping station that historically served the former Crimble Restaurant and Hotel. United Utilities have confirmed that:

- Both the pumping station and the rising main within the site boundary are private assets.
- Where the rising main leaves the property curtilage, it becomes a United Utilities–owned asset in accordance with the 2011 Sewer Transfer Regulations.
- Because the station is private, United Utilities hold no records relating to its design, capacity or operational performance.

2.1. Proposed Strategy for the Development

The proposed foul drainage strategy is to:

1. Connect all new dwellings to a new private foul drainage system within the development.
2. Convey foul flows to a private pumping station.
3. Maintain the established arrangement whereby:
 - The pumping station and rising main inside the boundary are privately owned and maintained.
 - The rising main outside the boundary remains a UU adopted asset.
4. Ensure all new private foul drainage is installed to the current United Utilities standards for pipework, chambers and connections.

2.2. Pumping Station Adoption

United Utilities have confirmed that the developer may apply for adoption of the pump station and rising main under a Section 102 application.

However:

- Adoption is not required for this development.
- It is not part of this drainage submission.
- Adoption would require the existing pump station to be rebuilt or upgraded to meet current UU specifications, including compliance with:
 - United Utilities Pumping Station Addendum, and
 - Design & Construction Guidance (DCG).

Accordingly, the development will retain the existing private arrangement, with maintenance responsibilities formally secured through the site's legal ownership structure.

2.3. Compliance Summary

This strategy complies with Condition 9 because:

- A clear foul drainage route is established.
- No increase in foul discharge beyond historic flows is expected.

21/00092/FUL Condition 9, 10 & 17

- Flow will continue to discharge into a UU adopted asset downstream.
- Private ownership and maintenance responsibilities are defined.
- UU are satisfied with the approach and have raised no objections.

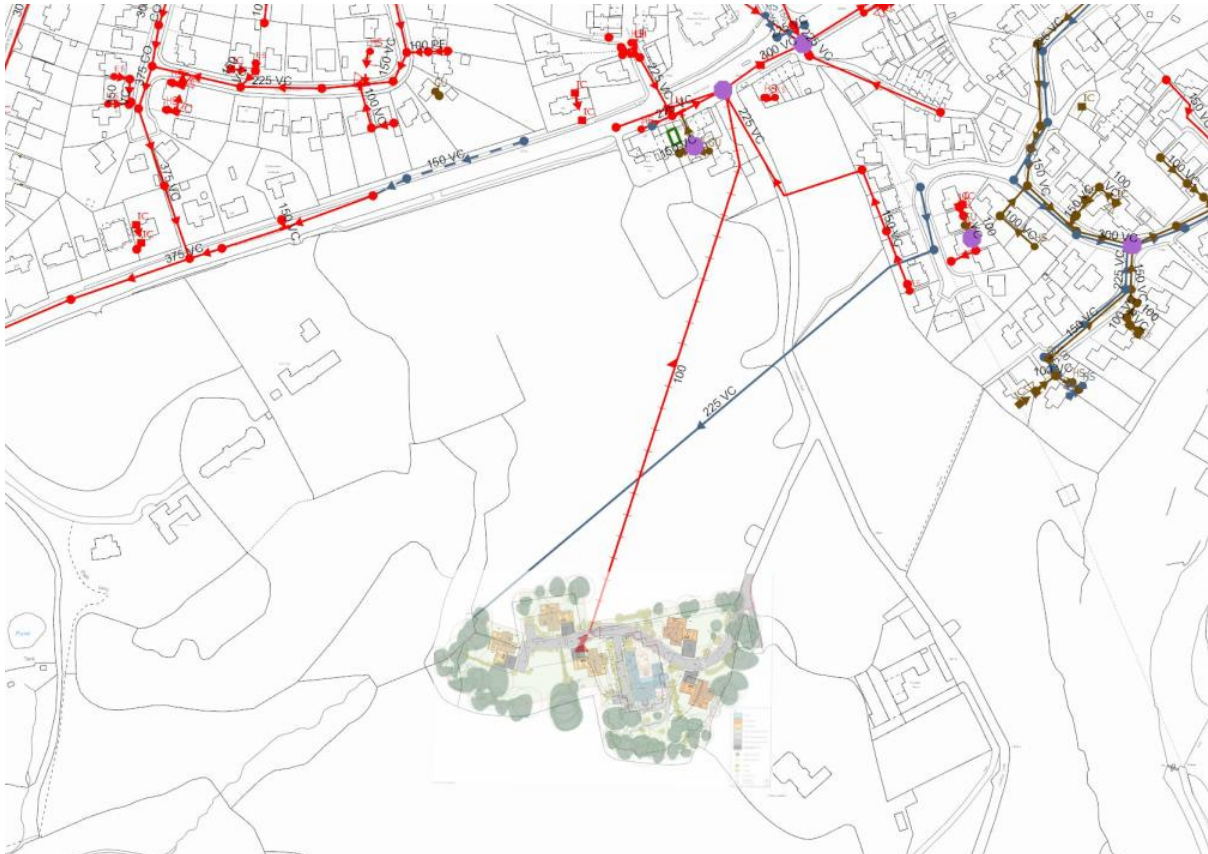


Figure 2 Proposed Development Shown On UU Sewer Map

3. Surface Water

3.1. United Utilities Position

Following consultation, United Utilities have confirmed:

- Surface water discharge to a watercourse is not their jurisdiction and will be determined by:
 - The Lead Local Flood Authority (LLFA), and
 - The Local Planning Authority (LPA).
- UU would not raise an objection to the proposed watercourse discharge *provided that*:
 - The National Planning Policy Framework (NPPF) hierarchy has been properly followed.
 - There is robust technical evidence confirming infiltration is not viable.

3.2. Compliance With NPPF Hierarchy

The drainage strategy follows the national SuDS hierarchy:

1. Infiltration to ground
 - BRE 365 testing was carried out at four test pits on 18 November 2025.
 - Maximum water level reduction was ≤ 350 mm over 6 hours with no further infiltration thereafter, confirming infiltration is not feasible.
 - The tests were conducted at the only viable location for a soakaway within the site.
2. Discharge to watercourse – Feasible and historically established
 - The existing site already discharges to a south-western watercourse, which flows to the River Roch.
 - A legal agreement exists to permit conveyance through neighbouring land.
 - The proposed development does not increase impermeable area.
3. Discharge to surface water sewer
 - Not required due to the viable watercourse route.
4. Discharge to combined sewer
 - Not applicable.

3.3. Proposed Surface Water Strategy

The proposed strategy therefore remains:

- Discharge to the existing watercourse, controlled through:
 - Flow restriction.
 - On-site attenuation, sized for the 1 in 100-year + 40% climate change event.

- Private ownership and maintenance secured within property title documents.

This strategy ensures:

- No increase in runoff rate from the development,
- No additional burden on UU assets,
- Compliance with NPPF, LLFA expectations and planning Condition 10.

3.4. UU Summary Position

United Utilities have confirmed they would not object to the proposed watercourse discharge, on the basis that:

- Evidence of hierarchy-compliance is provided (BRE 365 tests).
- The LLFA/LPA approve the watercourse connection.
- No surface water enters UU infrastructure.

This report provides all necessary evidence to satisfy those requirements.

3.5. Surface Water Drainage Strategy for Parking Areas

Parking area drainage forms part of the wider surface water strategy already assessed under Condition 10. The proposals ensure that:

- No run-off will enter Crimble Lane or public highway areas;
- Run-off from drives and parking bays will drain via permeable surfacing & linear drainage channels linked to private surface water pipework;
- All collected water will ultimately discharge to the existing watercourse, in line with the approved hierarchy and attenuation strategy.

Surface water from parking areas will enter the private surface water system and is attenuated before controlled discharge to the watercourse.

3.6. Levels, Falls and Run-Off Control for Parking Areas

The parking areas have been designed with:

- Minimum 1:80 crossfalls to prevent ponding;
- 1:60 preferred falls for tarmac driveways;
- No discharge onto neighbouring plots;
- No uncontrolled discharge to the public highway.

Finished levels will be confirmed on construction drawings and submitted for approval.

3.7. Sub-base and foundation specification for Parking Areas

The proposed resin bound parking areas shall be constructed as a fully permeable system, including a permeable sub-base and foundation layer, to allow surface water to infiltrate vertically and flow freely toward the proposed filter drains as shown on the approved General Arrangement drawing.

The final pavement build-up, including sub-base depth, material grading, structural design and permeability performance, shall be designed and installed strictly in accordance with the resin bound surfacing manufacturer's and supplier's technical guidance and installation specifications.

4. Flood Risk Considerations

- The site is located in Flood Zone 1 (low flood risk).
- The development does not increase impermeable area.
- Attenuation and flow-control ensure no increased discharge rate.
- The watercourse has existing capacity and an established drainage outfall.

The design ensures no increased flood risk on or off site.

5. Infiltration Testing

National and local planning policy requires that surface water disposal follows the sustainable drainage hierarchy. The first preference within this hierarchy is the use of infiltration to ground, which provides a natural and sustainable means of managing surface water at source while reducing reliance on piped drainage networks.

Only if infiltration is demonstrated to be unsuitable should consideration be given to discharge to a watercourse, surface water sewer, or combined system.

This section presents the results of infiltration testing undertaken at the site, carried out in accordance with the methodology and requirements set out in BRE Digest 365: Soakaway Design. The purpose of the testing was to determine the infiltration potential of the underlying ground and assess whether infiltration-based drainage is feasible for the proposed development. The findings provide the necessary technical evidence to inform the detailed design of the surface water drainage system and to ensure compliance with the planning condition attached to application 22/01184/FUL.

5.1. Testing Methodology

In order to inform the design of an appropriate surface water drainage strategy, four trial pits were excavated at representative locations within the development plot. The testing was undertaken in accordance with the procedures set out in BRE Digest 365: Soakaway Design, which specifies the approach for measuring infiltration performance and calculating soakaway capacity.

The trial pits were excavated to depths of 2 m below existing ground level, targeting the anticipated base level of proposed soakaway structures. The pits were filled with water and monitored for infiltration.

The tests were carried out by HME Civil Engineering Consultants on the 18th November 2025, under the supervision of suitably qualified personnel. Ground conditions were logged during excavation and photographs were taken for record purposes.



Figure 3: Test Pit Locations

5.2. Ground Conditions

- Made ground over clayey/silty soils.
- Dense clay strata at infiltration level.
- No meaningful infiltration observed.
- No groundwater inflows observed.

5.3. Results & Interpretation

- Maximum water level drop in any pit: 350 mm over 6 hours, no further infiltration thereafter.
- This is far below BRE 365 minimum infiltration thresholds.
- The results confirm infiltration drainage is not viable within the developable site.



Figure 4: Failed Infiltration Testing 18/11/25

6. Surface and Foul Water Design

The design of both the surface and foul water systems is shown on the General Arrangement Plans. With chamber and pipe dimensions and invert levels shown. All infrastructure is to be installed in accordance with the manufacturer's instructions.

6.1. Surface Water Design Summary

- Discharge point: Existing watercourse.
- Attenuation: Sized for 1 in 100-year + 40% climate change.
- Greenfield flows calculated for site and applied to outfall to minimise impact on receiving watercourse, calculations included in appendix.
- Flow control: As per the GA.
- Pipe gradients and manhole details are shown on the GA drawing (Appendix A).
- All pipes designed in accordance with Sewers for Adoption, BS EN 752, and the SuDS Manual (C753)

6.2. Foul Water Design Summary

- New foul drains convey flows to the existing pumping station.
- Pump station remains private but discharges to UU adopted main downstream.
- All foul system layout, levels and chamber details are shown on the GA drawing.
- A Section 106 application is being prepared.
- Additional package pump station to convey flows from low point at west of site back to existing pump station.

7. Maintenance and Management Plan

7.1. Overview

This Maintenance and Management Plan sets out the arrangements for the long-term management of the foul and surface water drainage systems serving the development at The Crimble.

It ensures that the installed systems continue to operate effectively for the lifetime of the development and remain compliant with the design intent, the Local Planning Authority's requirements, and national SuDS guidance (CIRIA C753).

7.2. Ownership and Responsibility

System	Ownership & Maintenance
Foul drainage incl. pump station	Private, jointly by property owners (legal deed).
Rising main after pump station	United Utilities (adopted).
Surface water system incl. attenuation	Private, assigned within title documents to each plot.
Off-site watercourse connection	Protected under existing legal easement.

7.3. Maintenance Objectives

The objectives of this maintenance plan are to:

- Ensure that both foul and surface water systems operate safely and efficiently;
- Prevent blockages, silting, and pollution;
- Maintain the infiltration capacity and discharge flow rates as designed;
- Protect downstream systems and prevent uncontrolled runoff;
- Ensure ease of access for inspection and maintenance; and
- Record and retain maintenance activities for future reference or inspection

7.4. Inspection and Maintenance Schedule

7.4.1. Surface Water Drainage System (Private – Property Owner)

Element	Maintenance Task	Frequency	Responsible Party
Gullies	Remove debris/leaves	Quarterly	Property Owner / Appointed Contractor
SW Manholes	Check silt depth, remove >25%	Annually	Property Owner
Flow Control	Inspect for blockage	Annually	Property Owner / Contractor
Attenuation	Inspect for standing water after storms	Annually & after major events	Property Owner / Contractor
Channels/Drive	Sweep to stop sediment	Twice per year	Property Owner / Contractor

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7.4.2. Foul Drainage System (Private – Property Owner)

Element	Maintenance Task	Frequency	Responsible Party
Pump Station	Visual inspection	Quarterly	Property Owner / Specialist Contractor
Pump	Professional service	Annually	Property Owner
Private Pipework	Check for flow restriction	As required	Property Owner
Rising Main (UU)	UU inspection	UU responsibility	UU

7.5. Emergency and Corrective Actions

If flooding, pump failure or blockage occurs:

- Immediate investigation by competent drainage contractor.
- Remedial actions logged in a Drainage Maintenance Log.
- LLFA must be consulted before any structural alteration.

7.6. Record Keeping and Review

All maintenance and inspection activities shall be logged and dated.

Records must note the condition of each drainage element, any issues identified, and corrective actions taken.

The plan shall be reviewed every five years or following any significant alteration to the site or drainage layout.

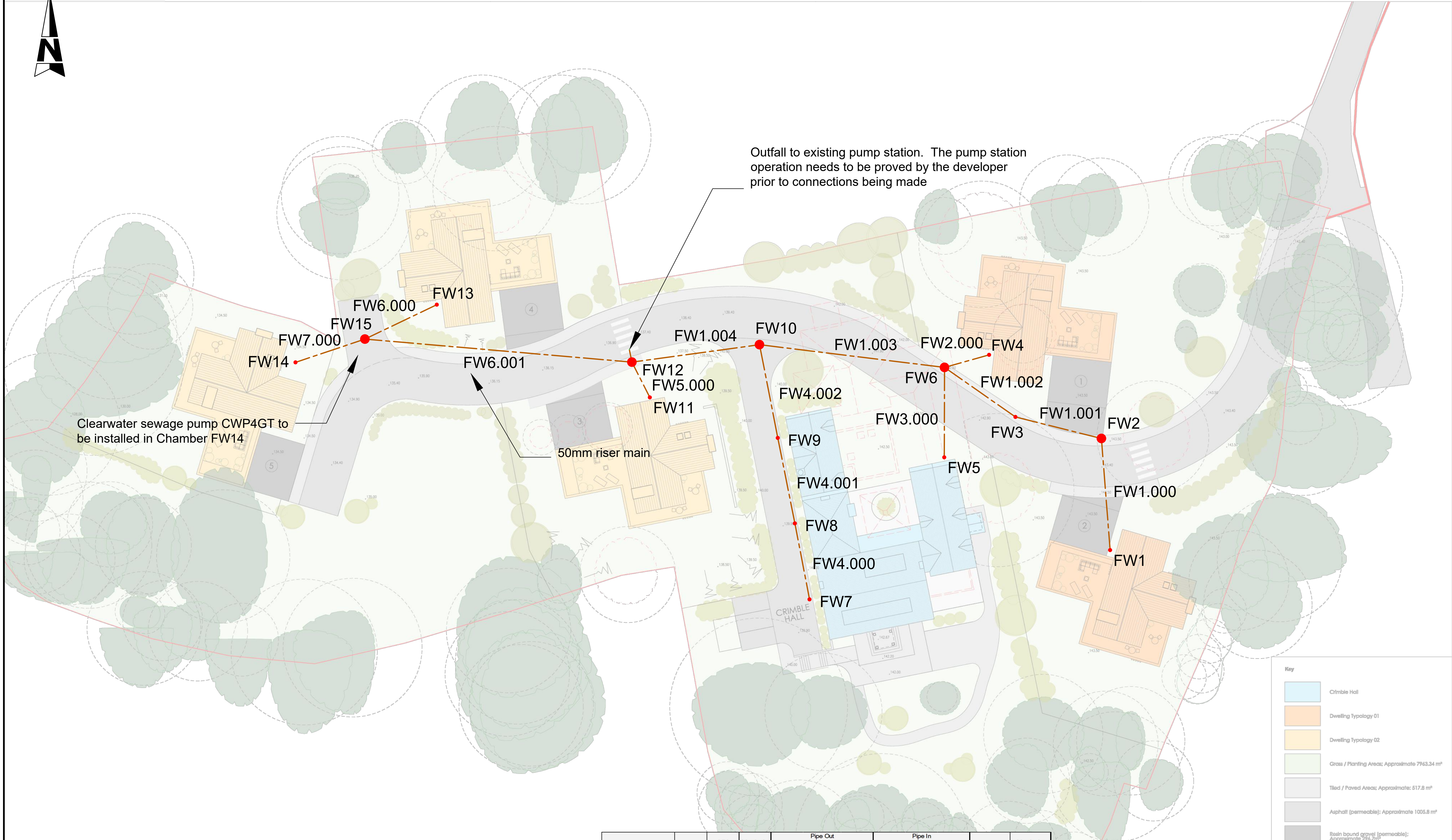
A copy of this Maintenance and Management Plan shall be retained with property documents and provided to any future owners to ensure continued compliance.

7.7. Summary

- Foul drainage: Existing pump station reused; private ownership; UU downstream adoption; fully compliant with Condition 9.
- Surface water: Infiltration proven non-viable; discharge to existing watercourse; attenuation and flow control implemented; compliant with Condition 10.
- Flood risk: No increase.
- Maintenance: Fully defined and allocated to plot owners with legal protections.

This strategy satisfies all requirements of Conditions 9 & 10 of 21/00092/FUL.

Appendix A Drainage General Arrangement Drawing (Foul Water)



Pipe Number	US/MH Name	Pipe Length (m)	Fall (m)	Slope (1:X)	US/IL (m)	US/CL (m)	Pipe DIA (mm)
1.000	1	15.105	0.168	90.0	142.190	143.500	110
1.001	2	11.952	0.332	36.0	142.022	143.500	110
1.002	3	11.672	0.679	17.2	141.690	143.000	110
2.000	4	6.250	1.010	6.2	142.200	143.500	110
3.000	5	12.135	0.135	90.0	141.200	142.500	110
1.003	6	25.145	2.321	10.8	141.011	142.500	110
4.000	7	10.447	0.116	90.0	138.690	140.000	110
4.001	8	11.757	0.131	90.0	138.574	139.900	110
4.002	9	12.829	0.143	90.0	138.443	139.900	110
1.004	10	17.372	2.311	7.5	138.301	140.000	110
5.000	11	5.339	0.200	26.7	136.190	137.500	110
1.005	12	1.753	0.019	90.0	135.990	137.300	110
6.000	13	10.746	0.250	43.0	134.940	136.250	110
7.000	14	9.881	0.110	90.0	133.190	134.500	110

Manhole Name	Cover Level (m)	MH Depth (m)	Manhole Diam. (mm)	Pipe Out			Pipe In			Manhole Easting (m)	Manhole Northing (m)
				PN	Invert Level (m)	Diameter (mm)	PN	Invert Level (m)	Diameter (mm)		
FW1	143.500	1.310	450	FW1.000	142.190	110				386330.970	411989.201
FW2	143.500	1.478	1200	FW1.001	142.022	110	FW1.000	142.022	110	386329.795	412004.260
FW3	143.000	1.310	450	FW1.002	141.690	110	FW1.001	141.690	110	386318.201	412007.164
FW4	143.500	1.300	450	FW2.000	142.200	110				386314.653	412015.548
FW5	142.500	1.300	450	FW3.000	141.200	110				386308.597	412001.718
FW6	142.500	1.489	1200	FW1.003	141.011	110	FW1.002	141.011	110	386308.637	412013.853
							FW2.000	141.190	110		
							FW3.000	141.065	110		
FW7	140.000	1.310	450	FW4.000	138.690	110				386290.424	411982.545
FW8	139.900	1.326	450	FW4.001	138.574	110	FW4.000	138.574	110	386288.450	411982.805
FW9	139.900	1.457	450	FW4.002	138.443	110	FW4.001	138.443	110	386286.145	412004.333
FW10	140.000	1.699	1200	FW1.004	138.301	110	FW1.003	138.690	110	386283.679	412016.923
							FW4.002	138.301	110		
FW11	137.500	1.310	450	FW5.000	136.190	110				386268.887	412009.807
FW12	137.300	1.310	1200	FW1.005	135.990	110	FW1.004	135.990	110	386266.468	412014.567
							FW5.000	135.990	110		
							FW6.001	135.990	50		
Existing Pump Station	137.300	1.330	0		OUTFALL		FW1.005	135.970	110	386266.112	412016.284
FW13	136.250	1.310	1200	FW6.000	134.940	110				386240.147	412022.323
FW14	134.500	1.310	1200	FW7.000	133.190	110				386221.088	412014.533
FW15	136.000	2.920	1200	FW6.001	133.080	50	FW6.000	134.690	110	386230.455	412017.680
							FW7.000	133.080	110		

Key	
	Crimble Hall
	Dwelling Typology 01
	Dwelling Typology 02
	Grass / Planting Areas; Approximate 7963.34 m²
	Tiled / Paved Areas; Approximate: 517.8 m²
	Asphalt (permeable); Approximate 1005.8 m²
	Rain bound gravel (permeable); Approximate 295.7 m²
	Existing trees to be maintained
	Existing trees to be removed
	New trees
	New hedges
	Roof Protection Areas
	Existing Site Levels
	Proposed Site Levels

- NOTES:
- Existing pump station will need to be proved to be in suitable condition by the developer prior to and new connections being made. The pump station will remain in private ownership following the completion of construction.
 - All Pipes to be HDPE Rigidrain pipes laid in accordance with the manufacture's instructions.
 - All chambers to be performed rigidrain chamber surrounded and constructed in accordance with manufacture's instructions.
 - Clearwater CWP4GT pump station to be installed in accordance with manufactures guidance for a 36.3m riser main with a head of 3m.
 - Additional connections at properties provided as necessary to service internal layout.

- KEY:
- FOUL DRAIN
 - CHAMBER
 - FLOW

Revision	Date	Description
Revision	Date	Description
Revision	Date	Description
Revision	Date	Description
Revision	Date	Description
Revision	Date	Description

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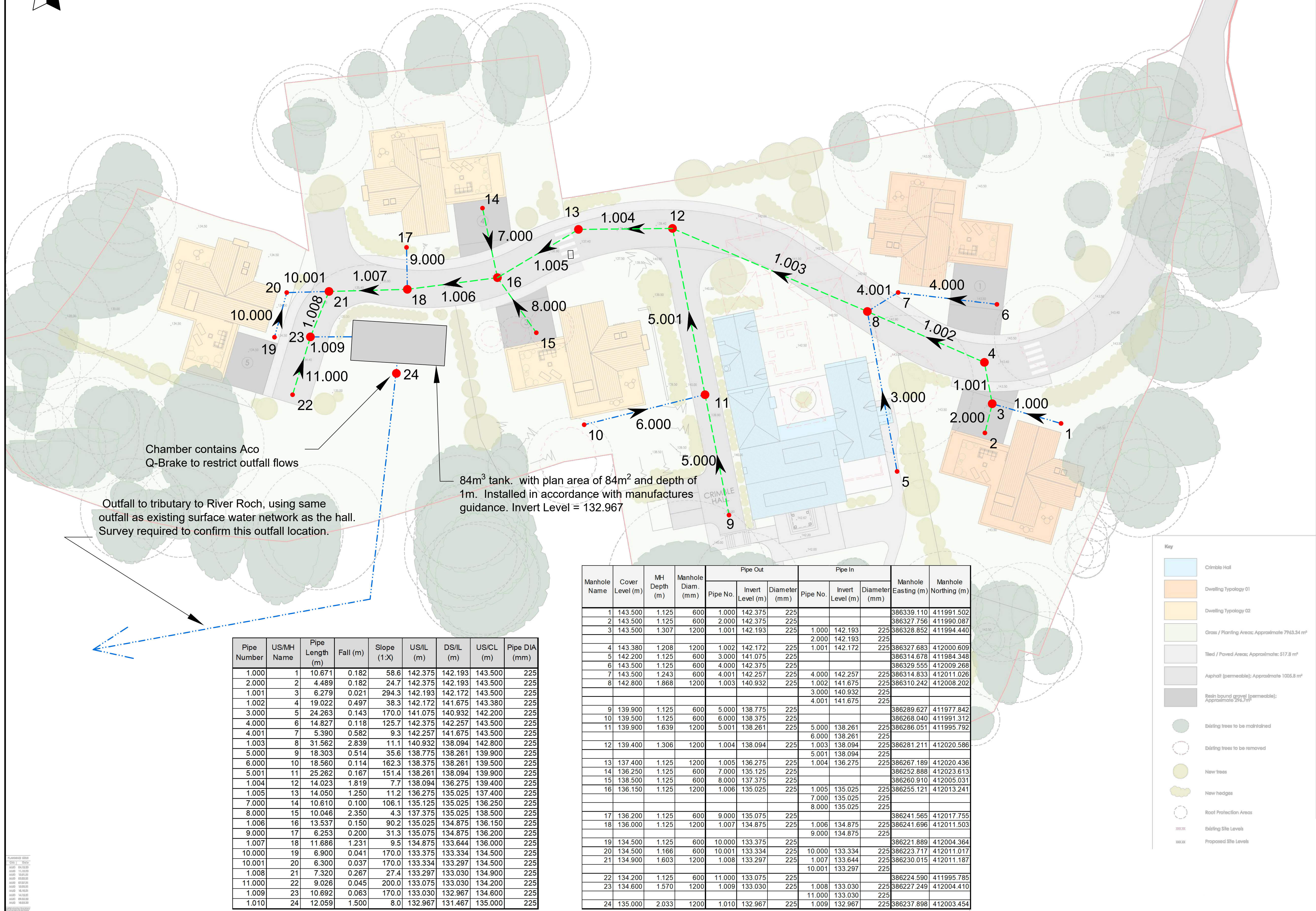
Project
CRIMBLE HALL

Drawing Title
FOUL WATER
GENERAL ARRANGEMENT

Drawing Number
FW_GA_01

Drawn: Date: 20/01/26 Scale: NTS Rev: A

Appendix B Drainage General Arrangement Drawing (Surface Water)



REVISION	DATE	DESCRIPTION
1	15/01/2020	ISSUED FOR TENDERS
2	15/01/2020	REVISIONS
3	15/01/2020	REVISIONS
4	15/01/2020	REVISIONS
5	15/01/2020	REVISIONS
6	15/01/2020	REVISIONS
7	15/01/2020	REVISIONS
8	15/01/2020	REVISIONS
9	15/01/2020	REVISIONS
10	15/01/2020	REVISIONS
11	15/01/2020	REVISIONS
12	15/01/2020	REVISIONS
13	15/01/2020	REVISIONS
14	15/01/2020	REVISIONS
15	15/01/2020	REVISIONS
16	15/01/2020	REVISIONS
17	15/01/2020	REVISIONS
18	15/01/2020	REVISIONS
19	15/01/2020	REVISIONS
20	15/01/2020	REVISIONS
21	15/01/2020	REVISIONS
22	15/01/2020	REVISIONS
23	15/01/2020	REVISIONS
24	15/01/2020	REVISIONS

Pipe Number	US/MH Name	Pipe Length (m)	Fall (m)	Slope (1:X)	US/IL (m)	DS/IL (m)	US/CL (m)	Pipe DIA (mm)
1.000	1	10.671	0.182	58.6	142.375	142.193	143.500	225
2.000	2	4.489	0.182	24.7	142.375	142.193	143.500	225
1.001	3	6.279	0.021	294.3	142.193	142.172	143.500	225
1.002	4	19.022	0.497	38.3	142.172	141.675	143.380	225
3.000	5	24.263	0.143	170.0	141.075	140.932	142.200	225
4.000	6	14.827	0.118	125.7	142.375	142.257	143.500	225
4.001	7	5.390	0.582	9.3	142.257	141.675	143.500	225
1.003	8	31.562	2.839	11.1	140.932	138.094	142.800	225
5.000	9	18.303	0.514	35.6	138.775	138.261	139.900	225
6.000	10	18.560	0.114	162.3	138.375	138.261	139.500	225
5.001	11	25.262	0.167	151.4	138.261	138.094	139.900	225
1.004	12	14.023	1.819	7.7	138.094	136.275	139.400	225
1.005	13	14.050	1.250	11.2	136.275	135.025	137.400	225
7.000	14	10.610	0.100	106.1	135.125	135.025	136.250	225
8.000	15	10.046	2.350	4.3	137.375	135.025	138.500	225
1.006	16	13.537	0.150	90.2	135.025	134.875	136.150	225
9.000	17	6.253	0.200	31.3	135.075	134.875	136.200	225
1.007	18	11.686	1.231	9.5	134.875	133.644	136.000	225
10.000	19	6.900	0.041	170.0	133.375	133.334	134.500	225
10.001	20	6.300	0.037	170.0	133.334	133.297	134.500	225
1.008	21	7.320	0.267	27.4	133.297	133.030	134.900	225
11.000	22	9.026	0.045	200.0	133.075	133.030	134.200	225
1.009	23	10.692	0.063	170.0	133.030	132.967	134.600	225
1.010	24	12.059	1.500	8.0	132.967	131.467	135.000	225

Manhole Name	Cover Level (m)	MH Depth (m)	Manhole Diam. (mm)	Pipe Out			Pipe In			Manhole Easting (m)	Manhole Northing (m)
				Pipe No.	Invert Level (m)	Diameter (mm)	Pipe No.	Invert Level (m)	Diameter (mm)		
1	143.500	1.125	600	1.000	142.375	225				386339.110	411991.502
2	143.500	1.125	600	2.000	142.375	225				386327.756	411990.087
3	143.500	1.307	1200	1.001	142.193	225	1.000	142.193	225	386328.852	411994.440
4	143.380	1.208	1200	1.002	142.172	225	2.000	142.193	225		
5	142.200	1.125	600	3.000	141.075	225	1.001	142.172	225	386327.683	412000.609
6	143.500	1.125	600	4.000	142.375	225				386314.678	411984.348
7	143.500	1.243	600	4.001	142.257	225	4.000	142.257	225	386329.555	412009.268
8	142.800	1.868	1200	1.003	140.932	225	1.002	141.675	225	386314.833	412011.026
							3.000	140.932	225	386310.242	412008.202
							4.001	141.675	225		
9	139.900	1.125	600	5.000	138.775	225				386289.627	411977.842
10	139.500	1.125	600	6.000	138.375	225				386268.040	411991.312
11	139.900	1.639	1200	5.001	138.261	225	5.000	138.261	225	386286.051	411995.792
							6.000	138.261	225		
12	139.400	1.306	1200	1.004	138.094	225	1.003	138.094	225	386281.211	412020.586
							5.001	138.094	225		
13	137.400	1.125	1200	1.005	136.275	225	1.004	136.275	225	386267.189	412020.436
14	136.250	1.125	600	7.000	135.125	225				386252.888	412023.613
15	138.500	1.125	600	8.000	137.375	225				386260.910	412005.031
16	136.150	1.125	1200	1.006	135.025	225	1.005	135.025	225	386255.121	412013.241
							7.000	135.025	225		
							8.000	135.025	225		
17	136.200	1.125	600	9.000	135.075	225				386241.565	412017.755
18	136.000	1.125	1200	1.007	134.875	225	1.006	134.875	225	386241.696	412011.503
							9.000	134.875	225		
19	134.500	1.125	600	10.000	133.375	225				386221.889	412004.364
20	134.500	1.166	600	10.001	133.334	225	10.000	133.334	225	386223.717	412011.017
21	134.900	1.603	1200	1.008	133.297	225	1.007	133.644	225	386230.015	412011.187
							10.001	133.297	225		
22	134.200	1.125	600	11.000	133.075	225				386224.590	411995.785
23	134.600	1.570	1200	1.009	133.030	225	1.008	133.030	225	386227.249	412004.410
							11.000	133.030	225		
24	135.000	2.033	1200	1.010	132.967	225	1.009	132.967	225	386237.898	412003.454

- NOTES:
- Existing outfall to tertiary river to be surveyed and flood defense consent applied for prior to construction commencing
 - All Pipes to be HDPE Ridgidrain pipes laid in accordance with the manufacture's instructions.
 - 600mm manholes to be ridgidrain preformed manholes surrounded and constructed in accordance with the manufacture's instructions.
 - 1200mm chambers to be catchpits with a minimum sump of 300mm to allow silt collection along the filter drain.
 - Filter drain to be half perforated with pipe orientated so the perforations are at the top of the pipe. The pipe to be bedded and surrounded using Type B filter stone which is to be laid so it is contiguous with the underside of the foundation of the permeable asphalt.
 - Flow control chamber size to be confirmed with aco and have a minimum of 300mm sump so it is suitable to attach an ACO Q-Brake to the outgoing pipe.
 - ACO Q-Brake to have the performance criteria of Design Head = 1.0m, Design Flow = 7.9l/s.

- KEY:
- CARRIER DRAIN
 - FILTER DRAIN
 - CHAMBER
 - FLOW

Revision	Date	Description

HME

CIVIL ENGINEERING

CONSULTANTS

Project

CRIMBLE HALL

Drawing Title

SURFACE WATER
GENERAL ARRANGEMENT

Drawing Number

SW_GA_01

Drawn: Date: 20/01/26 Scale: NTS Rev: A

Appendix C Micro Drainage Calculations

		Page 1
		
Innovyze	Network 2020.1.3	
<u>Simulation Criteria for Storm</u> Volumetric Runoff Coeff 0.750 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 Time/Area Diagrams 0 Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0 <u>Synthetic Rainfall Details</u> Rainfall Model FSR Profile Type Summer Return Period (years) 1 Cv (Summer) 0.750 Region England and Wales Cv (Winter) 0.840 M5-60 (mm) 19.000 Storm Duration (mins) 30 Ratio R 0.275		
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Network 2020.1.3

Online Controls for Storm

ACO Q-Brake Manhole: 24, DS/PN: 1.010, Volume (m³): 2.7

Design Head (m) 1.000 Diameter (mm) 120
 Design Flow (l/s) 7.9 Invert Level (m) 132.967

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.0	1.200	8.6	3.000	13.6	7.000	20.7
0.200	7.1	1.400	9.3	3.500	14.7	7.500	21.5
0.300	7.8	1.600	9.9	4.000	15.7	8.000	22.2
0.400	7.8	1.800	10.5	4.500	16.6	8.500	22.8
0.500	7.3	2.000	11.1	5.000	17.5	9.000	23.5
0.600	6.3	2.200	11.6	5.500	18.4	9.500	24.1
0.800	7.0	2.400	12.1	6.000	19.2		
1.000	7.8	2.600	12.6	6.500	20.0		

		Page 3												
														
Innovyze	Network 2020.1.3													
<u>Storage Structures for Storm</u> <u>Tank or Pond Manhole: 24, DS/PN: 1.010</u> Invert Level (m) 132.967 <table><tr><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th></tr><tr><td>0.000</td><td>84.0</td><td>1.000</td><td>84.0</td><td>1.001</td><td>0.0</td></tr></table>			Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	0.000	84.0	1.000	84.0	1.001	0.0
Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)									
0.000	84.0	1.000	84.0	1.001	0.0									
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Network 2020.1.3

Simulation Criteria

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

Return Period(s) (years)	1, 30, 100
Climate Change (%)	40, 40, 40

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Network 2020.1.3

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Flooded		Flow / Overflow		Half Drain	Pipe	Level	
		Depth (m)	Volume (m ³)	Cap.	(l/s)	Time (mins)	Flow (l/s)	Status	Exceeded
1.000	1	-0.199	0.000	0.03			1.8	OK	
2.000	2	-0.198	0.000	0.03			2.1	OK	
1.001	3	-0.160	0.000	0.18			4.2	OK	
1.002	4	-0.181	0.000	0.08			5.7	OK	
3.000	5	-0.177	0.000	0.10			3.6	OK	
4.000	6	-0.187	0.000	0.07			2.7	OK	
4.001	7	-0.197	0.000	0.04			4.0	OK	
1.003	8	-0.174	0.000	0.11			14.8	OK	
5.000	9	-0.192	0.000	0.05			3.7	OK	
6.000	10	-0.177	0.000	0.10			3.7	OK	
5.001	11	-0.140	0.000	0.30			10.5	OK	
1.004	12	-0.159	0.000	0.19			28.2	OK	
1.005	13	-0.152	0.000	0.23			28.2	OK	
7.000	14	-0.192	0.000	0.00			0.1	OK	
8.000	15	-0.225	0.000	0.00			0.0	OK	



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Network 2020.1.3

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.006	16	15 Winter	1	+40%	30/15 Summer			
9.000	17	15 Winter	1	+40%				
1.007	18	15 Winter	1	+40%	100/15 Winter			
10.000	19	15 Winter	1	+40%	30/15 Summer			
10.001	20	15 Winter	1	+40%	30/15 Summer			
1.008	21	15 Winter	1	+40%	30/15 Summer			
11.000	22	15 Winter	1	+40%	30/15 Summer	100/120 Winter		
1.009	23	15 Winter	1	+40%	30/15 Summer			
1.010	24	60 Winter	1	+40%	30/15 Summer			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Overflow Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Level Exceeded Status
1.006	16	135.158	-0.092	0.000	0.65		27.8	OK
9.000	17	135.100	-0.200	0.000	0.03		1.7	OK
1.007	18	134.949	-0.151	0.000	0.23		30.4	OK
10.000	19	133.421	-0.179	0.000	0.06		1.9	OK
10.001	20	133.412	-0.148	0.000	0.11		3.3	OK
1.008	21	133.408	-0.114	0.000	0.48		34.7	OK
11.000	22	133.243	-0.057	0.000	0.01		0.2	OK
1.009	23	133.243	-0.012	0.000	1.00		33.5	OK
1.010	24	133.180	-0.012	0.000	0.05		7.3	OK

3



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Network 2020.1.3

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Storm

PN	US/MH Name	Surcharged		Flooded		Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)				
1.000	1	-0.184	0.000	0.07			4.3	OK	
2.000	2	-0.181	0.000	0.08			5.0	OK	
1.001	3	-0.118	0.000	0.45			10.4	OK	
1.002	4	-0.153	0.000	0.22			14.8	OK	
3.000	5	-0.150	0.000	0.24			8.7	OK	
4.000	6	-0.165	0.000	0.16			6.5	OK	
4.001	7	-0.177	0.000	0.10			10.8	OK	
1.003	8	-0.140	0.000	0.30			38.6	OK	
5.000	9	-0.172	0.000	0.13			9.0	OK	
6.000	10	-0.146	0.000	0.24			9.0	OK	
5.001	11	-0.072	0.000	0.78			27.1	OK	
1.004	12	-0.111	0.000	0.50			73.7	OK	
1.005	13	-0.097	0.000	0.61			74.2	OK	
7.000	14	0.179	0.000	0.01			0.6	SURCHARGED	
8.000	15	-0.225	0.000	0.00			0.0	OK	



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Network 2020.1.3

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.006	16	15 Winter	30	+40%	30/15 Summer			
9.000	17	15 Winter	30	+40%				
1.007	18	15 Winter	30	+40%	100/15 Winter			
10.000	19	15 Winter	30	+40%	30/15 Summer			
10.001	20	15 Winter	30	+40%	30/15 Summer			
1.008	21	15 Winter	30	+40%	30/15 Summer			
11.000	22	120 Winter	30	+40%	30/15 Summer	100/120 Winter		
1.009	23	120 Winter	30	+40%	30/15 Summer			
1.010	24	120 Winter	30	+40%	30/15 Summer			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap. (l/s)	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.006	16	135.529	0.279	0.000	1.71			73.5	SURCHARGED	
9.000	17	135.113	-0.187	0.000	0.07			4.2	OK	
1.007	18	135.003	-0.097	0.000	0.61			79.5	OK	
10.000	19	134.010	0.410	0.000	0.13			3.8	SURCHARGED	
10.001	20	134.006	0.447	0.000	0.23			6.9	SURCHARGED	
1.008	21	134.000	0.478	0.000	1.21			87.5	SURCHARGED	
11.000	22	133.723	0.423	0.000	0.00			0.0	SURCHARGED	3
1.009	23	133.723	0.468	0.000	1.02			34.0	SURCHARGED	
1.010	24	133.713	0.521	0.000	0.05			7.9	SURCHARGED	



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Network 2020.1.3

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Storm

PN	US/MH Name	Surcharged	Flooded	Flow / Cap.	Overflow (l/s)	Half Drain	Pipe	Status	Level Exceeded
		Depth (m)	Volume (m³)			Time (mins)	Flow (l/s)		
1.000	1	-0.178	0.000	0.10			5.5		OK
2.000	2	-0.176	0.000	0.11			6.5		OK
1.001	3	-0.100	0.000	0.58			13.4		OK
1.002	4	-0.143	0.000	0.28			19.0		OK
3.000	5	-0.138	0.000	0.31			11.2		OK
4.000	6	-0.156	0.000	0.21			8.4		OK
4.001	7	-0.171	0.000	0.13			13.9		OK
1.003	8	-0.127	0.000	0.38			49.6		OK
5.000	9	-0.164	0.000	0.16			11.6		OK
6.000	10	-0.124	0.000	0.31			11.5		OK
5.001	11	-0.037	0.000	1.00			34.7		OK
1.004	12	-0.092	0.000	0.64			94.7		OK
1.005	13	0.023	0.000	0.76			93.7	SURCHARGED	
7.000	14	0.452	0.000	0.03			1.2	SURCHARGED	
8.000	15	-0.225	0.000	0.00			0.0		OK



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Network 2020.1.3

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.006	16	15 Winter	100	+40%	30/15 Summer			
9.000	17	15 Winter	100	+40%				
1.007	18	15 Winter	100	+40%	100/15 Winter			
10.000	19	15 Winter	100	+40%	30/15 Summer			
10.001	20	15 Winter	100	+40%	30/15 Summer			
1.008	21	15 Winter	100	+40%	30/15 Summer			
11.000	22	180 Winter	100	+40%	30/15 Summer	100/120 Winter		
1.009	23	180 Winter	100	+40%	30/15 Summer			
1.010	24	240 Winter	100	+40%	30/15 Summer			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Overflow Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.006	16	135.802	0.552	0.000	2.16		92.9	SURCHARGED	
9.000	17	135.123	-0.177	0.000	0.09		5.5	OK	
1.007	18	135.113	0.014	0.000	0.75		97.9	SURCHARGED	
10.000	19	134.463	0.863	0.000	0.16		4.8	FLOOD RISK	
10.001	20	134.458	0.899	0.000	0.31		9.1	FLOOD RISK	
1.008	21	134.451	0.929	0.000	1.46		105.8	SURCHARGED	
11.000	22	134.204	0.904	4.047	0.26		7.2	FLOOD	3
1.009	23	134.317	1.062	0.000	1.06		35.3	FLOOD RISK	
1.010	24	134.351	1.159	0.000	0.06		8.7	SURCHARGED	

Appendix D Greenfield Flow Calculations

		Page 1																								
																										
Innovyze	Source Control 2020.1.3																									
<u>ICP SUDS Mean Annual Flood</u> Input <table><tr><td>Return Period (years)</td><td>1</td><td>Soil</td><td>0.500</td></tr><tr><td>Area (ha)</td><td>0.900</td><td>Urban</td><td>0.000</td></tr><tr><td>SAAR (mm)</td><td>1176</td><td>Region Number</td><td>Region 10</td></tr></table> Results 1/s <table><tr><td>QBAR Rural</td><td>9.1</td></tr><tr><td>QBAR Urban</td><td>9.1</td></tr><tr><td>Q1 year</td><td>7.9</td></tr><tr><td>Q1 year</td><td>7.9</td></tr><tr><td>Q30 years</td><td>15.5</td></tr><tr><td>Q100 years</td><td>19.0</td></tr></table>			Return Period (years)	1	Soil	0.500	Area (ha)	0.900	Urban	0.000	SAAR (mm)	1176	Region Number	Region 10	QBAR Rural	9.1	QBAR Urban	9.1	Q1 year	7.9	Q1 year	7.9	Q30 years	15.5	Q100 years	19.0
Return Period (years)	1	Soil	0.500																							
Area (ha)	0.900	Urban	0.000																							
SAAR (mm)	1176	Region Number	Region 10																							
QBAR Rural	9.1																									
QBAR Urban	9.1																									
Q1 year	7.9																									
Q1 year	7.9																									
Q30 years	15.5																									
Q100 years	19.0																									
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